O C T A G O N

S Y S T E M S

Embedded PCs For Extreme Environments

5815 Floppy / Hard Drive Card
User's Manual
4047(1202)

Copyright

Micro PC™, PC SmartLINK™, CAMBASIC, Octagon Systems Corporation®, the Octagon logo and the Micro PC logo are trademarks of Octagon Systems Corporation.

Disclaimer

The information contained in this manual is believed to be correct. However, Octagon assumes no responsibility for any of the circuits described herein, conveys no license under any patent or other right, and makes no representations that the circuits are free from patent infringement. Octagon makes no representation or warranty that such applications will be suitable for the use specified without further testing or modification.

Octagon Systems Corporation general policy does not recommend the use of its products in life support applications where the failure or malfunction of a component may directly threaten life or injury. It is a Condition of Sale that the user of Octagon products in life support applications assumes all the risk of such use and indemnifies Octagon against all damage.

OCTAGON SYSTEMS®

6510 W. 91st Ave.
Westminster, CO 80031

Technical support: 303–426–4521
Telephone: 303–430–1500
FAX: 303–426–8126
Web site: www.octagonsystems.com

IMPORTANT!

Please read the following section before installing your product:

Octagon's products are designed to be high in performance while consuming very little power. In order to maintain this advantage, CMOS circuitry is used.

CMOS chips have specific needs and some special requirements that the user must be aware of. Read the following to help avoid damage to your card from the use of CMOS chips.

Using CMOS circuitry in industrial control

Industrial computers originally used LSTTL circuits. Because many PC components are used in laptop computers, IC manufacturers are exclusively using CMOS technology. Both TTL and CMOS have failure mechanisms, but they are different. Described below are some of the failures which are common to all manufacturers of CMOS equipment. However, much of the information has been put in the context of the Micro PC.

Octagon has developed a reliable database of customer–induced, field failures. The average MTBF of Micro PC cards exceeds 11 years, yet there are failures. Most failures have been identified as customer–induced, but there is a small percentage that cannot be identified. As expected, virtually all the failures occur when bringing up the first system. On subsequent systems, the failure rate drops dramatically.

- Approximately 20% of the returned cards are problem–free. These cards, typically, have the wrong jumper settings or the customer has problems with the software. This causes frustration for the customer and incurs a testing charge from Octagon.
- Of the remaining 80% of the cards, 90% of these cards fail due to customer misuse and accident. Customers often cannot pinpoint the cause of the misuse.
- Therefore, 72% of the returned cards are damaged through some type of misuse. Of the remaining 8%, Octagon is unable to determine the cause of the failure and repairs these cards at no charge if they are under warranty.

The most common failures on CPU cards are over voltage of the power supply, static discharge, and damage to the serial and parallel ports. On expansion cards, the most common failures are static discharge, over voltage of inputs, over current of outputs, and misuse of the CMOS circuitry with regards to power supply sequencing. In the case of the video cards, the most common failure is to miswire the card to the flat panel display. Miswiring can damage both the card and an expensive display.

- **Multiple component failures:** The chance of a random component failure is very rare since the average MTBF of an Octagon card is greater than 11 years. In a 7 year study, Octagon has never found a single case where multiple IC failures were not caused by misuse or accident. It is very probable that multiple component failures indicate that they were user–induced.

- **Testing "dead" cards:** For a card that is "completely nonfunctional", there is a simple test to determine accidental over voltage, reverse voltage or other "forced" current situations. Unplug the card from the bus and remove all cables. Using an ordinary digital ohmmeter on the 2,000 ohm scale, measure the resistance between power and ground. Record this number. Reverse the ohmmeter leads and measure the resistance again. If the ratio of the resistances is 2:1 or greater, fault conditions most likely have occurred. A common cause is miswiring the power supply.

- **Improper power causes catastrophic failure:** If a card has had reverse polarity or high voltage applied, replacing a failed component is not an adequate fix. Other components probably have been partially damaged or a failure mechanism has been induced. Therefore, a failure will probably occur in the future. For such cards, Octagon highly recommends that these cards be replaced.

- **Other over–voltage symptoms:** In over–voltage situations, the programmable logic devices, EPROMs and CPU chips, usually fail in this order. The failed device may be hot to the touch. It is usually the case that only one IC will be overheated at a time.

- **Power sequencing:** The major failure of I/O chips is caused by the external application of input voltage while the Micro PC power is off. If you apply 5V to the input of a TTL chip with the power off, nothing will happen. Applying a 5V input to a CMOS card will cause the current to flow through the input and out the 5V power pin. This current attempts to power up the card. Most inputs are rated at 25 mA maximum. When this is exceeded, the chip may be damaged.

- **Failure on powerup:** Even when there is not enough current to destroy an input described above, the chip may be destroyed when the power to the card is applied. This is due to the fact that the input current biases the IC so that it acts as a forward biased diode on powerup. This type of failure is typical on serial interface chips but can apply any IC on the card.

- **Under rated power supply:** The board may fail to boot due to an under rated power supply. It is important that a quality power supply be used with Octagon Systems cards that has sufficient current capacity, line and load regulation, hold up time, current limiting, and minimum ripple. It is extremely import to select a supply that ramps up in 10ms or less. This assures that all the circuitry on the CPU Cards sequences properly and avoids system lockup.

- **Excessive signal lead lengths:** Another source of failure that was identified years ago at Octagon was excessive lead lengths on digital inputs. Long leads act as an antenna to pick up noise. They can also act as unterminated transmission lines. When 5V is switch onto a line, it creates a transient waveform. Octagon has seen sub-microsecond pulses of 8V or more. The solution is to place a capacitor, for example 0.1 µF, across the switch contact. This will also eliminate radio frequency and other high frequency pickup.

