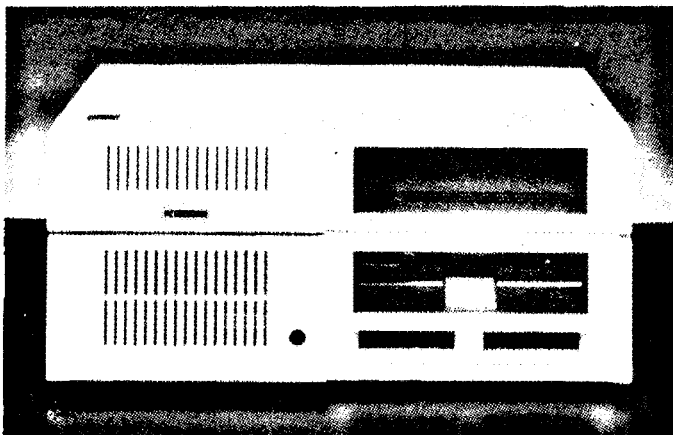


PC Enterprises'

SCSI Device Installation Kit

Installation and Operation Manual



One SCSI Host Adapter is all you Need to Control up to Seven SCSI Devices

PC Enterprises, PO Box 292, Belmar, NJ 07719 (908) 280-0025

This carton should contain the following:

- Snap-on-top Expansion Chassis
- Two-High Sidecar
- PCE SCSI Host Adapter Sidecar (inside the sidecar)
- Power Transformer
- Four Sidecar Screws
- Installation and Operation Manual

If you purchased a Complete Hard Drive, CD-ROM, Floptical, or Tape Drive System the SCSI device you selected is provided installed inside the Snap-on-Top Expansion Chassis.

Please inspect this carton to determine whether any item appears missing or damaged. If any item is missing or damaged, call our Customer Service Department (908) 280-0025 as soon as possible.

DEDICATION

The IBM PCjr was designed with hardware and BIOS limitations which could have prevented most PCjr users from ever attaching a mass storage device.

These limitations once crippled the PCjr, but today the PCjr is much more powerful than its creator could have ever imagined — thanks to add-on products devised by a small group of individuals.

This manual is dedicated to the technical team directly responsible for making this (and many other) PCjr products a reality. Thanks (in alphabetical order) to Sylvia Dayton, June Scott, Gerard Gonsalves, Kurt J. Stampone, and Raquel Pagliaro. If it were not for your help and devoted service my PCjr would be packed away in a box somewhere in my attic.

I would also like to thank Kelley Caroccia, Loretta DeMaio, Amy Feiner, Roseanna Fucci, Donna Greene, Mary Anne Hayes, Jackie Jeffrey, Adrienne Nafziger, JoAnne Pariso, and Judianne Scheiber. Special thanks are also in order for Dennis Gormley and most of all to Doug and Lisa.

..... *P. Joseph Calabria*

INTRODUCTION

Congratulations on your purchase of a PC Enterprises product. We expect this product to serve you reliably for many years to come. We hope you will be pleased with our product and pledge to do our best to keep you satisfied with our support, service, and new PCjr products.

This kit includes either an ST01jr or TMC850jr. Both are SCSI host adapter sidecars designed and manufactured by PC Enterprises specifically for the PCjr. The ST01jr is electrically identical to Seagate Technologies ST01 SCSI Host Adapter (which is available for other computers). The TMC850jr is electrically identical to the Future Domain TMC850 SCSI Host Adapter.

The ST01jr uses the Seagate BIOS and 900A SCSI controller chip. It provides excellent performance with virtually all SCSI hard drives made by Seagate Technologies (as well as a few other manufacturers). Refer to the section of this manual titled, "Selecting a SCSI Device" for a list of drives known to be supported.

The TMC850jr uses the Future Domain BIOS and 950 SCSI Controller Chip. It permits you to use a variety of SCSI devices which include fixed and removable cartridge hard drives as well as tape backup, CD-ROMs, WORMs, optical, and floptical drives. Once again, refer to the "Selecting a SCSI Device" section of this manual for a list of supported devices.

Four jumpers are provided on the PCE SCSI Host Adapter which enables it to operate with either the 900A (Seagate) or 950 (Future Domain) SCSI Controller Chip. These jumpers, which are clearly labeled on the SCSI Host Adapter, are preset at the factory to work with the SCSI chip and BIOS installed.

This manual is included with all PC Enterprises Mass Storage Systems. If you purchased a complete system, for your convenience, PC Enterprises has set up, tested, and installed your SCSI device in the snap-on-top expansion chassis included with this kit. This greatly simplifies installation. To install the system just snap the chassis on top of your PCjr, plug in the sidecar, and connect the cables. Detailed instructions are provided in the section of this manual titled "Hardware Installation".

We recommend inserting this manual into your PCjr Add-On Products binder (available separately from PCE). If you do not have this binder insert these instructions into Section 5 of the PCjr Guide to Operations Manual. Note: You can purchase a binder which is suitable to keep all your PCjr add-on products Installation and Operation Manuals together from PCE by ordering Catalog #80084.

Copyright Notice

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THE COMPLETE PCjr HARD DRIVE SYSTEM

Perhaps the most desired and sought after expansion for any computer is the hard disk drive. Hard drives are popular because they make computers much easier to use. They also add tremendous storage capacity to your system and virtually eliminate the need to run programs from floppy diskettes.

With a hard drive installed, chances are you'll never again find yourself fumbling through a box of diskettes searching for a program that you want to run. That's because hundreds of programs can now be on your hard drive and ready to run all the time.

The PC Enterprises Hard Drive System is self booting. This means the computer can load DOS automatically. All you need to do is start your computer with the door to drive A: open.

A hard drive also improves the speed and performance of your PCjr dramatically. That's because computers access hard drives much faster than floppy diskettes. You'll notice significant improvements in speed anytime you run a program which accesses the hard drive.

Our Complete PCjr Hard Drive System is especially easy to install. Just snap it on top of your PCjr or almost any other expansion chassis that snaps on top of the PCjr, then plug in a sidecar and power transformer.

We're extremely proud of this product, and think you'll agree, PC Enterprises' Complete PCjr Hard

Drive System is the most superior hard drive system ever offered for a PCjr.

FEATURES

Self Booting

The PCE BIOS (BIOS1) inside the SCSI Host Adapter will allow you to start DOS from the hard drive when you do not have a floppy diskette in your A: drive. To use this feature simply open the door to your drive A:, then start the computer with either a cold (power on) or a warm (Ctrl-Alt-Del) boot.

Fast Access Time

Access time specifications vary depending upon the drive you select, however PCE Systems use state of the art hard drives which are just as fast as the hard drives used with IBM's newest computers!

Memory Mapped Input/Output

The access time specification is very important if you are concerned with performance, but just as important is knowing whether a system is I/O or memory mapped.

The PCE SCSI Host Adapter plugs into the PCjr's expansion bus (instead of the internal modem slot). This permits the system to be memory mapped. A memory mapped interface is always preferred over an I/O mapped interface because memory cycles are shorter than I/O cycles. This means memory mapped hard drive systems transfer information much faster than I/O mapped systems.

