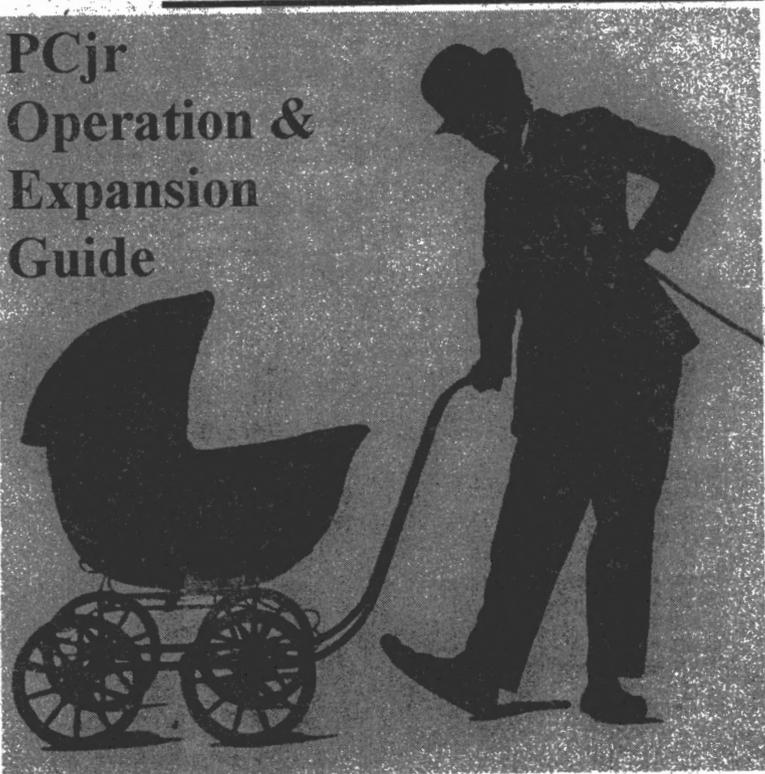


*Everything you always wanted to
know about your IBM PCjr
Computer!*

The 1995

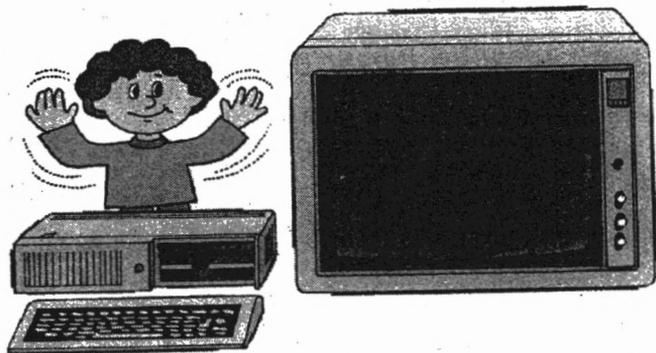
**PCjr
Operation &
Expansion
Guide**



**A PC Enterprises Publication
Revised 2/10/95**

PCjr

Operation and Expansion Guide



The PCjr is a genuine IBM computer that runs PC compatible software, although it is not as powerful as today's newest computers. If you own an IBM PCjr computer, there are thousands of software titles that you can use with your computer. This guide tells you how you can immediately put your PCjr computer to excellent use.

Regardless whether you own a PCjr yourself, or whether you use a PCjr at work or at school, this guide is certain to become the most useful reference you can find for the PCjr.

This guide is written in non-technical terms and provides all the information a PCjr user needs to put the computer to excellent use. In addition, a objective view of whether you should upgrade your PCjr, or purchase a new computer, is also provided.

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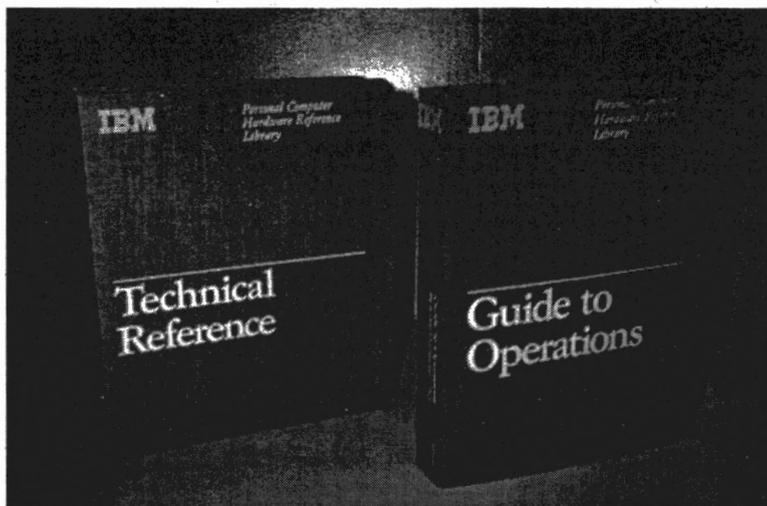
Introduction

Most PCjr users are happy with their PCjr, however they become dissatisfied with the selection of software available from local computer stores. Other PCjr users become discouraged when they try to purchase software and are told they should purchase a new computer instead. Upon reading this manual you will learn how to examine a software package and quickly determine whether the program is likely to run on your PCjr.

The PCjr Operation and Expansion Guide provides IBM PCjr users with a realistic look of what they can do with their PCjr computer. Use this guide as a supplement to the IBM PCjr Guide to Operations and Technical Reference Manuals.



If you decide to purchase options that expand the PCjr, only purchase what you need to do something new with the computer. The beauty of upgrading is that you never pay for features that you won't use or need. Add only what you want, when you want it. You'll spend the least, learn the most, and have more fun than you would if you purchased a new computer!



The **PCjr Guide to Operations** is the manual IBM provided with the PCjr when the computer was purchased new. Step-by-step instructions help you get started using the PCjr. Other sections identify PCjr connectors, and how to use cartridges. The manual also describes how to use the PCjr's built-in diagnostic tests that allow you to give your PCjr a thorough check-up. In addition, the manual comes with the Exploring the IBM PCjr diskette. This diskette provides a very helpful and interesting PCjr tutorial. If you do not have the **PCjr Guide to Operations Manual**, order #79033 (\$39.95).

The **PCjr Technical Reference Manual** includes the technical information IBM has released for the PCjr, and all internal options. The manual also includes sections on optional accessories including the internal modem, parallel printer attachment, and graphics printer. This is the only IBM published book available that provides memory and I/O maps, wiring diagrams, connector pin-outs, specifications, schematics, and BIOS listings. The **PCjr Technical Reference Manual** is a must-have for all PCjr users that desire technical information. While no longer in print, a limited supply of these manuals can still be purchased from PC Enterprises. To order the **PCjr Technical Reference Manual**, order #79015 (\$39.95).

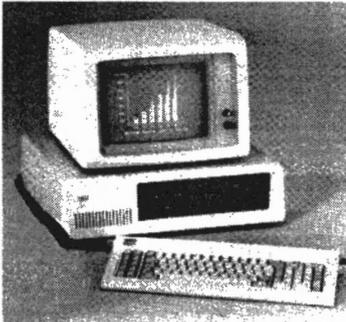
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Selecting Software that Runs on the PCjr

What it means to own an IBM or Compatible PC

The personal computer revolution started in the early 1980s. Previously, computers were too expensive for most people to purchase for home or small office use. During the early 1980s, several companies introduced affordable computers aimed at home and small business markets. Companies that offered personal computers for home use included Apple Computer, Atari, Commodore, Tandy, Texas Instruments, Timex Sinclair, and others.

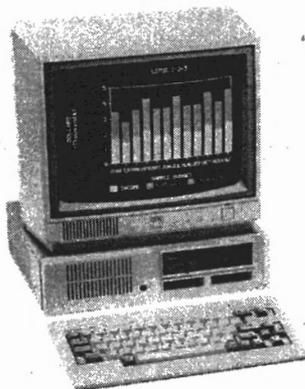


While each computer had its own advantages, all had the same major disadvantage. All required that you purchase software designed specifically for the computer you owned. If you owned a Tandy computer, you could only run Tandy compatible software. Likewise, an Apple computer required Apple compatible software, and so forth.

IBM Personal Computer Model 5150

Shortly after the personal computer revolution began, the International Business Machines Corporation, much better known as IBM, introduced its first personal computer. While IBM was not the first company to make a personal computer, IBM gained immediate respect because the company was the world's most successful manufacturer of mainframe computers. IBM named their computer the IBM Personal Computer Model 5150, although most people simply called it the IBM PC.

Thousands of companies, all over the world, immediately started to develop software that would run on the IBM PC. These companies realized that IBM would soon sell millions of personal computers. Almost overnight, IBM PC owners gained access to an unprecedented selection of software.



IBM Personal Computer PCjr Model 4860

Shortly afterwards, IBM introduced two newer personal computers. The IBM Personal Computer XT Model 5160 was essentially an IBM PC with an internal storage device called a fixed disk (hard drive), and the IBM Personal Computer PCjr Model 4860 which was IBM's entry into the home computer market.

To maintain compatibility with the thousands of software titles offered for the IBM PC, IBM designed the software interface for the XT and the PCjr so that the computers can run existing IBM PC software. Likewise, IBM has continued to maintain PC compatibility as they have introduced newer computer models, including the AT, PS/1, PS/2, and PS/Value Point computers.

In other words, the IBM PCjr computer should run any IBM PC compatible program, as long as the PCjr has any optional hardware that the program requires. PCjr users have found this statement to be true in most cases, although on rare occasions a compatibility problem due to incorrectly written software, or uncorrected "bugs" in the PCjr's BIOS, are encountered.

How Can I Select Software that Runs on the PCjr?

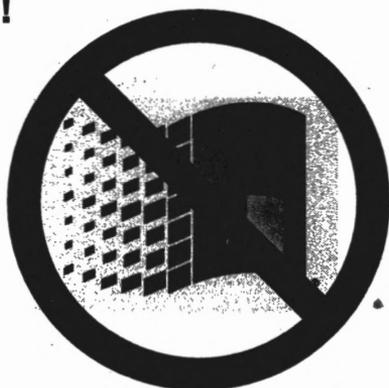


There are primarily three things to check for when you purchase software to run on your PCjr computer. First, make sure the software is IBM compatible. The PCjr computer can not run software designed to work on the Apple, Atari, Texas Instruments, Commodore, or other computers.

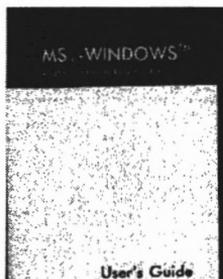
Second, look for DOS compatibility. The PCjr was designed to run IBM PC-DOS version 2.10 or later, however much of today's software requires DOS 3.0 or later. Make sure the program runs from DOS, and determine whether a specific version of DOS is required. We'll discuss how to tell which version of DOS your PCjr currently uses in the next section of this guide.

Third, check the hardware requirements of the software. Hardware requirements are almost always listed on the software package. The most common hardware requirement you will see is the amount of memory that the program requires. Some programs also have special microprocessor, video, or disk drive requirements. You'll learn all about hardware requirements in the hardware section of this guide.

Avoid Windows v3.1 and Multimedia Software!!

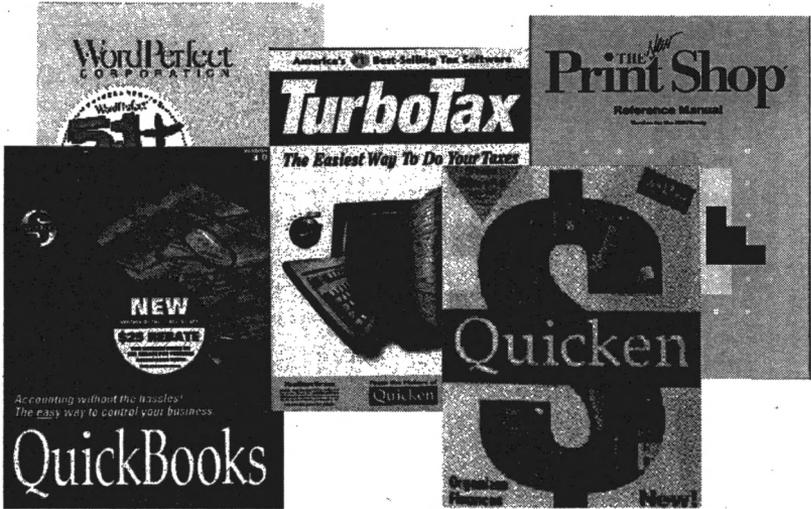


One category of software PCjr users should normally avoid is software that requires Microsoft Windows. Microsoft Windows is a software package that provides a "graphical" interface that is intended to make software easier to use.



When Windows-based software is used, you can select the program to run by pointing at a diagram on the screen. When you run DOS-based software, you must type an eight character or less word, then press the enter key. For example, to run Wordperfect for DOS you type WP, to run Lotus 1-2-3 for DOS you type 123, and to run Quicken for DOS you type Q. While a PCjr with 640KB of memory and a hard disk drive can run **Microsoft Windows version 3.0**, the PCjr can not run version 3.1 or later. Although **Microsoft Windows 3.0** is no longer being

produced, PC Enterprises has a limited supply still available. To purchase **Microsoft Windows 3.0** on 360KB diskettes order **#86041-1 (\$49.95)**. DOS 3.1 required.



Most of today's software is available in both DOS and Windows formats. The DOS version is often more powerful and responsive, while the Windows version is easier to use because of the graphical user interface. While the PCjr does a pretty good job of running most of today's DOS-based software, it is not a good machine to use to run Windows software. Microsoft Windows requires a tremendous amount of computer "horsepower" to work well. If you need to run Windows software we suggest you trade your PCjr for a more powerful computer. Call the PC Enterprises sales representative for new computer suggestions and trade-in allowances offered.

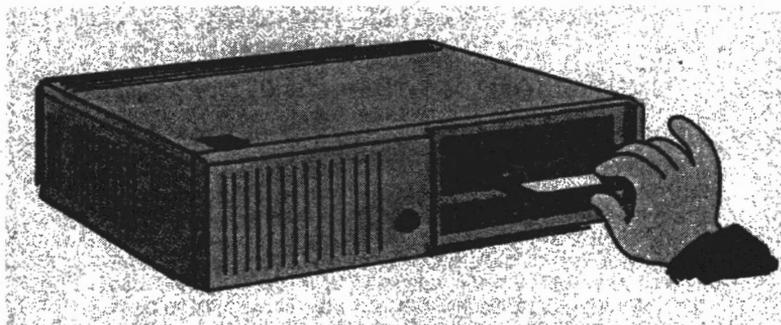
Despite the popularity of Microsoft Windows, DOS-based software has remained very popular and widely available. You can purchase DOS-based software that will do almost anything you might want your computer to do. Virtually any DOS-based word processing package will run fine on your PCjr, including Wordperfect 5.1 Plus. The PCjr can also be used to manage your checkbook and track your investments with Quicken for DOS, while small business owners can manage the accounting needs of their business with QuickBooks for DOS. At tax time, PCjr users can run Intuit's TurboTax for DOS and all year long you can design posters, banners, and personalized greeting cards with the Print Shop. Indeed there are thousands of DOS-based programs that allow you to get good use from your PCjr!

Understanding DOS, BASIC, and BIOS

What is DOS?

DOS is an abbreviation that stands for "Disk Operating System". Before any computer can run software, the computer's operating system must first be loaded into memory. Once DOS has been loaded, your PCjr is ready to run DOS-based software.

How do I Load DOS?

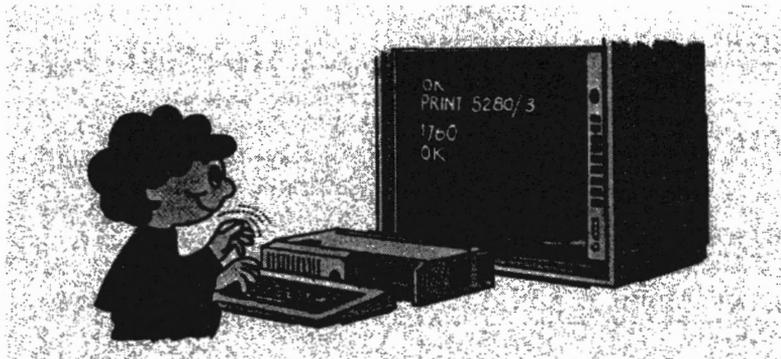


The process of loading DOS from a floppy diskette is not complicated. Simply insert the DOS system diskette into the PCjr, close the disk drive door, then turn the PCjr on. Anytime the PCjr is started with a diskette inside its disk drive, the PCjr always attempts to load DOS from that diskette.

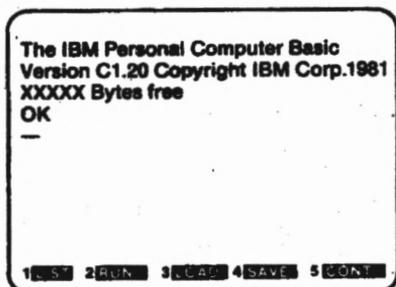
PCjr users often experience a "Non system disk" message when they start their PCjr. This is the PCjr's way of telling you that the diskette inside the diskette drive does not contain the DOS system files. Simply replace the diskette with a DOS system diskette, then restart your computer.

PCjr users that have an internal storage device called a hard drive do not need to start their PCjr with a DOS diskette in their diskette drive. Instead, DOS can be installed on the hard drive that is connected to the computer. Once this has been done, the PCjr will start DOS from the hard drive automatically, each time the computer is turned on.

Is There Anything I Can Do With the PCjr if I Don't Have DOS?



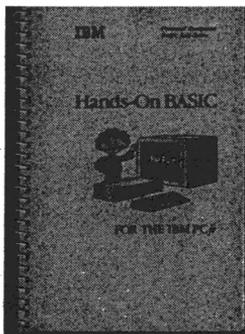
Yes. If you start the PCjr without having a DOS diskette in the diskette drive, the PCjr will automatically run Cassette BASIC. The Cassette BASIC screen looks like this:



Note: If your PCjr displays Version J1.00 it means Cartridge BASIC is installed.

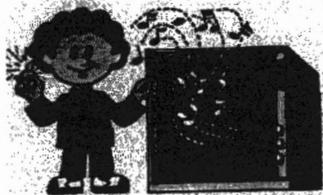


Cassette BASIC is a programming language that allows you to write your own programs. Many PCjr users learn about their PCjr and Cassette BASIC by purchasing a book that includes "Ready-to-type-in" programs. Unfortunately, Cassette BASIC does not permit you to access the PCjr's diskette drive. If you try to save a program that you write on your disk drive, you will receive a device time-out error. To save programs using Cassette BASIC you need a cassette recorder, cassette tape, and a cable to connect the cassette recorder to the C connector on the rear of the PCjr. To purchase the **PCjr Adapter Cable for Cassette Recorders** order #79005 (\$19.95).