Table of Contents

List of Figures

List of Tables

Chapter 1: Overview

Description

The 5815 Floppy/Hard Drive card is an integrated drive card that comes with one 1.44 MB 3.5" floppy drive. A single 2.5" hard drive can mount directly onto the 5815 card.

The 5815 is compatible with most of Octagon Micro PC CPU control cards. However, it cannot be used with the 5012A, 6012, or 6024 CPU cards or the 5080, 5081, 5082, 5083 Microcontroller cards.

Chapter 2: *Installation*

The 5815 Floppy/Hard Drive Controller requires one to two slots in a Micro PC card cage, depending on the card configuration and where it is placed in the card cage. The 5815 can plug directly into any slot in the backplane.

Hardware installation

WARNING!

The 5815 card contains static-sensitive CMOS components. The card is most susceptible to damage when it is plugged into another card. The 5815 card becomes charged by the user, and the static discharges to the system. To avoid damaging your card and its components:

Ground yourself before handling the card

Disconnect power before removing or inserting the card.

WARNING!

Octagon assumes no responsibility caused to IDE devices or the 5815 card if the device is connected incorrectly.

Using a Micro PC card cage

To install the 5815 card in a Micro PC card cage, you will need the following equipment (or equivalent):

5815 Floppy/Hard Drive Controller

Micro PC card cage (5xxx Card Cage)

Power module (510x or 71xx Power Module)

Octagon Micro PC CPU card

Component locations

Figures 1 & 2 show the 5815 Floppy/Hard Drive Controller component diagrams. Refer to these diagrams before connecting the 5815 card.

Figure 1 *5815 component diagram – top*

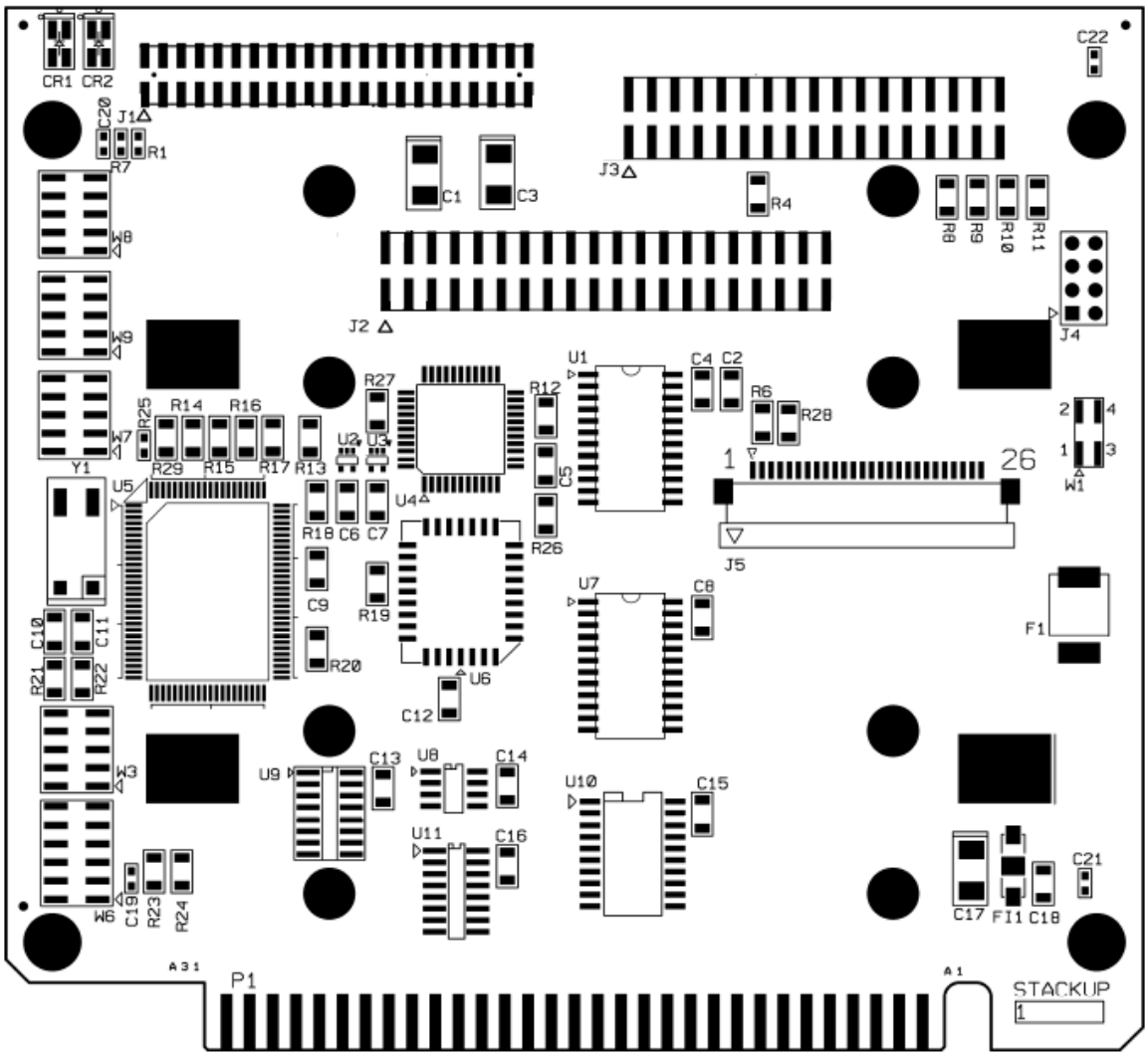
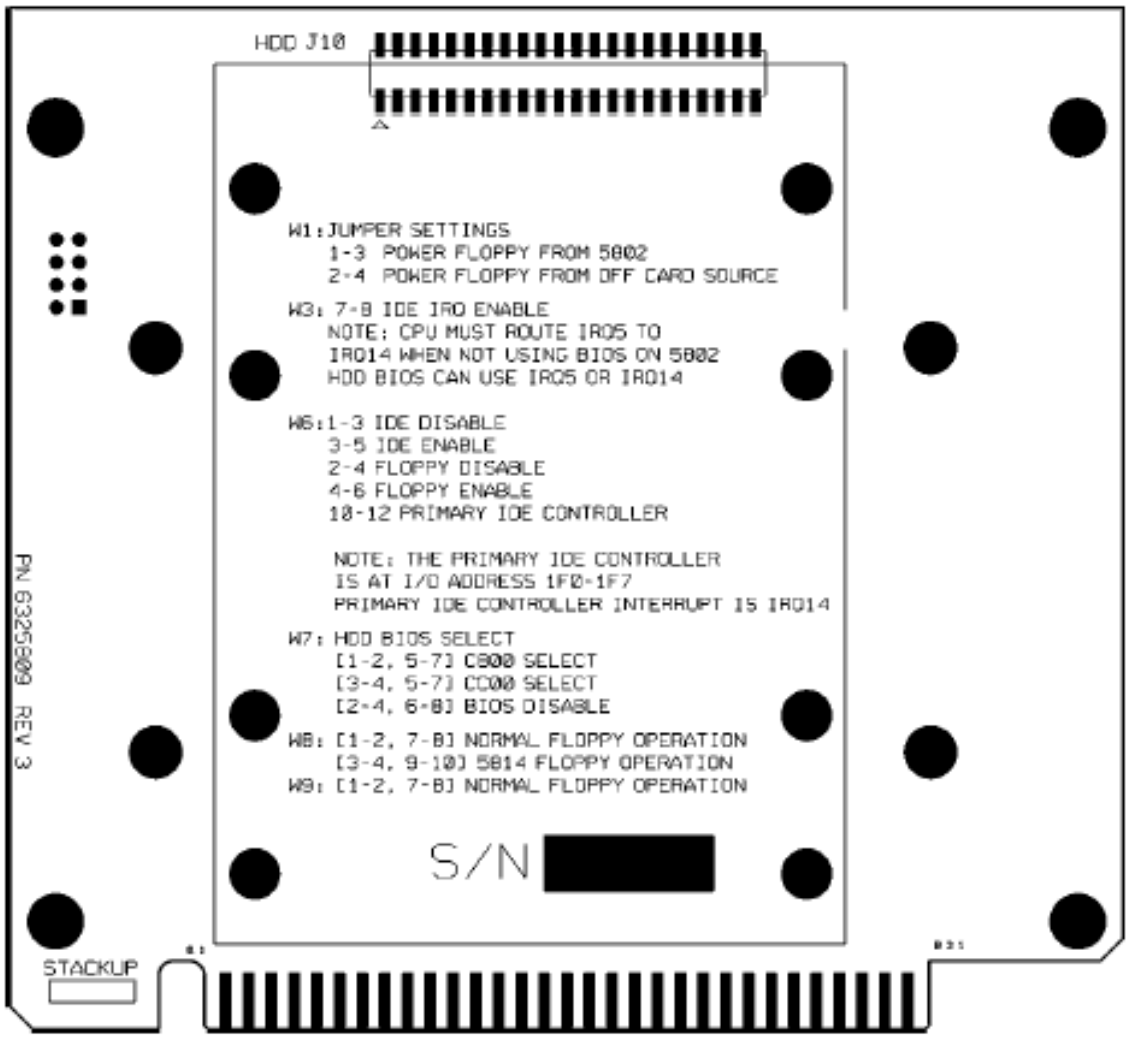