Earlier hard drive systems for the PCjr plugged into the PCjr's internal modem slot. These systems are all I/O mapped (and are therefore inherently slower).

Technical Note: An average PCjr I/O cycle is six clock cycles long. Each clock cycle is 210ns (nanoseconds), therefore an average I/O cycle takes 1260 (6 cycles x 210ns) nanoseconds. Average memory cycles take only four clock cycles and therefore 840ns – or as few as 525ns if you're also using the jrExcellerator Speed Up Board. It is also important to note that the jrExcellerator Speed Up Board only effects memory cycle time and therefore can not speed up I/O operations.

As you can see, hard drives become inherently faster when the PCE SCSI Host Adapter is used to operate the hard drive as compared to other hard drive controllers which plug into the internal modem slot.

Intelligent Controller

Not so intelligent controllers (often called dumb controllers) require more instructions to perform each operation. As an example, other systems such as the RIM SASITALK board (used with our original hard drive system), take as many as three instruction cycles (3780ns) to accomplish a single write operation! Intelligent controllers provide a tremendous advantage because the same write operation only takes one instruction cycle or 840 (525ns if the jrExcellerator speed up board is also being used). This means our SCSI Host Adapter can inherently send write information to a hard drive 4.5 times faster than systems which used the RIM board (7.2 times faster if the jrExcellerator is also used).

No Slots Required

BIOS support to make the drive self booting is provided on the sidecar – not in a cartridge. This means all your available cartridge slots remain available for other products.

DOS Compatible

All the DOS commands including SYS, FORMAT, FDISK, BACKUP, and RESTORE will work with your new system. This means virtually all other hard drive software, including utilities designed to work with SCSI systems, will also work. It also means you'll have no trouble getting application software to recognize your hard drive.

PC Compatible

If you ever decide to purchase another computer you'll be able to use your hard drive with the new computer without formatting! If you're using the Seagate chip set all you'll need to purchase is the Seagate ST01 SCSI Host Adapter Card which works with other computers which have an ISA bus. This relatively low cost item (\$39 at the time this manual was printed) is available from PC Enterprises (catalog #79032) and numerous other suppliers. Those who use the Future Domain chip set and later decide to attach their SCSI device to another computer should purchase the Future Domain TMC-850.

INSTALLATION REQUIREMENTS

SYSTEM REQUIREMENTS

64K PCjr

TOOLS REQUIRED

Medium sized flat-blade screwdriver

OTHER PRODUCTS REQUIRED

This manual is provided with all PCE SCSI systems and kits. When you purchase a complete SCSI system from PCE everything you need is included. If you have purchased the SCSI Installation Kit and are now installing a CD-ROM, Floptical, Tape Drive, or other SCSI device, you may need to purchase software to support the device you select. No software is needed to support hard disk drives as the required support is provided on the SCSI Host Adapter BIOS. Additional information is provided elsewhere in this manual.

SELECTING A SCSI DEVICE

When you purchase a SCSI hard drive from PC Enterprises the drive you receive is provided already formatted and partitioned. This allows PCE to extensively test the drive before it leaves our facility. If you decide to install any other version of PC-DOS you can re-format your hard drive with the DOS Format command using the version of DOS that you normally use. Detailed instructions are provided in the section of this manual titled, "Installing the Hardware".

Note: *To determine which version of DOS you are using start DOS then at the DOS prompt type: VER then press ENTER.*

General

If you intend to purchase your own SCSI device, be certain the device you purchase appears on the list of supported devices in the appropriate section of this manual. Also be sure the first SCSI device you install is set up with a unique SCSI ID Number and that the drive's terminating resistors are properly installed.

If you install additional SCSI devices, the SCSI ID Number for the additional devices must be set up accordingly. Also, only the last SCSI device (the furthest from the host adapter), should have its terminating resistors installed.

Supported Devices – ST01jr (Seagate chip set)

All known hard disk drives made by Seagate Technologies are supported, as long as the hard disk drive has an embedded SCSI controller. Seagate uses an N suffix to designate drives which have an embedded SCSI controller. This means the N suffix is extremely important. The following drives have been tested by PCE:

20 MB
Seagate ST125N
30 MB
Seagate ST138N
40 MB
Seagate ST157N
60 MB
Seagate ST177N
80 MB
Seagate ST1096N

It may be possible to use other hard disk drives or SCSI devices with the ST01jr Host Adapter Sidecar, however these are the only drives presently supported by Seagate Technologies. PCE has determined that the ST01jr also works with many hard disk drives manufactured by other companies including Conner, Miniscribe, and SyQuest (SyQuest drives may require the addition of two 30pFd capacitors) although these drives are not supported by Seagate.

**Supported Devices – TMC850jr
(Future Domain chip set)**

The Future Domain chip set offers the widest compatibility with SCSI peripherals in the industry, supporting products of more than 35 major manufacturers, with more than 140 devices running under DOS.

The following list of SCSI hard disk drives are representative of the SCSI devices supported by the TMC850jr chip set. If a SCSI hard disk drive does not appear on this list, it should be noted that the TMC850jr is compatible with all SCSI devices that conform to the SCSI-1 Common Command Sets.

Hard Disk Drives		
CAST 14403S 14404S 14405S 14406S C. ITOH YD-3042 YD-3082 CONNER CP340 CP3040 CP3100 CP3200 DPT CONTROLLER PM3010B/70 FUJITSU M2244S M2245S M2246S M2247S M2248S M2249S M2261S M2262S M2263S M2266S HITACHI DK515C HP COYOTE II 97548S IBM 0661371 (WD SC8320) MAXTOR XT-3170S XT-3280S XT-3380S XT-4170S	MAXTOR (con't) XT-8380S XT-8760S LXT-50S LXT-100S LXT-200S LXT-213S LXT-213SY PO-12S PO-17S MAXTOR/MINISCRIBE M8051S M8425S M9380S Panther P1-17S MICROPOLIS 1373 1374 1375 1375 1528 1574 1575 1576 1577 1578 1586 1684 NEC D3841 NEWBURY DATA NDR3095S NDR3170S NDR3280S NDR3380S NDR4380S PRIAM 717 728 738	QUANTUM 105S Q-250 Q-280 ProDrive 40S ProDrive 80S RODIME 652S 3057S 3085S 5075S 5125S 5180S SEAGATE/IMPRIMIS 4767N ST225N ST1126N (94351-126) ST1162N (94351-160) ST1201N (94351-200) ST1239N ST1480N ST2383N ST4385N (94181-385H) ST4702N (94181-702) ST4766N (94191-766) ST41200N (94601-12G) Sabre 1230 (97201-1230) 94211-091 94171-300 94171-307 94171-344 SIEMENS 2200 2300 4420 TOSHIBA MK153FB MK154FB MK156FB

Magneto-Optical Drives*
MAXTOR Tabiti I RICOH RO-5030E RO-5030EII RO-9200EII SHARP JY7000U SONY SMO-S501 *Supported only formatted cartridges of 512 bytes per sector.