The most popular BASIC programming book ever sold for the PCjr is IBM's **Hands-On BASIC**. This easy to understand book is the first book most PCjr users purchase to learn more about BASIC and their PCjr. If you are looking for a way to tap the power of your PCjr without spending very much money, this 431 page illustrated and easy-to-follow book is the best place to start. To purchase the **Hands-On BASIC Manual** order #85031 (\$19.95).

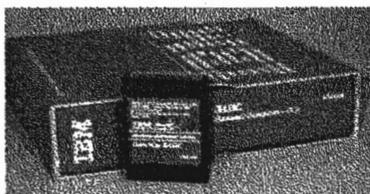
What is Cartridge BASIC?



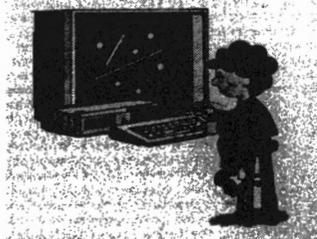
If you want to write your own programs using the programming language called BASIC, or if you want to run BASIC programs written by other people, you can purchase **Cartridge BASIC**. Cartridge BASIC is a more powerful programming language as

compared to **Cassette BASIC**, and **Cartridge BASIC** allows you to save programs on diskettes (provided your PCjr has a diskette drive).

Cartridge BASIC is also the only programming language that allows you to use the superior graphics and sound capabilities that make the PCjr more powerful than an IBM PC or PC XT. If you want to take advantage of the 16-color graphics and 4-voice sound capabilities that are built into the PCjr, you will need to purchase **Cartridge BASIC**.



Cartridge BASIC comes in a cartridge that plugs into a slot underneath the PCjr's disk drive. A comprehensive manual is included that describes how to use BASIC commands. Writing BASIC programs is easy and its fun. The best way to get started programming your PCjr is to purchase **Cartridge BASIC** along with any of the BASIC programming books described in this section. While **Cartridge BASIC** is no longer being manufactured, a small quantity of reconditioned units are available. To purchase **Cartridge BASIC** for the PCjr, order #78722 (\$119).



Can I Run BASIC Without Purchasing Cartridge BASIC?

Yes. All versions of IBM PC-DOS 2.10 through 5.02 include two programs that allow you to run BASIC programs. These programs are named BASIC.COM and BASICA.COM, and can be found on one of the DOS diskettes.

To run BASIC from diskette on an IBM PC or PC XT computer, all you need to do is start DOS, then enter the keyword "BASIC" or "BASICA" with the diskette that includes the BASIC program in your disk drive. However, when you do this on a PCjr, the BASIC program searches for the BASIC cartridge, then displays the "Cartridge Required" message, if the cartridge is not found. At this point the system freezes, and you must restart the PCjr.



The Configuration Plus Cartridge is an inexpensive product that allows you to get around this problem. With the Configuration Plus Cartridge installed, you can flip a switch that changes the PCjr's identification code to the same code as the IBM PC. Once this switch is flipped, the BASIC and BASICA programs both work normally on the PCjr. The only disadvantage of using the BASIC program found on diskette is that it will not be able to

access the superior graphics and sound capabilities of the PCjr.

The Configuration Plus Cartridge also includes three built-in

indicator lights that alert you to the status of the PCjr Caps Lock, Num Lock, and Scroll Lock or Insert mode indicators. In addition, the cartridge can allow your PCjr to recognize additional floppy drives, and an 80 column monitor, without using PCjr configuration software. To purchase a Configuration Plus Cartridge, order #18026 (\$29.95).





Regardless of which version of BASIC that you are using, PC Enterprises has several excellent books that include BASIC programming instructions and programs. The most popular third party book offered is **BASIC Exercises for the IBM PCjr**. This book uses the learn by example approach, a truly effective teaching method. It offers a practical and entertaining way to learn BASIC. Numerous short type-in programs and subroutines are included. To purchase **BASIC Exercises for the IBM PCjr**, order #85014 (\$9.95).



If you are more interested in "ready-to-type-in" programs, **Compute!'s IBM PC & Compatibles BASIC Program Collection** is a better choice. This book includes 25 favorite games, useful applications, educational programs, and helpful utilities that have appeared in various issues of the long running computer magazine **Compute!**. All programs have been fully tested on a PCjr. To order **Compute!'s IBM PC & Compatibles BASIC Program Collection**, order #85034 (\$9.95).

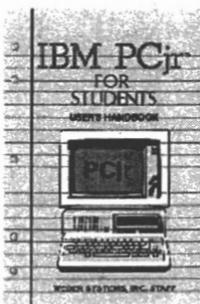


The best book offered for people that want to get their children interested in using the PCjr is **Compute!'s IBM PC and PCjr Games for Kids**. This book allows your PCjr to educate and entertain children of all ages, from preschool to high school. It includes 29 games and two utility programs which are ready to be typed in and run. To purchase **Compute!'s IBM PC and PCjr Games for Kids**, order #85033 (\$9.95).

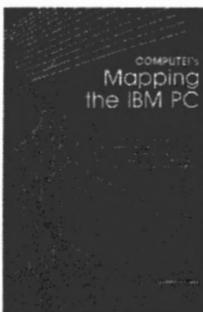
Can I Run IBM Compatible Software on a PCjr?

Yes, but to run software you'll first need to load DOS. Whether you load DOS from diskette, or from a copy of DOS installed on your hard drive, you are ready to run software as soon as DOS has loaded. You can tell that DOS has been loaded when the PCjr displays the DOS prompt on the screen. If you start DOS from diskette, the DOS prompt displayed will be the A:> prompt. PCjr users that start DOS from a hard drive will see a C:> prompt instead.

While many people only use DOS to run software, DOS also gives you the ability to copy diskettes and files, to format new diskettes, to compare files, and to solve a variety of other problems you may experience when you use a computer.



To help PCjr users learn more about their computer, PC Enterprises offers several inexpensive books. The **IBM PCjr for Students** book is designed to help students grades 7 through adult learn to use and program the PCjr. This book is divided into 26 individual lessons that help you learn about your PCjr's microprocessor, RAM, and ROM. It teaches you about DOS, diskettes, and printers. Several lessons are dedicated to showing the student how the PCjr can be used to help with school work. Order **IBM PCjr for Students #85004 (\$9.95)**.



Compute!'s Mapping the IBM PC and PCjr is also available. This book provides in depth discussions of the PCjr keyboard, video, and sound capabilities. It also includes comprehensive memory and port maps as well as an interrupt and function guide. This book is constantly used by all PC Enterprises' technicians and is the best reference book offered for IBM PC and PCjr computers. To order **Compute!'s Mapping the IBM PC and PCjr**, ask for **#85035 (\$9.95)**

How Many Versions of DOS are There?

Most software developers use version numbers to keep track of new releases of their software. The version number therefore tells you which releases of the software is newest.

At one time, it was common for most software developers to increment the version number by a full number when major changes were made, and by a fraction of a number when only minor changes had been made. Incrementing a version number from 2.1 to 3.0 therefore implied a rather significant improvement was made to the software, while going from 3.1 to 3.2 would be considered a relatively minor change.

IBM used this revision system in the early days of DOS. The first version of DOS that worked on a PCjr is PC-DOS 2.10. After releasing PC-DOS 2.1, IBM made significant changes and improvements to DOS. The new improved DOS was called PC-DOS 3.0, which was followed by 3.1, 3.2, and 3.3 which all had relatively minor enhancements.

Today, somebody in the marketing department of most companies determines the version number that a new software release will use. In many cases, as with current releases of DOS, companies select a version number that is slightly higher than the version number used by their top competitor. One company recently jumped from version 2.0 to version 6.0 after version 5.1 of a competitors software was released. As a result, you can no longer tell how significant the changes are to a new release of DOS or other software, unless you inspect the manual.

After the release of PC-DOS 3.3, IBM released PC-DOS 4.0 followed by PC-DOS 5.0, 6.1 and 6.3. DOS releases after 3.3 provide little benefit to PCjr owners, unless a hard drive is installed on the PCjr.

How Can I Determine the Version of DOS my PCjr is Using?

To determine which version of DOS your PCjr is using, start the PCjr with your DOS diskette or from your hard drive if your PCjr has a hard drive installed. When the computer displays the DOS prompt (usually A:>), type VER then press the enter key. The computer will display a message telling you which version of DOS you are using.

Example:

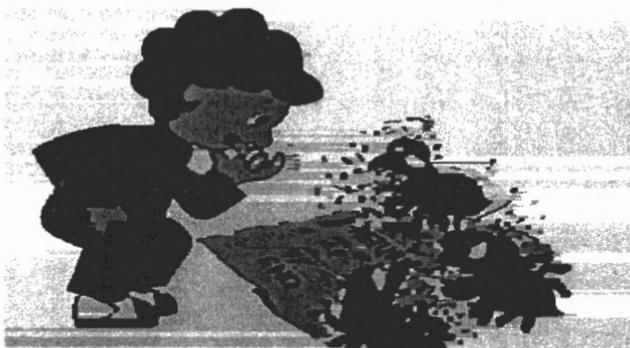
A:>VER

IBM Personal Computer DOS version 2.10

<Then Press Enter>

<Computer responds>

Is DOS 2.10 a Good DOS to Use on the PCjr?



Absolutely not! While many PCjr owners are still using DOS 2.10, upgrading to a more recent version of DOS can be the most important thing you can do. Software compatibility problems due to DOS 2.10 are quite common. Many programs will not work at all when your PCjr is using DOS 2.10, and programs that do run with DOS 2.10 often do unpredictable things, such as crashing without warning.

The crashing problem is caused by "bugs" that relate to the PCjr's NMI keyboard routine. A bug is an unintentional error that causes software to do something wrong. The bugs in the DOS 2.1 NMI routine were not detected until after DOS was released. While IBM quickly distributed corrective patches to their dealers, most dealers have long forgotten about these fixes, and no longer make them available. The crashing problem will always occur when you press or release one of the PCjr's keys, and certain programs are effected more frequently than others. When using IBM's Writing Assistant program, the PCjr often crashes (hangs up) when you press the save key! While this problem only occurs occasionally, it is a serious problem because it causes you to lose everything you typed into the computer and did not save. The PCjr must be turned off, and restarted.

Often, PCjr users fail to realize these problems are due to the primitive version of DOS that they are using, and instead blame their PCjr. Upgrading DOS totally eliminates this problem.

Can I Upgrade to Newer Versions of DOS?



Fortunately, IBM put the PCjr's operating system on diskettes, instead of making DOS a permanent part of the computer. As a result, in order to use newer and improved versions of DOS, all you need to do is use different DOS diskettes. This allows the PCjr to take advantage of all the improvements that have evolved since DOS was released. *While later versions of DOS will run on a PCjr, the latest version of DOS is not always the best version for PCjr owners to use.*

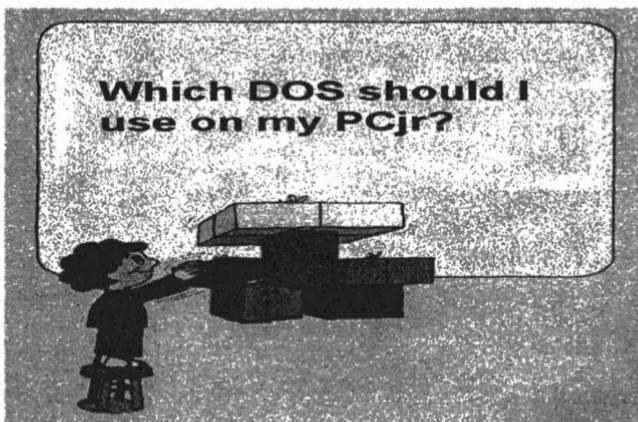
What is the Difference Between MS-DOS and PC-DOS?



Today, DOS is big business, and several companies sell competitive DOS products. The DOS normally sold with the PCjr was made by IBM, and is known as PC-DOS. Other companies that make DOS for personal computers include Microsoft and Novell DOS. Microsoft DOS (MS-DOS) and Novell (formerly DR-DOS), will work on some PCjrs, however these operating systems are not recommended because additional compatibility issues will be experienced.

Prior to the release of DOS 4.0, PC-DOS and MS-DOS were very similar. In most cases, either DOS could be used on the PCjr. Starting with release 5.0 additional compatibility issues were introduced, making PC-DOS the preferred DOS to use.

The PCjr can use any version of IBM PC-DOS 2.10 through the current version, however DOS 5.0 and higher requires a PCjr Compatibility Cartridge (see the BIOS upgrade section of this manual for additional information).



PC Enterprises is the Authority on DOS for the PCjr!

To run the largest selection of software, PC Enterprises **recommends using MS or PC-DOS version 3.3.** While DOS 3.3 is not the latest DOS release, it is an excellent DOS for PCjr owners to use. DOS 3.3 is mature, and therefore free from most bugs. It provides excellent software compatibility and leaves more memory available to run software than newer DOS versions. In addition, all the files are included in uncompressed form on only two diskettes.

PCjr users that have a hard drive larger than 32MB, normally prefer DOS 4.0 or later. Starting with DOS 4.0, the computer can access more than 32 megabyte hard drive partitions using a single drive letter. DOS 3.3 is still an excellent DOS to use, even if you have a hard drive, however the hard drive must be divided into 32MB partitions, with each partition using a separate drive letter.

DOS 6.1 can also be used, however DOS 6.1 comes on 17 low density diskettes, with many files compressed to save disk space. Floppy drive users that upgrade to DOS 6.1 must search through 17 diskettes to find the DOS utility that they need, then uncompress the utility before it can be used. For this reason, we do not recommend using DOS 6.1 unless a hard drive is installed.

DOS 3.3 is an Excellent DOS to use on the PCjr!



IBM has recently introduced DOS 6.3, although no significant benefits over DOS 6.1 have been found for PCjr users, and DOS 6.3 is currently not available on 360KB low density diskettes.

DOS can be purchased in local computer stores everywhere, however local stores often sell current DOS versions only. In addition, many stores only sell DOS on high density 3 1/2 inch diskettes, and the PCjr needs low density 5 1/4 inch diskettes. Although a coupon for low density diskettes is often included, to avoid having to wait several weeks or more for the diskettes your PCjr needs to arrive, be sure to purchase DOS on 5 1/4 inch low density (360KB) diskettes.

PC Enterprises has a variety of DOS versions available on low density 5 1/4 inch diskettes. In addition, PCE can also provide a special version of DOS that includes PCjr configuration software. DOS can be purchased from PC Enterprises with and without PCjr Memory Management Software.

While DOS 5.0 and later purchased from stores will not run on a PCjr unless the PCjr has a PC Enterprises' Compatibility Cartridge installed, PCE provides a special PCjr installation diskette that allows the use of these DOS versions without first updating the PCjr's BIOS. Unfortunately, copyright law does not permit PCE to distribute these installation diskettes unless you also purchase DOS.

Disk Compression Warning!!!

Recent versions of DOS include a disk compression option. Do not use disk drive compression on a PCjr, unless the PCjr is equipped with a product that allows it to recognize memory above 128KB without running memory management software. The PC Enterprises jrExcellerator and Display-Master Sidecars are two such products.

If you install the disk compression software on a PCjr without such a device, the compression software will try to load before your PCjr Memory Management Software, causing the PCjr to "hang up" each time you attempt to start DOS. If this should happen, you'll need to start DOS with a floppy diskette that has the hidden file that activates the disk compression software detected.

If you have already installed the compression software provided with DOS, and are now unable to access the information on your hard drive, you will need to install a device that lets the PCjr start DOS without memory management software. The jrExcellerator and Display-Master SVGA sidecar are two such products.

Tips For Running the DOS Install Program with 736KB

The PCjr's conventional memory can be expanded to 736KB, permitting the PCjr to load any version of DOS in high memory. The technique used by the PCjr is to use the address space reserved for a monochrome monitor. As the PCjr does not use a monochrome monitor, this technique will rarely cause problems. Unfortunately, the install program that comes with certain versions of DOS sees the memory above 640KB and is fooled into running as it would if the PCjr had a monochrome monitor. As a result, the PCjr Color Display will go blank. The only way around this problem is to remove the memory above 640KB until DOS is installed. DOS will perform perfectly, only the install is effected.

I do not Have a Hard Drive. Which DOS Should I Use?



If your PCjr does not have a hard drive and you decide to upgrade DOS, ask for **DOS version 3.3**. Purchase **#86044-0 (\$49.95)** to receive DOS by itself, or **#86044-1** to receive **DOS with a PCjr Startup Diskette (\$69.95)**

DOS 4.0 can also be used on your PCjr, however **DOS 4.0** offers minimal advantages as compared to **DOS 3.3**, unless you have a hard drive. Some hard drive users prefer this version of DOS because the DOS files are not compressed, and because PCjr modifications are not required. Floppy drive users also use **DOS 4.0** because it is the latest version of DOS that is practical to use without a hard drive. If you prefer to use **DOS 4.0** on your PCjr order **#86045-0 (\$49.95)** to purchase **DOS version 4.0 alone**, or **#86045-1 (\$69.95)** to purchase **DOS version 4.0 with a PCjr Startup Diskette**.

Which DOS Should I use if My PCjr has a Hard Drive?

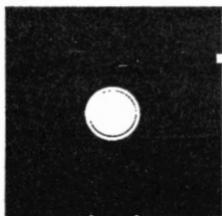
If your PCjr has a hard drive, and you also have 736KB of memory, **DOS 6.1** is clearly the best choice. If your PCjr only has 640KB of memory, **DOS 6.1** is still an excellent DOS to use, however your PCjr will not be able to load DOS high. **DOS 3.3** has a smaller core size, and therefore provides slightly more memory to run software. If you ever find a program that requires the computer to load DOS high, a device that expands memory to 736KB can be installed. With all trade-offs considered, **DOS 6.1** is recommended for all PCjr users that have large hard drives installed. Order **DOS 6.1 on 360KB diskettes with the PCjr Installation & Startup Diskette #86036-7 (\$49.95)**.



What is a PCjr Startup Diskette?

A PCjr Startup Diskette is a bootable DOS diskette that has already been set up to start DOS on your PCjr. The diskette includes the latest version of PCjr Memory Management Software. Memory Management software is required on a PCjr to recognize all memory above 128KB. While Memory Management Software is simple to use, you must know how to create and modify a CONFIG.SYS file. While we will discuss this subject in more detail later, it was important to mention Memory Management Software at this time.

When you purchase DOS from PC Enterprises that includes a PCjr Startup Diskette, all you need to do is insert the startup diskette into your drive and turn the power on. You do not need to know how to edit a CONFIG.SYS file. Starting with DOS 5.0, PC Enterprises includes a PCjr installation program on all DOS startup diskettes. This program allows PCjr users that have hard drives installed, to start DOS and install PCjr modifications on their hard drive. Once installed you'll be able to start DOS from a hard drive without the PCE Compatibility Cartridge installed.



Memory Management Software is also available separately, for those who already own DOS, and now need the software that allows the PCjr to recognize added memory. Every PCjr that has more than 128KB of memory should use the JRCONFIG.SYS program to configure DOS to work properly with their PCjr. If you start your PCjr without memory management software, DOS can not recognize memory installed on your PCjr above 128KB. JRCONFIG.SYS is the only program that has been updated to work properly with today's DOS and PCjr expansion products. Obsolete programs still used by many PCjr owners include PCJRMEM, CONPCJR, JRVIDMA, and JRMEMORY, to name a few. The use of any of these programs is strongly discouraged, as additional compatibility issues will be experienced. To purchase **PCjr Memory Management Software** with a printed easy-to-understand manual order #85502 (\$9.95).

