PC–450
User's Manual

Doc. #03801 Rev 1196

OCTAGON SYSTEMS CORPORATION®

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Tech. Support: 303–426–4521

IMPORTANT!

Please read 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. This section describes some of the common 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 <u>never</u> found a single case where multiple IC failures were <u>not</u> 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 power-up** - 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 power-up. This type of failure is typical on serial interface chips.

■ **Serial and parallel** - Customers sometimes connect the serial and printer devices to the Micro PC while the power is off. This can cause the failure mentioned in the above section, *Failure upon power-up*. Even if they are connected with the Micro PC on, there can be another failure mechanism. Some serial and printer devices do not share the same power (AC) grounding. The leakage can cause the serial or parallel signals to be 20-40V above the Micro PC ground, thus, damaging the ports as they are plugged in. This would not be a problem if the ground pin is connected first, but there is no guarantee of this. Damage to the printer port chip will cause the serial ports to fail as they share the same chip.

■ **Hot insertion** - Plugging cards into the card cage with the power on will usually not cause a problem. (**Octagon urges that you do not do this!**) However, the card may be damaged if the right sequence of pins contacts as the card is pushed into the socket. This usually damages bus driver chips and they may become hot when the power is applied. This is one of the most common failures of expansion cards.

■ **Using desktop PC power supplies** - Occasionally, a customer will use a regular desktop PC power supply when bringing up a system. Most of these are rated at 5V at 20A or more. Switching supplies usually require a 20% load to operate properly. This means 4A or more. Since a typical Micro PC system takes less than 2A, the supply does not regulate properly. Customers have reported that the output can drift up to 7V and/or with 7-8V voltage spikes. Unless a scope is connected, you may not see these transients.

■ **Terminated backplanes** - Some customers try to use Micro PC cards in backplanes that have resistor/capacitor termination networks. CMOS cards cannot be used with termination networks. Generally, the cards will function erratically or the bus drivers may fail due to excessive output currents.

■ **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 submicrosecond 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

PREFACE

This manual provides all the information required to install, configure, and operate the PC–450 Control Card. It is part of Octagon's Micro PC user manual series. To receive the Micro PC User Manual Binder, please return the reply card included with your Control Card.

CONVENTIONS USED IN THIS MANUAL

1. Information which appears on your screen (output from your system, commands or data that you key in) is shown in a different type face.

    ```
    Octagon PC-450 BIOS Vers x.xx
    Copyright (c) 1992,1993 Octagon Systems, Corp.
    All Rights Reserved.
    ```

2. Italicized refers to information that is specific to your particular system or program, e.g.,

    Enter *filename*

    means enter the name of your file.

3. Warnings always appear in this format:

    WARNING: The warning message appears here.

4. Paired angle brackets are used to indicate a specific key on your keyboard, e.g., <ESC> means the escape key; <CTRL> means the control key; <F1> means the F1 function key.

5. All addresses are given in hexadecimal.

SYMBOLS AND TERMINOLOGY

Throughout this manual, the following symbols and terminology are used:

W[–]   Denotes a jumper block and the pins to connect.

Autoexecution   Automatic execution of a program on power–up or reset.

BIOS drive   The solid–state disk which contains the system BIOS and ROM–DOS.

Control Card   Contains the CPU, memory, and operating system and controls the operation of all the extension cards.

DRAM   Dynamic Random Access Memory devices. DRAMs provide volatile memory with unlimited read and write cycles.

Flash EPROM   Electrically erasable EPROM which allows approximately 10,000 writes.

Memory device   The type of static RAM, DRAM, flash EPROM or EPROM specified for either volatile or nonvolatile memory.

PC SmartLINK   A serial communications software package designed by Octagon for use with the PC–450 Control Card. Refers to all versions of PC SmartLINK.

ROM   Read Only Memory devices. ROMs provide nonvolatile memory, have a limited number of write cycles, and include EPROMs, EEPROMs, and flash EPROMs.

ROM–DOS   DOS operating system included in Micro PC ROM.

Solid–State Disk (SSD)	A simulated disk using a high speed solid–state memory device, for example flash EPROM, EEPROM, or static RAM.
Static RAM	Static Random Access Memory device. Static RAMs provide volatile memory with unlimited read and write cycles. They may be used with a battery backup module.
TTL Compatible	Transistor transistor logic compatible; 0–5V logic levels.
Virtual Drive	A disk created in DOS or extended memory which emulates an actual disk. Provides temporary storage for files. When power to the computer is turned off the virtual drive disappears.
XMODEM	A communications protocol which allows transfer of files between two computers.
XON/XOFF	A communications protocol for asynchronous connections. The receiver can pace the sender by sending the XOFF and XON characters to stop and continue the data flow.
H	The suffix "H" denotes a hexadecimal number. A decimal number has no prefix or suffix. For example, 1000H and 4096 are equivalent.

TECHNICAL SUPPORT

If you have a question about the PC–450 Control Card and cannot find the answer in this manual, call Technical Support. They will be ready to give you the assistance you need.

When you call, please have the following at hand:

Your *PC–450 Control Card User's Manual*

A description of your problem.

The direct line to Technical Support is 303–426–4521.

CHAPTER 1   OVERVIEW

DESCRIPTION

The PC–450 integrates three serial ports, Ethernet communica-
tion, CRT and universal flat panel interface, floppy and hard disk
ports, 32 MB of DRAM, DOS 6.0 in ROM, SCSI, parallel printer
port, watchdog timer, AT calendar/clock, and a 486DX2-66 or
486DX4–100 processor.

Surface-mounted flash memory (2 or 4 MB standard) is an option
for the PC-450. If this option is requested, then the programs are
stored in flash memory with a built–in programmer and software.
Units with flash may be reprogrammed locally using a PC or
remotely through a modem.

MAJOR FEATURES

"Instant DOS" Operating System

The MS–DOS 6.0 compatible operating system is supplied in ROM.
Since it is stored in ROM, it is always present on power up and can
also execute other operating systems, like Windows, QNX and
LynxOS from flash memory or EPROM. All the software and
hardware is included so that the system is fully operational "out of
the box."

Local Bus Ethernet

The high performance Ethernet operates at full CPU speed giving
the highest throughput possible. The PC–450 can be populated
with any/or all of the standard interfaces (10BASE–T, 10BASE–2,
AUI). The circuitry is certified Novell compatible. A fiber optic
interface is available using the AUI port. This interface requires
12V for operation.

Local Bus SVGA

The video system on the PC–450 is the most comprehensive found
on any single board computer. Since the video circuitry operates
on the local bus at the full processor speed, programs like Windows
execute very rapidly. It uses the latest technology from Chips &
Technology and will drive virtually any type of flat panel display.
There is also an adjustable bias supply for LCD displays.

Solid–State Disks (SSDs)

The total executable program space on the PC–450 is 3 MB with the optional flash EPROM installed, up to 2.5 MB without the flash option. Software utilities and on-board flash programming hardware are provided to copy disk images to the SSDs.

SSD0 (optional 1 MB flash EPROM), if installed, contains the BIOS, ROM DOS 6.0 kernel and utility programs in the first 256K. The remaining 768K may be used to store programs and data. The SSD0 flash EPROM can be reprogrammed 100,000 times. The flash programmer and software reside on the PC-450 card.

SSD1A and SSD1B each accept either a 512K or 1 MB EPROM. When purchased, 0K is installed in SSD1B and either 512K or 0K is installed in SSD1A, depending on the optional installation of the SSD0 flash device.

SSD1A, when SSD0 is not present, is a 512K EPROM containing the BIOS, ROM DOS 6.0 kernel and utility programs. SSD1A, if SSD0 is installed, and SSD1B may be used for executable files or data storage. An SSD1A EPROM is not required if the SSD0 flash option is installed.

SSD2 accepts either a 128K or 512K static RAM, which can be battery–backed. The solid state disk is used for logging process data. Data is stored in a floppy disk format and does not require special software. 0K is supplied.

Up to 32 MB of DRAM

The unit supports 4, 8, 16 or 32 MB of zerowait state DRAM. The user can install either 4 or 16 MB SIMM modules for DRAM in applications where the temperature range does not exceed 0° to –70° C. Outside this range, Octagon can supply wide temperature range DRAM.

COM1, COM2 and COM3 Serial Ports

The PC-450 uses a high performance 16C552 communications controller. The baud rates for the serial ports are programmable to 115 KBaud. All have RS–232 interfaces. LEDs indicate transmit and receive activity.

LPT1 Parallel Port

This port has a 26–pin connector and is the standard PC printer port.

Diagnostics

The PC–450 has an on-board alphanumeric display. This 4–digit alphanumeric display can be used under program control for troubleshooting or operator prompting.

Octagon SETUP Information Stored In EEPROM

The PC-450 stores Octagon SETUP information in nonvolatile EEPROM. Information for the SSDs, boot device, operating system, network I/O address and IRQs, and the SCSI BIOS enable is stored using the OCTSETUP utility.

Battery-backed CMOS RAM

Other PC-450 AT system parameters such as number of floppies, hard drive information, time, date, password, etc., are stored in battery-backed CMOS RAM.

PC/104 Interface

This interface accepts a 8/16 bit, PC/104 expansion card, available from several manufacturers. Up to two of these modules may be stacked on the PC–450.

Where to go from here:

Before you can begin developing your application program for the PC–450, we recommend you read Chapters 2–5. These chapters give instructions for hardware installation, downloading and saving your program, and autoexecuting your application.

Chapter 2   Covers the basics of setting up a PC–450
Quick Start   system. This chapter describes how to
                         download files to the PC–450.

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CHAPTER 2   QUICK START

This chapter covers the basics of setting up a PC–450 system and tells you:

1.   How to install the PC–450 and

2.   How to transfer files between your PC and the PC–450.

PANEL MOUNTING THE PC–450

You need the following equipment (or equivalent):

PC–450 Control Card with PC–450 mounting plate
5V power supply with 5 Amp capacity (min)
AT compatible keyboard with PS/2 connector
VGA monitor
VTC–9F cable
Null modem adapter
PC–450 ROM–DOS & Utility Software Disk
Your PC

Please refer to Figure 2–1 for the location of various connectors before setting up your PC–450 system.

J3 J9 J15 CR18 CR19 P4

CR5 J13 CR11 CR17

J4 W3 U53 U54

F1

16 MB DRAM 16 MB DRAM

W2

R3

CR11

J14

W9 W10

SSD1A SSD1B SSD2

W8

J20 J21

P2

W5 W7 SW1

J1 W1 W4 J17 J18

J16

J19 CR20

P1 J6 J8 J12

+5 Gnd +12 J5 J7 Gnd R- R+ T- T+ P3 J11

■ = Pin 1
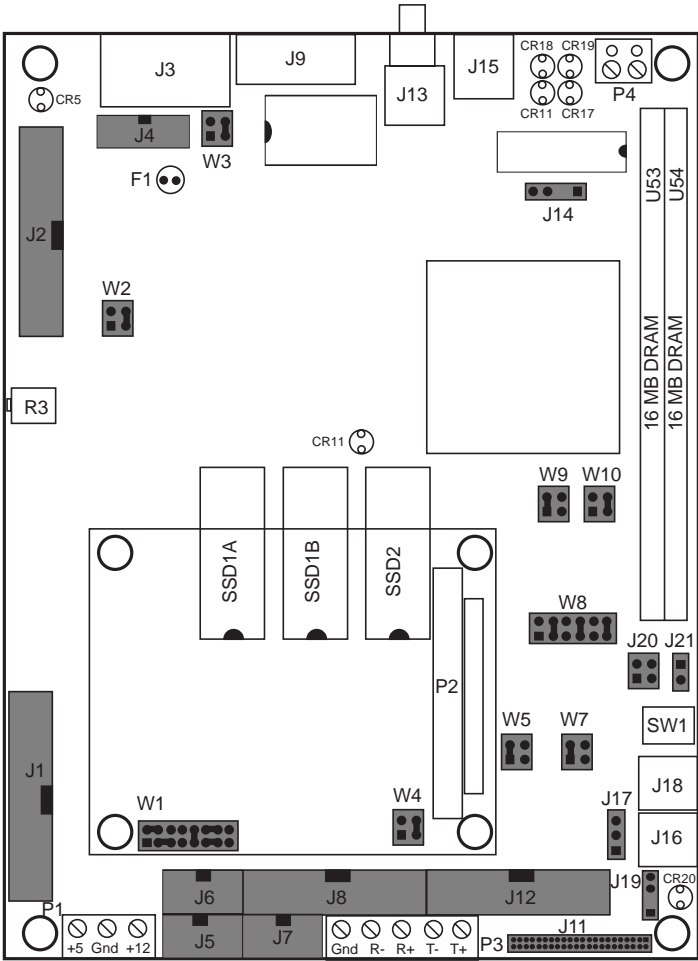
Figure 2–1 – PC–450 Component Diagram

NOTE: Refer to the table on the following page for descriptions of all the reference designators.

PC-450 Component Diagram			
Reference Designator	Description	Reference Designators	Description
J1	SCSI-2	J19	Battery
J2	Flat Panel	J20	Watchdog Latch
J3	SVGA Analog	J21	Reset
J4	PC Video	P1	Power
J5	COM2	P2	PC/104
J6	COM1	P3	COM3/RS-422/485
J7	COM3	P4	Remote Reset
J8	LPT1 Printer	W1	COM3/RS-422/485
J9	Ethernet AUI	W2	Flat Panel +/-Bias
J10	Touch Panel	W3	Ethernet
J11	IDE Hard Drive	W4	Factory Use Only
J12	Floppy Drive	W5	CMOS Discharge
J13	Ethernet BNC	W7	SSD2 Power
J14	Heatsink/Fan Power	W8	Boot Option
J15	Ethernet Twisted Pair	W9	Power Fail Source
J16	Keyboard	W10	NMI Select
J17	Speaker	F1	AUI Fuse
J18	Mouse	R3	Flat Panel Vee Bias Adjust

WARNING: The PC–450 Control Card contains static–sensitive CMOS components.

- Ground yourself before handling the PC–450 card.
- When programming a memory device, place the device in the socket before applying power.
- Take care to correctly connect power at P1.

To install the PC–450:

1. Use #6–32 standoffs and screws to secure the PC–450. A mounting plate is included with the PC–450 card. See the following section, "Installing the Mounting Plate". Figure 2–2 shows the mounting plate dimensions. Figure 2-3 shows the PC–450 dimensions.