Figure 2 5815 component diagram – bottom

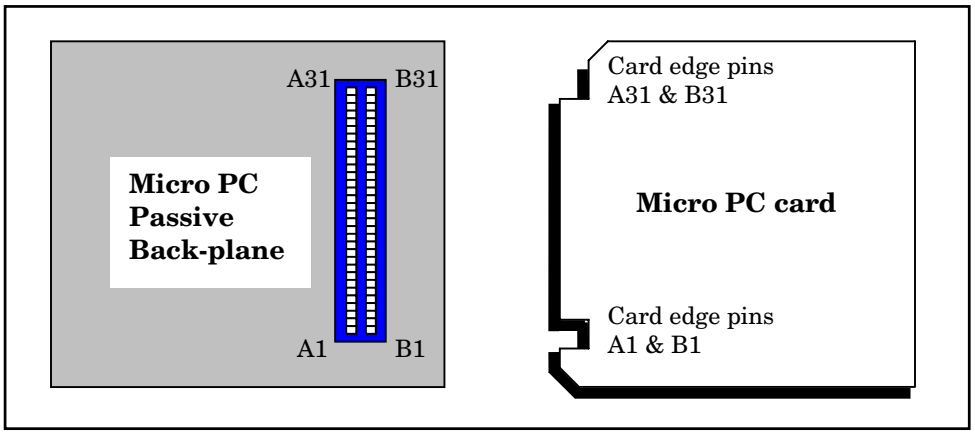


5815 installation

To install the 5815 card into a card cage:

1. Refer to the component diagrams for the location of various connectors and jumpers before installing the 5815 card.
2. Set all jumpers as necessary. Refer to the *Floppy drives* and *Hard drives* sections.