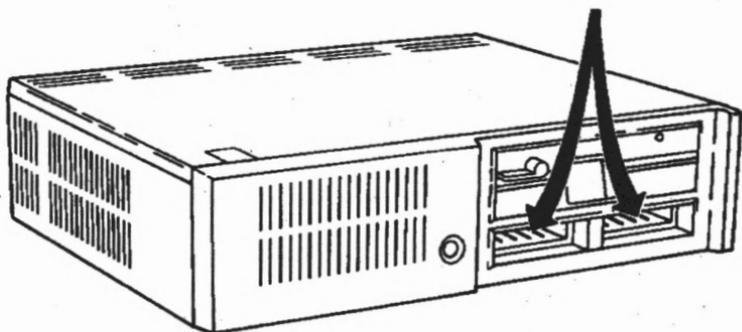
What is BIOS?

All computers have a BIOS. BIOS stands for Basic Input and Output System, but don't be concerned if that doesn't mean very much to you. What you should know about BIOS is that there are two computer chips inside your PCjr that provide the basic interface between the computer and the software that you run.

Most PCjr owners still use the PCjr's original BIOS released in 1984. While the PCjr's BIOS was intended to provide 100% PC compatibility, there are a few situations where BIOS does not do exactly what it should. If you try to run a program that uses one of the BIOS routines that does not work as it should, the program will not run correctly on your PCjr.

How do I Update the PCjr's BIOS?

IBM designed the PCjr with two cartridge slots underneath the PCjr's disk drive. Two types of cartridges can be inserted into these slots: Program cartridges and BIOS upgrade cartridges. Program cartridges provide an easy way to run software, while BIOS upgrade cartridges replace all or part of the PCjr's BIOS. BIOS upgrade cartridges improve the way your PCjr works, while providing a more compatible interface that lets you run more software.





How will a Compatibility Cartridge make my PCjr Run More Software?

If you want to run the latest DOS and DOS-based software on your PCjr, you may need a PC Enterprises **Compatibility Cartridge**. The **Compatibility Cartridge** corrects all the known "bugs" in the PCjr's BIOS, allowing you to run current versions of DOS and virtually all of today's DOS-based software.

While its a good idea to purchase a **Compatibility Cartridge** before you encounter a problem, many PCjr owners do not purchase the cartridge until it is needed. Typical problems include a variety of keyboard problems, especially beeping when you press a key. Sometimes the keyboard will not work at all, and sometimes double characters will be displayed. Diskette drive error messages and display problems may also be encountered.



In addition to DOS 5.0 and later, Quicken and QuickBooks (Intuit) are two very popular programs that are known to require the cartridge. Wordperfect 5.1 Plus does not require the cartridge, however some features may not work as you would expect, unless the **Compatibility Cartridge** or a 101-key keyboard is installed. IBM's Prodigy Information Service runs without the cartridge, however, freeze-up problems are more common. To order a **Compatibility Cartridge**, ask for #18032 (\$39.95)

Do any Other Cartridges make my PCjr More Fun to use?

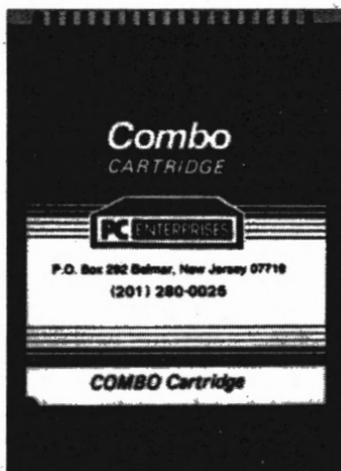


Yes. Three other BIOS update cartridges are available. The **Quicksilver Cartridge** speeds up the PCjr's memory test that is run each time the computer is turned on. With this cartridge installed, you never have to wait more than a fraction of a second for the PCjr to start loading DOS. More importantly, QuickSilver also corrects a bug that causes double characters, or even no characters, to appear when you use the PCjr's keyboard. To purchase the **QuickSilver Cartridge**, order #18027 (\$29.95).

The **Keyboard Buffer Cartridge** is another popular BIOS update Cartridge. This cartridge allows you to use the PCjr's keyboard while the PCjr is accessing a floppy diskette. While this sounds like a very minor problem, PCjr owners often become quite frustrated because they must stop typing when the computer accesses the disk drive. If you use the PCjr's keyboard while the diskette drive indicator light is on, you may hear a beep when you press a key. When this happens, the character you typed is often rejected. With the **Keyboard Buffer Cartridge** installed you'll have a 47 character type-ahead buffer. The **Keyboard Buffer Cartridge** also searches the DOS you have loaded for the infamous NMI bugs that so frequently cause PCjr's to lock up. If the bugs are found, they are exterminated and a message is displayed. To order the **Keyboard Buffer Cartridge**, ask for #18001 (\$29.95).

The third popular BIOS update cartridge for a PCjr is the **jrVideo Cartridge**. This cartridge speeds up the routines that write information on the screen. At times, the improvement in speed will be so dramatic that PCjr users must learn how to use the PCjr's pause key! The **jrVideo Cartridge** also provides better mode defaults, or in simpler terms, a more compatible video interface. As a result, programs that do not run correctly on a PCjr because of a video problem, often run after the **jrVideo Cartridge** is installed. To obtain a **jrVideo Cartridge** order #18002 (\$29.95).

My PCjr only has Two Slots. Which Cartridges Should I Purchase?



The **Combo Cartridge** is the most popular PCjr BIOS update cartridge ever sold. The **Combo Cartridge Version 3.0** combines all four cartridge routines described above, in a single PCjr cartridge. The **Combo Cartridge** will speed up the PCjr's memory test, improve and speed up the keyboard and video interfaces, and add all the compatibility updates available for a PCjr. To purchase the **Combo Cartridge V3.0**, order #18034 (\$89.95).

PCjr Hardware

What is an Entry Model PCjr?

IBM introduced two PCjr models. The Entry Model came standard with an 8088 microprocessor, Enhanced CGA graphics, 64KB of system memory and a cordless keyboard. In addition, the Entry Model has one serial port, two game (joystick) ports, and a light pen port (LP). The Entry model can easily be distinguished



from the Enhanced model because it has a plastic panel where the computer's disk drive is normally found. If your PCjr does not have a floppy diskette drive, you have the Entry Model of the PCjr.

What Makes the Enhanced Model of the PCjr Superior?

The Enhanced Model is essentially the same computer as the Entry Model, except that it has a low density 5 1/4 inch diskette drive and the 64KB Memory and Display Expansion card installed. The 64KB Memory and Display Expansion increases



memory to 128KB and allows the PCjr to display 80 columns of text. Neither model came with a hard disk drive.

Can I Upgrade the Entry Model to an Enhanced Model?

Yes, however the Entry Model is often too expensive to justify upgrading. To upgrade from an Entry Model to an Enhanced Model purchase the **64KB Display and Memory Expansion #78709 (\$50)**, a **Replacement Diskette Drive #78719 (\$98)**, **Diskette Drive Controller Card #78708 (\$50)**, **Diskette Drive Mounting Shelf #78725 (\$2.95)**, a **Diskette Drive Power Cable #91814 (\$9.95)**, and a **Diskette Drive Signal Cable #91813 (\$9.95)**. If you have an Entry model PCjr, and you want to run most of today's software, consider purchasing a new computer.

Should I Upgrade My Enhanced Model PCjr, or Buy a Computer?

As long as you don't need to run Windows or Multimedia software, upgrading the PCjr can make a lot of sense. The computer is not going to be as fast as today's newest computers, however speed is of little importance with many DOS-based programs.

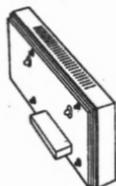
The PCjr has three disadvantages that you should be aware of before spending your hard earned money to upgrade the computer. First, the computer's microprocessor is not as fast as those used by today's newest computers. Even if you upgrade your PCjr, it will not win a race with a powerful 486 computer. Second, the PCjr came standard with 128KB of memory, and most of today's software requires 640KB to run. The only way around this problem is to expand the PCjr's memory. Finally, the PCjr did not come with a hard disk drive. This means you must start DOS with a floppy diskette, and purchase software that runs from diskette.

The only limitation you can not avoid, is the memory limitation. To run most of today's DOS-based software, your PCjr is simply going to need 640KB of memory. If your PCjr has anything less than 640KB of memory, you are going to be restricted to using software that runs with the amount of memory you have installed. Expanding your PCjr's memory to 640KB may cost \$149, or less, depending upon how much memory you now have.

PCjr users that decide not to upgrade memory can still use software that runs with 128KB of memory, however the selection of programs available is very limited. BASIC programs will always run fine on a PCjr, because BASIC never requires more than 64KB of memory. Likewise, PCjr Game Cartridges can be used on a PCjr without purchasing anything else, even if your PCjr is an Entry Model PCjr.

To run DOS-based software, the only other thing you need is a PCjr and DOS.

Which Options Should I Buy?



Memory expansion sidecars have always been the most popular PCjr add-on options. A single sidecar can add enough memory to run any DOS-based program available.

Complete printer packages are also very popular. After all, once you start to do things with your PCjr you are going to want to print things out. Aren't you?

Once you start using your PCjr, you will begin to realize all the things your PCjr can do. You may wish to add a hard drive to make your PCjr faster and easier to use. DOS and BIOS upgrades, joysticks, and PCjr software are also very popular upgrades. Most important, you can purchase add-ons when you need them, without paying for features you don't need.



Learning About the PCjr's Microprocessor!

A microprocessor can be thought of as the engine of your computer. The type of microprocessor used by your computer gives you an indication of how powerful the computer's engine actually is. The clock speed of the computer is a better gauge of the power of a computer. The PCjr uses the Intel 8088 microprocessor running at 4.77 MHz.

People often ask how the 8088 microprocessor compares to today's 286, 386, and 486 microprocessors. The answer is easier understood when you realize that the 8088 is from the same "80" microprocessor family as today's latest microprocessors. The next generation of microprocessors to become widely used was the 80286. Computers that use the 80286 microprocessor are called 286 computers. A 386 computer uses an 80386 microprocessor, and 486 computers now use microprocessors called simply, 486 microprocessors.

When selecting software to run on the PCjr, examine the software package to determine whether the program works with an 8088 microprocessor. Stay clear of programs that require a 286, 386, or 486 microprocessor.

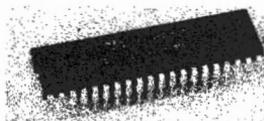
While the PCjr's microprocessor is not as fast as those used with today's newest computers, speed may be very unimportant. Whether or not speed will be important, depends upon the type of software you run.

An example can make this point very clear. Let's say you use your PCjr to write a letter. Each time you press a key, you'll see the character that you type appear on the screen. Regardless of how fast you type, the PCjr displays each character on the screen as quickly as you press a key. If you were using a computer that was ten times faster than the PCjr, the characters would technically appear on the screen faster, but you would never see the difference. In this case, improved speed gives you no advantage at all.



Of course, there are other times speed is more important. Let's say you are using Intuit's QuickBooks program to manage a small business. It may take the PCjr ten seconds to analyze hundreds of transactions before it starts to print a list of people that owe you money. While a faster computer may start printing the list faster, you still have to wait for your printer to finish before you can examine the list. If the printer that you use takes 3 minutes to print the list, the entire job would take your PCjr 3 minutes and ten seconds to complete. The fastest computer your money can buy might complete this job in 3 minutes and one second. Personal preference and budget normally determines whether this speed difference justifies purchasing a new computer.

Can I Install a Microprocessor Upgrade in the PCjr?

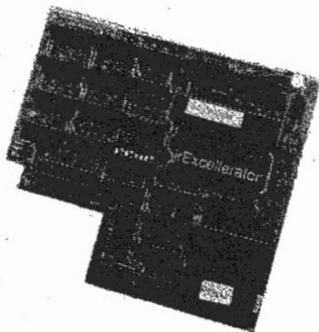


There are times that PCjr owners wish to make their PCjr's engine run faster. The easiest way to speed up your PCjr is to replace the Intel 8088 microprocessor with an NEC V20 Microprocessor. The V20 Microprocessor speeds up your

computer because it executes many 8088 instructions in fewer clock cycles. The biggest improvement comes in the area of number crunching. If you install a V20 Microprocessor, you will see from zero to 40% improvement in speed, depending upon the software you are running. While the V20 only provides a modest improvement in speed, it is an inexpensive and easy to install option. To order a NEC V-20, ask for #19001-2 (\$16.95).

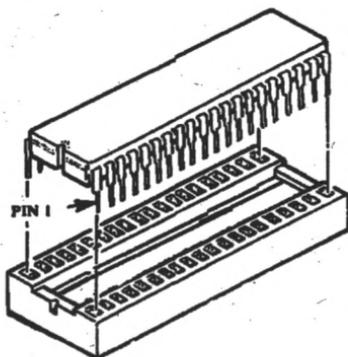
Can I Increase the Clock Speed of the PCjr?

Yes. The jrExcellerator Speed-up Board is an add-on product that plugs into the PCjr's microprocessor socket. The jrExcellerator doubles the clock speed of the PCjr (4.77MHz to 9.54MHz), allowing the computer to run almost twice as fast. In addition, the jrExcellerator includes an NEC V20 for maximum speed improvement. Once installed, your PCjr will benefit from a microprocessor upgrade in addition to faster clock speed. Doubling the clock speed has the effect of cutting processing time almost in half. An operation that takes your PCjr's 8088 microprocessor ten seconds to perform will take slightly more than five seconds with a jrExcellerator installed. To order a jrExcellerator Speed-up Board, ask for #14802 (\$99).

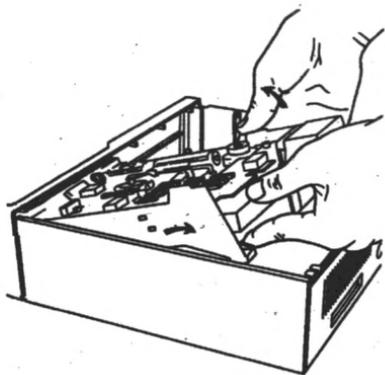


How can I tell Whether a Speed-up Device can be Installed in my PCjr?

Both speed up products require that you first remove your PCjr's existing microprocessor. In most cases, this will be a simple chore because the PCjr's microprocessor will be installed in an IC socket. A small screwdriver is the only tool required to lift a microprocessor from its socket.



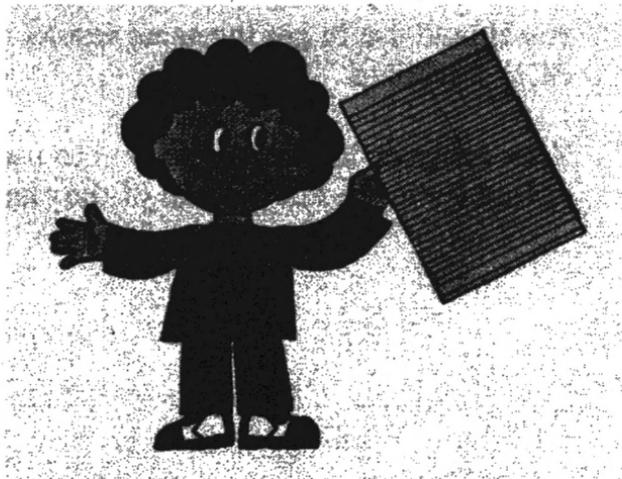
A few PCjrs do not have their microprocessor installed in a socket. Before purchasing either of the speed up products described in this guide, it is a good idea to inspect the PCjr 8088 microprocessor to determine whether it is installed in a socket, or permanently attached to the computer's system board.



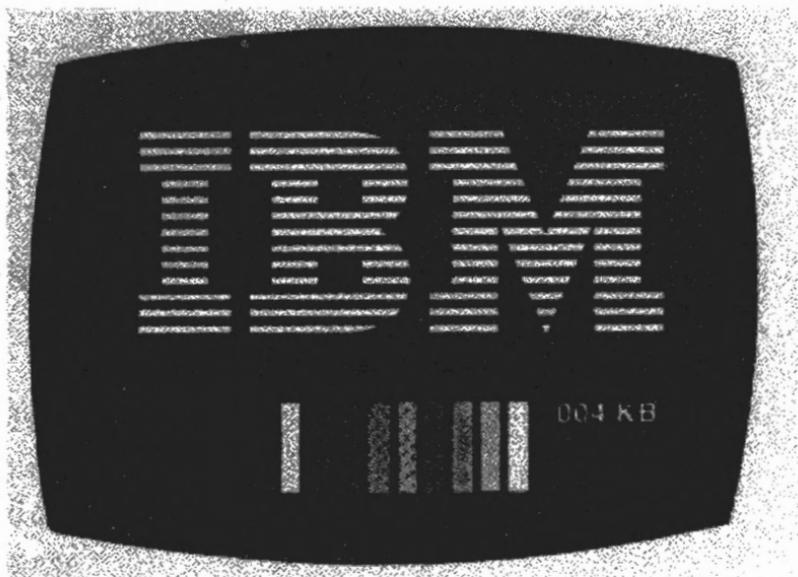
The PCjr microprocessor is located underneath the floppy disk drive. To remove the floppy diskette drive, refer to the instructions provided in the PCjr Guide to Operations Manual. The process concerns unplugging the cables that attach to the disk drive, then pulling the disk drive straight up. Although no screws are used to hold the disk drive in place, a fair amount of force is sometimes required.

Can I Upgrade to a 486 Microprocessor?

A much more dramatic speed increase would be obtained if the PCjr's main system board (motherboard) could be replaced with a system board that uses a 486 microprocessor. To date, no such product exists, however PC Enterprises will produce such a product, if the demand exists. PC Enterprises' Genesis\PC line of 486 Replacement Motherboards was introduced in late November of 1994. The first three replacement motherboards, which sell for \$295, are for the IBM PS/2 Models 25, 25-286, and Model 30-286. PCjr users interested in a 486 Replacement Motherboard for their PCjr are asked to call our toll-free line (800-922-PCjr) and ask to be placed on the notification list for the PCjr Genesis\PC Motherboard. PCjr owners included on this list prior to the formal announcement of a PCjr Genesis\PC Motherboard will be notified by mail and be offered special introductory pricing.



**Add your name added to the
PCjr Genesis\PC 486 Motherboard
Notification List!**



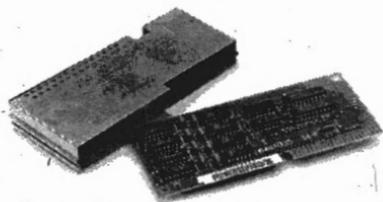
Learning About PCjr Memory Expansions!

The RAM or system memory of a computer is the area where information is stored while the computer is running a program. This storage area is measured in "Kilo-Bytes" and is therefore abbreviated **KB**.