Removable Drives	
IOMEGA Beta 20 SYQUEST SQ555	RICOH RH-5261 RH-5500
Floptical Drives*	
INSITE I32SVM *Supported as a Floppy Drive	

CD-ROM Drives
The following CD-ROM drives are compatible with Future Domain CD-ROM Device Drivers. CD-ROM Device Drivers are available separately from Future Domain.
CHINON CDX-431
DENON DRD-253
HITACH CDR-1750S CDR-3650J
LMSI/PHILLIPS CM131
NEC CDR-35 CDR-72 CDR-80
PANASONIC CR-501 LK-MC501
SONY CDU-541 CDU-6110 CDU-6111
TEXEL DM-3120 DM-5020
TOSHIBA XM-2100A XM-3100A XM-3200A XM-3301B XM-5100A

Tape Drives	
The following tape drives are compatible with the Future Domain Tape Backup Utilities specified in the table below. To use these drives you will also need Tape Backup Utility Software available from Future Domain Corporation.	
Archive Viper 2060S 2125S 552S 2125S 2150S 2525S 2150S 2525S	Maynard 2200HS Mountain File Safe 1200 2400 NCR 6091 6101 6300 2101
Archive Python 4520 4330 4320	Palindrome Fast 1300 Sankyo/Caliper CP-125SAE CP-150SAE CP-320 Sankyo 525
Compaq 525	Sony SDT-100
Sankyo/Caliper CP-125SAE CP-150SAE CP-320	Teac MT25T/20S MT25T/45S
Cipher ST150S-II/90	Tecmar 150ES 250ES 525ES THS-2200
Exabyte EXB-8200 EXB-8200SX 8500	WangDAT 1300/2600
Gigatrend 101 107	Wangtek 5125ES 5150ES 6130FS 6130HS 5090ES 5525ES
HP C2224A DAT/C1502A DAT	
IBM Internal/External	
Irwin 9130 9230	

Important Note

The devices listed in this section are listed by the Future Domain Corporation as devices supported by the Future Domain chip set. This information is provided in our manual for information only, as PCE has not tested, and therefore does not presently support many of these devices at this time (PCE does not know of any reason why any device on this list might not work with the TMC850jr).

SOFTWARE REQUIREMENTS

DOS LIMITATIONS

Early versions of DOS have a 32MB limitation with respect to the size of a hard drive. PC DOS 3.30 is the first version of PC DOS which did not have this limitation, however, DOS 3.30 requires a different drive letter for each 32MB section (called partitions). Later versions of DOS permit you to create partitions larger than 32MB, however using larger partitions with DOS can drastically degrade performance and is therefore not recommended (remember, you can determine which version of DOS you are using by typing VER at the DOS prompt). If you are using a version of DOS prior to PC DOS 3.30 (IBM Personal Computer DOS version 3.30) and you install a hard drive larger than 32MB, you will not be able to use more than 32MB unless you do something to overcome the limitations of the DOS you are using. There are two good ways to access more than 32 megabytes of your hard drive.

1. Upgrade to DOS 3.30 or later

PC-DOS 3.30 and PC-DOS 4.01 both work well on a PCjr (PC-DOS 4.0 does not work well on any computer). PC-DOS 5.0 works well on a PCjr when used with the PCE Compatibility Cartridge or with the DOS 5.0 patches found on the PCE Utility Disk.

Note: *If you have a PCE jrExcellerator or Display-Master, or a Rapport, Quadram, or Racore Drive II Enhancement Package, you can use DOS 5.0 without the Compatibility Cartridge and disk based patches.*

2. Disk Manager Software

Disk Manager is a software product of Ontrack Computer Systems Inc. which permits you to overcome the

32MB limitation of DOS and works with PC-DOS 2.10 and later. Disk Manager will also prepare and format your hard drive for you automatically. This is the equivalent of a low level format, FDISK, and DOS format for the hard drive.

OTHER SOFTWARE REQUIRED

Hard Drives

Neither the ST01jr or the TMC850jr requires any device driver software to work with SCSI hard drives, however, Future Domain's Disk Maestro Software (Catalog #85801) is available for the TMC850jr. Disk Maestro can prepare and format your hard drive for you, and also permits you to have hard drive partitions larger than 32MB, however DOS 3.3 or later is required.

CD-ROM Software

Device driver software is required to support CD-ROMs with all current versions of PC-DOS (through DOS 5.0). Future Domain CD-ROM Device Drivers are available from PCE and other companies which sell commercial software. Order PCE Catalog #85802. Requires DOS 3.0 or later and the TMC850jr.

Tape backup Software

Device driver software is required to support tape backup drives with all current versions of PC-DOS (through DOS 5.0). Future Domain tape backup software is available from PCE and other companies which sell commercial software. Order PCE Catalog #85803. Requires DOS 3.0 or later and the TMC850jr.

Floptical Support

Device driver software is required to support floptical drives with all current versions of PC-DOS (through 5.0). Future Domain floptical drive software is available from PCE and other companies which sell commercial software. Order PCE Catalog #85804 which has only been tested with DOS 3.30 and later. Also requires the TMC850jr. Floptical support also requires Future Domain BIOS version 8.0 (or later) which is not normally provided with the TMC850jr however, BIOS 8.0 is available separately (#59277-3).

COMPATIBILITY

GENERAL

The PC Enterprises SCSI Host Adapter Sidecar does not take up any system memory, does not require DMA and does not use any hardware interrupts. For these reasons the system is highly compatible with most other PCjr products—including other products which snap on top of the PCjr.

SOFTWARE COMPATIBILITY

The PCE BIOS needs two BIOS interrupts in order to make the drive self booting. Version 1.3 which was the first released version (59315-2) used BIOS interrupts 42 and 43 which subsequently conflicted with VGA when VGA was invented. Version 1.4 (59315-3) was released using interrupts 5A and 5B, however this conflicted with the IBM Cluster Attachment. Version 1.5 (59315-4) uses interrupts 5C and 5D which are not known to conflict with any other products.

The PCE BIOS has always been provided in a socket. This means if a compatibility problem ever arises,

you'll be able to upgrade your existing BIOS without sending your system back to PCE for service.

ROM ADDRESS SPACE

The PCE SCSI Host Adapter uses two BIOS chips. Each chip uses a portion of the ROM address space in the C0000h segment. Jumpers are provided on the PCE SCSI Host Adapter which permit you to change the block of addresses used by each of the two BIOS chips. This means the SCSI Host Adapter Sidecar will work with most other PCjr products including other products which use ROM address space, although, you may need to move a jumper if you encounter a conflict.

If the factory settings cause a ROM address conflict you probably will not see the appropriate messages displayed when the PCjr is first powered on or you may receive an "Error F" message. Sometimes another device installed may simply stop working correctly when the SCSI Host Adapter is plugged in. Refer to the section of this manual titled, "Selecting the ROM Address" for more information.

Possible Conflicts

The IBM Cluster and Speech Attachments are the only IBM brand products ever released which use ROM Address space (IBM's Parallel Printer Attachment and Memory Expansion sidecars do NOT use any ROM Address space and therefore can not cause ROM address conflicts).