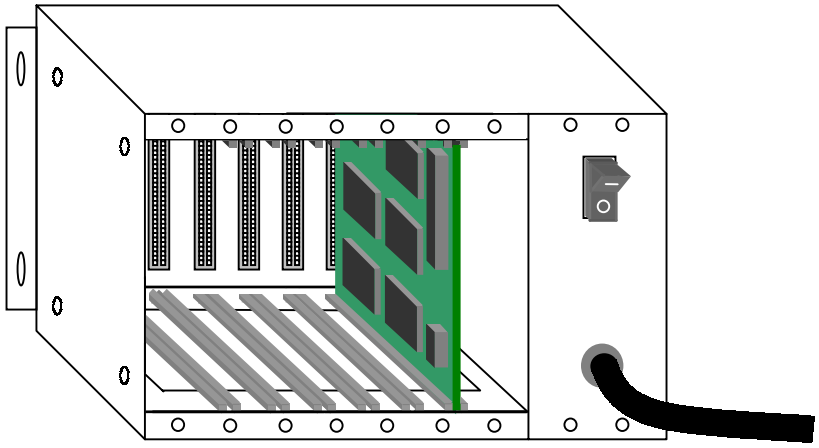
Figure 3 *Edge connector orientation*



3. Make sure power to the card cage is OFF.
4. Slide the 5815 card into the card cage. The components on the card should face away from the power supply. See Figure 4 for an illustration of a 5815 card in a Micro PC card cage.

Note Be careful not to push on the floppy or hard drive while installing the 5815 into the backplane connector. Pushing on the floppy or hard drive may damage it.

Figure 4 Populated Micro PC card cage



WARNING!

Plugging in the card incorrectly will destroy the card!

5. Power on the system.

5815 removal

When removing the 5815 from the backplane, make sure to first disable power to your system. Also, read the warning below.

WARNING!

While removing the 5815 from the backplane, do not squeeze the floppy drive or hard drive. Remove the 5815 assembly by taking hold of the 5815 only (without touching either the floppy or hard drive). Pulling the 5815 while squeezing the 5815 and floppy/hard drive may damage the floppy/hard drive.

Floppy drive

The floppy drive subsystem features a 765B compatible core controller that is 100% IBM compatible. The attached 3.5" drive is 12.7 mm high and provides 1.44 MB capacity per diskette.

The floppy controller may be enabled or disabled via jumper W6. Enable the controller when you use a floppy drive. Table 1 shows the settings for W6.

Table 1 W6 – Floppy drive jumper

Pins Jumpered	Description
W6[2-4]	Disable floppy controller
W6[4-6][9-11] *	Enable floppy controller

* default

Removing and replacing the floppy drive

This section provides instructions on how to remove and replace the floppy drive and its flat flex cable from the 5815.

Note You must first remove the floppy drive before adding a hard drive. However, the flat flex cable does not need to be disconnected from either the floppy drive or the 5815.

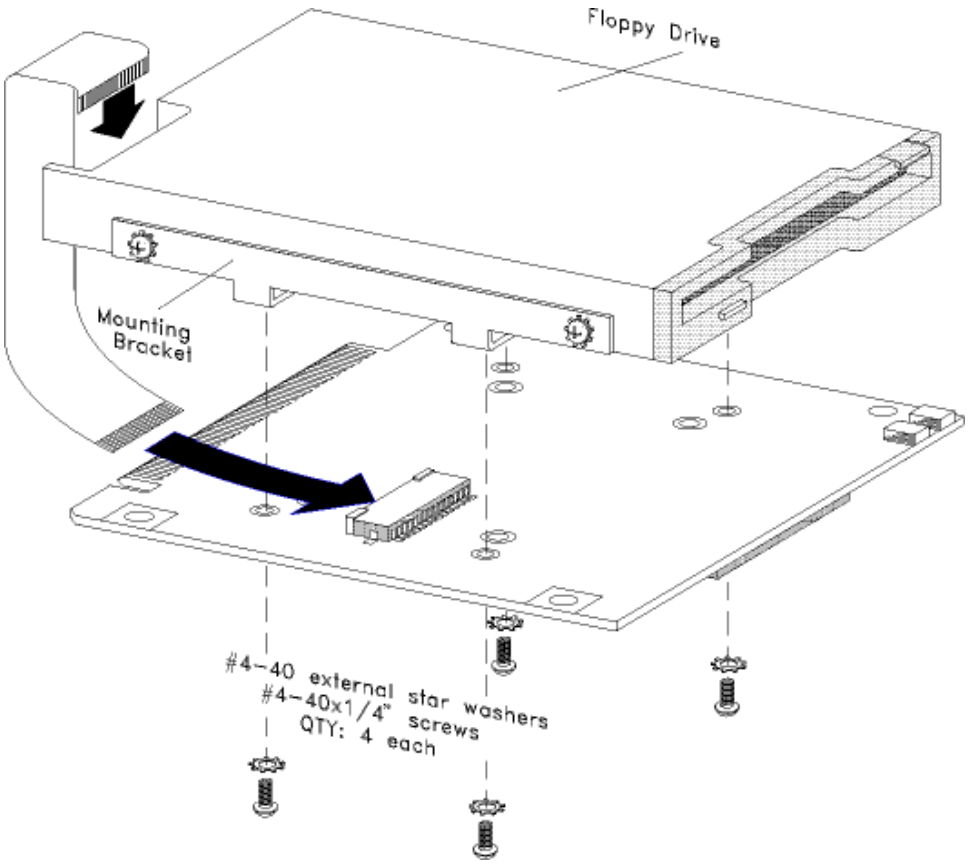
1. Power down the system.
2. Remove the 5815 from the system.

   While removing the 5815 from the backplane, do not squeeze the floppy/hard drive. Remove the 5815 assembly by taking hold of the 5815 only (without touching either the floppy or hard drive). Pulling the 5815 while squeezing the 5815 and floppy/hard drive may damage the floppy/hard drive.