When you first power on your PCjr on, the PCjr will start to test it's memory. In the lower right hand corner of the screen, you will see the PCjr count the amount of memory installed on your PCjr, or to 640KB whichever comes first.

If your PCjr's memory passes the Power On Self Test (POST), the PCjr will produce a single beep at the conclusion of the test. If a memory error is detected, an ERROR A message will be displayed, and two beeps will be produced. The number below the ERROR A message is the last memory range tested that passed the memory test.

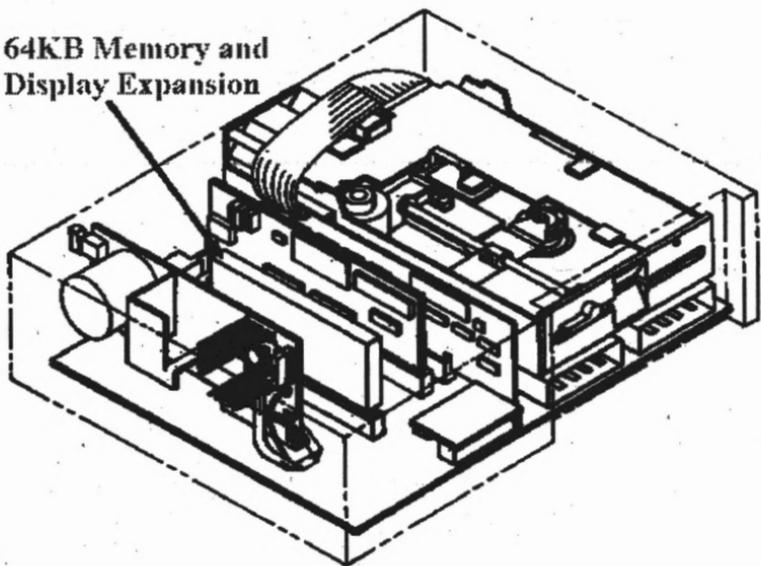
Increasing the Memory of the Entry Model PCjr



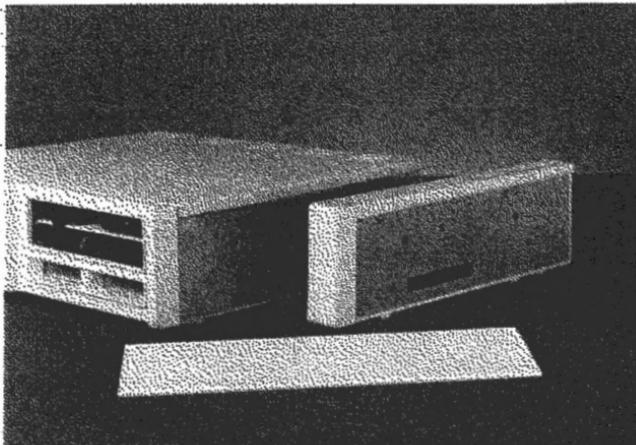
The Entry Model of the PCjr only has 64KB of system memory, and can only display 40 columns of text. In order to display 80 columns of text, you must increase the memory to 128KB, by installing the PCjr **64KB Display and Memory Expansion Card #78709 (\$50)**.

Once the PCjr's memory has been increased to 128KB, you can continue to increase memory exactly the same way as you would increase the memory of the Enhanced Model PCjr.

64KB Memory and Display Expansion



Increasing the Memory of the Enhanced Model PCjr



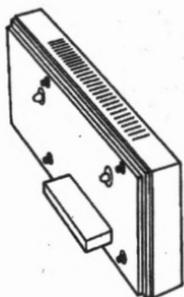
The Enhanced Model of the PCjr came with 128KB of system memory. This means the PCjr's 64KB Display and Memory Expansion Card is already installed.

Before we go any further, it is important to understand that system memory has nothing to do with diskette storage, although both types of storage is measured in KB. Diskette storage is the area where programs and data are stored so information is not lost when the computer is turned off. System memory is the area the computer uses while it is running a program. Many PCjr users incorrectly believe their PCjr has 360KB of memory. This number relates to storage space on your diskettes, and will be discussed in the *Learning About Floppy Drives* section in this guide.

Most programs written in the early 1980s run fine on a computer that has 128KB of memory. However, by today's standards, these programs have little power and have therefore become hard to find.

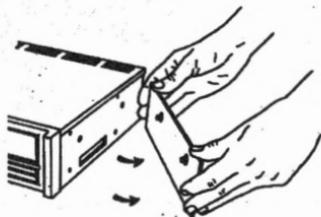
As IBM PC software became more and more powerful, programs grew in size. To run these more powerful programs you will almost certainly need to increase the PCjr's memory to 640KB.

Today's newest IBM compatible computers are still limited to 640KB of conventional memory, although additional memory is often provided to run Windows and Windows based software. New computers can not use the memory above 640KB as conventional memory. As a result, any memory above 640KB is seldomly used by DOS-based software.



Its easy and inexpensive to increase the system memory of a PCjr from 128KB to 640KB. Memory expansion products known as sidecars, are generally used. A sidecar is a PCjr expansion board that comes in an easy and safe to handle plastic case designed so upgrades can be installed in your own home. Even if you know very little about computers, you will have no trouble installing sidecars on your PCjr.

The sidecar plugs into a connector hidden behind the plastic panel on the right hand side of all PCjrs. To install a sidecar, begin by removing this panel. The panel snaps off without using any tools.

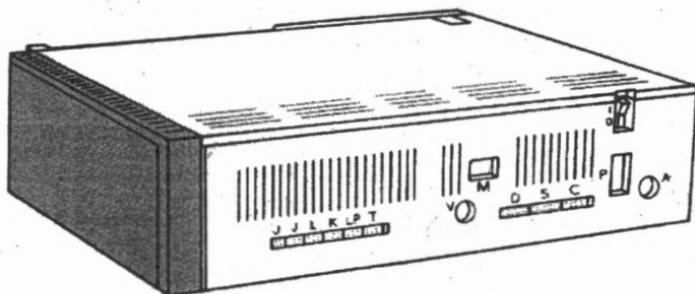


Next, position the sidecar so that it aligns with the rectangular cutout, then press the sidecar in place. Four screws are provided to keep the sidecar from coming off.

If you start with a 128KB PCjr, and you install a 512KB sidecar, your PCjr's memory will be increased to 640KB. This is all the memory you are going to need to run most DOS-based software. You can purchase a **512KB Memory Expansion Sidecar** by ordering #14019 (\$149).

My PCjr Counts up to 256KB. How do I Increase Memory?

If your PCjr currently has 256KB of system memory, it means a 128KB memory expansion product is already installed. In most cases, this memory expansion product will be a 128KB Memory Expansion Sidecar. Inspect the right hand side of the PCjr and determine whether a memory expansion sidecar is installed.



The least expensive way to increase memory when you already have a 128KB sidecar installed, is to send the sidecar to PC Enterprises for upgrading. Upgrading normally takes about one week, often less. PC Enterprises will remove the memory devices currently soldered inside the sidecar, and replace them with higher capacity devices. When you get the sidecar back, it will have 512KB of memory installed. To have a 128KB sidecar upgraded to 512KB, send your 128KB sidecar to PC Enterprises and ask for **Memory Sidecar Upgrade #97501 (\$99)**. PCE can upgrade sidecars made by IBM, PCE, Tecmar, Micro Products, Microsoft, Impulse, and others.

What is the Finest Memory Expansion Product Available for the PCjr?

A better way to increase memory is to purchase a PC Enterprises **Megaboard Sidecar**. The **Megaboard** sidecar adds a Megabyte (1024KB) of memory to the amount of memory that the PCjr already has. In other words, you can add a Megaboard even if your PCjr now has more than 128KB of memory.

A special PC Enterprises design permits the **Megaboard** sidecar to add memory above the traditional 640KB conventional memory limit. PCjr users that install a **Megaboard** sidecar have a total of 736KB of conventional memory available to run DOS and other software. The additional memory allows your PCjr to load DOS high as well as to have a ramdisk and simulated EMS memory. To order a Megaboard Sidecar order #14031 (\$199).

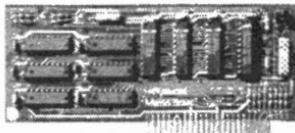
Can the PCjr Load DOS High?

Yes, although the PCjr's 8088 microprocessor can not load DOS in the high memory (HMA) area, you can expand a PCjr's memory to 736KB which completely compensates for this disadvantage. The 96KB of memory above 640KB allows PCjr users even more advantages than HMA and UMB memory provided by other computers. The PCjr Megaboard Sidecar is popular because it allows a PCjr with 128KB of memory to expand to 736KB without purchasing anything else.

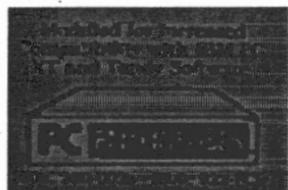
Despite the advantages of having 736KB of conventional memory, PCjr users that already have 640KB prefer a less expensive way to expand memory. As a result, the PC Enterprises 192KB internal memory card was introduced. This card replaces the PCjr's existing 64KB Display and Memory Expansion card with a new memory card that adds the memory needed to expand to 736KB.

The PC Enterprises 192KB Internal Memory Expansion Card is simple to install, however to use the product a system board modification is required.

The modification that supports the addition of the 192KB Internal Memory Card is one of Five System Board Modifications offered by PCE. The five modifications permit the PCjr to run more PC compatible software, to produce better sound, better graphics, and to add the two products that require modifications to install. To order the **PCE 192KB Internal Memory Card**, order #14032 (\$50)



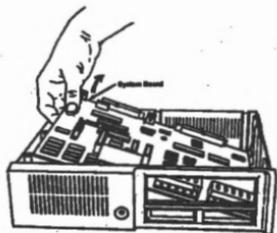
To determine whether your PCjr already has the required modifications, inspect the PCjr system board. Look for a silver and black label to indicate that the system board modifications have been installed.



If so, a second label affixed to the system board will display a modification number. The standard modification allows the Internal Memory Card to expand memory from 640KB to 736KB is **Modification #97514**. If your PCjr has any other modification numbers listed,

contact PC Enterprises for details.

If your PCjr's system board has not received the Five System Board Modifications, you can send your system board to PC Enterprises to have the modifications installed. These modifications will allow you to add the 192KB PCjr Memory Card and the Display-Master SVGA Sidecar. In addition, the system board modifications will allow the PCjr to run many programs that support the Tandy 1000 computer, in 16-color graphics instead of 4-colors, and 4 voice sound, instead of PC beeper sound. Ask to have the **PCE Five System Board Modifications #97514 (\$49.95)** installed.



If you decide to have the FIVE System Board Modifications installed on your PCjr system board, you can also install the disk drive address PROM. This PROM solves a disk drive compatibility problem that can prevent the PCjr from running certain PC compatible program.

The PCjr's floppy disk drive uses a different address as compared to other PC compatible computers. When software goes through DOS or BIOS this is never a problem, however programs that directly access the computer's hardware may not work correctly on a PCjr. Certain types of diskette based copy protection schemes have been demonstrated to show this problem. Disk Errors, Abort, Retry, Ignore errors, and general disk drive malfunctions are typical problems solved.

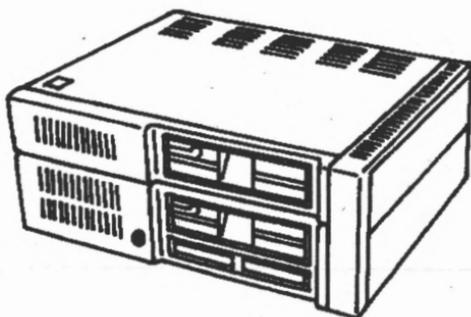
This PROM is not included with the PCE modifications because it does not work if you have a Racore DMA option installed. All other PCjr owners that have the PCE System Board Modifications should order the **Diskette Drive Address PROM** to obtain maximum compatibility. To order the **Disk Drive Address PROM** order #59331-1 (\$9.95).



Can I Load DOS High Without System Board Modifications?

Yes, you can always add a PCE Megaboard sidecar, and there is also another option. The PC Enterprises **Load High Sidecar #78727 (\$99)** is a Memory Expansion Sidecar that increases memory from 640KB to 736KB. To use this sidecar, you must already have 640KB, however, no modifications to the PCjr are required. Once installed, your PCjr will load DOS above the usual 640KB boundary, thus leaving more memory available to run software. If you already own an extra 128KB IBM Memory Expansion Sidecar PC Enterprises can convert it to a Load High Sidecar. Send your 128KB sidecar to PCE and order **modification #97509 (\$35)**. Once modified, your 128KB sidecar will allow you to load DOS high on your PCjr by increasing memory from 640KB to 736KB.

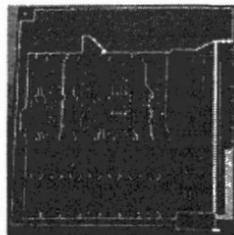
Special Information for Rapport, Racore, and Quadram Users

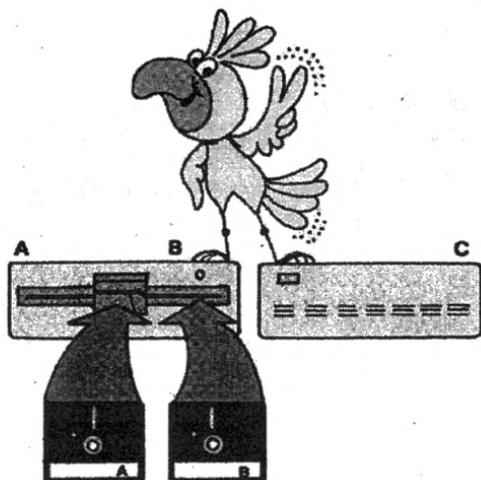


If your PCjr has two disk drives installed, one on top of the other, it is possible that you have a Drive II Enhancement Package made by Rapport, Racore, or Quadram installed. Check the rear of the PCjr for a switch labeled "jr/PC", or a label that describes the add-on option installed on your PCjr. If your PCjr has a Drive II Enhancement package made by one of these companies, you have special memory expansion options.

A memory board can be installed inside the upper unit of all Drive II Enhancement Packages made by these companies. Two types of memory boards have been available. The first board is the 384KB Expansion Board. It can be populated with 128KB, 256KB, or 384KB of memory. The second board is the Racore 512KB Memory Expansion Board. This board can add 256KB or 512KB of memory to your system. Keep in mind, the memory Expansion Board's memory always adds to the 128KB of Memory already inside the PCjr.

If your PCjr has a Rapport, Racore, or Quadram enhancement package installed, and you have anything less than 640KB of memory, the best way to increase memory to 640KB is to replace your existing memory board with a fully populated Racore 512KB Memory Expansion Board #32523 (\$49).





Learning About Hard Drives!

A hard disk drive is a storage device that is much like the trunk of your car. Adding a hard drive to your PCjr is therefore like adding a storage trunk to your computer. Once installed, you can put lots of programs inside the hard drive. The larger your hard drive, the more programs you can fit inside. When your hard drive gets full, you can make room for more programs by taking out some of the things you no longer use.

When a hard drive is installed in your PCjr, DOS is usually installed on the hard drive. This is a great convenience because, from this point on, DOS is always on the hard drive ready to be used. Each time when you turn the computer on, the PCjr will check to determine whether there is a diskette in the floppy drive. If a diskette is found in the floppy drive, and the floppy drive door is closed, the PCjr starts DOS from diskette in the usual manner. However, when a diskette is not found inside the floppy drive, or the drive door is open, the PCjr will automatically load DOS from the hard drive.

Once a program has been installed on the hard drive, you can run the program simply by typing it's name. The days of searching through a pile of floppy diskettes to find the diskette that includes the program or your data, are gone.



Many PCjr users confuse a hard drive with a hard jacket 3 1/2 inch diskette. A 3 1/2 inch diskette is actually a floppy disk in a hard plastic jacket. A hard drive can not be removed from the computer. For this reason, a hard drive is also referred to as a fixed disk.

In other ways, a hard drive and a floppy drive are very similar. Both use a disk covered with magnetic particles to store information. A hard drive, however, spins the disk much faster than a floppy drive. As a result, programs stored on a hard drive can be accessed much faster than from a floppy drive.

While the PCjr did not come with a hard drive, a hard drive can be easily installed. To attach a hard drive to the PCjr, a hard disk drive and a hard drive controller are required.

What Type of Hard Drives can I Add to the PCjr?

Most hard drives in today's computers use an IDE or SCSI interface. While IDE hard drives are generally less expensive, SCSI hard drives are top performers.

An IDE controller card has never been developed for the PCjr, so PCjr owners always install SCSI hard drives using an SCSI controller. Fortunately, SCSI is the best type of hard drive interface that a computer can use.

While IBM never offered a hard drive for the PCjr, PC Enterprises, in co-operation with the Future Domain Corporation, has developed an SCSI controller for the PCjr. The PCjr SCSI controller, also called a host adapter, is named the TMC850jr. This host adapter is provided in a PCjr sidecar that looks like any other sidecar.

The TMC850jr has a single 50-position connector. This connector allows you to connect any standard SCSI device to the PCjr. One SCSI host adapter permits the PCjr to operate up to seven SCSI devices. While hard drives are the most common SCSI devices, CD-ROM drives, Removable media hard drives, and optical drives have all been purchased and used by PCjr owners.

Do I Need a Hard Drive?

If you already have 640KB of memory, and you are now looking for ways to make your PCjr more powerful, a hard drive is the most important add-on you can purchase. While a hard drive is not essential to using your computer, a hard drive is required by some of today's software.

A hard drive will also change the way you use your PC. It makes using the computer much simpler. Once installed, your PCjr will load DOS and other software very fast. All you'll need to do is turn your PCjr on, then type the name of the program you want to run. Your programs and data will all be inside the PCjr, ready to run all of the time.

Will a Hard Drive Make my PCjr Run any Better?

Absolutely Yes! You'll see a dramatic improvement in performance when you add a hard drive to your PCjr. Hard drives spin almost ten times faster than a floppy drive. Spinning faster means information can be copied to and from the hard drive more quickly. For example, WordPerfect 5.0 takes about 36 seconds to load with only a floppy drive. When the same program is loaded from one of today's fast SCSI hard drives, the program only takes about 4 seconds to start.

How Large of a Hard Drive Do I Need?

The size of a hard drive determines how many programs will fit on the drive. While years ago a 20 or 30 Megabyte hard drive was considered very large, today's computers often use hard drives that provides hundreds of megabytes of storage space.

People that use newer computers often run Windows-based software most of the time. Windows is a resource hog, and needs a hard drive with hundreds of megabytes of storage, in order to have a good selection of programs. People that use Windows often give poor advice to PCjr users. These people will always tell you to purchase a larger hard drive than you need. Many Windows programs use one Megabyte or more hard drive space just to display a pretty picture when the program is started.