   CAUTION: When installing any component and/or PC/104 device, care should be taken to avoid excessively flexing the PC–450 card.
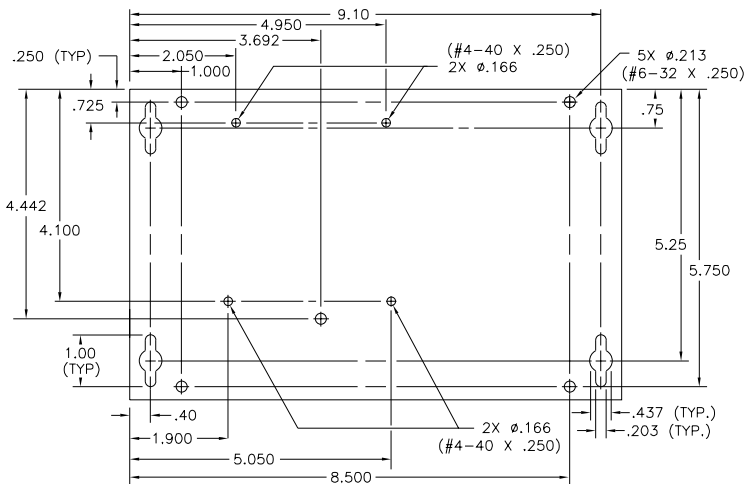
Figure 2–2—Mounting Plate Dimensions
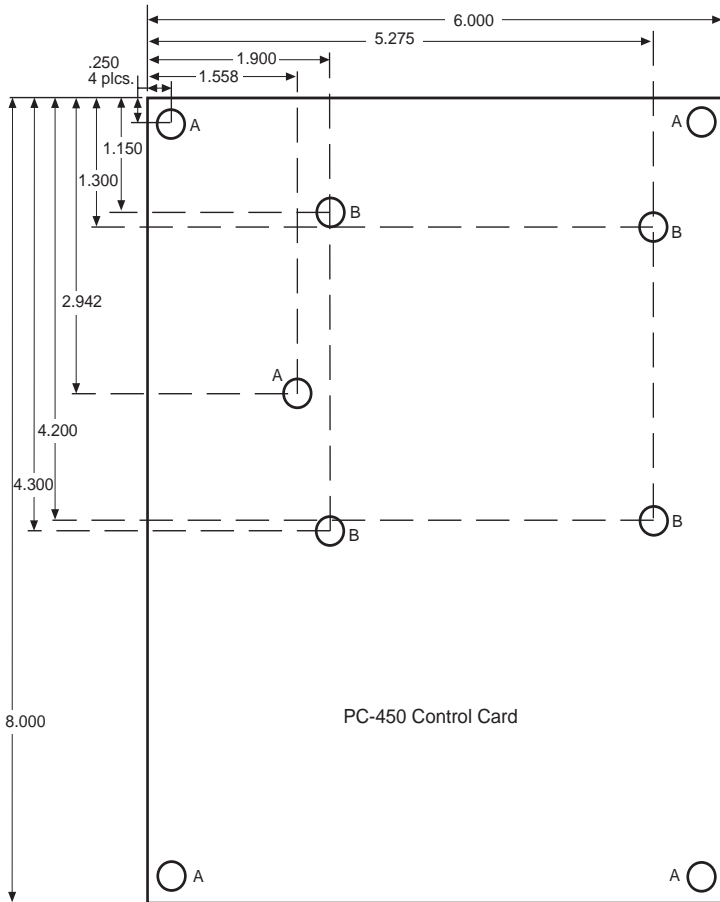
References are given in inches.
A = 0.156; Mounting holes
B = 0.125; PC/104 mounting holes

Figure 2–3—PC–450 Center to Center Hole Dimensions

2. A screw terminal connector at P1 is provided to supply the
    +5V power. Connect the proper ground and +5V wires to the
    terminal block at P1.

3. Connect the keyboard to J16 and the VGA monitor to J3.

4. Connect the VTC–9F cable with a null modem adapter be-
    tween COM1 of your PC to COM1 (J6) of the PC–450.

5. Install the 1 MB, 4 MB or 16 MB 72–pin DRAM SIMMs at U53
    and U54. The PC–450 supports up to 32 MB of DRAM in
    increments of 1 MB, 4 MB or 16 MB.

6. Power on the PC–450. Sign on messages, memory testing and
    CONFIG.SYS information will display.

7. You are now ready to transfer files between your PC and the
    PC–450.

TRANSFERRING FILES BETWEEN THE PC–450 & YOUR PC

The following information assumes there is no floppy drive at-
tached to the PC–450. A serial cable is used to communicate
between your PC and the PC–450.

You can download files to the virtual drive on the PC–450. The
virtual drive provides temporary storage for your files until you
save them to a flash EPROM (optional) or battery–backed static
RAM drive. The virtual drive also allows you to test and debug
your application files before permanently saving them. You can
also upload files from your PC–450 to your PC for editing and
debugging.

When booting from the BIOS drive, the VDISK.SYS driver allo-
cates a virtual drive. The default size of the virtual drive is 128K.

A utility program called TRANSFER.EXE resides on the BIOS
drive and is used to send or receive files via COM1 of the PC–450.
TRANSFER.EXE uses the XMODEM protocol. The following
information on downloading files between the PC–450 and your PC
uses an example program, DEMO.EXE and DEMO.BAS. These
files are on your PC–450 utility disk in the DEMO subdirectory.

Downloading Files to the PC–450

In order to transfer files from your PC to the PC–450, you must execute the TRANSFER program from both the PC–450 and your PC.

1. Copy the files from the PC–450 utility disk onto the hard drive of your PC.

2. Execute the TRANSFER.EXE program from the PC–450 to receive a file from your PC:

   ```
   TRANSFER /COM1 /R /V D:DEMO.EXE
   ```

   D: is the virtual drive on the PC–450 where the file will be transferred.

   DEMO.EXE is the name of the file on the PC–450 which you are receiving from your PC.

   /V enables "R" characters upon receiving a block and "T" upon transferring a block.

   /R enables the receive file mode.

3. Execute the TRANSFER program from your PC to send a file to the PC–450:

   ```
   TRANSFER /COM1 /S /V C:\DEMO.EXE
   ```

   C: is your (desktop) PC hard drive.

   DEMO.EXE is the file being transmitted from your PC.

   /S enables the send file mode.

   NOTE: Transfer will timeout if the program has not been started after approximately 40 seconds. It displays the following message:

   ```
   Failed to receive <drive>filename.ext
   Deleting <drive>filename.ext
   ```

Also, you may speed up the transfer using the /Bnnnnn switch to increase the baud rate. Example: /B57600.

4. To execute the program you have just downloaded, type:

```
D:DEMO
```

Uploading Files from the PC–450

In order to transfer files from the PC–450 to your PC, you must execute the TRANSFER program from both the PC–450 and your PC.

1. Copy the files from the PC–450 utility disk onto the hard drive of your PC.

2. Execute the TRANSFER.EXE program from the PC–450 to send a file to your PC:

```
TRANSFER /COM1 /S /V filename.ext
```

filename.ext is the name of the file on the PC–450 which you are sending to your PC.

/S enables the receive.

3. Execute the TRANSFER program from your PC to receive a file to the PC–450:

```
TRANSFER /COM1 /R /V filename.ext
```

filename.ext is the name of the file on your PC which you are receiving from the PC–450.

NOTE: Transfer will timeout if the program has not been started after approximately 40 seconds. It displays the following message:

```
Failed to receive <drive>filename.ext
Deleting  <drive>filename.ext
```

CHAPTER 3   RAMs AND EPROMs

Before you can save and boot your application from the PC–450, you must first configure the system for your particular application requirements. This chapter tells you how to install RAMs and/or EPROMs.

SSD0

The PC–450 has an optional 2 or 4 MB flash PROM that is surface mounted at U20. SSD0 can be used to store the system BIOS, BIOS extensions, and the BIOS drive. In addition, SSD0 can be partitioned into two user programmable drives, SSD0A and SSD0B. The size of SSD0A is always 1024K. The size of SSD0B is 512K on 2 MB systems or 2560K on 4 MB systems. The OCTSETUP program specifies the SSD0 size (either 2 MB or 4 MB.) Please refer to the section, "Octagon BIOS OCTSETUP," in Chapter 4 for more information.

You may choose to store your application program on a user programmable drive and have the system automatically load the program into DOS memory and execute on boot–up. Programs are stored to the flash PEROM using the on–card programmer. These devices are erased automatically during the programming process. You can write to the flash PROM for a limited number of times (about 100,000), if your application program requires changes. Refer to Chapter 5, "Save and Run Programs", for more information on programming the flash PROM.

SSD1A/SSD1B

Two DIP sockets, referenced as SSD1A and SSD1B, can hold 512K or 1 MB standard EPROMs. If the optional SSD0 flash PROM is not installed, SSD1A is populated with a 512K EPROM. The system BIOS, BIOS extensions, and the BIOS drive are stored in this EPROM, as well as user programs if a 1 MB EPROM is used. An SSD1A EPROM is not required if the SSD0 flash option is installed.

SSD1A and SSD1B solid-state drives can each be accessed as individual DOS compatible drives or combined as one drive. SSD1A or SSD1B may also be configured as a bootable device, executing programs on power-up.

To Install an EPROM

CAUTION: When installing EPROMs and RAMs, care should be taken to avoid excessively flexing the PC–450 card.

1. Install the EPROM into socket SSD1A/SSD1B.

    WARNING: When installing the chip, be sure to match the notch in the chip with the notch in the silkscreen. Incorrect installation will destroy the chip!

2. Run the OCTSETUP program to define the size of the device installed in SSD1A and SSD1B. Refer to Chapter 4 for more information.

    NOTE: If a new, unprogrammed EPROM is present while booting, the driver MEMDRIVE.SYS will report "Device not present." You must program the EPROM before it is recognized. Refer to Appendix B, "Programming Standard EPROMs" and DISKSAVE in Appendix A.

SSD2

SSD2 only accepts 128K or 512K static RAMs. A 3.6V AT clock battery can be used to battery back SSD2 via connector J19 and jumper block W7. The 3.6V AT battery will also retain the system time when the system is powered off.

Installing Static RAMs

1. Install the static RAM directly into SSD2.

    WARNING: When installing the chip, be sure to match the notch in the chip with the notch in the silkscreen. Incorrect installation will destroy the chip!

2. Make sure the battery backup for SSD2 is set correctly:

PC-450 SSD2 Power Source: W7	
Pins Jumpered	**Description**
[1-2]*	Power SSD2 from the 3.6V clock battery at J19 during power-down
[3-4]	Power SSD2 from +5V. No battery backup during power-down

 * = default

3. Connect the battery via J19:

PC-450 Battery: J19	
Pin #	**Function**
1	+ Battery
2	NC
3	Gnd
4	Gnd

4. Run the OCTSETUP program to define the size of the device installed in SSD2. Refer to Chapter 4, "Setup," for more information.

DRAM

The PC–450 supports 1, 4 and 16 MB, 8– or 9–bit, 72–pin SIMMs. You may install up to 32 MB of DRAM at U53 and U54.

Parity checking is default disabled. To enable parity checking for 9–bit DRAMs, register 11, bit 7 in the CHIPSet Register Control Menu must be enabled. Refer to Chapter 4, "ATBIOS SETUP," for more information.

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CHAPTER 4   SETUP

DESCRIPTION

The PC–450 contains two separate programs which are used to configure your system. The first is the ATBIOS SETUP program which configures your system for memory, floppy disk, hard drive, etc. The second program is the Octagon BIOS OCTSETUP program which defines the solid–state disks and the Ethernet I/O.

ATBIOS SETUP

The SETUP routine is used to configure the PC–450 operating parameters. This configuration is stored in battery–backed CMOS RAM. SETUP is accessed by pressing <CTL><ALT><S> during the power–on diagnostics or by executing the DOSETUP.EXE program found on the BIOS drive and the PC–450 utility disk. The following discusses the four menu options in the ATBIOS SETUP.

WARNING:	After DOSETUP is executed, the following prompt is displayed: "Do you wish to reboot system?" If you enter Y (yes), the system may lock up. Instead, enter N (no) and press <CTL><ALT><DEL>. This causes the system to do a warm reset.

Standard Setup Options Menu

Time   This field is used to set the system time. This field is updated once per second except when selected.

Date   This field is used to set the system date. The maximum value for the day depends on the month and year. The maximum value for the year is 2099.

Diskette This field is used to define the type and number of floppy diskette(s) installed in the system. Possible floppy diskette types are:
- Not Installed
- 5.25 in., 360K
- 5.25 in., 1.2 MB
- 3.5 in., 720K
- 3.5 in., 1.44 MB
- 3.5 in., 2.88 MB

Fixed Disk The fixed disk fields show the drive parameters associated with the drive type number, as defined in the following table. The individual values cannot be modified, with the exception of drive types 48 and 49.

Fixed disk drive types 48 and 49 are user defin-
able. Values may be entered for the number of
cylinders, number of heads, write pre–compensa-
tion cylinder, and number of sectors per track.
When using some IDE hard drives, pressing <F1>
when drive type 48 or 49 is selected will read the
parameters directly from the drive itself.

PC-450 Fixed Disk Drive Types													
Type	Cyl	Hd	Pre	LZ	Sec	Size	Type	Cyl	Hd	Pre	LZ	Sec	Size
1	306	4	128	305	17	10	22	733	5	300	733	17	30
2	615	4	300	615	17	20	23	306	4	0	336	17	10
3	615	6	300	615	17	30	24	612	4	305	663	17	20
4	940	8	512	940	17	62	25	612	2	300	612	17	10
5	940	6	512	940	17	46	26	614	4	none	614	17	20
6	615	4	none	615	17	20	27	820	6	none	820	17	40
7	462	8	256	511	17	30	28	977	5	none	977	17	40
8	733	5	none	733	17	30	29	1023	9	none	1023	17	76
9	900	15	none	901	17	112	30	1024	5	none	1024	17	42
10	820	3	none	820	17	20	31	1024	8	none	1024	17	68
11	855	5	none	855	17	35	32	809	6	128	809	17	40
12	855	7	none	855	17	49	33	830	7	none	830	17	48
13	306	8	128	319	17	20	34	830	10	none	830	17	68
14	733	7	none	733	17	42	35	776	8	0	775	33	100
15	Not available						36	1024	8	none	1024	17	68
16	612	4	0	663	17	20	37	615	8	128	615	17	40
17	977	5	300	977	17	40	38	615	8	none	615	17	40
18	977	7	none	977	17	56	39	925	9	none	925	17	69
19	1024	7	512	1023	17	59	40	1025	9	none	1023	17	76
20	733	5	300	732	17	30	41-47	Not available					
21	733	7	300	732	17	42	48-49	User defined					
Cyl = # of cylinders per drive							LZ = # of landing zone						
Hd = # of heads per drive							Sec = # of sectors per cylinder						
Pre = Write Pre-comp							Size = Capacity in MBs						

**Base
Memory**   This field is used to specify the amount of base
memory size available for use in the system, either
512K or 640K. On the PC–450, 640K is always
free.