The Drive II Enhancement products manufactured by Rapport, Quadram, and Racore usually require that you move a jumper. Be sure to read the following sections titled, "What You Should Know About ROM

Addressing" and "Understanding ROM Address Jumpers" for more information.

Note: *If you are currently using a Rapport, Quadram, or Racore Drive II Enhancement product and don't want to read more than what's absolutely necessary, refer to the special note for Rapport, Quadram, and Racore Drive II Enhancement Package users on page 31.*

POWER SUPPLY SPECIFICATIONS

The power supply included is designed to provide enough power to meet the requirements of most SCSI products that you might select.

Power Supply Specifications

15 Watts at +5 Volts (Typical Steady State)
4 Watts at +12 Volts (Typical Steady State)

If you are using kit with a SCSI device provided by PCE you will not need to worry whether the power supply can provide enough power to support your SCSI device. All you need to do is plug the power supply into the transformer, then plug the transformer into the wall outlet.

If you are using this kit with a SCSI device which you have selected yourself you should know that the power supply has been determined to work well with all 3½ inch hard drives we have tested, although 5¼ inch hard drives may or may not work properly. You should be pleased to know that the power supply has thermal shutdown protection. In most cases it will turn itself off automatically when an overload condition occurs. When the power supply goes into the thermal shutdown mode, it will automatically reset in about ten minutes.

In addition to the built-in thermal shutdown protection the power supply uses a 5 amp picofuse which provides further protection. This fast acting fuse is designed to turn off the power if an overload occurs before other damage might occur. If this fuse should open it can be replaced by a trained service technician with Microfuse MF5 or equivalent (PCE Catalog #16803).

EXPANSION AS A THIRD DRIVE

Note: If you already have a snap-on-top PCjr expansion product and you are now installing a SCSI Device Installation Kit, you're about to install a third level. In this case you will also need the PCE Third Level Installation Kit (Catalog #10045). This kit includes a Filler Panel (#95013) which covers the holes on the right hand side of the snap-on-top chassis and provides a finished look. Also included is a half height "inner" sideboard case.

SETTING UP THE HARDWARE

If all your existing PCjr add-on products which plug into the PCjr's sidecar expansion bus or microprocessor slot are genuine IBM or PC Enterprises products you will not need to change the factory jumper settings on the PCE SCSI Host Adapter Sidecar. It is shipped from our facility already set up and ready to be used on your system.

WHAT YOU SHOULD KNOW ABOUT ROM ADDRESSING

Sometimes novice users are confused by ROM addressing, however it's really quite simple. Some products need to use software to work properly. When this happens, PCjr add-on product manufacturers often have a choice. They can provide a disk and ask you to install the software that you need, or they can

put software in a ROM device and design their product so the software is installed automatically (or upon your demand without needing to copy the software onto your disk). PCE uses ROM devices whenever possible to take full advantage of the PCjr's capabilities, however each ROM device must have a unique range of addresses.

As you continue expanding your PCjr, sooner or later you may experience a ROM address conflict. If this happens you'll normally be able to solve the problem by moving a jumper which changes the ROM address used by one or more of your PCjr add-on products.

As long as you use only genuine IBM or PC Enterprises PCjr expansion products, chances are you'll never encounter a ROM address conflict. That's because PC Enterprises carefully selects factory settings which are not likely to interfere with IBM and PC Enterprises products.

You should suspect a ROM address conflict if you receive an "Error F" message, do not see BIOS messages displayed which this manual says you should see, or if one of your PCjr add-on products stops working after another product is installed.

The following section titled, "Understanding ROM Address Jumpers", will get too technical for some PCjr users. If you have already read the "Possible Conflicts" section, and you have no reason to suspect that you'll have a problem, skip the "Understanding ROM Address Jumpers" section entirely and proceed to the "Hardware Installation" section on page 26. If you ever experience a problem which you suspect is

related to ROM addressing, refer back to this section at that time.

UNDERSTANDING ROM ADDRESS JUMPERS

The PCjr has one 64K segment of address space available to "Optional ROMs" (C0000h-CFFFFh). Note that "Optional ROMs" are not always found in side-cars — they're also found on some boards which plug into the computer's microprocessor slot such as our jrExcellerator.

Optional ROMs are normally 8K, 16K, or 32K devices — depending upon the size needed for the application. For this reason, PC Enterprises likes to refer to the 64K of available ROM address space as eight 8K blocks. We also like to label each block with the starting address (in hex) for identification purposes. For example, the first 8K block uses addresses C0000h thru C1FFFh. We refer to this block as the C0h block. The second 8K block uses addresses C2000h thru C3FFFh. This is the C2h block.

Table 1 shows the factory settings for all PC Enterprises products currently in production as of the date this manual was written.

Table 1 Suggested ROM Addresses for PCE Products			
Block	Starting Address	Label	Factory Setting
#1	C0000	C0h	Megaboard (1 of 2)
#2	C2000	C2h	Megaboard (2 of 2)
#3	C4000	C4h	jrExcellerator
#4	C6000	C6h	SCSI Adapter
#5	C8000	C8h	SCSI Adapter BIOS (1 of 2)
#6	CA000	CAh	SCSI Adapter BIOS2 (2 of 2)*
#7	CC000	CCh	Turbo-Drive
#8	CE000	CEh	Speech Attachment

*Seagate BIOS only (The Future Domain BIOS only uses one block).

Optional Sidecar ROMs

The PCE SCSI Host Adapter Sidecar uses two BIOS chips which are labeled BIOS1 and BIOS2. Refer to Figure 1 for the location of these two BIOS chips and the jumper blocks used to select the address of each chip.

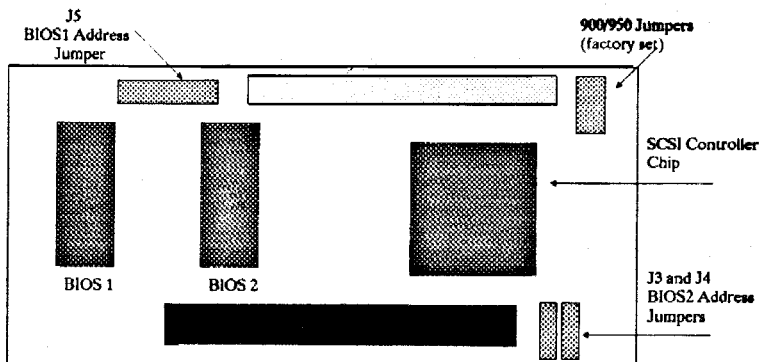


Figure 1

PRODUCTS WHICH CONFLICT WITH FACTORY SETTINGS

If you currently have an IBM Cluster Attachment you can not use any ROM addresses between C0000h and C7FFFh. This means you will need to change the factory setting for both BIOS devices (BIOS1 and BIOS2) on the PCE SCSI Host Adapter.

If you currently have, or someday expect to purchase an IBM Speech Attachment, you should know that the Speech Attachment uses the ROM address space between CE000h and CFFFFh. This means you must be especially careful if you change the factory setting for BIOS2 of the PCE SCSI Host Adapter.