In the DOS world, storage needs are vastly different. A typical DOS program requires one or two megabytes of disk space. As a result, a 40MB hard drive may meet all of your needs. Of course, regardless how large of a hard drive you purchase, you'll never have *too much* space. As a result, PCjr users often purchase hard drives that provide 100 megabytes, or more, disk space.

Will I Need to Upgrade DOS if I Purchase a Hard Drive?

No, however, it is a good idea. DOS 2.10, the DOS normally sold with the PCjr, will not allow you to access a hard drive that is larger than 32 megabytes. DOS 3.3 is also limited to this same 32 megabyte boundary, however DOS 3.3 is the first IBM DOS that allows you to have multiple partitions. A partition is a portion of the hard drive that can be accessed using a drive letter. To access a 170 megabyte hard drive with DOS 3.3, you would need to partition your hard drive to use six drive letters. When you're done, you will have a drive C:, D:, E:, F:, G:, and H:.

The easiest and least expensive solution to this problem is to purchase Ontrack's Disk Manager software. Disk Manager software works with DOS 2.1 and later, and allows you to access the entire hard drive using only two drive letters. Disk Manager is easy to use. Simply insert the Disk Manager software into your floppy drive and type DM. Disk Manager will prepare, partition, and format your hard drive for you. Regardless of the size of your hard drive, you'll be able to access the entire hard drive using only two drive letters.

Disk Manager works on all PCjr hard drives, and with all versions of DOS. To purchase Disk Manager Software order #85806 (\$29.95).



Will Later Versions of DOS Overcome the 32 Megabyte Limitation?

Yes. Starting with DOS 4, hard drives much larger than 32 megabytes can be used without this limitation. Most PCjr users prefer to access the entire hard drive using one drive letter. Adding a hard drive is therefore an ideal time to upgrade DOS.

The process of installing DOS on your PCjr's hard drive is fairly simple. After starting DOS with a bootable diskette that contains the DOS you want to install, you'll use the FDISK program to create a drive letter, then the format program to organize the hard drive to hold files.

The one thing unique to a PCjr, is that PCjr Memory Management Software must always be installed on any floppy or hard drive used to start DOS.

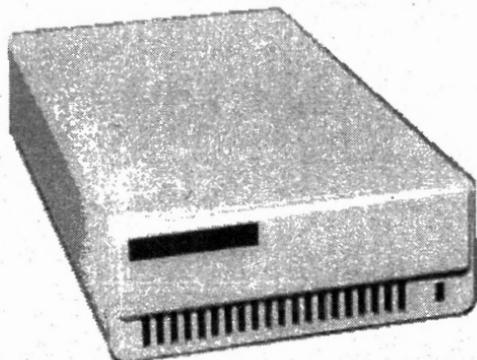
Installing DOS 5.0 and later requires a PCE Compatibility Cartridge, unless you purchased DOS from PC Enterprises and received a special PCjr Installation and Setup Diskette. This Installation and Setup Diskette allows you to install software patches that create a bootable copy of DOS on your hard drive. These patches are very desirable as they allow you to start DOS with your PCjr, even when the Compatibility Cartridge is removed for any reason.

PC Enterprises offers a variety of hard drive systems for the PCjr. External systems sit alongside the PCjr in their own case, and attach using the PC Enterprises TMC850jr sidecar host adapter.

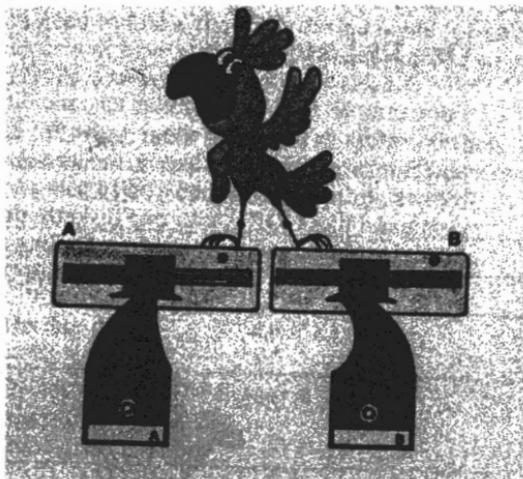
Novice computer users often purchase a new hard drive with DOS already installed. This is an excellent choice, as it means the new hard drive can be installed in only a few minutes. All you need to do to is attach the host adapter sidecar to the PCjr, then plug the hard drive into the wall.

Can I Continue Using my Hard Drive if I Purchase Another Computer?

Yes. If you ever purchase a new computer you'll have no trouble connecting the PCjr SCSI hard drive to the new computer. Simply install the PCjr hard drive into the new computer, and attach it to a Future Domain TMC850 or compatible SCSI controller. While most PCjr users that have purchased a hard drive are still using their PCjr, it is nice to know that you have this option.



To purchase a **40 Megabyte External Hard Drive** for the PCjr order #12585-0 (\$199.). If you prefer to purchase a **107MB Hard Drive** order #12621-0 (\$249). These hard drive systems are provided with DOS installed, and can therefore be attached to the PCjr in fewer than five minutes. PC Enterprises has a variety of other capacity hard drives available from time to time. Contact the PCE representative for current pricing and availability.



Learning About Floppy Disk Drives!

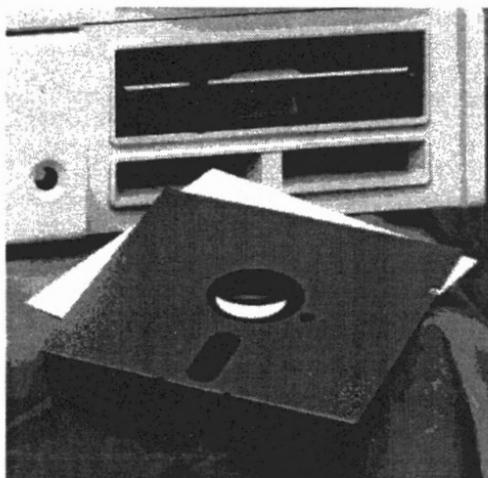
Floppy diskettes are storage devices used by computers when removable storage is required. Software that you purchase for your PCjr always comes on floppy diskettes. Likewise, information you wish to save must be stored on disk before you turn the computer off.

Floppy diskettes are often described by their physical size. You will see reference to 3 1/2 inch diskettes and 5 1/4 inch diskettes. In these cases, the physical size of the diskette in no way refers to storage capacity.

A much better way to refer to floppy diskette types, is by using a number that approximates the formatted storage capacity of the diskette. Two types of 5 1/4 inch diskettes are common. These types are known as low density 360KB and high density 1.2MB diskettes. The PCjr uses low density 360KB diskettes. Two types of 3 1/2 inch diskettes are common. The two common types are 720KB and 1.44MB. A third type is 2.88MB, however this type of diskette never seemed to catch on.

The most common diskettes used today are 720KB and 1.44MB diskettes. The PCjr can also use these diskettes, however, a 3 1/2 inch diskette drive must first be installed.

What Type of 5 1/4 Inch Diskettes does the PCjr use?



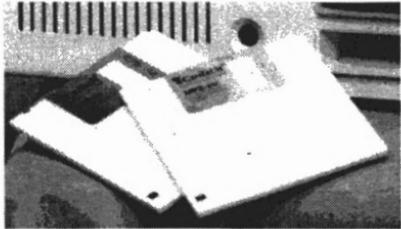
The type of diskette used by the PCjr can hold up to 360KB of information. These diskettes are known as Double-Sided, Double-Density diskettes or "DSDD" diskettes for short. Information is stored on both sides, and each diskette storage unit holds twice as much information as older single density diskettes. Today, most people refer to these diskettes as 5 1/4 inch low-density diskettes.

The second common type of 5 1/4 inch diskettes can hold approximately 1.2MB of information. These diskettes are known as high density 5 1/4 inch diskettes (1MB=1024KB). Information is also recorded on both sides, however using these diskettes requires that the computer have a high density controller card installed. The high-density controller card sends information to the diskette twice as fast as the double-density controller used by the PCjr.

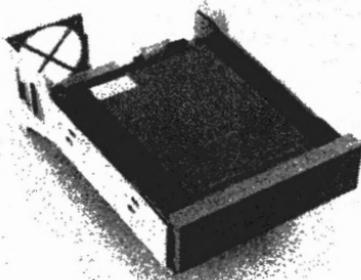
You can usually determine whether a diskette is low or high density by looking for a reinforcement ring around the center hole. If the diskette has this ring, it is a low density diskette.

Can the PCjr use 3 1/2 Inch Diskettes?

Low density 3 1/2 inch diskettes store twice as much information as the diskettes used by the PCjr, and are therefore referred to as 720KB diskettes. Fortunately for PCjr owners, 720KB diskettes do not require a different controller card. In other words, PCjr owners can replace their 5 1/4 inch disk drive with a 3 1/2 inch drive rather easily.



How can I Replace my PCjr's 5 1/4 Inch Drive with a 3 1/2 Inch Drive?



While replacing the PCjr's disk drive with a 3 1/2 inch disk drive is rather simple, you should be forewarned that once you replace your 5 1/4 inch drive with a 3 1/2 inch drive you will have no way to use your existing 5 1/4 inch diskettes. For this reason, PCjr users rarely replace their 5 1/4 inch drive, unless they have access to another computer that can be used to convert their

software. The exception is PCjr users with a hard drive. Hard drive users frequently copy all their important software onto the hard drive before they swap floppy drives.

If you replace your PCjr's disk drive with a 3 1/2 inch drive, you may also wish to purchase DOS 3.20 or later. Earlier versions of DOS require software device drivers to access the second 360KB of 720KB diskettes. While PC Enterprises provides the software that you'll need with their 720KB PCjr Replacement Drive, simpler operation and improved performance can be obtained if you use DOS 3.20 or higher.

To purchase a 3 1/2 inch low density floppy drive for the PCjr to replace your existing 5 1/4 inch floppy drive order a **720KB Replacement Drive for the PCjr #44003 (\$69)**.

How do I add a Second Floppy Diskette Drive to the PCjr?

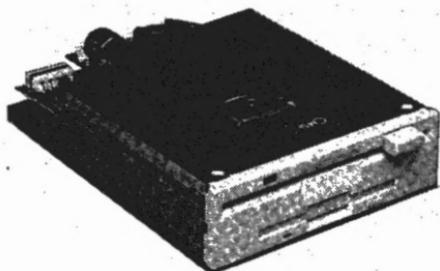
While the diskette drive controller card included with the PCjr can controller either 360KB or 720KB floppy diskette drives, the PCjr's controller card does not have the hardware required to control more than one floppy drive at a time.

In order to add a 3 1/2 inch drive to your PCjr, you might think that you would need a separate case and power supply. Not so!

Combination drives, more commonly referred to as Combo Drives, are actually two floppy drives in one. Combo Drives are ideal for use in the PCjr because the PCjr only has one drive bay.

The PCjr Combo-Drive #12806 (\$149) comes

with a disk drive controller card that allows the PCjr to access two disk drives, and software that permits the PCjr to use 720KB diskettes with any version of DOS.



While the actual disk drive unit provided with **PCjr Combo-Drives** use high density technology, at present, PCjr users must settle for using low density diskettes. The reason is that a high density controller card has never been developed for the PCjr. If a demand for this product exists, PC Enterprises will design a PCjr high density controller card that allows the PCjr Combo-Drive to use 1.44MB and 1.2MB diskettes. PCjr users that purchase a **PCjr 486 GenesisPC™ Replacement Motherboard** will also have no trouble using high density diskettes with the PCjr Combo-Drive.

Often, PCjr owners call PC Enterprises and ask how to get a 5 1/4 inch or Combo drive working on their PCjr. Unfortunately, this is not possible. High Density 5 1/4 inch drives require The PCjr Combo-drive uses a special controller card that allows the PCjr to access the correct tracks. A special modification made by PCE allows the 1.2MB drive to work in the dual speed mode with 360KB diskettes.

Is There any way to Install a High Density Floppy Drive on the PCjr?

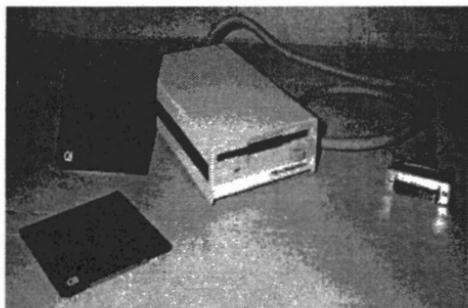
Yes. The easiest way to connect a high density drive to the PCjr is to purchase a drive that plugs into the PCjr's printer port. While connecting a floppy drive to a printer port may at first seem like a crazy idea, the concept is actually quite sound.

When the PCjr sends information to its printer port, the PCjr doesn't care whether the device that receives the information is a printer or a disk drive. The high density diskette drives sold by PC Enterprises use device driver software to access the floppy drive without interfering with your printer, and are very simple to use and install.

To install these drives, simply plug the cable that comes from the drive into your PCjr's Parallel Printer Attachment. If you also use a printer, you then plug the printer into a connector on the rear of the drive. Finally, you run a simple "install" program that adds the device driver software to your system's startup diskette. The new drive normally becomes your C: drive, however, if you already have a C: drive, the letter D: may be used.

Installation is simple, and these drives work very reliably on a PCjr, however there is one disadvantage we have found. While these drives write information at about the same speed as your existing disk drive, read operations take about twice as long as you would expect. If your PCjr has a hard drive, this will be a very minor problem. When you have a hard drive, you will normally use the high density drive to install new software. In this case, the ability to use high density diskettes is much more important than how long it takes to install software. In addition, since only disk "read operations" are effected, it doesn't take any longer to back up your hard drive than you would expect.

If you do not have a hard drive, you can still install a high density drive on your PCjr, however expect it to take longer to load software. If longer read times are annoying, install PC Enterprises' jrExcellerator Speed-up board.

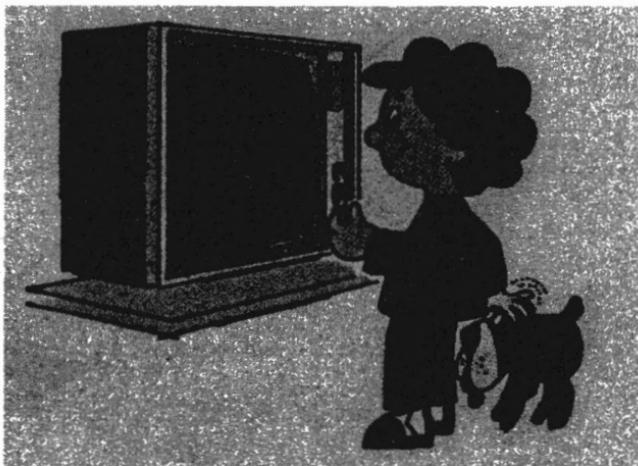


If you would like to purchase a 3 1/2 inch high density drive, order the **1.44MB External Floppy Drive system #12557 (\$199)**. This drive is highly recommended if you want to use high density diskettes. The drive allows you to use 720KB (DSDD) diskettes in addition to 1.44MB (High Density) diskettes, without difficulty.

If you need to use 5 1/4 inch high density floppy diskettes, order the **1.2MB External Floppy Drive System #12559. (\$199)**. This drive is not recommended, unless you absolutely need to use 5 1/4 inch 1.2MB diskettes. We discouraged the use of this system due to interchangeability between the two types of 5 1/4 inch diskettes. While 5 1/4 inch high density drives can also read and write on a 360KB diskette, once you use a high density drive to write on a 360KB diskette, the diskette often becomes unreadable in the original 360KB diskette drive. This is a problem that exists with 5 1/4 inch drives, and has nothing to do with the PCjr or with this drive system. Nevertheless, to avoid technical support calls where customers explain that their new drive has ruined all their diskettes, PC Enterprises strongly discourages the use of this system. The high density 3 1/2 inch diskette drive is a much better choice for average PCjr users.

Special Note for Racore Users

If you have a Racore Drive II Enhancement Package with the Racore DMA option, it is not likely that your system can use any floppy drive except the drive that came with the PCjr. A disk drive controller modification is required to use the Racore controller with any replacement drive. Send your Racore Floppy Drive Controller to PCE and request **modification #97511 (\$30)**



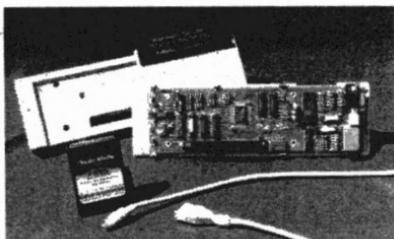
Learning About Video Adapters!

All PCjr's have a built in Enhanced CGA graphics card. Enhanced CGA is compatible with true CGA as long as programs are well behaved, as most of today's programs are.

Occasionally, an ill-behaved program bypasses the usual BIOS and DOS interfaces and directly accesses the PCjr's display adapter. The PCjr will work correctly with many ill-behaved programs, but not all. For this reason, compatibility problems due to Enhanced CGA, are occasionally encountered. Few commercial programs are too ill-behaved to work on a PCjr, however older game software sometimes exhibit problems when run on the PCjr.

In addition, the PCjr's display adapter is almost Tandy compatible. With a minor hardware modification, the PCjr can run most Tandy programs. Tandy programs are nice to run because they display 16-color graphics and 4-voice sound. PCE can make a modification to your PCjr system board to make the PCjr more Tandy compatible. This modification is discussed in another section of this guide.

EGA and VGA programs can not be run on a PCjr, unless a Display-Master Sidecar is installed. The Display-Master allows software that uses EGA, VGA, or SVGA modes to be used.



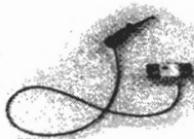
Display-Master sidecar shown removed from the sidecar case.

Many PCjr users purchase the Display-Master to upgrade to EGA software. This is because the PCjr Color Display generally has no trouble with EGA resolution. As a result, if you install a Display-Master and continue using your PCjr monitor, your software will automatically detect EGA mode and produce 16 colors graphics, provided the software you run supports EGA mode.

VGA and SVGA modes allow the PCjr to display much better graphics and clearer text, however the PCjr's monitor can not be used to run this type of software. You will need to purchase any VGA or SVGA monitor. A 15-position connector can be found on the rear of the Display-Master sidecar that allows you to connect an industry standard monitor. To purchase a **Display-Master sidecar order #14048 (\$149)**.

One popular low cost video upgrade is the **Thin-Font module**. This module makes the PCjr Color Display easier to read. Characters that appear on the PCjr Color Display are often difficult to read because they "fill-in". The **Thin-Font Module** is an easy to install product that gives you much more crisp, more easily read characters.

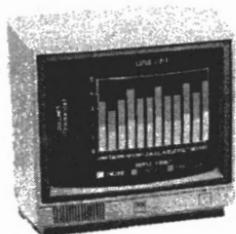
Once installed, you can select the character-set you prefer with a simple keyboard command. The first character set is very similar to the characters you now use. These characters are two dots wide. The second character set has one-dot-wide characters, so they are sharper and easier to read.



The Thin-Font module is easy to install because it replaces the PCjr's character generator chip. Simply unplug the PCjr's existing character generator chip from its socket, and replace it with the Thin-Font module. To order a **Thin-Font Module** order #18009 (\$19.95).