3. Remove the four screws and locking washers that are accessed from the underside of the 5815 card. This releases the floppy drive and its attached mounting brackets from the card. See Figure 5.

Note We do not recommend that you remove the mounting brackets from the floppy drive in order to remove it from the 5815.

Figure 5 Removing the floppy drive from the 5815



4. To disconnect the flat flex cable from either the drive or the 5815, carefully disengage the locking latch that is part of the connector. To do this, pull out on the tabs that are on the sides of the locking latch mechanism.

Note Be careful when you pull the tabs. Excessive force may break the connector.

5. At this point, you may now install the hard drive. See the *Installing a Hard Drive* section for details. If you want to replace the floppy drive and the flat flex cable, go to step 6.

6. Install the flat flex cable by first releasing the locking latch mechanism on the 5815.

7. Insert the end of the cable fully into the connector on the 5815.

8. After the cable is fully inserted, it is necessary to lock the cable into place by pushing in on the hook tabs.

   Repeat steps 6 through 8 to connect the cable to the floppy drive.

9. Secure the floppy drive and its mounting brackets to the 5815 by replacing the four screws and locking washers. The mounting holes are accessed from the underside of the card.

Note Make sure that the flat flex cable is free from the mounting bracket before tightening the screws.

10. The 5815 is now ready to be installed into the backplane. See the *5815 Installation* section for more details.

Spindle speed and precompensation

The controller is configured to operate a floppy drive with a single speed spindle of 300 rpm using the alternate precompensation value of 125 nS for floppy data writes.

Floppy drive interrupts

If the floppy drive controller is enabled, the standard floppy drive interrupt (IRQ6) is used. If the floppy drive controller is disabled, the interrupt is available for other purposes.

Floppy drive DMA

If the floppy drive controller is enabled, the standard floppy drive DMA channel 2 is used. If the floppy drive controller is disabled, the DMA channel is available for other purposes.

Floppy drive power requirements

The power for the floppy drive is supplied through a flat flex cable. No external power cable is required.

Floppy drive interrupts

If the floppy drive controller is enabled, the standard floppy drive interrupt (IRQ6) is used.

Floppy drive SETUP

To use the floppy drive system, the floppy drive controller must first be enabled. See the beginning of this section and Table 1. The remainder of the setup depends on the CPU control card being used. Refer to your CPU control card manual.

Floppy drive access indicator

The 5815 provides a bi-colored LED, labeled FD, to indicate floppy selection. The LED does not flash with every access to the I/O register, but only when the floppy drive is selected.

Hard drives

The 5815 accepts a 12.7 mm (height), 2.5" standard IDE hard drive that can be mounted directly to the card. The drives are available in various capacities.

Note PC-XT CPU cards (5012A, 6012, 6024) are not supported.

Hard drive controller

The hard drive controller may be enabled or disabled via jumper W6. Enable the controller when using a hard drive.

Table 2 W6 jumper – Hard drive enable

Pins Jumpered	Description
[1-3]	Disable hard drive controller
[3-5] *	Enable hard drive controller
[10-12] *	Enable primary IDE controller

* default

Hard drive interrupt

The hard drive uses interrupt IRQ5 on the backplane. This interrupt may then be routed to interrupt IRQ14 or IRQ5 on the specific CPU control card that is used in your system. Refer to your CPU control card manual. This jumper must be installed when using a hard drive.