If you currently have a Rapport, Quadram, or Racore Drive II Enhancement Package you will almost definitely need to change the address of BIOS2. Detailed information is provided later in this manual.

CHANGING THE ROM ADDRESS USED BY THE SCSI HOST ADAPTER BIOS

Selecting the Address of BIOS1

BIOS1 is the PC Enterprises BIOS which is an 8K ROM device. This means BIOS1 only takes up one 8K block. The factory setting for this ROM device is C6h (block #4). It can be changed by moving jumper J5 to any other block, however BIOS1 must use an address which is lower than BIOS2 (C0h is lower than C2h).

Selecting the Address of BIOS2

When the ST01jr (Seagate chip set) is used, BIOS2 is the Seagate BIOS which needs 16K of address space (two blocks). Hardware limitations only permit this device to be mapped into either of two locations. The ST01jr is shipped with jumpers J3 and J4 both open

(no jumpers installed). This sets the starting address to C8000h (blocks 5 and 6). As an alternative, you may install jumper J3 which moves the starting address to CC000h (blocks 7 and 8) however, doing so will interfere with the IBM Speech Attachment (refer to Table 1).

Table 2 ROM Address Options with the Seagate BIOS			
J3	J4	Starting Address	Blocks Used
Open	Open	C800	5 and 6
Open	Shorted	C800	5 and 6
Shorted	Open	CC00	7 and 8
Shorted	Shorted	Invalid	N/A

When the TMC850jr (Future Domain chip set) is used, BIOS2 is the Future Domain BIOS which only takes up 8K (one block) of address space. The TMC850jr is shipped with jumper J4 installed. This sets the starting address to C8000h (block 5). In addition, the Future Domain BIOS offers two alternate settings which allow you to use CA000h or CE000h as the starting address (refer to Table 3).

Special Note for Rapport, Quadram, and Racore Drive II Enhancement Package Users

The Drive II Enhancement Package marketed by Racore also uses 8K of ROM address space (one block). Racore models 1500 and 1501 (or equivalent 15XX upgrade package) will occupy two blocks. In most cases, factory settings for these systems conflict with factory settings for the PCE hard drive system. This means if you have one of these products you may need to change the address used by BIOS2 of the Racore Drive II Enhancement product that you have.

Table 3 ROM Address Options with the Future Domain BIOS			
J3	J4	Starting Address	Blocks Used
Open	Shorted	C800	5
Open	Open	CA00	6
Shorted	Open	CE00	8
Shorted	Shorted	Invalid	N/A

HARDWARE INSTALLATION

Please be aware that all hard disk drives and other SCSI devices are precision devices that must not be dropped, struck, or disassembled. The packing used to ship your new system was designed to protect it during shipment. You may want to keep the unit inside the packing until you are ready to install it.

1. Unplug all power cables from your PCjr computer system and allow the system five minutes to cool for your safety.
2. Remove the system lid by prying up on its rear edge.
3. Remove the PCjr side panel and all attached sidecars. However, if you have a Racore, Rapport, or Quadram Drive II Enhancement Package attached as the first attachment, leave the sideboard installed and only remove the side panel.

Note: The Racore, Rapport, and Quadram Drive Two Enhancement packages are systems which add a second floppy disk drive to your PCjr. If your PCjr only has one floppy disk drive, you do NOT have a Drive II Enhancement Package installed.

CAUTION: *Be especially careful during the next step of this procedure not to pinch either the 50-conductor ribbon cable or the single conductor "Pick Wire" between*

the hard drive enclosure and the PCjr. If you should damage either of these items by closing them between the two chassis, your new hard drive system will become inoperable.

4. Snap the enclosure which contains the hard drive on top of your system. **Be certain that both, the 50-conductor SCSI Bus cable and the single conductor "Pick Wire" are routed through the slot on the right side of the enclosure. DO NOT punch these wires!**
5. Determine whether you already have a second floppy drive enclosure mounted on top of your PCjr.

If you already have a second drive system attached to your PCjr (such as a PCE Junior Drive II or Racore/Quadram Drive Two Enhancement Package), you will be installing your new hard drive as the **THIRD LEVEL** on your PCjr.

If you do NOT already have a second drive system attached you will be installing your new hard drive as the **SECOND LEVEL**.

6. Notice that the sidcar-like sideboard enclosure that came with your new hard drive system has two pieces which are provided already snapped together. The host adapter is found inside the plastic cases. Use a screwdriver to separate the two halves of the case. The thinner side is referred to in this manual as the inner sideboard case. Notice that this inner case is the full height of the outer sideboard case (third level installation kits include a half height inner sideboard case).

7. If you will be installing your SCSI device as the SECOND LEVEL:

Install the full height inner sideboard case of the sideboard enclosure onto the right-hand side of the computer. It must snap into both the PCjr and the hard drive enclosure. As you install the inner sideboard case, route the 50-conductor SCSI cable and the single conductor "Pick Wire" through the long rectangular hole in the center of the side panel.

If you will be installing your SCSI device as the THIRD LEVEL:

Install the half height inner sideboard case that came with the PCE Third Level Installation Kit (instead of the full height inner sideboard case) onto the right hand side of your PCjr.

- 8. Please examine the PCjr's sidecar expansion connector at this time. This connector, which is located on the right hand side of the PCjr, should have a total of 60 pins (30 on the top row and 30 on the bottom row). Before proceeding, be certain that all of the pins are present and none have become bent or improperly aligned. Be extremely careful when you install the PCE SCSI Host Adapter sidecar not to bend any of the pins. Be certain it is properly aligned and is pushed straight into the PCjr to avoid bending or misaligning any of the pins (bent or broken connector pins are the most frequent installation problem encountered).**
- 9. Install the PCE SCSI Host Adapter onto the 60-pin bus connector. To do this, first align the connector then push it straight in.**

10. Now plug the 50-conductor SCSI cable onto J2 of the SCSI Host Adapter. This cable is keyed (a pin is intentionally missing) and will therefore can only be attached in one direction.

NOTE: In the next two steps you will select suitable addresses for the SCSI Host Adapter's ROM BIOS chips. If you haven't already done so, you can refer to the section of this manual titled "Understanding ROM Address Jumpers" for more information.

The ROM BIOS of the SCSI Host Adapter is provided on two devices. Each section has the ability to use a different starting address however, BIOS1 must be located at a lower address than BIOS2 (address C0h is lower than address C2h).

11. Setting the address of BIOS1: Install the "Pick Wire" vertically onto the pair of pins labeled **C6h** of the SCSI Host Adapter. This sets the starting address of BIOS1 to C6000h, and also provides the hard drive power supply with the ("pick") signal it needs to turn itself on and off.

Note: The factory setting C6h (C6000 hex) will not conflict with factory settings for any PCjr add-on product made by IBM or PCE except the IBM PCjr Cluster Attachment. If you have a PCjr Cluster Attachment you will need to change the setting to C8h (or higher). If you change the setting to C4h it will conflict with the factory setting for the PCE jrExcellerator Speed-up Board, although the jrExcellerator address can easily be changed to any other address block.