How do I Connect a Monitor to the PCjr?

The PCjr was designed to work with the **PCjr Color Display** which uses an 18-position Amp MT connector. The connector plugs into the PCjr's D-connector found on the rear of most PCjrs.



The monitor is capable of displaying text in 80 column modes with vivid 16-color graphics and 640 x 200 resolution. The monitor Also allows you to run most software in EGA modes when used with the PCE Display-Master SVGA Sidecar.

The **PCjr Color Display** is unique because it has a built-in amplifier, speaker, and headphone jack. This feature allows you to hear PCjr 3-voice sound without purchasing any other hardware. The **PCjr Color Display** is also shielded so that the monitor can be placed on top of the PCjr system unit, without interfering with the floppy disk drive. If you try to use a PCjr with almost any other monitor placed on top of the system unit, the monitor may interfere with the operation of the floppy disk drive. "*Disk boot errors*", or "*error reading drive*" messages will often result.

While the **PCjr Color Display** is no longer being manufactured, a small supply of reconditioned monitors is available. To purchase a **PCjr Color Display**, order #78705 (\$179).

Can I use the PCjr Monitor on any other Computer?

Yes, however, an adapter is required. The **PCjr Monitor adapter** changes the PCjr's 18-position AMP MT-type connector to an industry standard 9-pin D-type connector. The adapter consists of a small printed circuit board inside a shielded metal case. One end of the adapter plugs into the PCjr Color Display, and the other end into the CGA display card of the other computer. To order a **PCjr Monitor Adapter**, ask for #22526 (\$49.95).

The PCjr also has an RCA-type connector for a composite monitor. To use this connector, simply connect a composite monitor to the connector marked with the letter "V", on the rear of the PCjr. Composite monitors are not very popular because color composite monitors are generally limited to 40 column-modes.

Can I Connect Other Monitors to the PCjr?



Yes. The **Adapter Cable for Color Displays** permits any RGB monitor to be used with the PCjr. This adapter changes the monitor's 9-Position D-type male connector to a PCjr connector. To order the **Adapter Cable for Color Displays** order #79019 (\$29.95).

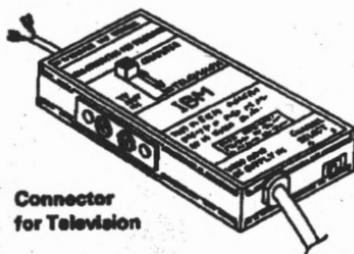
The PCjr Color Display has a built-in amplifier and speaker. If you are not using this monitor, the only sound you will hear is PC beeper sound, you will not be able to hear PCjr 3-voice sound.

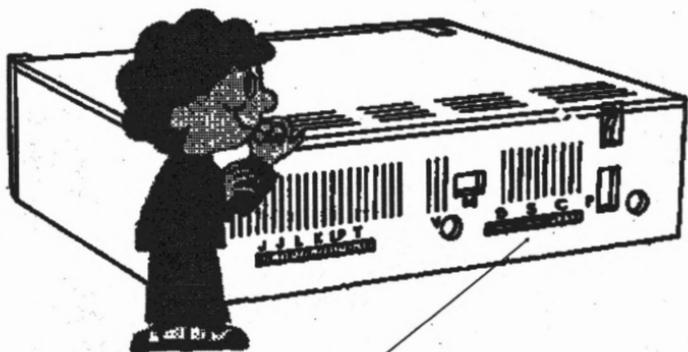


An external amplifier and speaker are highly recommended if you are not using a genuine IBM PCjr Color Display. The External Amplifier and Speaker will allow you to hear PCjr and Tandy sound when you run PCjr and Tandy software. It fits inside the PCjr and installs in minutes. To purchase an External Amplifier and Speaker order #14804 (\$29).

Can I Connect my PCjr to a T.V.?

Yes. The PCjr can be connected to a television set when a monitor is not available. To connect the PCjr to your television you'll need the Connector for TV. This cable plugs into the "T" connector on the rear of the system unit. The other end attaches to your television. To order a Connector for TV order #79003 (\$29.95).





The PCjr's S-connector allows you to connect RS-232 serial devices

Learning About the PCjr Serial Port!

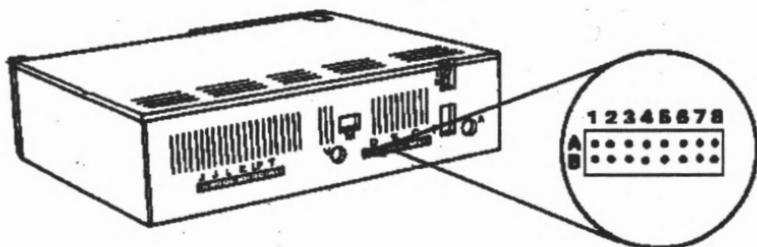
A serial port provides a way to connect a variety of devices to your computer. Virtually all mice and external modems have serial interfaces. In addition, printers, plotters, and a variety of other specialty devices also use a serial interface. Devices that have a serial interface are known as serial devices, and can normally be plugged into the PCjr's serial port.

When a computer uses a serial port to communicate with a device, the information is always sent as a stream of ones and zeros. Normally one device sends a "start bit" to the receiving device, followed by 8 or 9 bits of data. Sometimes one or more "stop bits" are sent at the end of the data stream. Serial ports can also use a "parity bit" to help insure that all information transmitted was received correctly. Most serial ports conform to the RS-232C standard.

All PCjrs come standard with one serial port. While the PCjr's serial port is not identical to the serial port of an IBM PC, it is RS-232C compatible. As a result, most serial devices can be used with a PCjr.

The PCjr's serial port is fully programmable by using the "Mode" command described in the DOS manual. It will add and remove start bits, stop bits, and parity bits. The baud-rate generator allows operation from 50 to 4800 baud. Five, six, seven, or eight bit characters with 1, 1 1/2, or 2 stop bits are supported. While these things will have little meaning to most PCjr owners that read this guide, they are included for future reference. The significant thing to remember is that the PCjr's serial port was not designed to be used above 4800 baud. Using a serial device that operates above 4800 baud is a hit or miss venture. The only way you'll know whether the device will work on your PCjr is to try it.

Does the PCjr use the Same Serial Connector as other Computers?



No. The PCjr uses a 16-position AMP MT type connector, while most other computers use 9 or 25-pin D-type connectors. To add a serial device to the PCjr you must purchase a device that comes with a PCjr-type connector, or purchase an adapter that converts to a D-type connector.



The **PCjr Serial Cable** is a six foot long cable that converts the 16-position AMP MT type connector to a standard D-type connector. One end of this cable plugs into the PCjr's S-connector. The other end provides a male 25-position D-type connector, identical to the connector found on an IBM PC. To order the **PCjr Serial Cable** ask for item #22505-5 (\$34.95).

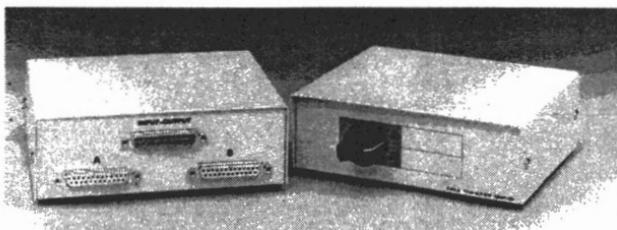
Can I Connect a Device that uses a 9-position D-type Connector to the PCjr?

Yes, however a 9-position serial adapter is required. Although the original IBM PC used a 25-position connector, the computer only used nine contacts. Soon, computer manufacturers switched to a smaller and less expensive 9-position connector. Adapters that convert from a 25-position connector to a 9-position connector are inexpensive and readily available. To connect a serial device that has a 9-position connector to the PCjr you'll need a PCjr Serial Cable, and a 9 to 25 position



Adapter. The adapter you need has a 9-position male connector at one end, an a 9-position female connector at the other end. Order **9 to 25-position D-type adapter #22536 (\$9.95)** to use a 9-position serial device with your PCjr.

Can I Connect More Than One Serial Device to my PCjr?



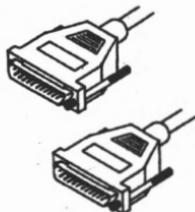
Yes. You can install an AB Switching Box that lets you select between two serial devices simply by flipping a switch. The only disadvantage of this approach is that you can not use more than one serial device at a time. This should be a very minor inconvenience if the devices you want to connect are a mouse and a modem. You'll rarely need to use these two devices together.

Two female 25-position D-type connectors are provided on the rear of a switching box for serial devices. To purchase an **AB Switching Box** order #75501 (\$9.95).

Switching boxes can be connected to the PCjr by using the PCjr Serial Cable, without any other adapters. Depending on what you are hooking up, you may also need a gender changer or a 9 to 25-position adapter. Four-way switching boxes are also available. A four-way box allows you to connect four devices, and are called ABCD switching boxes. To order an **ABCD Switching Box**, order #75515 (\$12.95).

A mouse can easily be connected to a switching box because it comes with it's own cord. Simply plug the mouse into the serial box of your choice.

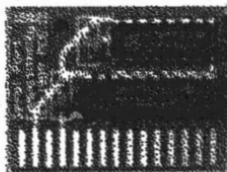
A 9-position to 25-position male adapter may be required. Most external modems do not come with their own cable. Purchase a cable to connect an external modem to a switching box that has male 25-position connectors at both ends. To purchase the **Male to Male DB-25 Serial Cable** order #22506-1 (\$14.95).



Is the PCjr's S-connector COM1 or COM2?

When you try to use a serial device that is connected to your PCjr, the software that you use will ask whether the device is COM1: or COM2:. The answer depends upon whether the PCjr has anything plugged into the internal modem slot. The PCjr's S-connector always uses the hardware address and IRQ associated with COM2: (2F8 and IRQ3), however if you do not have an internal modem installed, DOS, BASIC, and BIOS will associate COM1: with the PCjr's S-connector. Certain versions of ProComm and other programs that operate a modem, sometimes become confused by this situation. As a result, some programs consider the PCjr's S-connector COM1:, other programs consider it COM2:, and others will not work at all unless a ComSwap Board or an Internal Modem is installed.

When a ComSwap Board or an internal modem is installed in the PCjr, the PCjr's S-connector is always COM2:, and programs that you use will have no trouble accessing a device attached to the PCjr's S-connector.



A **ComSwap Board** is an inexpensive and simple to install product that should be installed if you do not have an internal modem in your PCjr. Installation is simple. Just plug the ComSwap Board into the internal modem slot. There is no software or other hardware to configure. The **ComSwap Board** fools the PCjr into thinking that the PCjr already has a COM1:, so that COM2: is correctly assigned to the device plugged into the PCjr's S-connector. This allows you to use the PCjr's S-connector without concern that a program you run will encounter a compatibility problem. To order a **ComSwap Board** ask for #15506 (\$9.95).

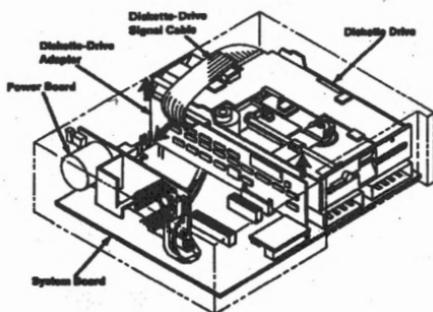
Will all Serial Devices Work on the PCjr?

No, although most do. A few serial devices, especially mouse and tracker balls, need a -12 volt signal to work correctly. The power supply used with most PCjrs only produce -6 volts. While this level meets all the requirements of the RS-232c specification, many companies that manufacture serial devices never test their device on a computer that generates -6 volts.

Look inside your PCjr to determine which power board you have. You can easily find the PCjr's power supply because it plugs into the "Black Brick" power transformer. The most common power board is 7 inches long. This is the power supply that produces -6 volts. If your power supply measures 10 inches long, you have a power supply that produces -12 volts and you will not need to be concerned with this problem.

What Should I Do If I Have the Seven Inch Long Power Supply?

Most serial devices work fine with the PCjr, even if the PCjr uses the 7-inch power supply. If you already have a serial device that will not work on your PCjr, replace your power supply with the 10 inch long power supply. PC Enterprises offers both printers and mice with PCjr connectors. These devices will work with the 7-inch power supply and be discussed later in this guide.

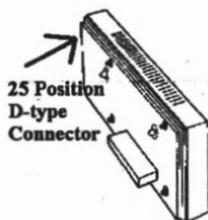




Learning About Printers!

Printers are normally connected to a computer's parallel port. Parallel ports send eight "bits" of information to the computer at a time, as compared to serial ports that send one bit at a time.

The PCjr can use any standard printer that has a parallel interface, however you'll first need to add a parallel printer port. The PCjr **Parallel Printer Attachment** is a parallel printer port that comes in a PCjr sidescar. The printer attachment sidescar looks very similar to memory expansion and other sidescars, although it can be identified by a 25-position female D-type connector on its rear end. To purchase a **PCjr Parallel Printer Sidescar**, ask for #79006 (\$89.95).



To connect a printer that has a parallel interface to the PCjr's printer port, all you need is a PCjr Printer Cable. PCjr Printer Cables are available in 6 and 10 foot lengths. Longer cables may not work reliably, and therefore should be avoided. To purchase a 6 foot PCjr **Parallel Printer Cable** order #22510-1 (\$14.94). To order a 10 foot PCjr **Parallel Printer Cable** order #22510-3 (\$19.95).

Most PCjr users purchase a Dot matrix printer. While the PCjr can also use ink jet, laser, and other printers, Dot matrix printers are often the most affordable printers offered. Dot matrix printers are compact and easy to use. Models which have a 9-pin printer head provide the most economical choice, while printers with 24-pin printer heads provide higher quality print. Dot Matrix printers are fast, and are able to print graphics. Color Dot matrix printers can also print in color, for those programs that support color.



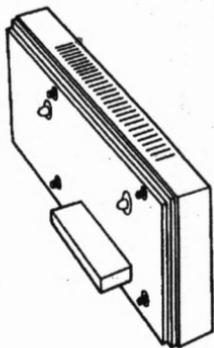
The most popular dot matrix printer ever sold by PC Enterprises is the Star Micronics NX1001 printer. This printer is connected to the PCjr Parallel Printer Attachment with a PCjr Printer Cable and used without much fuss or trouble. The printer accepts single sheets or fan-fold tractor feed printer paper. It can also print on carbonless multiple copy computer paper using a variety of different font styles and types. The 9-position version is the most popular because it is the most affordable. To order the **Standard 9-pin Dot matrix Printer order #78610 (\$169)**. If you prefer to print in color, order the **Color 9-pin Dot matrix Printer #78618 (\$199)**. To order the best Dot matrix printer available, ask for the **Color 24-pin Dot matrix Printer #78612 (\$309)**.

Can I Purchase Everything I Need to Print with the PCjr at Once?



Yes. If you do not already have a printer, you can purchase a complete package that includes everything you'll need to immediately start printing with the PCjr. Complete packages include the printer of your

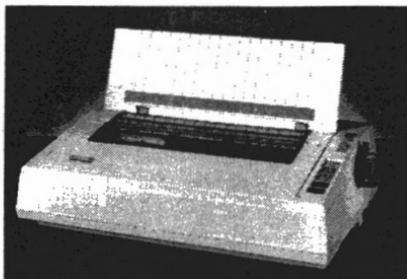
choice, a PCjr Parallel Printer Attachment, 6 foot printer cable, and over 100 sheets of continuous form tractor feed computer paper.



To order a Complete Printer Package that includes the Standard 9-position Dot matrix Printer order #10076 (\$269). If you prefer to print in color, order the Color 9-position Dot matrix Printer #10072 (\$299). To order the best Dot matrix printer available, ask for the Color 24-pin Dot matrix Printer #10074 (\$409).



Do I Need to buy a Printer Attachment to Connect a Printer?



No. The least expensive way to connect a printer to the PCjr is to purchase the **NEC ELF 370 Spinwriter Printer**. This printer comes with its own cable, and connects to the S-connector that came standard on all PCjrs.

The **ELF 370 Spinwriter** is a true letter quality printer that previously sold for \$395. Daisy wheel technology is now out of date, so these printers are being offered well below cost while the supplies last.

Daisy wheel printers use a wheel to position the proper character in place. The printer then strikes the paper through a ribbon, producing exceptionally good quality print.

The **Elf 370 Spinwriter** prints up to 190 words per minute, and features a user friendly operator control panel. It comes standard with a single sheet feeder, a simple-to-use paper control lever, and an auto load feature. The printer will work with almost any software package because it has a switch that lets you select either NEC or IBM mode. The main disadvantages of this printer are that it is not as fast as Dot matrix printers, and it can not print graphics.

Many PCjr users that already have a Dot matrix printer purchase the **ELF 370 Spinwriter** as a second printer. This allows them to print draft copies of documents and graphics with their Dot matrix printer, and letter quality documents with their daisy wheel printer.

As this is a clearance special on a discontinued model, all sales are final. To order the **NEC ELF 370 Spinwriter Printer** ask for #78601 which is offered for only \$145.

Learning about the PCjr Speech Attachment

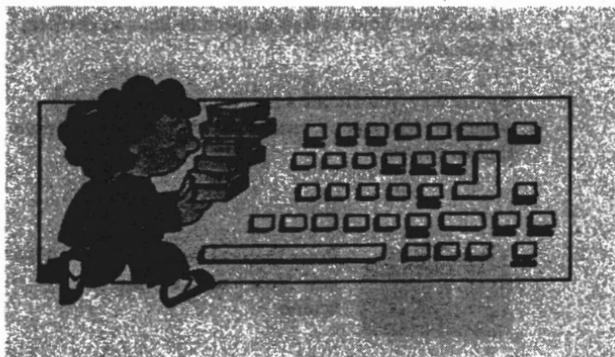
The **PCjr Speech Attachment** can enable your PCjr to seemingly come to life by talking, laughing, and even singing songs. It is perhaps the most fascinating PCjr product ever designed.

The **Speech Attachment** will work with any software designed to support the IBM Speech Attachment, including IBM's notarized **Writing to Read** software. In addition, the PC Enterprises **MakeTalk!** program is also included. **MakeTalk!** allows you to record your own voice and other sounds with your PCjr. The sounds you record can be played back from the DOS command line, batch files, BASIC programs, or the **AlarmTalk!** program. **AlarmTalk!** is a program that turns your computer into a talking alarm clock that can remind you of things you forget. To purchase a **PCjr Speech Attachment** with **MakeTalk!** software, order #79013 (\$149).

The most famous software package designed to work with the PCjr Speech Attachment is IBM's **Writing to Read**. This software is often used by schools and parents alike to show children how to develop language skills at an early age. **Writing to Read** helps children learn how to write, read, and pronounce words correctly. It is based on the "alphabetic principle" and can be a priceless learning tool for children in kindergarten and first grade.

The **Writing to Read** software uses the talking technology of the PCjr Speech Attachment to provide an interactive, multi-sensory learning experience. The clear, distinct human voice being reproduced from your computer is simply remarkable. **Writing to Read** requires 128KB RAM, DOS v2.1 or later, a Speech Attachment, and a Cassette Recorder. It includes 12 diskettes, 10 workbooks, and 15 instructional cycle audio cassettes. To order **Writing to Read**, ask for #86210 (\$199).