Table 3 W3 jumper – IRQ routing select

Pins Jumpered	Description
[7-8] *	Route interrupt to BUS IRQ5
[8-10]	Disable IRQ

* default

Installing a card mounted 2.5" hard drive

1. Disconnect power to the Micro PC card cage.
2. Remove the 5815 from the system.

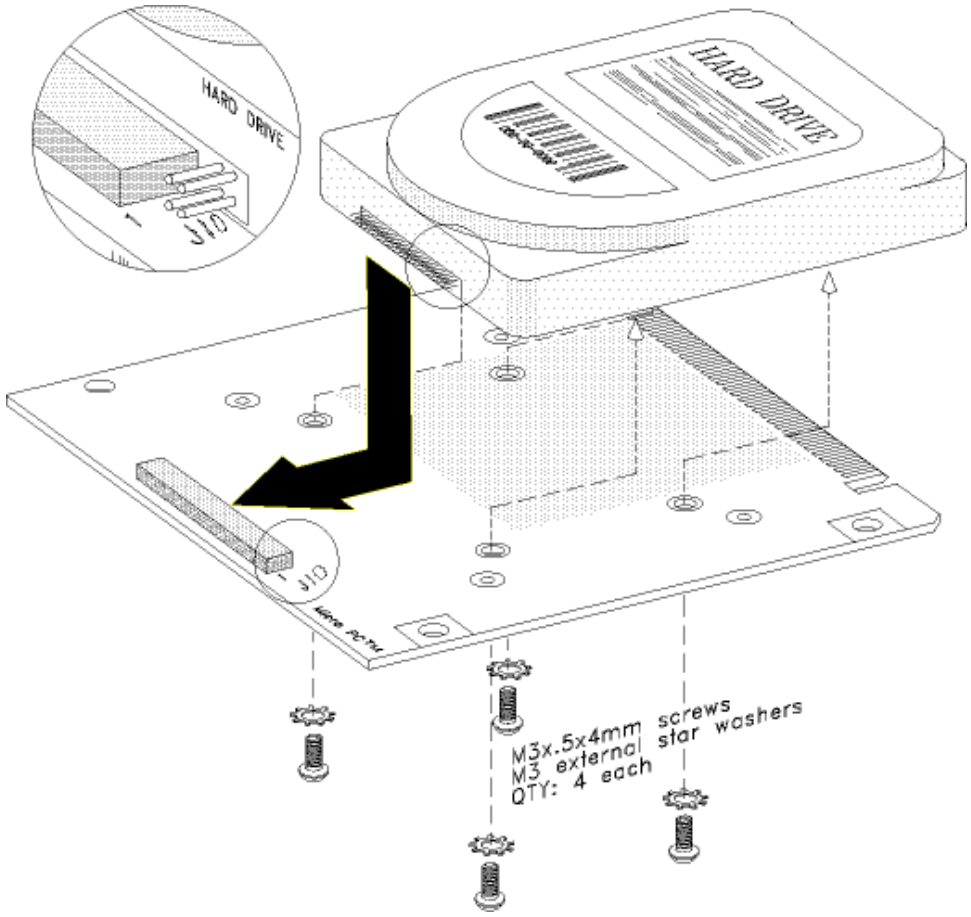
WARNING

While removing the 5815 from the backplane, be careful not to squeeze the floppy/hard drive. Remove the 5815 assembly by taking hold of the 5815 only (without touching either the floppy or hard drive). Pulling the 5815 while squeezing the 5815 and floppy/hard drive may damage the floppy/hard drive.

3. Remove the floppy drive and its mounting bracket. See the *Removing and Replacing the Floppy Drive* section.

4. Align the hard drive properly with the J2 connector on the 5815. See Figure 6.

Figure 6 *Installing a hard drive onto the 5815*



5. Make sure that the hard drive is located and mated properly to the J10 connector by checking the alignment of the mounting holes on the underside of the 5815.

Note There will be four extra pins that do not insert into the J10 connector.

See the inset illustration in Figure 6.

6. When the hard drive is mated properly to the connector, secure the hard drive to the 5815 with the proper screws.

7. Replace the floppy drive/mounting bracket assembly to the 5815. The four mounting holes are visible from the side where the hard drive has been mounted. See the *Removing and Replacing the Floppy Drive* section for more details.

Note When replacing the floppy drive/mounting bracket assembly, be sure to use the same hardware that was removed. Also, make sure that the flat flex cable is free from under the bracket before tightening the screws.

8. Verify that the jumpers at W3, W6 and W7 are properly set for the required configuration. Refer to the *Hard Drive Interrupt*, *Hard Drive Controller*, and *Hard Drive BIOS* sections of this manual for further details.

9. Slide the 5815 into the card cage. See the *5815 Installation* section for more information.

WARNING!
Be careful not to push on the 2.5" hard drive while installing the 5815 into the backplane. Pushing on this device may damage it.

WARNING!
Some drives may require an insulator placed over the solder connections on the J10 connector to prevent accidental short circuits.

Disabling the hard drive

When no hard drive is required, the hard drive can be disabled by setting the hard drive interrupt, hard drive controller and BIOS configuration jumpers to disabled. See the *Hard drive controller, Hard drive interrupt,* and *Hard drive BIOS* sections for more information.

Hard drive power requirements

+5V is supplied to the hard drive through the interface connector. The amount of power used is dependent on the particular drive that is chosen for installation. Note that only 2.5" drives can be powered from this connector.

Hard drive SETUP

The hard drive requires either the CPU system BIOS, or the 5815 extended BIOS to access the hard drive. Execute the CPUs SETUP command to determine which BIOS is required. If hard drive parameters, such as number of drives, cylinders, and heads, are allowed, then the system BIOS can control the hard drive. When the system BIOS controls the hard drive, the 5815 extended BIOS is not required and it is recommended to disable the 5815 BIOS via jumper W7. See the *Hard drive BIOS* section for more information. Also see your CPU user's manual for details on how to set up the system.

If the 5815 extended BIOS is required, it must have the hard drive information to properly access the hard drive. This information is entered with the HDSETUP program, which is included on the CD-ROM. Each hard drive has a specific number of cylinders, heads and sectors per track. See your hard drive manual for the correct values for your hard drive.

Note Before running HDSETUP, set either W7[1-2][5-7] or [3-4][5-7] on, see W7 jumper table.

Note Some drives give both a "physical" and "logical" set of values for the drive information. Always use the "logical" values.

The HDSETUP screen displays parameters and questions and requests that you enter information for each item. Below is an example of the HDSETUP screen:

```
Number of hard drives:  1
1st hard drive
==================================================

Number of Cylinders:                300
Number of Heads:                     16
Number of Sectors/Track:             63

Hard drive IRQ in use:  IRQ 14

Do you wish to change this setup?  (Y/N):  Y

Number of hard drives:    1

Please enter the parameters for the 1st hard drive in
the system.

Number of Cylinders:                683
Number of Heads:                     16
Number of Sectors/Track:             63

Your IDE controller is configured to use IRQ 14.
Do you want to change to IRQ 5?  (N/Y):  N

Number of hard drives:  1
1st hard drive
==================================================

Number of Cylinders:                683
Number of Heads:                     16
```

```
Number of Sectors/Track:            63
Hard drive IRQ in use:  IRQ 14
Are the parameters correct?  (Y/N):  Y
Hard drive setup complete.
The changes will be effective after the system is
rebooted.
```

Note Some older Octagon CPUs require IRQ5, otherwise use IRQ14.

WARNING!

Operating a hard drive with the wrong parameters may result in data loss, which requires a complete reformat of your hard drive. Make sure you have the correct parameters for your drive.

Hard drive BIOS

An extended hard drive BIOS is located on the 5815. This BIOS, the BIOS memory address, and serial EEPROM are selected via jumper W7.