If you need to change the setting for BIOS1 do not use C0h or C2h if you have (or someday expect to purchase) a PCE Megaboard, Impulse, Micro.

Products, or PCE Multifunction Board.

Note: The address used by the PCE Megaboard can be changed if necessary, however we prefer that you try to avoid using C0h or C2h as it would interfere with the factory defaults.

- 12. Setting the address of BIOS2:** The factory settings usually work fine unless you are using a Rapport, Quadram, or Racore Drive II Enhancement Package (a second 360K disk drive).

Note: If you are using the ST01jr the jumper may be set from the factory so that it only covers one pin. This effectively makes the jumper open (off) since the shorting block is not connecting both pins of J3.

Special note for Racore, Rapport, or Quadram users: The Racore, Rapport, and Quadram Drive Two Enhancement Packages also use ROM address space. The usual factory settings for these products (C8h) conflicts with the factory setting for BIOS2. To eliminate conflicts you can change the address of BIOS2 on the PCE SCSI Host Adapter. To accomplish this, close jumper J3 of the SCSI Host Adapter. Make sure this jumper is installed vertically. Also make sure jumper J4 is left open.

If you have followed the instructions within this special note, your system will have "optional ROMs" set up as shown below:

	Label	Actual Starting Address
BIOS2 (ST01jr)	CCh	CC000 hex
BIOS2 (TMC850jr)	CEh	CE000 hex
Racore, Rapport or Quadram BIOS	C8h	C8000 hex
BIOS1 (ST01jr and TMC850jr)	C6h	C6000 hex

You may wish to maintain this information to simplify the installation of future add-on products.

13. Plug the PCjr's power transformer into your PCjr, even though the installation is not complete at this point. In this step we will be powering up the system with the SCSI Host Adapter exposed. If any special settings are required it will be much easier to make changes at this point. You must also plug in

the second power transformer that came with your new SCSI system. Plug this transformer into the power receptacle found on the rear of the snap-on-top enclosure (you must also plug the transformer into a wall outlet).

14. Turn on the PCjr's power switch and verify that BIOS1 displays a message (the actual message will vary depending upon the version of software). If you receive either the "PCjr ST01JR Disk Boot Software" (versions 1.3 or 1.4) or "SCSI Host Adapter Software" (version 1.5 and later) messages it means that BIOS1 is running correctly.

Note: If you are using PCE BIOS version 1.3 or 1.4 you will receive this message even if you have a TMC850jr installed (that's because the TMC850jr uses the same PCE BIOS as the ST01jr. This message was changed with version 1.5 to avoid confusion).

If the computer returns an ERROR F when powered on, recheck the jumper settings for BIOS1 and BIOS2. The two digit message which appears after the Error F display is the segment where the error was detected. (Example: Error FC8 indicates a checksum problem with the ROM BIOS at location C8h). If you do not see the appropriate message described in the preceding step, a problem with BIOS1 is indicated (if BIOS1 does not run, BIOS2 will always fail the checksum test and produce an error F). Verify that the pick wire (jumper) is installed vertically and that it is on position C6h. If so, try C0h, C2h, or C4h instead.

15. Immediately after the appropriate message appears, you should then see a second message, produced by BIOS2 displayed:

or

(C) 1986-1991 FUTURE DOMAIN CORP SCSI ROM BIOS 950 AT V7.0
(the revision number may vary)

If this message does not appear recheck the BIOS2 address jumpers (J3 and J4).

16. After both messages appear the SCSI BIOS waits for all SCSI devices attached to the SCSI bus to respond. After a short wait, usually less than ten seconds, you should see another message which describes the type of SCSI devices you have installed (example: 1 SCSI Drive Found).
17. Finally, check to determine whether the computer successfully completes its **Power On Self Test (POST)**. If so, POST produces a single beep (except when you're using a PCE Quicksilver or Combo Cartridge that disables the beep). If the POST fails, your PCjr will produce two beeps. If this should happen recheck the installation paying particular attention to the possibility of bent pins (also make sure you have not placed something on top of your keyboard).

If you are installing a hard drive: At this point your system will start DOS from the hard disk drive (provided the door to your A: drive is open) and the hard drive is correctly formatted. Power down your system then install the outside case of the sideboard enclosure over the SCSI Host Adapter. Secure with the four mounting screws. Be careful not to over-tighten the mounting screws as over-

tightening these screws can damage your system. The screws should be snug, not tight!

- 18. If you have installed your hard drive as the third level:** Install the filler panel that came with your Third Level Installation Kit at this time (This panel is installed for cosmetic reasons only and **ONLY** when your system is mounted as the third drive level). You should install the Filler Panel by snapping it onto the right-hand side of the hard drive enclosure. It covers the exposed holes and gives your system a finished look.

If you require assistance make note of all the expansion products attached to your system and contact our Technical Staff by calling (908) 280-0072.

HARD DRIVES

If you purchased your hard drive from PC Enterprises, your hard drive has already been formatted with DOS 2.10 and is now ready for use.

Installing your DOS on the Hard Drive

Keep in mind that PC-DOS versions prior to 3.30 do not permit the use of extended DOS partitions, or in other words if you're using DOS 3.20 or earlier you will not be able to use more than 32MB unless you upgrade your DOS or purchase the Disk Manager Software (or a similar software product). If you are using any version of PC-DOS prior to PC-DOS 4.0 you will not be able to use more than 32MB of your hard drive as one drive letter (unless you also use Disk Manager device driver software).

Which Drive Letter

The first thing to do is determine which drive letter your hard drive will use. In most cases, your hard drive

will become drive C:, however, this will not be the case if you have three or four floppy drives connected.

DOS always assigns drive letters in sequence. Floppy drives get their letters first, then hard drives, then devices controlled by device driver software. Drive letters A: and B: are always reserved for floppy drives. This means regardless whether you have one or two floppy drives the first drive letter assigned by DOS will always be drive letter C:.

If you have three or four floppy drives, the letter assigned to your hard drive depends upon whether your third and fourth drives are controlled by DOS, or by device driver software. If your third and fourth floppy drives are controlled by DOS, your hard drive becomes drive D: or E: (respectively). If your third and fourth drives are controlled by device driver software (such as MICRODSK.SYS or DRIVER.SYS), then your hard drive becomes your C: drive.

Note: Your drives will be controlled by DOS if you tell DOS about them with either a Configuration Cartridge or with configuration software (example: DEVICE = JRCONFIG.SYS -D3).

If you are using Disk Manager Software two or more partitions (and therefore drive letters) will be used. The first partition will be assigned its drive letter by DOS and therefore usually becomes drive C:, but the letter assigned to the second partition can vary depending upon the order of files in your CONFIG.SYS file.

Formatting

These instructions assume your hard drive is accessed as drive C:. If you have configured your DOS to control three or more floppy drives your hard drive will not be drive C:. In this case substitute the proper drive letter for your drive every time you see a reference to drive C:.

20 and 30 MB Drives

These drives can be used with all versions of PC-DOS and do not require device driver software because the size of the drive does not exceed the 32MB limitation of DOS.