Learning About Keyboards!

The PCjr has an infrared keyboard interface that allows you to use a wireless keyboard with the computer. The original PCjr keyboard was known as a 62-key chicklet style keyboard, because the keys looked like little chicklet candy. In order to provide all the keystrokes that IBM's full size keyboard could generate, the PCjr keyboard uses special multiple key sequences. You can use the PCjr's built-in Keyboard Adventure game to teach you more about the keyboard. Instructions for using this tutorial are described in the PCjr Guide to Operations Manual

The **Chicklet Keyboard** was not very popular for several reasons. First, the name of the key was printed underneath the key, instead of on top of the key. In addition, the keys did not have indentations for your fingers. Chicklet keyboards allow you to use keyboard overlays. A keyboard overlay lets you make your own keyboard legends. To purchase a **Chicklet Style Wireless Keyboard** for the PCjr order #71507 (\$29.95). To order a set of five **Keyboard Overlays** for the PCjr Chicklet Keyboard order #71517 (\$2.95).

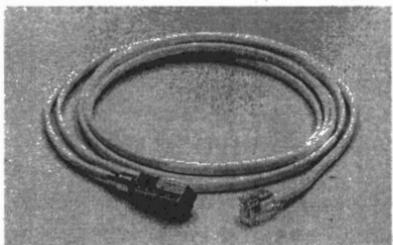
Some PCjr users purchase multiple keyboards to make computer games more interesting. In these cases, everyone playing the game can use their own keyboard.

IBM introduced the PCjr Replacement Style Keyboard to satisfy those that did not like the Chicklet Keyboard. While the IBM Replacement Keyboard has the same number of keys, it is very popular because it is compact and easy to use. Both IBM keyboards support the wireless infrared interface. To order the **PCjr Replacement Style Keyboard**, ask for #71508 (\$49.95).



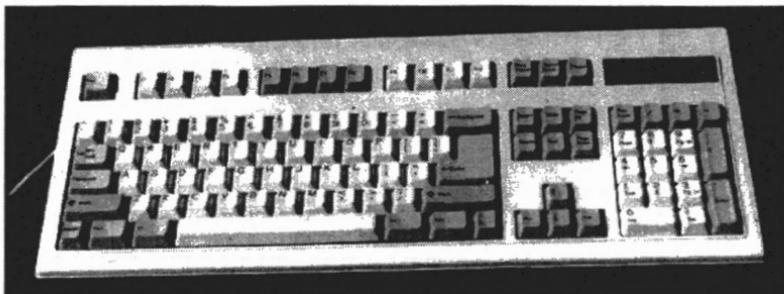
While a wireless interface for a keyboard may sound interesting at first, most PCjr users prefer to have a cable connected to their PCjr. The PCjr keyboard cable allows the keyboard to be used without batteries, and without the keyboard facing the system unit. Keyboard cables also eliminate interference and beeping caused by bright lights and other PCjrs.

Keyboard cables plug into the telephone style connector on the IBM keyboard and the K connector on the rear of the PCjr system unit. To order a 6 foot Straight Keyboard Cable ask for #22502-1 (\$22.95). To order a 6 foot Coiled Keyboard Cable order #22501-1 (\$24.95).



Today's newest computers often use a 101-key keyboard. While many PCjr users are very satisfied with the 62-key IBM Replacement Style Keyboard, there are times that a full size keyboard is more convenient.

Can I Add a 101-Key Keyboard to my PCjr?



Yes. However you can not use keyboards sold in local computer stores. The PCjr's keyboard interface is completely different from that of other computers. While PCjr 101-key keyboards sold by PC Enterprises may look similar to keyboards that you see elsewhere, the design and the connectors are different.

Why do People Prefer 101-key Keyboards?

A 101-key keyboard is easier to use because it has more keys. For example, when your software asks you to press F10 to continue, all you need to do is press the F10 key. In addition to individual function keys, separate keys are provided for cursor movement, and a numeric keypad is built in. People who use more than one computer often prefer to have the same key layout on each computer.

To order the PC Enterprises 101-key Keyboard for the PCjr ask for #71532 (\$89.95). This keyboard comes with its own cable, and plugs into the K connector located on the rear of all PCjr systems.

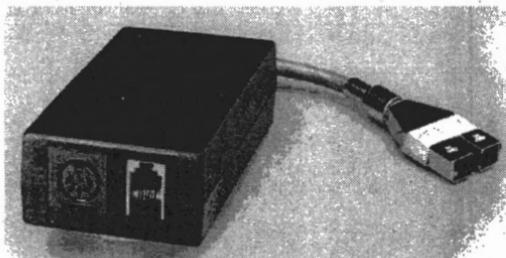
Can I Add a Numeric Keypad to the PCjr?

Yes. If you do a lot of data entry, a **Numeric Keypad** can greatly simplify the use of your PCjr. The PCjr Numeric Keypad can be connected to either the chicklet or replacement style PCjr keyboard with a cable provided.

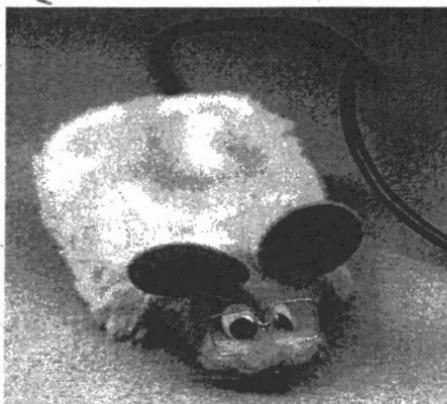
To use the Numeric Keypad, you must connect the keypad to the PCjr's K connector using the PCjr Keyboard Cable that you already have. The keypad is then connected to your existing PCjr keyboard with the cable supplied. Once installed, you'll have a 23-key keypad with arithmetic operator keys, arrow keys, a backspace, Fn, and an Enter key. To order a PCjr Numeric Keypad order #71511 (\$29.95).



Are There Any Adapters to use a PC Keyboard on a PCjr?



Yes, the Racore Keyboard adapter plugs into the PCjr's K and LP connector, and provides a normal keyboard connector. To work with this adapter, the keyboard installed must be an XT type keyboard. Genuine IBM-XT keyboards work fine, as well as many keyboards that have an XT/AT switch. Many "auto-switching" XT/AT keyboards will not work. To order the **Keyboard Adapter for XT Keyboards**, order #71506 (\$49.95).



Learning About Mice!

A mouse is a small hand held device that attaches to your PCjr with a long thin cord. The cord resembles the tail of a mouse, which gives the mouse its name.

As the mouse is moved, signals are sent to the computer that move a pointer on the screen. The mouse can have two or three buttons. Most of today's mice have two buttons. These mice conform to the "MS mouse" standard established by a company named Microsoft. A three button mouse is called a "PC mouse". These mice conform to a standard set by the Mouse Systems company.

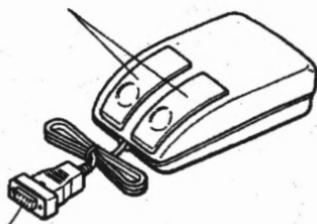
A mouse can be an excellent option to purchase for your PCjr. Using a mouse gives you simple control over your software. More important to some people, a mouse makes using your PCjr more fun.

To use a mouse with a particular program, the program must be *designed* to work with a mouse. Programs that support a mouse, in most cases, say so on the software package. When a program supports a mouse, the mouse can be used in a variety of different ways. Many programs display a menu of options, and allow you to press a mouse button to select the option of your choice. Other programs allow you to point at things you want to do, or in the direction you want to move. The exact way that you will use the mouse is determined by the software.

A mouse also requires a mouse driver to work. This driver is a program you must run before the mouse can be recognized by your software. Mouse drivers are normally named MOUSE, and are provided when you purchase the mouse. A mouse driver is also provided with newer versions of DOS.

How Can I add a Mouse to my PCjr?

Two types of mice are offered for the PCjr. The least expensive and most common type is a serial mouse. Serial mice are sold in virtually all local computer stores, however mice purchased in stores also require that you have a PCjr Serial Cable, and a 25 to 9 pin adapter in order to attach to the PCjr. This is because the PCjr's Serial Cable provides a 25 pin D-type connector, while mice sold in stores use a 9-position D-type connector, and the PCjr's Serial port has a 16-position AMP MT-type connector.



What type of Mouse is the Least Expensive Mouse you can Add to a PCjr?

The least expensive type of mouse you can add to your PCjr is one that comes with a 16-position AMP MT-type connector. These mice can be plugged into the PCjr's S-connector without any adapters. To order a **Low Cost Serial Mouse for the PCjr** order #15509 (\$39.95).



While serial mice are relatively inexpensive, the disadvantage is that they use the PCjr's only serial port. If you anticipate that someday you'll need to use the PCjr's serial port to add another serial device, a bus mouse is a better type of mouse for you to install.

I Already use the PCjr S-Connector. Can I Still Add a Mouse?

Yes. You can add a bus mouse to your PCjr. A **PCjr Bus-Mouse** is a mouse that plugs into the expansion slot of a computer. These mice are slightly more expensive because they include an interface board that comes inside a PCjr sidecar. The Bus-Mouse sidecar plugs into the PCjr's sidecar expansion bus, and the mouse plugs into the rear of the PCjr Bus-Mouse sidecar.



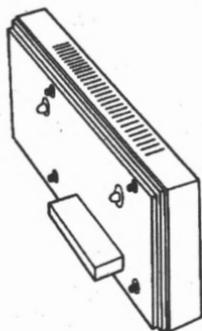
Once you have decided to purchase a bus mouse for your PCjr, you must decide which bus mouse best meets your needs. PC Enterprises' **PCjr Bus-Mouse** is the lowest cost bus mouse you

can purchase. While this mouse has excellent 360 dots per inch (DPI) resolution, no other features are provided on the sidecar. To purchase the **PCjr Bus-Mouse** order #14049 (\$59.95).

The other way of obtaining a bus mouse is to purchase the bus mouse that is built into the PC Enterprises Game-Master Lite sidecar. The Game-Master Lite sidecar is a PCjr sound card, however it also has the required circuitry to connect a bus mouse.

Game-Master Lite Sidecar

Game-Master Lite is a single PCjr sidecar that makes software look and sound much better on a PCjr. Inspect the package of almost any software product, to determine which graphics modes the software supports. If the software package says it supports the 16-color Tandy graphics mode, Game-Master Lite can make the program look much better on your PCjr. Without a Game-Master Lite, (or PCE System Board Modifications), these programs only produce 4-color graphics on a PCjr.

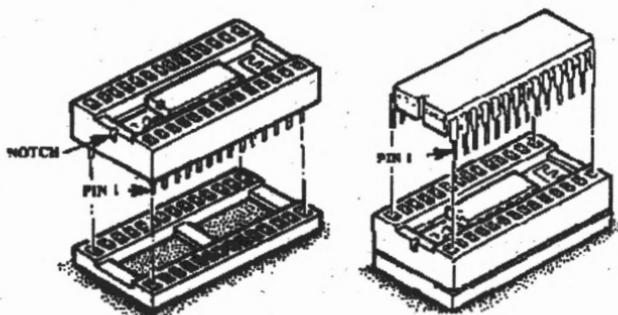


While examining the software package, you may also notice the words Adlib or SoundBlaster FM sound compatible. Programs that support these sound standards can produce sounds that are identical to those produced by electronic organs. To hear these sounds on a computer, you must install an Adlib or SoundBlaster compatible sound card, such as Game-Master Lite.

In addition to supporting Tandy 16-color Graphics and SoundBlaster FM sound, the Game-Master Lite sidecar allows you to add three other options. The Game-Master **Bus-Mouse Kit #10071** can be ordered for only \$45. The kit includes a bus-mouse and a Game-Master bus mouse controller chip, that plugs into a socket on all Game-Master sidecars.

The second option is a memory expansion kit. If you have a Game-Master you can increase your PCjr's memory from 512KB or 640KB to 736KB with fast sidecar memory. To increase from 512KB to 736KB install a **256KB Game-Master Memory Upgrade kit #11206 (\$69)**. To increase from 640KB to 736KB, order the **Game-Master 128KB Upgrade kit #11205 (\$49)**.

The third Game-Master option is a battery backed up clock calendar. A socket in the Game-Master allows you to install the jrROM clock, described in another section of this guide. To purchase **Game-Master Lite**, ask for **#14050-1 (\$99)**.



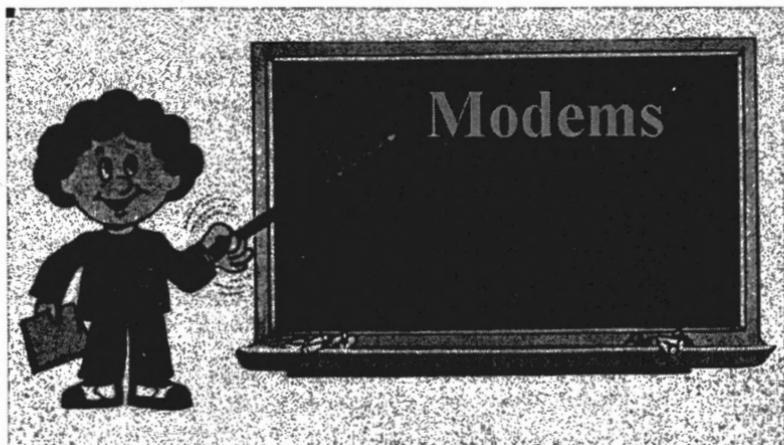
Learning About Clock/Calendars!

Often, people don't bother to enter the date and time when they start their PCjr. Each time a file has changed, DOS records the current date and time in the directory of the disk.

When you use the DIR command to view the disk's directory, you can examine the date and time to determine which files are newest. This is pretty helpful when two or more of your diskettes have files you saved using the same name. In order for the correct date and time to appear in the diskette's directory, you have two choices. You can add the DATE and TIME commands to your AUTOEXEC.BAT file then enter the date and time each time you start your PCjr, or you can install a clock/calendar in your PCjr.

The product most PCjr owners install is the jrROM-Clock. This product installs underneath virtually any 28-pin ROM device in your PCjr or PCjr sidecar. Most PCjr users install the jrROM-Clock under one of the PCjr's BIOS chips. Simply remove the PCjr's BIOS chip, plug in the jrROM-Clock, then plug the BIOS chip into the socket on the jrROM-Clock.

The jrROM-Clock uses an embedded lithium energy cell. In most PCjrs, the jrROM-Clock energy cell will last approximately 20 years, although the manufacturer only provides a ten year warranty. To purchase a jrROM-Clock order #14801 (\$39.95).



Learning About Modems!

A modem is a device that enables a computer to communicate with other computers using telephone lines. Telephone lines are designed to transmit sounds that are among the general frequency of the human voice. A modem must therefore convert the computer's digital information to signals within this frequency range. To do this, the modem uses MODulation and DEModulation techniques, which give the modem its name.

The speed at which a modem transmits information has generally been described using the term baud. Standard modems include 300, 1200, 2400, and higher baud rates. In these ranges, bits per second (bps) is often used interchangeably with the term baud, although technically they are not the same. At higher speeds bps may be higher than baud. As a result, most modem manufacturers have stopped using the term baud, and now use bps to describe the speed of their modems.

Modems are usually downward compatible. This means that if you have a 2400 baud modem, and you make a connection with a computer that has a 300 baud modem, your modem will automatically drop down to the same speed as the 300 baud modem. For transmission to occur, both modems must use the same rate.

Two categories of modems exist. Internal modems plug inside the PCjr, leaving the PCjr's S-connector available for a mouse or serial printer. External modems use the computer's only serial port connector, and require a PCjr Serial Cable to install. These reasons have caused an overwhelming percentage of PCjr users to purchase internal modems.

Modems can be compatible with one or more communication standards. The Bell 103 and Bell 212A standards are supported by modems manufactured by a company named Hayes, and are used in the US, Canada, and Mexico. The CCITT standards are international standards.

When the Hayes Corporation started to make modems for IBM and compatible PCs, the company developed a set of software commands to send instructions to the modem. These commands are commonly referred to as the Hayes command set, or the AT command set. Modems manufactured by other companies are often said to be Hayes compatible. This means that their modems will acknowledge the commands developed by the Hayes Corporation.

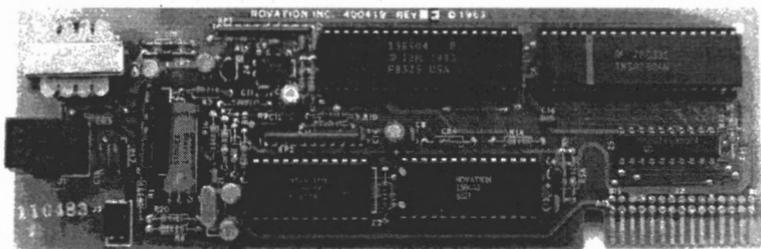
Modems require software to operate. The software sends commands to the modem and therefore makes the modem easier for you to use. For example, to cause a Hayes compatible modem to dial a number you might use the ATDT command, followed by the number you want to dial. If you enter the command: ATDT18005551234 your modem will use touch tone dialing method to dial 1 (800) 555-1234. Communication software allows you to display a menu of places you frequently call, and select any item on the list. Once selected, the software sends the proper command to the modem. Popular communication software packages include ProComm and BITcom.

It is important to point out that, if you own a modem that is not Hayes compatible, you will not have trouble communicating with Hayes compatible modems, as long as both modems use the same Bell or CCITT standard. It is only the software that you will use to operate your modem, that is effected by Hayes compatibility.

The IBM 300 baud internal option is an excellent starter modem if you would like an inexpensive way to learn about modems. While this modem is not Hayes compatible, several public domain software packages that support the IBM 300 baud internal modem are available. The IBM internal modem uses a standard defined by IBM and the Novation corporation. To tell the IBM internal modem to dial 1 (800) 555-1234 you type the command: DIAL 1 800 555 1234. IBM Internal Modem commands use a Control-N prefix instead of the AT prefix used by Hayes Compatible modems.

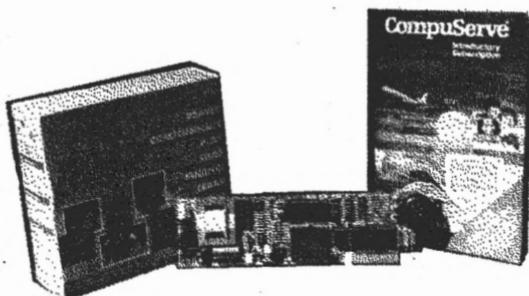
The biggest disadvantage of the IBM 300 baud Internal Modem is speed. This modem is eight times slower than the PCE 2400 baud Modem. While this difference is significant, so is the amount of money that you save when you purchase a 300 baud modem.

Another good reason to purchase and install the IBM 300 baud Internal Modem is the COM port address problem (explained in the Serial Ports section of this guide). If you install an internal modem now, and you later add an external modem using the PCjr's S-connector, you will not need to worry about the COM port address problem.