**Extended
Memory**   This field is used to specify the amount of
extended memory. Extended memory is located
above 1 MB in the CPU address space. The value
for this field must be entered in multiples of 64K,
from 0K to 31744K.

Display   This field is used to specify the primary display adapter installed in the system. This setting will always be EGA or VGA.

Advanced Feature Control Menu

Numlock   This field is used to specify the state of the Numlock key.

486 Cache   The user may enable or disable the initialization of the 486 internal cache.

Shadow System   If the system has at least 1 MB of system RAM installed, it is possible to "shadow" the system BIOS and, if installed, the video BIOS. If these options are enabled, the respective BIOSes will be copied from ROM and into RAM between 640K and 1 MB and then write protected. The BIOS code will be executed from RAM instead of ROM, thus dramatically improving the performance of the system and video BIOS functions.

Boot Device Order   This option allows the user to select the hard drive as the primary boot device, even if a bootable floppy is in drive A:.

NOTE: The boot device order is only effective when OCTSETUP has set the boot device to floppy/hard drive, and no boot BIOS is enabled. Refer to the section, "Octagon BIOS OCTSETUP."

Password   If this option is set to "Enabled", the user will be prompted to enter a password. The password can be 3 to 7 characters in length. The user will then be prompted for the password each time the system is turned on or SETUP is entered, either by pressing <CTL><ALT><S> on bootup or by executing DOSETUP from the DOS prompt.

Technical Option Control Menu

Dynamic Memory Sizing   If Dynamic Memory Sizing is enabled, the BIOS will determine the amount of memory installed in the system and configure the system parameters accordingly. If Dynamic Memory Sizing is disabled, the following parameters must

be configured to reflect the size and quantity of DRAM installed.

Block x DRAM Type   This field is used to specify the type of DRAM installed in a block:
- 1 MB (256 KBit x 4)
- 4 MB (1 MBit x 4)
- 16 MB (4 MBit x 4)

Block x Start   This field is used to specify the start address of the DRAM block which ranges from 0 MB to 126
Address   MB in 1 MB increments.

Block x Interleave   This field is used to specify whether a block is involved in an interleave. Blocks must be interleaved in even/odd pairs:
- Block 0 with Block 1
- Block 0 with Block 3
- Block 2 with Block 1
- Block 2 with Block 3

CHIPSet Register Control Menu

This menu is only required when you are using a boot BIOS, such as the standard SCSI boot BIOS, in your system and you need to change the register. For each register, a description of the bits or bit field within the register will display on the right side of the screen.

CAUTION: When using the register control menu, use extreme care. The values entered into the registers can prevent the PC–450 from working properly.

CMOS DISCHARGE

If you need to reset the ATBIOS back to the default settings, use the following steps.

NOTE: Discharging the CMOS will also discharge the SSD2 SRAM, which causes you to lose any files or information stored there.

1. Power–off the PC–450.

2. Move the jumper at W5[1–2] to W5[3–4]. Wait 2 seconds.

PC-450 CMOS Discharge: W5	
Pins Jumpered	**Description**
[1-2]*	Normal operation
[3-4]	Discharge CMOS memory. Make sure power is OFF.

* = default

3. Move the jumper back to W5[1–2] and power on the PC–450.

4. Press <CTL><ALT><S> during bootup to access the ATBIOS SETUP menus.

OCTAGON BIOS OCTSETUP

The OCTSETUP.EXE program defines the PC–450 system parameters other than those configured by the ATBIOS SETUP program. It is shipped with default configuration parameters stored in the EEPROM, U3. Changes are made by running the OCTSETUP program which is stored on the BIOS drive and on the PC–450 utility disk.

PC-450 OCTSETUP Parameters	Description	Default
SSD0 Device (optional)	Defines the flash PEROM size installed	2 MB
SSD1A Device	Defines the EPROM size installed	None
SSD1B Device	Defines the EPROM size installed	None
SSD2 Device	Defines the SRAM size installed	None
Boot Device	Defines the system boot drive	BIOS Drive
Boot DOS	Defines boot operating system	ROMDOS
Ethernet I/O	Defines the base address for the Ethernet interface	300-31FH
Ethernet IRQ	Defines the Ethernet interrupt	IRQ9
Oncard SCSI/Network, etc. BIOS	Enables oncard extended BIOS for SCSI hard drive, etc.	Disabled

If you are running OCTSETUP for the first time and have not previously saved and autoexecuted your program, we recommend that you keep the default setting, "Boot Device=BIOS drive." The PC–450 will continue to boot from the BIOS drive until you have verified that your program files are successfully saved to SSDx. Once your program is tested and verified, you can run OCTSETUP to configure the system to autoexecute your program.

RUNNING OCTSETUP

1. Make sure a keyboard and monitor are connected to the PC–450.

2. Make sure the jumper W8[9-10] is enabled and W8[11-12] is disabled. This configures the system to automatically boot from the BIOS drive using the factory default settings for the OCTSETUP program.

PC-450 Boot Options: W8	
Pins Jumpered	**Description**
[1-2]*	Use video BIOS or system BIOS from SSD1A (systems without SSD0 flash)
[3-4]†	Use video BIOS or system BIOS from SSD0 (systems with SSD0 flash)
[5-6]	Uses video BIOS at C000H (VGA).
[7-8]*†	Uses video BIOS at D000H. Reprogrammable via PGMVIDEO (SSD0 installed) or 450EPROM.BAT (SSD1 installed).
[9-10]	Boots from the BIOS drive.
[11-12]*†	Boots from OCTSETUP boot device.

* = default for models booting from EPROM

† = default for models booting from flash

3.   Power on the PC–450.

4.   At the prompt, type:

```
OCTSETUP
```

5.   The system displays the PC–450 setup parameters and available options. Select the option by pressing the space bar until the correct information appears, then press <ENTER>. Press <ESC> if you want to exit without saving your responses.

NOTE: The asterisk indicates the factory default setting. Also, some options may/may not display depending on how other options have been configured.

- **SSD0 Device:**
  ```
  None*
  2 MB flash*
  4 MB flash
  ```

- **SSD1A Device:**
  ```
  None*
  512K EPROM
  1 MB EPROM
  ```

- **SSD1B Device:**
  None*
  512K EPROM
  1 MB EPROM

- **SSD2 Device:**
  None*
  128K SRAM
  512K SRAM

- **Boot Device:**
  BIOS drive*
  SSD0A
  SSD0B
  SSD1A
  SSD1B
  Floppy/Hard drive

- **Boot DOS:**
  ROM–DOS*
  User supplied DOS or full ROM-DOS

- **Ethernet I/O:**
  280H–29FH
  300H–31FH*
  320H–33FH

- **Ethernet IRQ:**
  IRQ3
  IRQ9*
  IRQ10
  IRQ11

- **Oncard SCSI/Network, etc. BIOS:**
  Disabled*
  Enabled

```
Press enter to save these changes or ESC to
abort option changes

Saving configurations . . . . done.
```

6. The PC–450 configuration parameters are now saved to the serial EEPROM. Make sure the jumper at W8[9-10] is disabled and W8[11-12] is enabled. Reset the PC–450. The system will now use the options defined in OCTSETUP and boot from the specified device.

CHAPTER 5   SAVE & RUN PROGRAMS

SAVE AND RUN YOUR PROGRAMS ON THE PC–450

Once you have written, tested and debugged your application, you can then save it to the flash EPROM in SSD0A or SSD0B (optional) or in SSD1A, SSD1B using an external EPROM programmer. When you reboot the PC–450, your program automatically loads into DOS memory and executes.

This chapter tells you:
1. How to save an application program to SSD0A, SSD0B;
2. How to save an application program to SSD1A, SSD1B;
3. How to autoexecute the program from the PC–450; and
4. How to override autoexecution of your program.

The information in this chapter assumes you will be using ROM–DOS in your application. Some programs make undocumented MS–DOS calls. With ROM–DOS, an error will be returned when an undocumented DOS call is made, causing your program to operate erratically. We recommend using your own DOS when using programs with undocumented DOS calls.

SAVING PROGRAM AND SUPPORT FILES

In addition to your application program, you must also transfer support files to the PC–450 to ensure proper operation. These files include the ROM–DOS COMMAND.COM, CONFIG.SYS, AUTOEXEC.BAT and other files specific to your application. ROM–DOS COMMAND.COM is required to boot the PC–450 with ROM–DOS from SSD0A, SSD0B, SSD1A, or SSD1B. AUTOEXEC.BAT defines the routine for autoexecution of your program. CONFIG.SYS defines the various device drivers of your PC–450 system. The following is an example listing of CONFIG.SYS entries for the device drivers included with the PC–450. The device drivers are discussed in greater detail in Appendix A, "Software Utilities." Refer to Appendix B for more information on how the PC–450 assigns drive designators:

```
DEVICE=VDISK.SYS 128            Accesses a virtual drive
DEVICE=MEMDRIVE.SYS  SSD0A      Accesses the SSD0A drive
DEVICE=MEMDRIVE.SYS  SSD0B      Accesses the SSD0B drive
DEVICE=MEMDRIVE.SYS  SSD1A      Accesses the SSD1A drive
DEVICE=MEMDRIVE.SYS  SSD1B      Accesses the SSD1B drive
DEVICE=MEMDRIVE.SYS  SSD2       Accesses the SSD2 drive
DEVICE=MEMDRIVE.SYS  BIOS       Accesses the BIOS drive
```

NOTE: We recommend you include in your CONFIG.SYS file the entry DEVICE=MEMDRIVE.SYS BIOS. This allows you to easily access utility programs (OCTSETUP, TRANSFER, etc.) that are located on the BIOS drive.

To Save Files to the PC–450 SSD0A, SSD0B

This section assumes that the optional SSD0 flash PROM is installed on the PC-450. The following information steps you through transferring, saving and autoexecuting a program using the DEMO application and the user drive SSD0A or SSD0B. All the files for this application are located on the PC–450 utility disk in the DEMO directory. The two programs, DISKSAVE and DISKSEND, transfer and save the files on a floppy disk to the flash EPROM. The DISKSAVE program resides on the BIOS drive of the PC–450 and the DISKSEND program resides on the PC–450 utility disk.

1. Copy the following files from the PC–450 utility disk into a subdirectory on your hard drive named \DEMO:

    ```
    COMMAND.COM
    CONFIG.SYS
    AUTOEXEC.BAT
    MEMDRIVE.SYS
    DEMO.EXE
    ```

2. Copy the file DISKSEND.EXE from the PC–450 utility disk to your PC. Make sure the file is in your DOS PATH or in your current directory.

3. Connect a VTC–9F cable and a null modem adapter between COM1 on the PC–450 to a COM port on your PC.

4. Make sure the SSD0 device is configured correctly via the OCTSETUP program.

5. On the PC–450, execute the DISKSAVE program by typing:

    ```
    C>DISKSAVE /X /DSSD0A
    ```

    NOTE: Depending on the drive you are programming, the designation will change from SSD0A or SSD0B. Refer to DISKSAVE in Appendix A for more information.

    The system displays the following message:

    ```
    Attempting connection with DISKSEND on remote host.
    ```

6. From your PC, execute the DISKSEND program by typing:

    ```
    C>DISKSEND \DEMO
    ```

    The system then erases and programs the flash EPROM. This takes several minutes. Once DISKSAVE/DISKSEND completes, press the reset button or type:

    ```
    RESET
    ```

7. Display and verify the contents of flash EPROM:

    ```
    DIR E:
    ```

    NOTE: The drive designator will vary depending on your system configuration.

8. Test run the DEMO program:

    ```
    E:DEMO
    ```

To Save Files to the PC-450 SSD1A, SSD1B

DISKSAVE.EXE, on the PC-450 utility diskette, is used to create a disk image of user programs to be programmed into the EPROM for SSD1A or SSD1B. A directory on your desktop PC is created, programs to be included are copied to that directory and then DISKSAVE is executed. Refer to DISKSAVE.EXE in Appendix A for additional information.

If SSD0 Flash EPROM Is Installed

The following example only creates an image of files to be pro-grammed into the SSD1A EPROM:

```
md C:\TEST
copy C:\PC450\DEMO\*.* C:\TEST
DISKSAVE C:\TEST /DSSD1A /S1M
```

A disk image, SSD1A.IMG, is created from the directory C:\TEST, is to be used for SSD1A and the specified size of the EPROM is 1 MB. The SSD1A.IMG can then be programmed into an EPROM using an off-board programmer.

The same process is uded for SSD1B with the /D option changed to /DSSD1B.

If SSD0 Is Not Installed

If SSD0 is not installed, SSD1A must be used for the BIOS drive. The BIOS drive includes the required system and video files. If a 1 MB EPROM is used, SSD1A can also be used for storing addi-tional user programs. Refer to the 450EPROM.DOC file located in the \EPROM directory on the PC-450 utility diskette. The 450EPROM.BAT file is used to create the disk image file which includes all of the system files, a flat panel video BIOS, if required, and the user disk image created with DISKSAVE.

DISKSAVE.EXE is used to create a disk image of user programs to be combined with the required files for SSD1A. Refer to the section above.

AUTOEXECUTING YOUR PROGRAM

Once you've saved your program and other files to the flash EPROM in SSD0A or SSD0B, or in EPROM in SSD1A or SSD1B, you may autoexecute your program at bootup.

1. Make sure the name of your application program is listed in the AUTOEXEC.BAT file (e.g., DEMO) which you programmed into the flash EPROM.

    NOTE: If you can execute OCTSETUP (from the BIOS drive or a utility floppy disk) skip to step 4.

2. Make sure jumper W8[9-10] is enabled and W8[11-12] is disabled.

3. Power on the PC–450. The system will boot from the BIOS drive.

4. Execute the OCTSETUP program and specify the boot device, i.e., SSD0A, SSD0B, SSD1A, or SSD1B.

5. Power off the PC–450 and change W8[9–10] to W8[11–12], then power on the PC–450.

   The system resets and boots from the selected SSD device. The SSD device now becomes drive C (when no hard drives are installed) or drive D (when one hard drive is installed.)