The SCSI formatting process is very simple (SCSI drives do not require a low level format). Use the DOS FDISK command to partition the drive and then use the DOS FORMAT command to format the hard drive.

If you purchased a Complete PCjr Hard Drive System from PC Enterprises, it is provided already formatted and partitioned so you may not need to worry about formatting your hard drive. If DOS loads correctly you can use the VER command to determine the version of DOS installed. If you need to reformat the hard drive for any reason, you should know that hard drives can be formatted the same way you format floppy drives (DOS FORMAT command). To format your hard drive first load your DOS from a floppy diskette then at the A> prompt type:

FORMAT C:/S/V < at the A prompt >

Note: Many people are not very familiar with the /V parameter, although it is a normal feature of DOS. The /V lets you assign a name to your drive's volume label. This name is subsequently displayed each time

you ask for a directory. When prompted to enter a volume label we suggest you enter: **HARD_DRIVE1**.

After the drive has been formatted, copy the files from the floppy diskette that you use to start your system onto the hard disk drive. To do this, type:

COPY A:*. * C:/V < Then press ENTER >

Your hard drive is now formatted and ready to be used. Refer now to the section of this manual titled, "Using Your New Hard Disk Drive System".

Drives Which are Larger than 32MB

Be sure to read the "DOS Limitations" section of this manual. If you will be using Disk Manager Software skip to the section of this manual titled "Using the Disk Manager Software" as you will not need to be concerned with the rest of this section.

If you are using PC-DOS 3.30 use the FDISK utility (provided with DOS 3.30) to create a primary DOS partition and as many extended DOS partitions as you need. Each partition is subject to the 32MB limitation. You will also need to use FDISK to assign logical drive letters to partitions you create.

Note: Before you use FDISK to "create" partitions you should first "display" existing partition information as partitions may already exist. If FDISK displays existing partition information you will need to use the "delete partition option" of FDISK before you create new partitions.

Using Disk Manager Software (optional)

If you purchased the optional Disk Manager Software you'll be able to use your entire hard drive with any version of PC-DOS (2.10 or later). In addition, the

Disk Manager Software will prepare and format your drive automatically. To use Disk Manager, start your PCjr with your usual DOS diskette. Then run the DM program which is on the Disk Manager diskette.

Answer the questions as they appear on the screen. You will be given several options concerning how you'd like to partition your hard drive. Select the option you prefer.

Important Note: *It is strongly recommended that you make the first partition at least 3.0MB (larger is better). This will greatly simplify future upgrade to DOS 5.0*

At one point you will be prompted to insert your DOS diskette (also referred to as a "system diskette") in drive A:. This is to allow your DOS files to be copied onto the hard drive. Shortly afterwards, you will be asked to reinstall the Disk Manager diskette to continue.

When installation is complete, two or more drive letters will be assigned to your drive (depending upon the number of partitions you told Disk Manager to create). Note that drive partitions set up by Disk Manager are controlled by device driver software. This means if your hard drive uses letter C: it will now use letter C: and something else. The "something else" will be D: unless have another device driver that causes drive letters to be assigned (such as a Ramdisk) in your CONFIG.SYS file.

To use the partitions set up by the Disk Manager Software be certain: (1) the floppy or hard drive you start DOS with includes the line
DEVICE = DMDVR.BIN in your CONFIG.SYS

file; and (2) the DMDRVR.BIN program must be on the disk or diskette you use to start DOS with. This has been done for you automatically.

Note: The XBIOS feature does not offer any benefits for PCjr users. You can use the /X parameter (if you desire), to disable this feature. Also note (if you disable the feature) that you will not need to keep the XBIOS.OVL program on your hard disk.

When the Disk Manager Software finishes running, you will receive a message asking you to prepare your system to boot. At this point, it is not recommended that you boot from the hard drive unless your PCjr recognizes its memory without memory management software (such as it does with a jrExcellerator (PC Memory Mode) or Display-Master installed).

When you receive the "prepare to boot" message, insert the disk you normally use to start DOS into drive A:, close the floppy drive door, then press ENTER. Next, copy your DOS disk to the hard drive with the COPY command, but *please read the next paragraph before you begin.*

If you use the COPY A:*. * C: command, you will erase the CONFIG.SYS file that Disk Manager wrote on your hard drive. For this reason we suggest you rename the CONFIG.SYS file on your floppy disk to CONFIG.OLD, or something else before you begin.

Note: A better approach is to use the MD\ and CD\ commands of DOS to create a subdirectory for DOS. An excellent discussion of subdirectories can be found in your DOS manual. If you are a new user you may not wish to use subdirectories just yet. In this case, proceed with the instructions below.

Type:

RENAME A:CONFIG.SYS A:CONFIG.OLD

then copy your floppy software to your hard drive by typing `COPY A:*. * C:/V`.

At this point you should customize the hard drive's `CONFIG.SYS` file to include any special device drivers required by your system. Example 1 is an example of a basic `CONFIG.SYS` file that recognizes the PCjr's memory, hard drive partitions, and also sets up a small `RAMDISK`.

The optimum number of files and buffers to use will vary depending upon the software that you run (software that requires additional buffers or files should tell you in the manual provided with the software). Eight buffers and 20 files are good general values to use, however feel free to adjust these values if necessary for your application. An excellent discussion of the `BUFFER` and `FILE` commands can be found in your DOS manual.

It is important to know that DOS normally uses 512 byte sectors and therefore each buffer set up by DOS is 512 bytes. Disk Manager uses larger sectors when partitions larger than 32MB are used. If Disk Manager changes the sector size to 2048 bytes each buffer that you set up will be the equivalent of four DOS buffers. In other words, if a program recommends 20 buffers you may achieve satisfactory performance using only five buffers.

It's nice to know when Disk Manager is using sectors larger than 512 bytes (so you can make adjustments when you decide how many buffers to use with your software). The sector size used by Disk Manager varies with the partition size you select. If you do not have a utility which tells you the sector size you are using you can use the `CHKDSK` command. Enter the

command CHKDSK to determine how much memory you have available. Then decrease the number of buffers by one, reboot, and run CHKDSK again. The difference in available memory is the sector size you are using.

Example 1

```
BUFFERS = 8
FILES = 20
DEVICE = JRCONFIG.SYS      < Recognizes memory above 128K >
DEVICE = DMDRVR.BIN       < Recognizes Disk Manager Partitions >
DEVICE = LOWRD.SYS        < Sets up a small RAMDISK >
```

Here's a second example of how a properly written CONFIG.SYS file might be set up:

Example 2

```
BUFFERS = 8
FILES = 20
DEVICE = JRCONFIG.SYS -V32 -Y1 -G1 -S360
DEVICE = DMDRVR.BIN
DEVICE = LOWRD.SYS
DEVICE = MEGADSK.SYS
```

In this example, the -V32 option of JRCONFIG.SYS sets up your PCjr with a 32K video buffer (which lets you run 16-color software), -Y1 installs your PCE Keyboard Buffer Cartridge, -G1 recognizes the PCE jrROM-Clock, and -S360 allocates 360K of memory to be used as a RAMDISK (do not use the -Y and -G options if you do not have the associated add-on products). DMDRVR.BIN lets your system recognize your hard drive partitions set up by Disk Manager, LOWRD.SYS assigns a drive letter to the RAMDISK, and MEGADSK.SYS assigns a drive letter to your PCE Megaboard RAMDISK (if you do not have a PCE Megaboard do not include this line). The JRCONFIG.SYS and LOWRD.SYS utilities can be

obtained by purchasing the PCE Utility Diskette (#85505).