Table 4 W7 jumper – BIOS address and enable

Pins Jumpered	Description
[1-2] [5-7]	BIOS enabled at C800-CBFF
[3-4] [5-7]	BIOS enabled at CC00-CFFF
[2-4] [6-8] *	BIOS disabled

* default

Enable the BIOS if your CPU cards' system BIOS does not contain a hard drive BIOS as an integrated part of the system BIOS. Disable the BIOS if it does (W7[2-4][6-8] installed). Refer to Table 5 for which Octagon CPU cards require the 5815 extended hard drive BIOS and which CPU cards required the on-card CPU extended hard drive BIOS.

The memory area selection is dependent on which areas are already in use by other cards. For faster system performance, this area can be shadowed if your CPU allows this feature.

Table 5 Extended BIOS selection

5815 Hard Drive I/O Map	
Octagon CPU card	**Extended BIOS to use**
4000 4010 4020 5025A	5815 BIOS using HDSETUP.COM
5066 5070 6010 6020 6030 6040 6050 6225	CPU BIOS using SETUP.COM

Hard Drive I/O Map

The hard drive I/O map consists of eight command block read/write registers at I/O locations 1F0H through 1F7H, and an additional two control block registers at 3F6H and 3F7H. The BIOS uses the hard drive registers for control, command and proper data transfers. The following table is for reference use only.

Table 6 Hard drive I/O map

5815 Hard Drive I/O Map		
I/O Address	**Read**	**Write**
1F0H	Data	Data
1F1H	Error	Features
1F2H	Sector Count	Sector Count
1F3H	Sector Number	Sector Number
1F4H	Cyl Low	Cyl Low
1F5H	Cyl High	Cyl High
1F6H	Drive/Head	Drive/Head
1F7H	Status	Command
3F6H	Alt. Status & HDSETUP	Device Control
3F7H	Drive Address	HDSETUP

Hard drive access indicator

The 5815 provides an amber colored LED, labeled HD, to indicate hard drive access. The LED flashes when any of the registers of the hard drive I/O addresses are accessed.

Software features and additional notes

Extended BIOS

An extended BIOS is provided on the 5815 allowing the use of IDE drives. This is used when the CPU system BIOS does not directly support a hard drive BIOS. This BIOS is modified from the original Octagon 5815 extended BIOS and allows a translation of cylinder/head/sector for drives that support LBA (logical block address) raising the maximum size of the drive from the previous limit of 528MB (on the 5800A/5815) to 8.422GB (1024*255*63 sectors).

Note 1: Software from the HDD manufacturer (such as Maxtor's MAXBLAST) may be used to support larger drives. Most of these programs require booting from the HDD to function correctly.

Note 2: Drives with parameters under the 528MB limit are accessed via the older (CHS) cylinder/head/sector addressing method instead of logical block addressing (LBA), thereby maintaining compatibility with drives used on Octagon 5800A and 5815 cards.

Note 3: Drives larger than 8.422GB require an operating system (WIN98, WINNT etc.) which supports the larger hard drives.

Note 4: DOS has a maximum size of 2GB per DOS partition with a maximum of 4 partitions. This is due to the maximum number of FAT table entries and the maximum cluster size.

Note 5: The translation done by the BIOS may not be compatible with other BIOS/OS translations (sometimes also called Huge, LBA or Large). Drives therefore will most likely require repartitioning and reformatting when using this extended BIOS.

Note 6: The Phoenix BIOS on the 5066 CPU, 60x0 CPUs, etc., has a limit of 9999*16*63 (5.1GB).

Note 7: Drives over 8.422GB are automatically set to 8.422GB (user may also enter 16384 cylinders, 16 heads and 63 sectors per track to force this.)

Note 8: There is no support for advanced drive features such as UDMA or advanced PIO modes (either in HW or SW).

Note 9: The extended BIOS is 16KB in length and is jumper selectable to start at either segment C800h or CC00h and can be disabled entirely. Cards using the system BIOS should disable the extended BIOS (to free up system memory space) and the serial EEPROM.

Note 10: On some ALi processor based CPU cards, various problems occurred when using some hard drives and the CPU BIOS. For this

reason it is recommended to use the 5815 extended BIOS/HDSETUP program on those cards.

Note 11: The extended BIOS allows the use of either IRQ5 or IRQ14 (selectable in the HDSETUP program). When IRQ14 is used the system CMOS is automatically updated (both the number of drives and checksum) while booting to indicate the number of drives used. On some Octagon AT compatible CPU cards BUS IRQ5 is forced to IRQ14, on others it is a jumper option. The option used in the HDSETUP program must match the current system settings.

Note 12: Neither the SETUP program nor the extended BIOS is required if the system BIOS supports a hard drive (most standard AT BIOSes automatically support HDD). It is recommended to disable the 5815 extended BIOS and the serial EEPROM and use the system BIOS in most cases.

HDSETUP.COM

Included with the 5815 (on the CD-ROM) is the setup program HDSETUP.COM which allows the user to specify HDD information (number of drives, cylinders, heads and sectors) into the onboard EEPROM for later use by the extended BIOS.

The extended BIOS must be enabled (either W7[1-2][5-7] or [3-4][5-7], see the W7 jumper table) for HDSETUP to work correctly.

Technical specifications

Power requirements

Idle, floppy drive only: 5V +/-5% @ 100 mA

Motor on, floppy drive only: 5V +/-5% @ 300 mA

Idle, floppy and hard drive: 5V +/-5% @ 280 mA

Motor on, floppy and hard drive: 5V +/-5% @ 660 mA

Environmental specifications

Specifications are for 5815 only and are de-rated to the operating temperature of the drive(s) installed.