OVERRIDING PROGRAM AUTOEXECUTION FROM THE SSD DRIVE

If you want to 'override' autoexecution of your program, you must reboot the PC–450 from the BIOS drive. There are three options available:

1. You can rerun OCTSETUP and change the configuration to boot the BIOS drive. If you included the line `DEVICE=MEMDRIVE.SYS BIOS` in your CONFIG.SYS file, you can access the OCTSETUP program on the PC–450 BIOS drive.

2. You can rerun OCTSETUP if you included the program on a local drive, e.g., the boot drive or floppy/hard drive.

3. You can enable jumper W8[9–10] and disable W8[11-12].

Running OCTSETUP Again

1. Make sure you have a keyboard and monitor attached to the PC–450.

2.   Execute OCTSETUP which is on the BIOS drive, (or boot drive, floppy/hard drive) and type:

```
D:OCTSETUP
```

NOTE: The drive designator will vary depending on the hardware configuration of the PC–450.

3.   Select the "BIOS drive" as the boot device.

4.   Type:

```
E:RESET
```

5.   Make the necessary changes to your application and copy the new files to a subdirectory on your local hard drive, floppy disk or RAM disk.

6.   Reprogram the SSD in use by following the steps above. Verify and test your program.

7.   Rerun SETUP to change the boot device to the appropriate option.

8.   Reset the PC–450.

W8 Jumper Changes

If the OCTSETUP program is not accessible from the SSD boot device or any other local drive, you must enable jumper W8[9–10] and disable W8[11-12]. The PC–450 will then boot from the BIOS drive using ROM–DOS.

After booting from the BIOS drive, reprogram the SSD in use by following the procedure in the previous section, "Running OCTSETUP Again." Before rebooting the PC–450, be sure to disable jumper W8[9–10] and enable W8[11-12] if you want the PC–450 to boot a device other than the BIOS drive.

CHAPTER 6   SERIAL PORTS

DESCRIPTION

The PC–450 has three serial ports COM1, COM2 and COM3 that are 16C550 compatible. They can be used for interfacing to a printer, terminal or other serial device. These ports support: 5–, 6–, 7–, or 8–bit word lengths; 1, 1.5, or 2 stop bits, and baud rates up to 115.2K. LEDs show the status of TX1, RX1, TX2 and RX2 signals.

COM3 is also jumper selectable between RS–232 and RS–422/485.

COM1/COM2/COM3 Serial Ports: J5, J6 & J7		
Pin #	COM1/COM2 Function	COM3 Function
1	DCD	
2	DSR	
3	RxD*	RxD*
4	RTS	RTS
5	TxD*	TxD*
6	CTS	CTS
7	DTR	
8	RI	
9	Gnd	Gnd
10	+5V	+5V

* = active low

Use a VTC–9F cable to connect the ports to the external serial equipment. The pinout of the connector allows you to plug the cable directly into a 9–pin PC serial connector. When interfacing the PC–450 to your PC, you need to use a null modem adapter.

LEDS

LED CR7 indicates TX1, CR6 indicates RX1, CR8 indicates TX2, and CR9 indicates RX2. Refer to Figure 2-1 for the location of the LEDs.

COM3 AS RS–422/485

COM3 is jumper selectable for either RS–232 or RS–422/485 communications at jumper block W1. Make sure the correct jumpers are set for RS–422/485 prior to using the port.

PC-450 COM3 Configuration: W1	
Pins Jumpered	**Description**
[1-3]	IRQ7
[3-5]*	IRQ4
[9-10]*	4-wire RS-422
[7-8]	2-wire RS-485 (DCD Receiver Enable)
[4-6]	Receive Data from RS-485
[2-4]*	Receive Data from RS-232
[11-13][12-14]*	RS-485 Receiver terminated
[13-15][14-16]	RS-485 Receiver not terminated

 * = default

When using COM3 as RS–422/485, the transmitter and receiver are not optically isolated, therefore, you must avoid ground loops. You should only send signals through the RS–422/485 lines, not power or power grounds. Power grounds cannot be used as a reference ground for RS–422/485 signals. You will need to establish a common ground reference before implementing your RS–422/485 network. The maximum common mode voltage output is +/-7V. Refer to the EIA 485 specification for further details on grounding and safety procedures.

You can connect up to 32 units on a multidrop RS–422/485 network. However, only one transmitter can be active at a time. Although no wire type or maximum wire length is specified in the EIA 485 specification, the EIA 422 specification (which is very similar) lists a maximum length of 4000 feet.

The RS–422/485 port is accessed through COM3 via terminal block P3. It supports two–wire or four–wire transmissions. Jumper block W1[7–8][9–10] determines the transmission method.

The following diagrams show how a typical two–wire or four–wire mode network is implemented:

RS-422/485
2 Wire (Half Duplex) Transmission
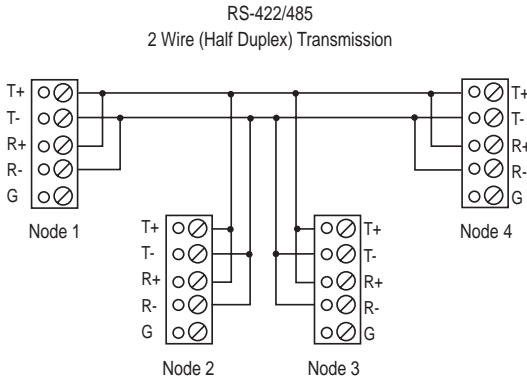
Figure 6–1—Two–Wire Network

RS-422/485
4 Wire (Full Duplex)
Transmission
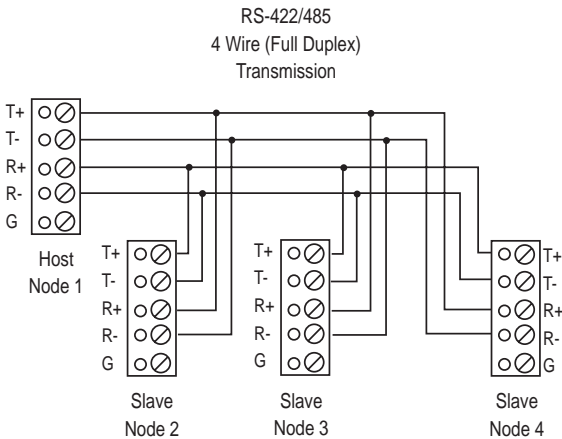
Figure 6–2—Four–Wire Network

Transmitter Control

To turn the transmitter ON and OFF through software control refer to the following table:

RS-422/485 Transmitter Control		
Program Statement	**Description**	**COM Port**
Read/Modify/Write a "1" to bit 2, I/O location 3EC	Disables transmitter, Enables receiver input	COM3
Read/Modify/Write a "0" to bit 2, I/O location 3EC	Enables transmitter, Disables receiver input	COM3

Termination Network

Jumper block W1[11–12–13–14–15–16] installs or removes the termination network. A termination network must be installed at the first and last receiver of the network. Failure to do so may cause spurious oscillation on the receive line and corrupt incoming data.

INTERRUPTS

The PC Bus does not allow shared interrupts on the bus. By default, the interrupts are disabled for COM1 and COM2. The factory default sets the interrupt for COM3 to IRQ4 which is the same interrupt used by COM1. If your application requires both COM1 and COM3 to support interrupts, you can change the interrupt for COM3 via jumper block W1[1–3] (IRQ7) or W1[3–5] (IRQ4).

You can also disable via software the COM1 and COM2 interrupts (IRQ4 and IRQ3) to allow for other devices which use these interrupts. To disable interrupts for COM1, write a 0 to 3FC bit 3. To disable COM2, write a 0 to 2FC bit 3.

CHAPTER 7   WATCHDOG TIMER & NMI

WATCHDOG TIMER

The watchdog timer is a failsafe against program crashes or processor lockups. The watchdog times out every 1.6 seconds. The address for the watchdog timer enable port is 384H. The timer is software disabled when you write a "0" to address 384H. This is the default setting on power–up or reset.

When you want to start using the watchdog timer, write a "1" to address 384H. You must write (any data) to 210–217H within the timeout period to prevent the board from resetting. When you write to 210–217H, the timer resets and begins counting down again. The following table lists the software enable and strobe information:

Watchdog Timer Software & Strobe Addresses	
Enable Base Address 384H	**Strobe Base Address 210-217H**
Timer disables = 0* Timer enabled = 1	Write any data to this address to reset timer

 * = default

WATCHDOG LATCH

The watchdog latch allows you to add a buzzer or light in series with a button, which can be reset should the watchdog timeout. The latch is available through jumper block J20:

PC-450 Watchdog Latch: J20	
Pin #	**Description**
1	Gnd
2	Normally Open
3	Gnd
4	Normally Open

The following diagram shows a typical circuit for the watchdog
latch:
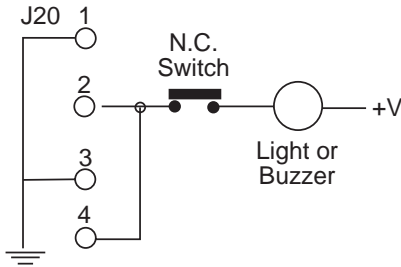
Figure 7–1—Typical Watchdog Latch Circuit

NMI

The PC–450 will generate an NMI interrupt if power drops below a
preset level. This allows you to save critical application data
before power fails. The input is jumper selectable at W9 to
monitor the on–card 5V supply or external power (usually voltage
input to the power supply regulator). To preset the power fail
level, use the following formula and resistor values:

$$V_{TP} = 1.25(1 + R131/R132)$$

where V_{TP} = trip point voltage desired

NOTE: V_{TP} is factory set to 4.75V. The default for R131 is 28K
and R132 is 10K.

PC-450 Power Fail Source: W9	
Pins Jumpered	**Description**
[1-2]*	Source is the +5V
[3-4]	Connects to source which is off card

 * = default

If you want to monitor the pre–regulated power, you must connect this voltage to W9 pin 3. You must also size R131 and R132 for a new V_{TP}.

If you are monitoring powerfail, you must also set the jumper block W10[3–4]. This selects the powerfail logic as the source of the NMI interrupt. Alternately, you can configure the PC–450 to generate an NMI interrupt from the PC/104 interface.

PC-450 NMI Source Select: W10	
Pins Jumpered	**Description**
[1-2]*	Source is PC/104 IOCHECK
[3-4]	Source is on-card watchdog/power fail circuit

 * = default

HARDWARE RESET

The PC–450 has a button which allows you to reset the system without turning off the power. This provides a more complete reset than the <CTL><ALT><DEL> method. The RESET command also accomplishes the same thing as the reset button. J21 allows you to connect an external switch closure to the PC–450. The switch must be a "normally open" type.

Remote Reset

In addition to the push-button reset, there is a separate input so that the PC–450 can be remotely reset. The remote reset is optically isolated so that extraneous noise will not trigger erroneous resets. The remote reset is connected to P4.

PC-450 Remote Reset: P4	
Pin #	**Description**
1	Reset
2	Gnd

The voltage at P4 pin 1 must be greater than 2.0 VDC with respect to P4 pin 2 in order to reset the system. Pulse P4 pin 1 high for a period greater than 50 mS, then low.

CHAPTER 8   LPT1 PARALLEL PORT

LPT1 PARALLEL PORT

The LPT1 parallel port has a 26–pin connector at J8. It can be used to support a number of devices including a PC compatible printer, multiline display or matrix keypad.

PC-450 LPT1 Printer Port: J8		
Pin #	Function	
1	Out	STB*
2	Out	AFD*
3	I/O	DATA 0
4	In	ERR*
5	I/O	DATA 1
6	Out	INIT*
7	I/O	DATA 2
8	Out	SLIN*
9	I/O	DATA 3
10		Gnd
11	I/O	DATA 4
12		Gnd
13	I/O	DATA 5
14		Gnd
15	I/O	DATA 6
16		Gnd
17	I/O	DATA 7
18		Gnd
19	Out	ACK*
20		Gnd
21	In	BUSY
22		Gnd
23	In	PE
24		Gnd
25	In	SLCT
26		+5

* = active low

PRINTER

To install a printer:

1. Use an Octagon VTC–5/IBM cable from the LPT1 port (J8) to the 25–pin connector on your printer cable.

2. Connect the cable to your printer.

DISPLAY

The LPT1 port supports either 4x20 or 4x40 liquid crystal displays (LCD). To interface the displays to the PC–450, use the Octagon 2010 interface board. A CMA–26 cable is required to connect the interface board to the PC–450. The program DISPLAY.EXE (found on the PC–450 utility disk in the \DISPLAY subdirectory) provides an easy method to use the display. Please refer to the file DISPLAY.DOC on the utility disk for information on initializing and using the display. Also, refer to the *2010 Product Sheet* for information on the interface board. To install a display:

1. Connect a CMA–26 cable from the LPT1 port to J1 on the 2010.

2. Connect the display cable to either the 14–pin or 16–pin header on the 2010. The size of the display will determine which header to use.

3. Refer to the file DISPLAY.DOC for more information on initializing and using the display.

KEYPAD

LPT1 also supports 4x4 matrix keypads. To interface the keypad to the PC–450, use the Octagon 2010 interface board. A CMA–26 cable is required to connect the interface board to the PC–450. The program DISPLAY.EXE (found on the PC–450 utility disk) provides an easy method to use the keypad. Refer to the file DISPLAY.DOC on the utility disk for information on initializing and using the keypad. Also, refer to the *2010 Product Sheet* for information on the interface board. To install a keypad:

1. Connect a CMA–26 cable from the LPT1 port to J1 on the 2010.

2. Connect the keypad cable to the 10–pin header on the 2010.

3. Refer to the file DISPLAY.DOC for more information on reading the keypad.

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DIAGNOSTICS DISPLAY

The PC–450 diagnostics port is a 4–digit display that supports the alpha/numeric ASCII character set. It is located at I/O locations 218–21FH. The port can be used by applications programs to display the status and other information. The register set for the 4–digit display consists of five separate registers described as follows:

PC-450 Diagnostic Display Port	
I/O Location	**Description**
218H	Control Word
219H	Control Word
21AH	Control Word
21BH	Control Word
21CH	Digit 0 (rightmost)
21DH	Digit 1
21EH	Digit 2
21FH	Digit 3 (leftmost)

The Control Word Register bits have the following definition:

CLEAR
 D7 = 0   Standard operation
 D7 = 1   Clear the entire display

LAMP TEST
 D6 = 0   Standard operation mode
 D6 = 1   Display all dots at 50% brightness

BLINK
 D5 = 0   Blink attribute disabled
 D5 = 1   Blink entire display

ATTRIBUTE ENABLE
 D4 = 0,   Disable above attributes
 D4 = 1,   Enable above attributes

ATTRIBUTES

    D3, D2 = 0, 0   Display cursor instead of character
    D3, D2 = 0, 1   Blink character
    D3, D2 = 1, 0   Display blinking cursors instead of character
    D3, D2 = 1, 1   Alternate character with cursor

BRIGHTNESS

    D1, D0 = 0, 0   0% (blank)
    D1, D0 = 0, 1   25%
    D1, D0 = 1, 0   50%
    D1, D0 = 1, 1   100%

The digit display registers at ports 21C–21FH support the standard ASCII character codes. If the high bit is set, the associated attribute that is set in the control word is enabled for that digit. If the high bit is cleared, the associated attribute is not enabled for that character.