Note: JRCONFIG.SYS (version 3.0 and later) and LOWRD.SYS (version 2.0) are the only PCjr memory management utilities currently supported by PCE add-on products. If you are using any other utility to recognize your PCjr's memory we recommend switching over to JRCONFIG at your earliest convenience.

Using the Hard Drive System

Your system should now be ready to boot from the hard drive.

1. Open the door to your A: drive so the computer will not be able to read any floppy disk that might be installed in the drive.
2. Turn the power to your computer on.
3. Notice that the floppy drive light will come on momentarily as the Hard Drive BIOS checks to determine whether a floppy disk is installed. Shortly afterwards the system will load DOS from the hard drive and display a C: prompt.

CD-ROM DRIVES

The Future Domain CD-ROM device drivers and Microsoft CD-ROM extensions (which come with the CD-ROM driver) are both required. Start your system in the usual manner, then insert the Future Domain CD-ROM driver diskette and type **INSTALL**.

PATCHING THE NMI BUGS

Certain bugs are known to exist in PC DOS which, under certain circumstances, cause PCjrs to hang up without warning. While these bugs are always there,

they cause problems much more frequently when larger and more complex programs are run.

Left uncorrected, these bugs all prove to be a real problem, especially since the main reasons most people add a hard drive is so they can run larger and more complex programs!

To solve this problem, the PCE SCSI Host Adapter adds a new command to the set of "Internal DOS Commands". The name of this command is NMIPATCH. Simply enter this command and the PCE BIOS searches the version of DOS currently in memory for these bugs and applies corrective patches.

Entering the NMIPATCH command will therefore cause either of two messages to appear: (1) NMI Patches Not Needed; or (2) DOS NMI Patches Applied.

If you receive the "Patches Applied" message when you enter the command, it means the PC Enterprises BIOS has found and exterminated the bugs in DOS. The bugs however, are only patched in core (system memory), so you will need to re-enter the NMIPATCH command each time you start DOS. To do this, we recommend you add this command as a line in your AUTOEXEC.BAT file. To permanently correct these bugs you'll need the DOS patches found on the PCE Utility Diskette (Catalog #85505).

OTHER PCjr PRODUCTS

PC Enterprises started developing PCjr products in 1984. Today, as always, we remain dedicated exclusively to the PCjr — and we intend to continue developing new products and services for the PCjr as long as the need exists.

PC Enterprises believes a computer, in many ways, can be compared to a home electronic stereo system. As long as your receiver does what its supposed to do, and as long as it allows you to add the newest devices which come out (a laser disk player, for example), there's little reason to replace it.

Likewise, as long as the PCjr can run software that's available, you'll probably continue using your PCjr for a long, long time. As a result, we pledge to continue developing products which maintain compatibility with other computers, while making the PCjr much more powerful than most could have ever dreamed.

Our latest catalog of PCjr products now includes hundreds of PCjr add-on products. PCjr owners can obtain a FREE copy of our catalog by placing an order, or calling our toll free catalog and order hotline: (800) 922-PCJR.

Notes:

RETURN POLICIES

Damaged Equipment

This policy pertains to equipment which arrives in a damaged condition, obvious or concealed.

We carefully pack and inspect all products before leaving our facility and pay adequate insurance to the carrier who accepts FULL responsibility for safe delivery. If your package is damaged in transit you must immediately report the damage to the carrier (failure to do this in a timely manner may result in the carrier and or PC Enterprises refusing to honor the claim). The carrier will inspect the package, provide for its return to PCE, and provide any additional information necessary for you to be reimbursed for damages. The equipment must not be returned to PCE without prior approval by PCE and release from the carrier.

Note: Be sure to save the original carton and all packing materials. Some carriers refuse to honor insurance claims unless they can verify that there is physical damage to the shipping carton. If the shipping carton shows obvious damage due to handling, and all of the original packing materials are still with the carton, carriers tend to respond to insurance claims without delay.

Defective Equipment

This policy pertains to equipment which does not work correctly, although the equipment does not appear to have been damaged during transit.

If you experience a problem with any PC Enterprises product, you should call or write to PC Enterprises. If

it is determined that the merchandise should be returned to us, you will be given a Return Authorization Number (RA Number).

If you need help using or installing a product purchased from PCE help is just a phone call away. In most cases our Customer Service department (908) 280-0025 will be able to answer all of your questions. If you need to speak to a trained PCjr technician ask our Customer Service Representative for the current hours and phone number of our Tech Lab.

30 Day Satisfaction Guarantee

All hardware is sold with our 30 day Satisfaction Guarantee. Try it. If for any reason you are not completely satisfied, we'll take it back. Items manufactured by other companies must be returned in like-new condition with all original packaging and documentation (do not write on documents or boxes). We will refund the purchase price of the item(s) less a 15% restocking charge if in our opinion the item must be retested before it can be resold. Shipping and handling charges are not refundable.

Anything Returned Without an RA Number Will be Refused and Returned to you Without Exception!

LIMITED WARRANTY

PC Enterprises warrants the original purchaser of this product that it will be in good working order for the one year period (90 days for reconditioned products) from the date of purchase from PC Enterprises or authorized dealer. Should this product fail to be in good working order at any time during the warranty period, PC Enterprises will, at its option, repair or replace the product at no additional cost except that as stated below. Repair parts and replacement products will be furnished either reconditioned or new. All replaced parts and products become the property of PC Enterprises. This warranty does not include service to repair damage to the product as a result of misuse, disaster, accident, or modification of the product.

Repair service covered by this warranty may be obtained by shipping the product to PC Enterprises and providing proof of purchase date. You agree to insure the product or assume the risk of loss or damage in transit, to prepay shipping charges, and to use a suitable shipping container. You must also contact PC Enterprises prior to returning any products for repair to receive a Return Authorization (RA) number. Any products returned without an RA number will be refused.

All express and implied warranties for this product including the warranties of merchantability and fitness for a particular purpose, are limited in duration to the one year period from the date of purchase, and no warranties, whether express or implied, will apply after this period. Some states do not allow limitations on how long an implied warranty lasts, so the above may not apply to you.

If this product is not in good working order as warranted above, your sole remedy shall be repair or replacement as provided above. In no event will PC Enterprises be liable to you for any damages, whether incidental or consequential, arising out of the use of, or inability to use such product. Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, whereas the above limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which may vary from state to state. Modification or other disassembly of the PC Enterprises' product without written permission from PC Enterprises will void this warranty.

This warranty only applies to products marketed and sold by PC Enterprises as new products.