–4° to 45° C operating
–23° to 65° C nonoperating
20% to 80%, RH, noncondensing

I/O Map

Table 7 I/O Map

1F0-1F7h Primary IDE Controller	
Address	Register
1F0-1F7h	Task file registers
376-377h	Miscellaneous AT registers

3F0-3F7h Primary Floppy Disk Controller		
Address	Register	Access
3F0h	Status register A	R
3F1h	Status register B	R
3F2h	Digital output register	R/W
3F3h	Tape drive register	R/W
3F4h	Main status register	R
3F4h	Data rate select register	W
3F5h	Data (FIFO)	R/W
3F6h	Reserved	
3F7h	Digital input register	R
3F7h	Configuration control register	W

Jumper settings

Table 8 W3 jumper – IRQ routing select

Pins Jumpered	Description
[7-8] *	Route interrupt to BUS IRQ5
None	Disable IRQ

* default, must be installed when using a hard drive

Table 9 W6 jumper – Floppy / hard drive selects

Pins Jumpered	Description
Hard drive jumpers	
[1-3]	Disable hard drive controller
[3-5] *	Enable hard drive controller
[10-12] *	Enable primary IDE controller
[8-10]	Reserved
Floppy jumpers	
[2-4]	Disable floppy controller
[4-6][9-11] *	Enable floppy controller

* default

Table 10 W7 jumper – BIOS address and enable

Pins Jumpered	Description
[1-2] [5-7]	BIOS enabled at C800-CBFF
[3-4] [5-7]	BIOS enabled at CC00-CFFF
[2-4] [6-8] *	BIOS disabled

* default

Connector pinouts

Table 11 J5 – Floppy drive

Pin	Function	Pin	Function
1	+5 V	2	Index*
3	+5 V	4	DS0, DS1*
5	+5 V	6	Disk Change
7	NC	8	Reserved
9	Reserved	10	MOTOR ON*
11	NC	12	DIR*
13	GND	14	STEP*
15	GND	16	WRITE DATA*
17	GND	18	WRITE GATE*
19	GND	20	TRK 0*
21	GND	22	WRITE PROTECT*
23	GND	24	READ DATA*
25	GND	26	SIDE SELECT*

*active low

Table 12 J10 – 2.5" IDE drive

Pin	Function	Pin	Function
1	RESET*	2	GND
3	SD7	4	SD8
5	SD6	6	SD9
7	SD5	8	SD10
9	SD4	10	SD11
11	SD3	12	SD12
13	SD2	14	SD13
15	SD1	16	SD14
17	SD0	18	SD15
19	GND	20	KEY
21	DMARQ	22	GND
23	DRWR*	24	GND
25	DRRD*	26	GND
27	IOCHRDY	28	CSEL
29	DMACK*	30	GND
31	HDD-INT	32	IOCS16*
33	VA1	34	PDIAG*
35	A0X	36	BA2
37	CS0*	38	CS1*
39	SLV/ACT	40	GND
41	+5V	42	+5V
43	GND	44	GND

*active low

Warranty

Octagon Systems Corporation (Octagon), warrants that its standard hardware products will be free from defects in materials and workmanship under normal use and service for the current established warranty period. Octagon's obligation under this warranty shall not arise until Buyer returns the defective product, freight prepaid to Octagon's facility or another specified location. Octagon's only responsibility under this warranty is, at its option, to replace or repair, free of charge, any defective component part of such products.

Limitations on warranty

The warranty set forth above does not extend to and shall not apply to:

1. Products, including software, which have been repaired or altered by other than Octagon personnel, unless Buyer has properly altered or repaired the products in accordance with procedures previously approved in writing by Octagon.
2. Products which have been subject to power supply reversal, misuse, neglect, accident, or improper installation.
3. The design, capability, capacity, or suitability for use of the Software. Software is licensed on an "AS IS" basis without warranty.

The warranty and remedies set forth above are in lieu of all other warranties expressed or implied, oral or written, either in fact or by operation of law, statutory or otherwise, including warranties of merchantability and fitness for a particular purpose, which Octagon specifically disclaims. Octagon neither assumes nor authorizes any other liability in connection with the sale, installation or use of its products. Octagon shall have no liability for incidental or consequential damages of any kind arising out of the sale, delay in delivery, installation, or use of its products.

Service policy

1. If a product should fail during the warranty period, it will be repaired free of charge. For out of warranty repairs, the customer will be invoiced for repair charges at current standard labor and materials rates.
2. Customers that return products for repairs, within the warranty period, and the product is found to be free of defect, may be liable for the minimum current repair charge.

Returning a product for repair

Upon determining that repair services are required, the customer must:

1. Obtain an RMA (Return Material Authorization) number from the RMA Administrator, 303-430–1500.
2. If the request is for an out of warranty repair, a purchase order number or other acceptable information must be supplied by the customer.
3. Include a list of problems encountered along with your name, address, telephone, and RMA number.
4. Carefully package the product in an antistatic bag. Failure to package in antistatic material will VOID all warranties. Then package in a safe container for shipping.
5. Write RMA number on the outside of the box.
6. For products under warranty, the customer pays for shipping to Octagon. Octagon pays for shipping back to customer.
7. Other conditions and limitations may apply to international shipments.

Note PRODUCTS RETURNED TO OCTAGON FREIGHT COLLECT OR WITHOUT AN RMA NUMBER CANNOT BE ACCEPTED AND WILL BE RETURNED FREIGHT COLLECT.

Returns

There will be a 15% restocking charge on returned product that is unopened and unused, if Octagon accepts such a return. Returns will not be accepted 30 days after purchase. Opened and/or used products, non–standard products, software and printed materials are not returnable without prior written agreement.

Governing law

This agreement is made in, governed by and shall be construed in accordance with the laws of the State of Colorado.

The information in this manual is provided for reference only. Octagon does not assume any liability arising out of the application or use of the information or products described in this manual. This manual may contain or reference information and products protected by copyrights or patents. No license is conveyed under the rights of Octagon or others.