Example

```
#include <DOS.H>
#define DiagDisplay 0x218

void main (void)
{
/* Display PASS on the PC450 */
/* Diagnostic display */
   outportb (DiagDisplay+7, 'P');
   outportb (DiagDisplay+6, 'A');
   outportb (DiagDisplay+5, 'S');
   outportb (DiagDisplay+4, 'S');
}
```

CHAPTER 10   CRTs AND FLAT PANELs

DESCRIPTION

The PC–450 supports a variety of high–performance flat panels
and SVGA CRT monitors. Monitor resolutions up to 1024 x 768
and flat panel resolutions up to 1280 x 1042 are supported. The
video controller uses 1 MB of video DRAM. The video controller
circuit operates on the local bus device at the full processor speed
allowing for faster execution of programs such as Windows.
Standard VGA monitors with analog inputs are connected using a
DB–15 connector at J3. Flat panel displays are connected using a
50–pin connector at J2. Please refer to the utility disk for addi-
tional information on flat panel displays. An LED CR5 indicates
video activity.

| WARNING: | Octagon assumes no responsibility for any damage caused to flat panel displays and/or the PC-450 if the display is connected incorrectly. |

PROGRAMMING THE VIDEO BIOS

The following section applies only to a PC-450 with the SSD0
option installed. If SSD0 is not installed, refer to the section, "To
Save Files to the PC-450 SSD1A, SSD1B" in Chapter 5, "Save and
Run Programs." 450EPROM.BAT is to be used with a VIDEO.DAT
file for reprogramming the video BIOS. When the new BIOS has
been programmed and installed into the PC-450, refer to the
section, "Connecting the Monitor/Display" later in this chapter.

The PC–450 is factory configured and programmed for a VGA
analog monitor. If you wish to use a monitor other than the
default or a flat panel display, you must reprogram the video BIOS
for the appropriate display. If you are using the default monitor
and have not previously reprogrammed the video BIOS, please skip
to the section, "Connecting the Monitor/Display".

1.   Make sure a standard VGA monitor and AT/PS–2 compatible
     keyboard are attached to the PC–450.

2.   Make sure W8[7–8] is enabled and W8[5–6] is disabled.

PC-450 Boot Options: W8	
Pins Jumpered	**Description**
[1-2]*	Use video BIOS or system BIOS from SSD1A (systems without SSD0 flash)
[3-4]†	Use video BIOS or system BIOS from SSD0 (systems with SSD0 flash)
[5-6]	Uses video BIOS at C000H (VGA).
[7-8]*†	Uses video BIOS at D000H. Reprogrammable via PGMVIDEO (SSD0 installed) or 450EPROM.BAT (SSD1 installed).
[9-10]	Boots from the BIOS drive.
[11-12]*†	Boots from OCTSETUP boot device.

* = default for models booting from EPROM

† = default for models booting from flash

3.   Power on the PC–450.

4.   Download the file, PGMVIDEO.EXE, and *.DAT file for your display (e.g., LQ10DH11.DAT) from your PC to the PC–450 virtual drive. These files are found on the VGA65540 utility disk in the \PC450 and \BIOS subdirectories. Refer to Chapter 5, "Save and Run Programs" for detailed information on downloading files.

  NOTE: If you are using a flat panel display, refer to the README.DOC file on the VGA540 utility disk for a list of the supported displays. If your particular display is not currently listed, please contact Octagon Technical Support (303–426–4521) for assistance.

5.   To program the PC–450 for the appropriate monitor/display, type the following:

```
<drive>:PGMVIDEO  <drive>:LQ10DH11.DAT
```

  The <drive> designator is the virtual drive where you trans-ferred the files from your PC. The *.DAT file will change depending on the type of display you are using.

6. The system displays the following message:

```
PGMVIDEO Vx.xx
Octagon Systems (c) Copyright 1994
This utility programs a new video BIOS into the
PC–450.

Programming Video BIOS from LQ10DH11.DAT

The system may lock up if you are currently
using the Video BIOS which is being overwritten,
and the video BIOS is not currently shadowed.
You must reset the system when complete.  If the
system does not operate correctly with the new
video BIOS, move jumper W8[7–8] to W8[5–6] to
use primary video BIOS.

Erasing the flash EPROM.
.
Erase complete.
Programming the flash EPROM.
. . .
Programming complete.
```

7. Power–off the PC–450 and attach the appropriate monitor or flat panel display. Refer to "Connecting the Monitor/Display."

CONNECTING THE MONITOR/DISPLAY

The PC–450 supports both an analog monitor and/or a flat panel display. The programs CT.COM and FP.COM allow you to toggle between displaying the monitor and the flat panel. The program SM.COM allows you to display from the monitor and the flat panel simultaneously. These programs are found on the VGA65540 utility disk in the \UTIL subdirectory along with other diagnostic and configuration utilities. Refer to the README.DOC file.

Analog Monitor
1. The DB–15 connector at J3 supports an analog VGA color or monochrome monitor. Plug the cable supplied with your monitor directly into J3.

PC-450 SVGA Connector: J3			
Pin #	Function	Pin #	Function
1	Red	9	NC
2	Green	10	Gnd
3	Blue	11	NC
4	NC	12	NC
5	Gnd	13	Horizontal Sync
6	Gnd	14	Vertical Sync
7	Gnd	15	NC
8	Gnd		

2. Make sure the video BIOS jumper W8[5–6] is enabled.
    W8[7–8] can be used if CRT.DAT is programmed using
    PGMVIDEO.EXE.

Flat Panel Display

1. Configure jumper block W2 for the flat panel bias polarity:

PC-450 Flat Panel Bias Polarity: W2	
Pins Jumpered	Description
[1-2]	Negative voltage
[3-4]*	Positive voltage

 * = default

2. Power on the PC–450 and measure VEESAFE at J2, pin 3 and
    adjust R3, VEE BIAS adjust, for the correct BIAS voltage for
    your flat panel display.

3. Power off the PC–450 and connect the flat panel display to the
    PC–450 using a 50–pin IDC connector. The following table
    lists the pin number and function for J2:

PC-450 Flat Panel Connector: J2			
Pin #	Function	Pin #	Function
1	VDDSAFE +5V	2	+12 VSAFE
3	VEESAFE	4	Reserved
5	ENABKL	6	Gnd
7	M	8	DE
9	Gnd	10	LP
11	FLM	12	Gnd
13	SHFCLK	14	Gnd
15	P0	16	P1
17	Gnd	18	P2
19	P3	20	Gnd
21	P4	22	P5
23	Gnd	24	P6
25	P7	26	Gnd
27	P8	28	P9
29	Gnd	30	P10
31	P11	32	Gnd
33	P12	34	P13
35	Gnd	36	P14
37	P15	38	Gnd
39	P16	40	P17
41	Gnd	42	P18
43	P19	44	Gnd
45	P20	46	P21
47	Gnd	48	P22
49	P23	50	Gnd

* = active low

4.   Make sure the video BIOS jumper W8[7–8] is enabled.

5.   Power on your PC–450.

6. A BIOS and DOS message similar to the following should appear on your display:

```
Octagon PC-450 BIOS Vers x.xx
Copyright (c) 1994 Octagon Systems Corp.
All Rights Reserved
```

7. The VEESAFE voltage may require additional adjustments in order to obtain the proper contrast.

CHAPTER 11   EXTERNAL DRIVES

DESCRIPTION

The PC–450 is compatible with all common floppy disk drives used in the PC. It will also drive up to 528 MB hard drives that have 16–bit IDE interfaces. The BIOS extension ROM for the hard drive is supplied on the card so that no additional software is needed. The floppy drives use DMA channel 2. An LED CR20 indicates hard drive activity.

FLOPPY DISK CONTROLLER

The PC–450 can interface directly to one or two 3.5 in. or 5.25 in. floppy drives via the connector at J12. Make sure the 34–pin floppy drive cable meets the following pinout requirements:

PC-450 Floppy Drives: J12			
Pin #	Function	Pin #	Function
1	NC	2	DSEL
3	NC	4	NC
5	NC	6	DRATE
7	+5	8	INDEX*
9	+5	10	MTR2 ON*
11	+5	12	DS1*
13	Gnd	14	DS2*
15	Gnd	16	MTR1 ON*
17	Gnd	18	DIR IN*
19	Gnd	20	STEP*
21	Gnd	22	WR DATA*
23	Gnd	24	WR GATE*
25	Gnd	26	TRK 00*
27	Gnd	28	WP*
29	Gnd	30	RD DATA*
31	Gnd	32	SIDE 1*
33	Gnd	34	DISKCHANGE

 * = active low

NOTE: If you wish to add a second floppy drive to your system, you must use a floppy drive cable which has two connectors.

Power Requirements

The PC–450 requires +5V for operation. You must also supply power to the floppy drive(s) through an external source. Refer to your floppy drive manual for specific instructions.

Installing a Floppy Disk Drive

NOTE: Some floppy drive manufacturers use an incorrectly installed keyed header on their floppy drives. The assumed pin 1 of the keyed header is actually pin 34. This causes problems when a customer assumes that connecting a keyed floppy cable into a keyed floppy cable header actually aligns pin 1 with pin 1. When this situation occurs, pin 1 is connected to pin 34, the floppy drive indicator remains continuously lit, the floppy drive cannot be accessed, and the PC-450 is wrongfully blamed.

Sony and Toshiba drives are noted to have an incorrectly installed 34-pin header. If you are experiencing these types of problems, investigate the floppy drive cable header. Determine the correct position of pin 1, usually by noting the actual pin numbers silkscreened on the circuit board. If this is the problem, either use a floppy cable with non-keyed connectors or remove the connector key and correctly align pin 1 to pin 1.

1. Disconnect power to the PC–450.

2. Insert one end of your cable into the rear of the floppy drive. Make sure pin 1 on the cable is connected to pin 1 on the drive.

3. Insert the other end of the cable into J12 on the PC–450.

4. Connect power to the floppy drive.

5. Execute the ATBIOS SETUP program to configure your system for a floppy drive. You can execute this program either by pressing <CTL><ALT><S> during system boot–up or by executing the file DOSETUP.EXE. This file is found on the PC–450 BIOS drive and the utility disk. The system will step you through the configuration. Also, refer to Chapter 4, "Setup", for more information on the ATBIOS SETUP program.

   WARNING: After DOSETUP is executed, the following prompt is displayed: `"Do you wish to reboot system?"` If you enter Y (yes), the system may lock up. Instead, enter N (no) and press <CTL><ALT><DEL>. This causes the system to do a warm reset.

6. If you want to boot the system from the floppy drive, you will need to create a bootable floppy disk. Run OCTSETUP to specify the boot device as a floppy/hard drive. Run DOSETUP to set the floppy type and boot device order.

> **NOTE:** When you boot from SSD0A/B or SSD1A/B using your own DOS (not ROM–DOS), only one floppy drive will be available, since DOS thinks that the flash EPROM is drive A. Connect your floppy disk drive to the second floppy connector and access it with "B:".

HARD DISK CONTROLLER

The PC–450 will drive up to 528 MB hard drives that have 16–bit IDE interfaces via a 44–pin connector at J11. Make sure your cable meets the pinout requirements of the following table:

PC-450 IDE Hard Drive: J11			
Pin #	**Function**	**Pin #**	**Function**
1	RESET*	2	Gnd
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	Gnd	20	KEY
21	Reserved	22	Gnd
23	IOWR*	24	Gnd
25	IORD*	26	Gnd
27	NC	28	BALE
29	NC	30	Gnd
31	IRQ 14	32	IO16*
33	ADDR1	34	NC
35	ADDR0	36	ADDR2
37	CS0	38	CS1
39	LED	40	Gnd
41	+5 LOGIC	42	+5 MOTOR
43	Gnd	44	NC

* = active low

Octagon Hard Drive Cable

The PC-450 uses a 2 mm header for the hard drive interface. This header is the same type that is used with 2.5" and smaller drives. The Octagon disk drive cable, model 4080, has a 2 mm connector on one end and two connectors, a 2 mm and a standard 0.1", on the other end. The 4080 cable connects to the PC-450 2 mm header and then will connect to either a 2.5" or smaller hard drive, or a standard 3.5" hard drive.

Installing a Hard Drive

1. Disconnect power to the PC–450.

2. Insert one end of the cable into the rear of the drive. Make sure pin 1 on the cable is connected to pin 1 on the drive.

3. Insert the other end of the cable into J11 on the PC–450.

4. Execute the ATBIOS SETUP program to configure your system for a hard drive. You can execute this program either by pressing <CTL><ALT><S> during system boot–up or by executing the file DOSETUP.EXE. This file is found on the PC–450 BIOS drive and the utility disk. The system will step you through the configuration. Also, refer to Chapter 4, "Setup," for more information on the ATBIOS SETUP program.

> **WARNING:** After DOSETUP is executed, the following prompt is displayed: `"Do you wish to reboot system?"` If you enter Y (yes), the system may lock up. Instead, enter N (no) and press <CTL><ALT><DEL>. This causes the system to do a warm reset.

5. If you want to boot the system from the hard drive, you will need to format the drive accordingly.

BOOTING WITH ROM–DOS

If you want to boot from a floppy/hard drive with ROM–DOS, do the following steps:

1. Boot from the PC–450 utility disk.

2. Execute the following command:

   ```
   SYS C:
   ```

3. The system copies COMMAND.COM as well as a hidden file to the hard drive.

CHAPTER 12   PC/104

DESCRIPTION

This connector allows you to interface to one or two PC/104 form factor modules including hard disks, A/D converters, digital I/O, serial ports, etc. The PC–450 supports 8– and 16–bit, 5V modules. These modules can be stacked on top of the PC–450 to form a highly integrated control system.
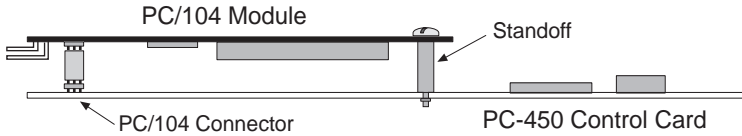
Figure 12–1—Typical PC/104 Module Stack

WARNING:	When installing any PC/104 module, care should be taken to avoid excessively flexing the PC–450 board.

The following table describes the pinouts for the PC/104 connector:

PC-450 PC/104 Bus Signal Assignments: P2				
Pin #	Row A	Row B	Row C	Row D
0	--	--	Gnd	Gnd
1	IOCHCK*	Gnd	SBHE*	MEMCS16*
2	SD7	RESETDRV	LA23	IOCS16*
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	OWS*	LA17	DACK0*
9	SD0	+12V	MEMR*	DRQ0
10	IOCHRDY	(KEY)	MEMW*	DACK5*
11	AEN	SMEMW*	SD8	DRQ5
12	SA19	SMEMR*	SD9	DACK6*
13	SA18	IOW*	SD10	DRQ6
14	SA17	IOR*	SD11	DACK7*
15	SA16	DACK3*	SD12	DRQ7
16	SA15	DRQ3	SD13	+5V
17	SA14	DACK1*	SD14	MASTER*
18	SA13	DRQ1	SD15	Gnd
19	SA12	REFRESH*	(KEY)	Gnd
20	SA11	SYSCLK	--	
21	SA10	IRQ7	--	
22	SA9	IRQ6	--	
23	SA8	IRQ5	--	
24	SA7	IRQ4	--	
25	SA6	IRQ3	--	
26	SA5	DACK2*	--	
27	SA4	TC	--	
28	SA3	BALE	--	
29	SA2	+5V	--	
30	SA1	OSC	--	
31	SA0	Gnd	--	
32	Gnd	Gnd	--	

* = active low

CHAPTER 13   ETHERNET

DESCRIPTION

The PC–450 Ethernet LAN interface is a local bus device that provides a high performance node controller that executes the algorithms necessary for network operation, including buffer management, collision detection and error reporting. It also performs the Manchester encoding and decoding and serial/parallel data conversions. It provides all the standard network interfaces: 10BASE–T (twisted pair), 10BASE–2 (coaxial) and AUI (DB–15 connector). The card will also accept an AUI fiber–optic interface with the addition of a 12V supply. The Ethernet controller from SMC is certified Novell compatible. Four LEDs are provided to indicate Ethernet activity.

LAN drivers for Novell Netware and Microsoft NDIS are supplied on the Ethernet utility disk.

CONFIGURING THE ETHERNET INTERFACE

The Ethernet interface is factory configured to use the default I/O address of 300–31FH and interrupt of IRQ9. If you wish to change these settings, you must run the OCTSETUP program and change the appropriate options. The jumpers at W3 allow you to configure the PC–450 to use either the default Ethernet settings, or to use the parameters as defined in the OCTSETUP program:

PC-450 Ethernet Configuration: W3	
Pins Jumpered	**Description**
[1-2]	Default I/O address is 300-31FH & IRQ9
[1-2] not jumpered*	Uses OCTSETUP configuration for Ethernet I/O address and IRQ
[3-4]*	Enables AUI/Twisted Pair connector
[3-4] not jumpered	Enables BNC connector

* = default

Jumper block W3 selects the network interface connector for either BNC or AUI/twisted pair. When the BNC connector is enabled, the system supplies –9V for this connector. If you are using 10BASE–T (twisted pair) or are **not** using the Ethernet interface, we recommend that you jumper W3[3–4] in order to conserve power.

PC-450 Ethernet BNC: J13	
Pin #	**Function**
1	RXI
2	COAXGND

NOTE: Ethernet 10BASE-2 has a characteristic impedence of 50 Ohms. A 50 Ohm load terminator must be placed at each end of the network.

The 10BASE–T or twisted pair interface is available at connector J15. It is a standard RJ–45 connector:

PC-450 Ethernet Twisted Pair: J15	
Pin #	**Signal**
1	TXTP+
2	TXTP-
3	RXTP+
4	NC
5	NC
6	RXTP-
7	NC
8	NC

The AUI connector is a DB–15 connector at J9:

| PC-450 AUI Connector: J9 ||
Pin #	Signal
1	Gnd
2	COLP
3	TXP
4	Gnd
5	RECP
6	Gnd
7	NC
8	NC
9	COLN
10	TXN
11	Gnd
12	RECN
13	+12V
14	Gnd
15	NC

CONFIGURING FOR NOVELL NETWARE

The PC–450 utility disk contains the Novell ODI workstation driver
SMC9000.COM. The disk also contains a network configuration
file, NET.CFG (located in the directory Netware\Station), which
defines the hardware settings for the PC–450. It is configured with
the following default factory settings:

```
LINK DRIVER SMC9000
    PORT 360
    INT 07
    MEDIA_TYPE 10BASET
    FRAME ETHERNET_802.3
```

NET.CFG for the PC–450 must be changed to reflect a port address
of 280, 300 or 320 and an interrupt of 03, 09,10 or 11 depending on
OCTSETUP settings.) Use any DOS editor to enter the appropriate

changes. Refer to the READ_FS.ME file on the Ethernet utility disk for the options for each setting.

In order to connect a workstation to the network, a copy of SMC9000.COM, NET.CFG and the Netware files LSL.COM, IPXODI.COM and NETX.COM must reside in the same directory. (**NOTE**: See your network administrator for the appropriate version of the Netware files.)

To connect the workstation to the network, you would execute files in the following sequence

```
Ver 5.0 (Only if running ROM–DOS)
lsl
smc9000
ipxodi
netx
```

   or

```
Ver 6.0 (Only if running ROM–DOS)
lsl
smc9000
ipxodi
netx
```

NOTE: The interrupt defined in the NET.CFG file will override any interrupt settings as defined by the OCTSETUP program or by jumper block W3[1–2]. The available interrupts are 03, 09, 10, and 11.

Refer to the READ_FS.ME file on the Ethernet utility disk for information regarding files servers. Contact Octagon Technical Support for information regarding other network drivers.

LEDS

LED CR16 indicates BSEL, CR17 indicates transmit, CR18 indicates link, and CR19 indicates receive.

CHAPTER 14   TROUBLESHOOTING

If your system is not working properly, check the following items:

System generates a BIOS message but locks up when booting from SSDx or boots from the BIOS drive even though SSDx was specified.

1. Enable W8[9–10] and disable W8[11–12] to force booting from the BIOS drive.

2. Press the reset button and reboot. Then note the drive designator for SSDx.

3. Display the directory of SSDx and verify that all the necessary boot files exist. If any files are missing, re-execute the steps in Chapter 5, "Save and Run Programs," after adding the missing files.

4. If no files are missing, remake SSDx to overwrite any files which may have become corrupted.

Booting from SSDx with DOS doesn't work:

1. Test the boot files using the original floppy on the floppy drive of your PC. Make sure all the necessary boot files are present.

MEMDRIVE.SYS reports SSDx device not present with EPROM installed.

1. You must program the EPROM using DISKSAVE and an external EPROM programmer.

MEMDRIVE.SYS reports smaller size disk than device installed in SSD1A/B.

1. Device was programmed from smaller disk than destination device using DISKSAVE and DISKSEND. For example, if 415K of file space is programmed into a 512K EPROM, only a 415K device will be reported.

MEMDRIVE.SYS reports SSD2 device not present.

1. Install a 128K/512K static RAM into SSD2. Make sure pin 1 is correct.

MEMDRIVE.SYS reports SSD0x device not present.

1. SSD0x must be programmed with DISKSAVE/DISKSEND first. See Chapter 5.

SSD2 contents are reformatted after every power cycle.

1. Make sure the CMOS battery is connected to J19 and jumper W7[1–2] is installed, W7[3–4] is removed and W5[1–2] is installed.

OCTSETUP can't write Ethernet setup.

1. You must remove W3[1–2] after system power is on and before running OCTSETUP.

TECHNICAL ASSISTANCE

Carefully recheck your system before calling Technical Support. Run as many tests as possible; the more information you can provide, the easier it will be for the Technical Support staff to help you solve the problem. For technical assistance, please call 303–426–4521.

CHAPTER 15   TECHNICAL DATA

TECHNICAL SPECIFICATIONS

CPU

DX2/66 and DX4/100.

NOTE: All systems require a heat sink and external fan. Failure to do so will cause system to shutdown.

	Freq	**Airflow - ft/min (m/sec)**					
		0 (0)	**200 (1.01)**	**400 (2.03)**	**600 (3.04)**	**800 (4.06)**	**1000 (5.07)**
AMD DX2 Ambient Temp. (°C) w/out Heat Sink, 3.3V	66	77.9	78.8	79.8	80.7	81.4	82.0
AMD DX4 Ambient Temp. (°C) w/out Heat Sink, 3.3V	100	74.2	75.6	77.1	78.5	79.6	80.5

Clock

33 MHz

DRAM (U53, U54)

Up to 32 MB DRAM. 1 MB, 4 MB or 16 MB, 32– or 36–bit 72–pin SIMMs.

Solid–State Disk 0, A and B (U20)

2 MB or 4 MB surface mounted flash EPROM (optional). Programmer built–in.

Solid–State Disk 1 A and B (U13, U26)

Supports 512K or 1 MB EPROMs for application program. Must use off–card programmer.

Solid–State Disk 2 (U34)

Supports 128K or 512K static RAMs that may be battery–backed. RAM not included. Uses same battery as calendar/clock (3.6V lithium connected to J19.)

ROM–DOS

Combined with BIOS ROM; DOS 6.0 compatible.

Serial I/O
COM1 (J6), COM2 (J5) and COM3 (J7) are 16C550 compatible.
COM3 is jumper selectable between RS–232 and RS–422/485 (P3).

Printer Interface
LPT1 at J8 is PC compatible. Supports LCD displays and 4x4
matrix keypads via Octagon 2010 Interface board.

Keyboard
IBM AT with PS2 style connector.

Mouse
IBM PS2 style

Floppy Disk Drive
3.5 in. or 5.25 in. format

IDE Hard Drive
2.5 in. or 1.8 in. format, up to 528 MB. May use an Octagon 4080
cable with the standard 3.5" hard drive.

SCSI
Standard SCSI or SCSI–2 devices.

Flat Panel
Monochrome, STN TFT, Color, EL, Plasma

Flat Panel Mating Connector
Use Thomas & Betts Ansley 609-5030 or equivalent mating
connector.

VGA Analog
Standard VGA or SVGA

Ethernet
10BASE–2, AUI and 10BASE–T supported.

Watchdog Timer
Default timeout is 1.6 seconds. Software enabled and strobed.
Disabled on power–up and reset. Address of the enable timer is
384H; address of strobe is 210–217H.

NMI

NMI generated from either on–card powerfail logic or PC/104 interface. Jumper selectable to monitor from either on–card 5V or external voltage.

Power Requirements

+5V at 3.1 A typical — fully populated
+5V at 4.65 A maximum

Environmental Specifications

–40° to 85° C operating; Processor heatsink and fan may be required at higher ambient temperatures.
–55° to 90° C nonoperating
RH 5% to 95%, noncondensing

Size

6.0 in. x 8.0 in.

Memory Map

PC-450 Memory Map (absolute)	
Address	**Description**
0000-9FFFH	System base memory
A0000-BFFFFH	Video memory
C0000-C7FFFH	Video BIOS
C8000-CFFFH	Off card
D0000-D7FFFH	Off card (Not available when boot BIOS is on card.)
D8000-DFFFFH	Optional boot BIOS or off card. (See OCTSETUP section to enable/disable)
E0000-E3FFFH	Window for SSDs
E4000-EFFFFH	SSD boot BIOS
F0000-FFFFFH	System BIOS
1000000 - 2000000H	Extended memory (up to 32 MB)

PC-450 I/O Map	
Hex Range	**Function**
0000-00FFH	Core logic I/O functions
00-0FH	DMA controller No. 1 (8 bits)
20-21H	Interrupt controller No. 1 (IRQ 7:0)
22-23H	Configuration & data ports
40-43H	Timer (8254)
60H	Keyboard data port
61H	Port B
64H	Keyboard command and status port
70H	Real time clock address port, NMI mask
71H	Real time clock data port
80-8FH	DMA page registers
92H	Fast CPU reset and GATEA20
A0-A1H	Interrupt controller No. 2 (IRQ15:8)
C0-DFH	DMA controller No. 2 (16 bit)
102	VGA controller
01F0-01FFH	Hard disk
0200-020FH	Game port
0210-0217H	Watchdog strobe
0218-021FH	Diagnostic port
0220H	Bank chip select register, Read/Write
	Bit 0 = Bank address 14
	Bit 1 = Bank address 15
	Bit 2 = Bank address 16
	Bit 3 = Bank address 17
	Bit 4 = Bank address 18
	Bit 5 = Bank address 19
	Bit 6 = Bank address 20
	Bit 7 = Bank address 21
0221H	Socket select register, Write
	Bit 0 = Socket select ID0
	Bit 1 = Socket select ID1
	Bit 2 = Socket window enable

PC-450 I/O Map continued	
Hex Range	**Function**
0221H	Socket select register, Read
	Bit 0 = Serial EEPROM data in
	Bit 1 = Socket select ID 0
	Bit 2 = Socket select ID 1
	Bit 3 = Window enable (1 = enabled)
	Bit 4 = No function
	Bit 5 = VBIOS jumper - W8[5-6][7-8]
	Bit 6 = PBIOS jumper - W8[9-10][11-12]
	Bit 7 = XBIOS jumper - W8[1-2][3-4]
0280-029FH	Ethernet range 1
02F8-02FFH	COM2 serial port
0300-031FH	Ethernet range 2 or W3[1-2] (jumper on)
0320-033FH	Ethernet range 3
0340-035FH	SCSI controller
0380H	Serial EEPROM chip select
0381H	Serial EEPROM data to device
0382H	Serial EEPROM clock
0383H	Serial EEPROM program enable
0384H	Watchdog enable
0385H	Flash program voltage enable
0386H	Flash write enable
0387H	COM1 and COM2 powerdown and LED
0398H	Data & index for Super I/O controller
0399H	Data & index for Super I/O controller
03B0-03BFH	Video mono mode (except 3BC-3BE)
03BC-03BEH	LPT1 printer port
03C0-03CFH	Video control - EGA
03D0-03DFH	Video color - CGA
03E8-03EFH	COM3 serial port
03F0-03F7H	Floppy disk interface
03F8-03FFH	COM1 serial port

INTERRUPTS

PC-450 Interrupts	
IRQ	**Function**
0	System timer
1	Keyboard controller
2	Cascade to second interrupt controller
3	COM2/COM4 (optional Ethernet)
4	COM1/COM3
5	Free
6	Floppy
7	LPT1 (jumperable to COM3)
8	Real time clock
9	PC/104 IRQ2 - Ethernet
10	Free (optional Ethernet)
11	SCSI-2 (optional Ethernet)
12	Mouse
13	Coprocessor
14	IDE hard drive
15	Serial EEPROM data in

DMA

PC-450 DMA Channels	
Number	**Function**
0	Refresh
1	Free
2	Floppy disk
3	Free
4	Free
5	Free
6	SCSI-2
7	Free

JUMPER SETTINGS

PC-450 COM3 Configuration: W1	
Pins Jumpered	**Description**
[1-3]	IRQ7
[3-5]*	IRQ4
[9-10]*	4-wire RS-422
[7-8]	2-wire RS-485 (DCD Receiver Enable)
[4-6]	Receive Data from RS-485
[2-4]*	Receive Data from RS-232
[11-13][12-14]*	RS-485 Receiver terminated
[13-15][14-16]	RS-485 Receiver not terminated

* = default

PC-450 Flat Panel Bias Polarity: W2	
Pins Jumpered	**Description**
[1-2]	Negative voltage
[3-4]*	Positive voltage

* = default

PC-450 Ethernet Configuration: W3	
Pins Jumpered	**Description**
[1-2]	Default I/O address is 300-31FH & IRQ9
[1-2] not jumpered*	Uses OCTSETUP configuration for Ethernet I/O address and IRQ
[3-4]*	Enables AUI/Twisted Pair connector
[3-4] not jumpered	Enables BNC connector

* = default

PC-450 CPU Speed Select: W4	
Pins Jumpered	**Description**
[1-2] [3-4]*	Factory default. Do not change

* = default

PC-450 CMOS Discharge: W5	
Pins Jumpered	**Description**
[1-2]*	Normal operation
[3-4]	Discharge CMOS memory. Make sure power is OFF.

* = default

PC-450 SSD2 Power Source: W7	
Pins Jumpered	**Description**
[1-2]*	Power SSD2 from the 3.6V clock battery at J19 during power-down
[3-4]	Power SSD2 from +5V. No battery backup during power-down

* = default

PC-450 Boot Options: W8	
Pins Jumpered	**Description**
[1-2]*	Use video BIOS or system BIOS from SSD1A (systems without SSD0 flash)
[3-4]†	Use video BIOS or system BIOS from SSD0 (systems with SSD0 flash)
[5-6]	Uses video BIOS at C000H (VGA).
[7-8]*†	Uses video BIOS at D000H. Reprogrammable via PGMVIDEO (SSD0 installed) or 450EPROM.BAT (SSD1 installed).
[9-10]	Boots from the BIOS drive.
[11-12]*†	Boots from OCTSETUP boot device.

* = default for models booting from EPROM

† = default for models booting from flash

PC-450 Power Fail Source: W9	
Pins Jumpered	**Description**
[1-2]*	Source is the +5V
[3-4]	Connects to source which is off card

* = default

PC-450 NMI Source Select: W10	
Pins Jumpered	**Description**
[1-2]*	Source is PC/104 IOCHECK
[3-4]	Source is on-card watchdog/power fail circuit

* = default

CONNECTOR PINOUTS

PC-450 SCSI-2 Connector: J1			
Pin #	**Signal**	**Pin #**	**Signal**
2	SD0*	28	Gnd
4	SD1*	30	Gnd
6	SD2*	32	ATN*
8	SD3*	34	Gnd
10	SD4*	36	BSY*
12	SD5*	38	ACK*
14	SD6*	40	RST*
16	SD7*	42	MSG*
18	SCDP*	44	SEL*
20	Gnd	46	C/D*
22	Gnd	48	REQ*
24	Gnd	50	I/O*
26	TERMPWR		

NOTE: All odd numbered pins are ground.

* = active low

PC-450 Flat Panel Connector: J2			
Pin #	**Function**	**Pin #**	**Function**
1	VDDSAFE +5V	2	+12 VSAFE
3	VEESAFE	4	Reserved
5	ENABKL	6	Gnd
7	M	8	DE
9	Gnd	10	LP
11	FLM	12	Gnd
13	SHFCLK	14	Gnd
15	P0	16	P1
17	Gnd	18	P2
19	P3	20	Gnd
21	P4	22	P5
23	Gnd	24	P6
25	P7	26	Gnd
27	P8	28	P9
29	Gnd	30	P10
31	P11	32	Gnd
33	P12	34	P13
35	Gnd	36	P14
37	P15	38	Gnd
39	P16	40	P17
41	Gnd	42	P18
43	P19	44	Gnd
45	P20	46	P21
47	Gnd	48	P22
49	P23	50	Gnd

* = active low

PC-450 SVGA Connector: J3			
Pin #	Function	Pin #	Function
1	Red	9	NC
2	Green	10	Gnd
3	Blue	11	NC
4	NC	12	NC
5	Gnd	13	Horizontal Sync
6	Gnd	14	Vertical Sync
7	Gnd	15	NC
8	Gnd		

COM1/COM2/COM3 Serial Ports: J5, J6 & J7		
Pin #	COM1/COM2 Function	COM3 Function
1	DCD	
2	DSR	
3	RxD*	RxD*
4	RTS	RTS
5	TxD*	TxD*
6	CTS	CTS
7	DTR	
8	RI	
9	Gnd	Gnd
10	+5V	+5V

* = active low

PC-450 LPT1 Printer Port: J8		
Pin #	**Function**	
1	Out	STB*
2	Out	AFD*
3	I/O	DATA 0
4	In	ERR*
5	I/O	DATA 1
6	Out	INIT*
7	I/O	DATA 2
8	Out	SLIN*
9	I/O	DATA 3
10		Gnd
11	I/O	DATA 4
12		Gnd
13	I/O	DATA 5
14		Gnd
15	I/O	DATA 6
16		Gnd
17	I/O	DATA 7
18		Gnd
19	Out	ACK*
20		Gnd
21	In	BUSY
22		Gnd
23	In	PE
24		Gnd
25	In	SLCT
26		+5

* = active low

PC-450 AUI Connector: J9	
Pin #	Signal
1	Gnd
2	COLP
3	TXP
4	Gnd
5	RECP
6	Gnd
7	NC
8	NC
9	COLN
10	TXN
11	Gnd
12	RECN
13	+12V
14	Gnd
15	NC

PC-450 IDE Hard Drive: J11			
Pin #	Function	Pin #	Function
1	RESET*	2	Gnd
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	Gnd	20	KEY
21	Reserved	22	Gnd
23	IOWR*	24	Gnd
25	IORD*	26	Gnd
27	NC	28	BALE
29	NC	30	Gnd
31	IRQ 14	32	IO16*
33	ADDR1	34	NC
35	ADDR0	36	ADDR2
37	CS0	38	CS1
39	LED	40	Gnd
41	+5 LOGIC	42	+5 MOTOR
43	Gnd	44	NC

* = active low

PC-450 Floppy Drives: J12			
Pin #	Function	Pin #	Function
1	NC	2	DSEL
3	NC	4	NC
5	NC	6	DRATE
7	+5	8	INDEX*
9	+5	10	MTR2 ON*
11	+5	12	DS1*
13	Gnd	14	DS2*
15	Gnd	16	MTR1 ON*
17	Gnd	18	DIR IN*
19	Gnd	20	STEP*
21	Gnd	22	WR DATA*
23	Gnd	24	WR GATE*
25	Gnd	26	TRK 00*
27	Gnd	28	WP*
29	Gnd	30	RD DATA*
31	Gnd	32	SIDE 1*
33	Gnd	34	DISKCHANGE

* = active low

PC-450 Ethernet BNC: J13	
Pin #	Function
1	RXI
2	COAXGND

PC-450 Fan Power: J14	
Pin #	**Function**
1	NC
2	NC
3	+5V
4	Gnd

PC-450 Ethernet Twisted Pair: J15	
Pin #	**Signal**
1	TXTP+
2	TXTP-
3	RXTP+
4	NC
5	NC
6	RXTP-
7	NC
8	NC

PC-450 Keyboard: J16	
Pin #	**Signal**
1	Data
2	NC
3	Gnd
4	+5 VDC
5	Clock NC
6	Gnd

PC-450 Speaker: J17	
Pin #	**Function**
1	Speaker
2	Gnd
3	NC

PC-450 Mouse Connector: J18	
Pin #	**Description**
1	Data
2	NC
3	Gnd
4	+5 VDC
5	Clock
6	Gnd

PC-450 Battery: J19	
Pin #	**Function**
1	+ Battery
2	NC
3	Gnd
4	Gnd

PC-450 Watchdog Latch: J20	
Pin #	**Description**
1	Gnd
2	Normally Open
3	Gnd
4	Normally Open

PC-450 Reset: J21	
Pin #	**Function**
1	Gnd
2	POWERGOOD

PC-450 Power: P1	
Pin #	**Description**
1	+5V
2	Gnd
3	+12V

PC-450 PC/104 Bus Signal Assignments: P2				
Pin #	**Row A**	**Row B**	**Row C**	**Row D**
0	--	--	Gnd	Gnd
1	IOCHCK*	Gnd	SBHE*	MEMCS16*
2	SD7	RESETDRV	LA23	IOCS16*
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	OWS*	LA17	DACK0*
9	SD0	+12V	MEMR*	DRQ0
10	IOCHRDY	(KEY)	MEMW*	DACK5*
11	AEN	SMEMW*	SD8	DRQ5
12	SA19	SMEMR*	SD9	DACK6*
13	SA18	IOW*	SD10	DRQ6
14	SA17	IOR*	SD11	DACK7*
15	SA16	DACK3*	SD12	DRQ7
16	SA15	DRQ3	SD13	+5V
17	SA14	DACK1*	SD14	MASTER*
18	SA13	DRQ1	SD15	Gnd
19	SA12	REFRESH*	(KEY)	Gnd
20	SA11	SYSCLK	--	
21	SA10	IRQ7	--	
22	SA9	IRQ6	--	
23	SA8	IRQ5	--	
24	SA7	IRQ4	--	
25	SA6	IRQ3	--	
26	SA5	DACK2*	--	
27	SA4	TC	--	
28	SA3	BALE	--	
29	SA2	+5V	--	
30	SA1	OSC	--	
31	SA0	Gnd	--	
32	Gnd	Gnd	--	

* = active low

PC-450 COM3/RS-485: P3	
Pin #	**Signal**
1	T+
2	T-
3	R+
4	R-
5	Gnd

PC-450 Remote Reset: P4	
Pin #	**Description**
1	Reset
2	Gnd

LED	
CR5	Video Access
CR6	Receive Serial Port 1
CR7	Transmit Serial Port 1
CR8	Transmit Serial Port 2
CR9	Receive Serial Port 2
CR11	Power On
CR16	Ethernet BSEL
CR17	Ethernet Transmit
CR18	Ethernet Link
CR19	Ethernet Receive

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APPENDIX A   SOFTWARE UTILITIES

INTRODUCTION

The PC–450 ROM-DOS and Software Utility Disk come with the utilities listed below. Some of these utilities are also available on the PC–450 BIOS drive. This appendix describes the utilities and their use.

Support commands:
DISKSAVE.EXE
DISKSEND.EXE
LPT1CON.COM
OCTSETUP.EXE (Refer to Chapter 4, "Setup.")
PGMBIOS.EXE
PGMVIDEO.EXE
RESET.COM
TRANSFER.EXE

Support device drivers:
MEMDRIVE.SYS

NOTE: Other utilities are included from ROM-DOS and are not mentioned in this section. Please refer to your ROM-DOS manual.

DISKSAVE.EXE

DISKSAVE.EXE: Support Command

PURPOSE: To program a disk into SSD0A or SSD0B
(FLASH EPROM); or to create disk image
files for SSD1A or SSD1B (EPROM).

SYNTAX: **DISKSAVE** [/**D***y*] [/**S***s*]
[/**F***d* | *path* | /**X** [/**C***c*] [/**B***b*]]

PARAMETERS: /**D***y* specifies the destination device to be
programmed. *y* can be SSD0A, SSD0B,
SSD1A or SSD1B. The default is SSD0A.

/**S***s* specifies the size of the EPROM to be
programmed. /**S** is only used when the device
specified with /**D** is SSD1A or SSD1B. *s* can
be either 512K or 1M. The default is 512K.

/**F***d* specifies the source for programming to
be a local drive. The disk image of the
specified drive is used. *d* can be any DOS
drive letter. Use /F when path and /X are not
used

path specifies the source for programming to
be a local tree of files. Use path when /F and
/X are not used.

/**X** specifies the source for programming is
done through communication over a serial
link connecting the PC–450 to a remote host
system running DISKSEND.EXE.

/**C***c* specifies the COM port *c* to be used. Use
/**C** only when /**X** is used. *c* can be 1, 2, 3 or 4.
The default is 1.

/B*b* specifies the baud rate *b* to be used. Use /**B** only when /**X** is used. *b* can be 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200. The default is 38400.

EXAMPLE 1: To program SSD0A from local drive A, enter:

```
DISKSAVE   /FA   /DSSD0A
```

EXAMPLE 2: To program SSD0B from local subdirectory C:\DEMO\TEST, enter:

```
DISKSAVE   C:\DEMO\TEST   /DSSD0B
```

EXAMPLE 3: To program SSD0A from remote drive A, first enter the following command on the PC–450:

```
DISKSAVE   /X   /DSSD0A
```

Then enter the following command on the remote host system:

```
DISKSEND   /FA
```

EXAMPLE 4: To program SSD0B from a remote subdirectory C:\DEMO through COM2 at baud rate 9600, first enter the following command on the PC–450:

```
DISKSAVE   /X   /DSSD0B   /C2   /B9600
```

Then enter the following command on the remote host system:

```
DISKSEND   C:\DEMO   /B9600
```

EXAMPLE 5: To create a 1 MB image file for the EPROM from local drive A, enter:

```
DISKSAVE   /FA   /DSSD1A   /S1M
```

EXAMPLE 6:   To create a 512K image file from a local
                     subdirectory named C:\TEST, enter:

```
DISKSAVE  C:\TEST  /DSSD1A  /S512K
```

REMARKS: The size of SSD0B is dependent on the size of
                     SSD0 as specified with the OCTSETUP.EXE
                     program and the physical size of SSD0.

                     To program an SSD which boots from a user-
                     supplied DOS or full ROM–DOS, the source
                     must be a bootable drive (use the /**F** *d* option)
                     from either a remote or local system.

                     When a subdirectory path is used as input to
                     DISKSAVE.EXE, you must first build a
                     temporary file in the current directory.
                     Consequently, the current directory cannot be
                     included in the specified path and must not be
                     write-protected.

                     The filename of the image file used to
                     program SSD1A/SSD1B is SSD1A.IMG or
                     SSD1B.IMG.

                     The size of the solid state disk generated with
                     DISKSAVE.EXE is made only as large as
                     required to minimize programming time.

SEE ALSO: DISKSEND.EXE, TRANSFER.EXE

DISKSEND.EXE

DISKSEND.EXE: Support Command

PURPOSE: To send a disk image through a serial link to the DISKSAVE.EXE program running on the PC-450.

SYNTAX: **DISKSEND** [/**F***d* | *path*] [/**C***c*] [/**B***b*]

PARAMETERS: /**F***d* specifies the source for programming to be the local drive. The disk image of the specified drive is used. *d* can be any DOS drive letter. Use /Fd when not using path.

   path specifies the source for programming to be a local tree of files. Use path when not using /Fd.

   /**C***c* specifies the COM port *c* to be used. Use /**C** only when /**X** is used. *c* can be 1, 2, 3 or 4. The default is 1.

   /**B***b* specifies the baud rate *b* to be used. Use /**B** only when /**X** is used. *b* can be 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200. The default is 38400.

EXAMPLE 1:   To send a local disk image through the serial link to the PC-450 running DISKSAVE.EXE, first enter the following command on the PC-450:

```
DISKSAVE   /X   /DSSD0A
```

   Then enter the following command at the host system:

```
DISKSEND   /FA
```

EXAMPLE 2:   To send the image of floppy drive A via COM2 at the host system, that is to be programmed into SSD0B via COM1 at the PC–450, first enter the following command on the PC–450:

```
DISKSAVE  /X  /DSSD0B  /C1
```

Then enter the following command at the host system:

```
DISKSEND  /C2  /FA
```

REMARKS: When DISKSAVE.EXE is used in conjunction with DISKSEND.EXE, the /**X** option must be used.

To program an SSD which boots from a user-supplied DOS or full ROM–DOS, the source must be a floppy drive (use the /**F***d* option).

The size of the disk image generated with DISKSEND.EXE that was sent over the serial link is made only as large as required to minimize transfer and programming time.

SEE ALSO: DISKSAVE.EXE, TRANSFER.EXE

LPT1CON.COM

LPT1CON.COM   Support Command

PURPOSE: To transfer the system video output to LPT1 so that an attached LCD display becomes the system display.

SYNTAX: **LPT1CON**

EXAMPLES: To change the display from the current mode to the LPT1 with a 4x40 LCD display connected to LPT1 with a 2010 interface card, enter the following:

```
DISPLAY D3
LPT1CON
```

REMARKS: For more information about DISPLAY, see the DISPLAY.DOC file on the utility disk in the \DISPLAY subdirectory.

MEMDRIVE.SYS

MEMDRIVE.SYS   Device Driver

PURPOSE: To allow access to solid state drives (SSDs) as DOS drives.

SYNTAX: **DEVICE=MEMDRIVE.SYS**
[**SSD***xx* | **BIOS**]

PARAMETERS: **SSD***xx s*pecifies which SSD to access as a drive. *xx* = 0A, 0B, 1A, 1B or 2.

BIOS specifies the BIOS drive.

EXAMPLES: When booting from SSD0A to access SSD0B, SSD1A, SSD2 and the BIOS drive, add the following lines to your CONFIG.SYS file on SSD0A.

```
DEVICE=MEMDRIVE.SYS  SSD0B
DEVICE=MEMDRIVE.SYS  SSD1A
DEVICE=MEMDRIVE.SYS  SSD2
DEVICE=MEMDRIVE.SYS  BIOS
```

REMARKS: MEMDRIVE.SYS validates the device specified as having a DOS compatible drive format. When the drive has a DOS format, a DOS drive letter is assigned to the device. The device is then accessed using normal DOS commands. The drive letter is dependent on the system configuration and the order of the devices in the CONFIG.SYS file.

If the device specified is SSD2 and the static RAM does NOT have a DOS format, then the device is formatted and a drive letter is assigned to it. If the device is battery-backed, the format and file contents remain when power is removed from the system. When the device is formatted, a message similar to the following is displayed:

```
PC-450 MEMDRIVE.SYS v2.0, format-
ting SSD2 (512K) as drive F:
```

When MEMDRIVE.SYS assigns a drive letter to an SSD, a message similar to the following is displayed:

```
PC-450 MEMDRIVE.SYS v2.0, assigning
SSD1A (512K) as drive E:
```

NOTE: MEMDRIVE.SYS will not assign a drive letter to SSD0A, SSD0B, SSD1A or SSD1B unless the drive has been previously programmed. A message similar to the following will result if this occurs:

```
PC-450 MEMDRIVE.SYS v2.0, memory
device not found in SSD1A.
```

The flash EPROM for SSD0A, SSD0B is programmed on card with the DISKSAVE program. Once DISKSAVE has repro-grammed SSD0A or SSD0B, the system should be reset or odd system behavior will result.

The devices for SSD1A and SSD1B are programmed with the DISKSAVE program and an external EPROM programmer.

MEMDRIVE.SYS only allows writes to SSD2.

To reformat SSD2 turn the system power off and temporarily remove the battery backup to SSD2 by changing the battery backup enable jumper. (See the section, Installing SSD2, in this manual.)

NOTE: Removing the battery will also discharge CMOS setup.

SEE ALSO: DISKSAVE.EXE

PGMBIOS.EXE

PGMBOOT.EXE   Support Command

PURPOSE: To program a boot BIOS so that the PC-450 can boot from devices such as a SCSI hard drive or from a network.

SYNTAX: **PGMBIOS** *boot.dat*

PARAMETERS: *boot.dat* specifies the new boot BIOS file to program.

EXAMPLE 1:   To program the standard SCSI boot BIOS, enter:

    PGMBIOS SCSI.DAT

REMARKS: The SCSI boot BIOS file is located on the utility disk and is preprogrammed at the factory.

    The SCSI boot BIOS is required for booting from a SCSI hard drive.

    Use OCTSETUP to enable this BIOS.

    Other boot BIOS such as for booting from a network, which is not supplied by Octagon Systems Corporation, may be programmed with this utility. The file must be equal to or smaller than 32K in size.

SEE ALSO: PGMVIDEO.EXE, OCTSETUP.EXE

PGMVIDEO.EXE

PGMVIDEO.EXE Support Command

PURPOSE: To program the video BIOS so that the PC-450 can operate displays other than a standard VGA monitor.

SYNTAX: **PGMVIDEO** *video.dat*

PARAMETERS: *video.dat* specifies the new video BIOS file to program.

EXAMPLE 1: To program the video BIOS for a 640x480 color TFT display without the display enable, enter:

```
PGMVIDEO   LQ10DH11.DAT
```

EXAMPLE 2: To program the video BIOS for a standard CRT, enter:

```
PGMVIDEO   CRT.DAT
```

REMARKS: The video BIOS files are located on the utility disk, as well as connection information for specific displays.

After programming the new video BIOS, move jumper W8[5-6] to W8[7-8] and reboot the system so that the new video BIOS can take effect.

To return to the standard CRT video BIOS, move jumper W8[7-8] to W8[5-6] and reboot the system.

See the README.DOC file in the VGA540 utility disk for more information.

SEE ALSO: PGMBIOS.EXE

RESET.COM

RESET.COM   Support Command

PURPOSE: To reset the system using the watchdog reset circuit.

SYNTAX: **RESET**

EXAMPLES: To reset the PC–450, enter the following:

```
RESET
```

REMARKS: The watchdog reset provides a hardware reset similar to pushing the reset button. This is a more complete reset than <CTL><ALT><DEL> or other software initiated resets.

TRANSFER.EXE

TRANSFER.EXE   Support Command

PURPOSE: To transfer files to or from the PC-450 over a serial port.

SYNTAX: **TRANSFER** *filepath* [/**S** | /**R**] [/**B***b*] [/**V**] [/**COM***c*]

PARAMETERS: *filepath* specifies the file pathname to send or receive.

SWITCHES: /**S** specifies to send the file.

/**R** specifies to receive the file. This is the default.

/**B***b* specifies baud rate of transfer where *b* can be (300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115 (115200)). The default is 9600.

/**V** enables the display of "R" when a block (128 bytes) is received, or "T" when a block is transmitted.

/**COM***c* specifies the serial port to use. *c* can be 1-4. The default is 1.

EXAMPLES: To send a file named C:\DEMO\DEMO.EXE from a remote PC to the file named D:\DEMO.EXE on the PC-450 at 57600 baud with a serial cable from COM2 on the remote PC and COM1 on the PC-450, enter the following command on the PC-450:

```
TRANSFER  D:\DEMO.EXE /R /V /B57600
```

Then enter the following command on the remote PC:

```
TRANSFER  C:\DEMO\DEMO.EXE /S /V
/COM2 /B57600
```

To receive a file named D:\MYAPP.EXE from the PC-450 and name it C:\APPS\MYAPP2.EXE on the remote PC over a serial cable connected to COM1 on both systems at 9600 baud, enter the following command on the PC-450:

```
TRANSFER  D:\MYAPP.EXE /S
```

Then enter the following command on the remote PC:

```
TRANSFER  C:\APPS\MYAPP2.EXE
```

REMARKS: The TRANSFER command communicates with other XMODEM compatible file transfer programs.

The serial port on the PC-450 requires a null modem adaptor when connected to a serial port on the remote PC. See the section, Serial Port, in this manual for more information.

The maximum baud rate is dependent on the processor speeds of the remote PC and the PC–450.

The received file size is rounded up to the nearest 128 byte boundary.

SEE ALSO: DISKSAVE, DISKSEND

APPENDIX B

PROGRAMMING STANDARD EPROMS

The PC–450 SSD1A/B accepts either 512K or 1 MB standard EPROMs. You must program the EPROMs before installing them on the PC–450, since there is no on–card programmer. The program DISKSAVE.EXE is used to create the disk image file which is programmed into the EPROM. The source for the image file can reside on the PC–450 or your PC. Refer to Appendix A, DISKSAVE for more information.

When SSD0 is not installed and SSD1A contains the video/system BIOS, SSD1A can hold up to 512K of user program/diskspace (in a 1 MB EPROM).

Programming an EPROM from a local drive
1. If a ROM disk is required, create a disk image by entering:

    ```
    DISKSAVE /FA /DSSD1A /S512
    ```

    while booting from user-supplied DOS

    or

    ```
    DISKSAVE \PC450\DISK /DSSD1A /S512
    ```

    while booting from ROM-DOS.

2. Run 450EPROM.BAT in \EPROM directory. For more information, see 450EPROM.BAT.

POWER SUPPLY

Power supply current requirements are dependent on various factors. Processor type used, total DRAM installed, additional EPROMs and SRAM, hard drive/floppy drives installed, PC/104 modules installed, flat panel installed, processor cooling fan, etc., all contribute to total current consumption. A minimum 3.5A supply is adequate for the PC–450 with a DX2–66 processor and fully populated DRAM, EPROMs and SRAM, however, with the addition of external options, 5A or higher current supply is recommended.

ASSIGNING DRIVE DESIGNATORS

ROM–DOS is an MS–DOS version 6.0 compatible operating system. Since it is stored in ROM, it is always present on power–up. During run time it requires only about 20K when DOS is loaded high and 64K when DOS is loaded low. When you boot from ROM–DOS in the BIOS socket, the system automatically assigns drive designators to the extended memory virtual drive, SSD0A/B, SSD1A/B and SSD2. However, if you boot from SSD0A/B, SSD1A/B or floppy/hard drive you must add the appropriate device drivers to your CONFIG.SYS file and copy the files to your boot drive in order to access SSDx, the BIOS drive, and the extended memory virtual drive.

NOTE: Even though you provide information about memory devices during setup, you must still define drivers for these devices in your CONFIG.SYS file. You may also need to format the device.

When your system boots up, the PC–450 device drivers will be listed with their drive designations. When you boot from ROM–DOS in the BIOS drive, drives D–G are defined in the CONFIG.SYS file. The drives are designated as:

- A: floppy disk
- B: floppy disk
- C: BIOS drive
- D: virtual disk
- E: SSD0A
- F: SSD0B
- G: SSD1A
- H: SSD1B
- I: SSD2

If your system has a hard drive, drive D: (in the example above) becomes the hard drive and drives C–I are now designated as D–J.

When you boot from SSD1A/B with ROM–DOS, the drives are designated as:

- A: floppy disk
- B: floppy disk
- C: SSD1A/B
- D: first driver in CONFIG.SYS
- E: second driver in CONFIG.SYS

In the following example of bootup messages, the system boots from the SSD0A programmed, 512K EPROM in SSD1A and nothing installed in SSD2.

```
PC-450 MEMDRIVE.SYS v2.0, assigning SSD1A (512 KB) as drive E:
PC-450 MEMDRIVE.SYS v2.0, memory device not found in SSD2.
```

NOTE: If a 512K battery–backed static RAM was installed in SSD2, the message would read MEMDRIVE.SYS v2.0, assigning (or formatting) SSD2 (512K) as drive F.

The CONFIG.SYS file has two lines:

```
DEVICE = MEMDRIVE.SYS SSD1A
DEVICE = MEMDRIVE.SYS SSD2
```

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2. 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.
3. 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.

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

1. Obtain an RMA (Return Material Authorization) number from the Customer Service Department, 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.

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