The **IBM 300 Baud Internal Modem** will allow you to explore the world of telecommunications with your PCjr for less than ten dollars. You will be able to use the CompuServe Information Forum, the Internet Highway, and electronic mail, without spending a lot of money. The IBM Internal Modem comes with public domain telecommunication software. In addition, a \$15 CompuServe usage credit allows you to use CompuServe for an introductory period without paying anything at all! To purchase the **IBM 300 Baud Internal Modem** order #79024 (\$9.95).

If you become serious about using a modem, you will soon desire a faster modem for your PCjr. The PCjr uses a different baud rate generator as compared to other computers, and therefore may not work reliably at baud rates above 4800. The fastest internal modem ever made for the PCjr is the PC Enterprises **2400 Baud Internal Modem**. This modem is Bell and CCITT compatible, and it is also Hayes compatible. Hayes compatibility means the modem will work with ProComm, BITcom, CrossTalk, or other communication programs that you may purchase.



Besides from the IBM 300 baud Internal Modem, the PC Enterprises **2400 Baud Internal Modem** is the only internal modem for the PCjr that is currently available. The modem comes with public domain telecommunication software, a CompuServe \$15 usage credit, and a trial membership to IBM's Prodigy Information Service. To order the **2400 Baud Internal Modem** for the PCjr order #15508 (\$99).

External modems can also be purchased for a PCjr, however you'll first need the PCjr Serial Cable to connect the modem. To prevent the COM port address problem from causing a compatibility issue (see the serial port section of this guide), a ComSwap board or internal modem should also be installed. PC Enterprises offers several external modems for the PCjr. To order a **1200 Baud External Modem** order #10120 (\$79), or select a **2400 Baud External Modem** by asking for #10121 (\$99). These modems are provided with a PCjr Serial Cable. Faster external modems are not offered by PC Enterprises because PCE can not guarantee compatibility with your particular PCjr.

Replacement Parts

The PCjr is a genuine IBM computer that has proven itself to be one of the most reliable computers ever made. Although its not very likely that the computer will ever require service, no PCjr Operation and Expansion Guide would be complete without a section on troubleshooting.

If you have a problem with your PCjr, you can attempt to fix the problem yourself by purchasing the replacement parts you need, or you can have your PCjr professionally serviced.

Where Can I Send my PCjr for Service?



PC Enterprises offers a **Flat Rate Repair Service** for PCjr computers. The cost of flat rate repair is determined by the number of drives installed in the PCjr. To have a **Flat Rate Repair** performed on a PCjr with one disk drive, send the

PCjr to PC Enterprises and request service #98529 (\$99). To service a PCjr with two drives, request service #98530 (\$129). Include \$15 for return shipping if you send in a one drive system, and \$20 for two drive systems.

The flat rate repair fee covers most problems, however it does not include servicing monitors, printers, or hard drives. Problems with these items will be quoted separately. Also, you'll need to provide a note that explains the problem, and include everything needed for us to duplicate the problem at our facility. Contact the customer service department for additional details.

Can I Repair my PCjr Myself?

Yes. The PCjr has a variety of built-in tests that are designed to give your PCjr a thorough checkup. It's a good idea to familiarize yourself with these tests before you experience a problem. To access the PCjr's built in diagnostic tests press the Ctrl-Alt-Ins key combination. These tests are described in the "Testing" section of the Guide to Operations Manual.

In addition, each time the PCjr is turned on, the PCjr runs a series of tests. These tests are known as POST (Power On Self Test).

You can generally repair the PCjr yourself once you become familiar with the built in diagnostics and POST.

How Can POST Help me Fix my PCjr?

Each time you turn your PCjr on, the PCjr runs its Power On Self Test (POST). During this test, the IBM logo screen appears and the computer performs a number of tests. The most noticeable test performed is the memory test.

When a problem is detected, two beeps are produced, and the PCjr attempts to display a message that helps you determine the type of problem encountered.

Sometimes POST starts to run, but the problem with the system prevents it from displaying an error message on the screen. In this case, you'll see a white or black screen, and you'll hear two beeps, three beeps, or no beeps at all.

The PCjr should count to the full amount of memory installed, each and every time it is started. If the PCjr ever stops counting before it finishes testing its memory, a problem with memory is indicated. In this case the PCjr will require service. PCjr users that continue using the PCjr when this happens, will experience software crashes and hang ups.

When the PCjr successfully completes POST, it produces one beep. Next, the floppy disk drive indicator should light up as the PCjr attempts to load DOS from the floppy drive. (Note: If a QuickSilver or Combo Cartridge is installed, the PCjr will not beep unless a problem is found.)

If the computer does not complete POST, the basic troubleshooting procedure is to remove everything that is not essential to complete POST. The PCjr should successfully complete POST with everything removed except the power supply, power supply transformer, and monitor. If POST completes, start to put the PCjr back together, one item at a time, until the failure can be identified.

Always check for bent and misaligned pins, any time you unplug a device from the rear of the PCjr, or from the sidecar expansion bus. Bent pins are a common problem, and can cause a variety of error messages. If you encounter bent pins, use a needle nose pliers to carefully straighten the pins. Please be aware that PCE can not perform Flat-Rate Repair on anything but a completely assembled computer that demonstrates a problem.

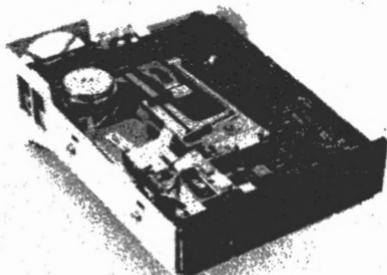
Floppy Disk Drive

Floppy disk drive errors are the most common problems experienced. This should not be surprising, since a floppy drive has lots of moving parts. Mechanical components with moving parts tend to wear, and always seem to fail before electronic components.

The first sign that a floppy disk drive has started to fail is often seen during formatting. The computer will report bad sectors when you format a good diskette. You may also have trouble reading diskettes that were formatted by other computers. When attempting to load DOS, a bad or missing DEV/CON error may be produced, or the system may simply go into BASIC. Sometimes an ERROR H message is produced.

When a disk drive problem is suspected, use the PCjr's built in drive diagnostic tests to test the disk drive. The test performs read and write tests, then reports the result. If the test fails, you can be reasonably sure that either your PCjr disk drive, or the disk drive controller card, should be replaced. Since the failure rate of the PCjr disk drive is much greater than that of the disk drive controller card, replacing the disk drive is a reasonably safe bet.

Unfortunately, if the disk drive passes this test, it does not mean the drive is working properly. The built-in test has no way to verify proper head alignment. If your disk drive has gone out of alignment, the disk drive tests may still pass, although you'll have trouble using diskettes formatted on other computers. These diskettes may produce occasional "Abort, Retry, or Ignore" messages.



Reconditioned Replacement Floppy Drives for the PCjr can be purchased from PC Enterprises by ordering #78719 (\$98).

PCjr System Board

The PCjr system board is the main board of the PCjr computer. Computer system boards are often referred to as "motherboards", because one motherboard allows you to add many other computer boards. The other computer boards that you add, are sometimes referred to as daughter cards, but are more commonly known as expansion cards.

PC Enterprises sells replacement PCjr system boards with the FIVE System Board Modifications already installed described in the memory section of this guide. These modifications permit your PCjr to display much better graphics, to produce much better sound, and to accept two popular add-on expansion cards. If you purchase a Replacement System Board that has the PCE modifications, you'll be able to install the 192KB Internal Memory Card that allows you to load DOS high, and the Display-Master VGA sidecar that allows you to run VGA and SVGA software.

When the PCjr system board goes bad, the PCjr will often display a white or black screen. You can tell that the power transformer and +12 volt power supply are working because the system board fan will be operating. In many cases, two beeps will be heard, the screen will change color, or the disk drive light will come on. If any of these things happen, the PCjr +5 volt power supply is usually okay. If your PCjr has these symptoms, remove all expansion cards that are installed, and test the system board with only the power supply and monitor connected. If the system board does not complete the PCjr's Power On Self Test (POST) check the +5 volt output of the power supply with a meter. If the power supply output is correct, the PCjr System Board should be replaced. To order a PCjr Replacement System Board order #78739 (\$98).



Power Supply Transformer

The PCjr Power Supply Transformer can be easily identified because it resembles a black brick. This transformer is designed to convert the 110 volt AC power to 16.7 volts AC.

The power supply transformer is designed to automatically interrupt power, if for any reason an overload condition should exist. This function provides protection to your home and your PCjr in the event of a short circuit.

In the event that the protection circuit is activated, the power supply transformer must be replaced. In most cases when a PCjr power supply transformer fails, the protection circuit is activated by a surge on the power line.



In these situations, the power supply transformer will shut down. Measuring the output voltage with an AC voltmeter is the best way to test a power transformer. The transformer should produce about 16.7 volts AC. If the protection circuit has triggered, the transformer will produce no voltage at all.

If you do not have a meter, you should suspect a failed power transformer any time the PCjr's fan does not operate. Also, if the transformer is working properly it will feel warm and may produce a humming sound. To order a **Replacement Power Transformer**, ask for #78712 (\$44).

PCjr Power Supply Card

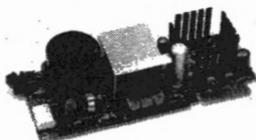
The PCjr's power supply card plugs into the left-most slot of the PCjr system board, and produces power at several levels. If you do not see or hear anything when the PCjr's power switch is turned on, a defective power supply or power transformer are the most likely parts that have failed.

The best way to test the PCjr power supply card is to measure the output with a DC volt meter. The easiest place to measure voltage is on the power cable connector that attaches to the floppy disk drive. In most cases, if the +12V and +5V signals are present, the power supply is working properly.

If you do not have a DC volt meter, listen to whether the PCjr's fan operating. If so, the power supply is producing +12 volts, as it should and you can eliminate the Power Supply Transformer. Unfortunately, you'll need to use a DC volt meter to tell whether the PCjr is producing the +5 volt signal required to operate the computer.

Before purchasing a new power supply, remove all plug in expansion cards from the PCjr, and test the PCjr again with only the monitor, power supply, and power supply transformer connected. This will insure that the problem is not being caused by some other item that is plugged into the computer.

If you need to purchase a replacement power supply there are two products to choose from. The original **PCjr Replacement Power Supply** card measures 7 inches long, and is rated to produce 33 Watts. To purchase this power supply, order #78707 (\$49.95). If you prefer a heavy duty power supply, the ten inch power supply is much less likely to fail in the future. This power supply produces approximately 46 Watts and works in all PCjrs. To purchase the heavy duty power supply ask for #78729 (\$69.95).



64KB Memory and Display Expansion

The IBM 64KB Memory and Display Expansion card plugs inside the PCjr in the second expansion slot (adjacent to the power supply). This product increases the PCjr's internal memory from 64KB to 128KB and also provides the video memory necessary for the PCjr to display 80 columns of text.

When this item fails, the PCjr's display may appear garbled, or the PCjr may produce an ERROR A message *before* it counts up to 128KB. If this should happen remove any memory expansion products you may have installed and retest the system. If the problem does not change, remove the **64KB Memory and Display Expansion** card and retest the system. If the problem only occurs with the 64KB card installed, replace the card. To order a **64KB Memory and Display Expansion** card order #78709 (\$50).



Can I Still Purchase the PCjr?

Yes. If you are like most PCjr owners, the Enhanced Model PCjr has quickly become an important part of your household. You may wish to purchase additional PCjr's for a friend or for other members of the family. Perhaps a relative that is going away to school, or maybe you'll want each of your children to have their own PCjr.



Complete PCjr systems are still available from PC Enterprises for a limited time. While the PCjr is no longer in production, PCjr computers are still being assembled from IBM's supply of genuine PCjr replacement parts.

A complete PCjr system with DOS v3.3, 640KB of memory, IBM's improved replacement style keyboard, two joysticks, PCjr Starter Diskette, Guide to Operations manual, power transformer, and a reconditioned PCjr Color Display can be purchased for \$299 while the supply of parts lasts. These systems can be ordered with a 5 1/4 inch 360KB floppy drive or a 3 1/2 inch 720KB floppy drive.

To order a complete PCjr system with a 5 1/4 inch floppy drive, ask for #10146-1 (\$299). To order a complete PCjr system with a 3 1/2 inch floppy drive, ask for #10146-2 (\$299).

Enhanced Model PCjr Systems are also available without the monitor and other accessories included above. These system units include a floppy drive, 128KB of memory, replacement style cordless keyboard, and a power transformer. All you need to use this system is DOS and a suitable monitor. To order an **Enhanced Model PCjr** with a 5 1/4 inch low density drive, order #78733-2 (\$129). To order a PCjr with a 3 1/2 inch low density drive, order #78733-3 (\$129). An adapter that allows you to connect the PCjr to any industry standard RGB (CGA) monitor is available upon request.

PC and PCjr Compatible Software \$10 per Disk!!!

These programs are either shareware or public domain. Shareware is a marketing concept that allows you to test and use software before you pay the author. If you like a program after trying it, you are asked to send the author the registration fee, if one is requested.

Our charge for these programs covers our cost to gather, test, and reproduce the software. In most cases, you are permitted to copy these programs, and share them with your friends. Please do not return disks because they do not meet your needs. If a program is not suitable for your purpose, then do not send the author any money that is requested.

PCE has tested the following programs to insure compatibility with IBM PC and PCjr systems. Unless otherwise noted all programs run with DOS v2.1 or higher. The amount of memory required when tested with DOS 2.1 is indicated.

A few titles come on more than one diskette. In this case, you must pay for each diskette. Titles that come on multiple diskettes are noted in the description.

Special Note for PCjr users:

Some PCjr's start DOS in the 40 column mode. Before running software, always set the 80 column mode to avoid compatibility problems. To do this, insert your DOS diskette then type MODE CO80 at the DOS prompt. You can also create an AUTOEXEC.BAT file that automatically sets the 80 column mode. Refer to your DOS manual for further information on the MODE and AUTOEXEC.BAT commands. Also, all titles that require more than 128KB of memory, also require memory management software on a PCjr. The software we used in our tests was JRCONFIG.SYS with the /O option. The /O options makes more memory available to run software, however it may cause your PCjr to run somewhat slower. (Do not use /SO unless you need to).

All titles are also available on 3 1/2 360KB diskettes. The software in this section is provided on low density 5 1/4 inch 360KB diskettes. To order any of these programs on 3 1/2 inch 720KB diskettes, change the -1 to a -3 (example: 87005-1 comes on 5 1/4 inch 360KB diskettes, to order on 3 1/2 inch 720KB diskettes, ask for 87005-3).

While PCE can not offer a refund or a credit on any software product you purchase, we are eager to know of any problems you experience. If our testers overlooked a compatibility problem that prevents you from running a program, we will be happy to send you a free disk the next time you place an order.

Get One Disk FREE for every three disks purchased!!!

Ask for discount #80947

Computer Education

How to use Shareware

A must have for the beginning shareware user. An easy to read short tutorial for anyone just starting out with Public Domain Software. Shows how to run programs, use DIR, etc. 128KB. #87005-1

DOS Learning System

Excellent first tutor for DOS with all elementary things explained for the complete novice. Includes on-screen examples and an interactive teaching method. 640KB. #87006-1

DOS Tutor

A good general purpose tutorial for new computer users. Learn how to use the DOS operating system. 128KB. #87007-1

Computer Tutor

Highly recommended for newcomers to computing. Teaches you about your computer. Very good! 128KB. #87008-1

PC Professor

An easy to use BASIC tutor. Teaches more than just the basics. Shows you how to modify BASIC programs. PCjr Basic Cartridge or Configuration Plus cartridge required. 64KB. #87009-1

Business Programs

Landlord

User friendly rental property management system. Helps you maintain from 1 to 9,640 rental units. 512KB. #87010-1

Legal Forms

This program contains over 100 different easy to fill in legal forms. Say it legally with affidavits, assignments, authorizations, and more. 64KB. #87011-1

Make My Day

Complete computerized time management system. Includes an appointment calendar and job scheduler. Perfect for anyone with a busy schedule. 128KB. #87012-1

PC-Calc+

This is a spreadsheet program that we suggest you try. Spreadsheets allow you to organize information in rows and columns, then manipulate the data as you like. Hard drive required. Three disk set. #87004-1

Word Processing Programs

Finally! A Sensible Word Processor version 2.0

A simple no-nonsense easy-to-use word processor. Built-in features galore. Works with any monitor and printer. Perfect for the PC or PCjr. 256KB. #87015-1

PC-Write v2.71

PC-Write is a full featured word processing program that includes a spelling checker. Widely considered a competitor to such expensive programs as WordPerfect, Microsoft Word, and Xywrite III. Two disk set. 256KB. #87001-1

PC-Write v3.02

This newer version of PC-Write has numerous enhancements to earlier versions. Three disk set. 384KB. #87002-1

Utilities

Anti-Virus Software

McAfee's famous virus scan and clean software. Detects and removes hundreds of viruses including the "Your PC is stoned" virus and the "Michelangelo" virus that formats your hard drive on March 23. #85513-1

File Compression Software

Are you tired of running out of disk space? Then try PKzip, and PKunzip. Condenses your files for maximum storage. #85514-1

PC-Talk

If you use a modem, try PC-Talk! PC-Talk works exceptionally well on the PCjr and is very easy to use. Requires a Hayes compatible modem. 128KB. #87003-1

General Education

Fifty State Quizer

Designed in a game format for fun to play education. Features questions in categories such as state capitols, bordering states, state flowers, etc. 256KB. #87017-1

Letter Attack

Aliens have launched a letter attack, and only your typing skills can save the planet. As words and letters fly across the screen, you must eliminate them by typing them correctly. Fun way to increase your typing speed and accuracy. 640KB. #87020-1

Entertainment

NYET (formerly called TETRIS)

Experience the famous Russian video game. Known to be number one with Nintendo game fans. #87023-1

Color Trivia

A trivia game that includes colorful graphics and exciting sound effects. 128KB. #87026-1

Video Games

A collection of six fun-for-all BASIC games. Includes MUMMIES, BANDIT, HAMURABI, KANGAROO, RUBIC, and WILLIE. PCjr Basic Cartridge or Configuration Plus cartridge required. 64KB. #87027-1

Video Games II

Yet another collection of five absorbing and fun video games. Includes BRICKS, FORTUNE, KONG, PYRAMID, and DEMON. 128KB. #87028-1

Fue

A graphic maze adventure. Navigate your way through the 3-D maze picking up treasures as you go. Get the coins, but don't let the energy beetle zap you or you die! 256KB. #87029-1

Jig-Saw CGA

Assemble four 16-piece jig-saw puzzles right on your screen. Great program for kids. 256KB. #87030-1

GIN Card Games

Gin rummy is a card game for two players. Allows you to play Oklahoma or Hollywood style. 128KB. #87031-1

Phrase Craze

Wheel of Fortune clone for CGA monitors. Up to five players accumulate cash, and try to solve the puzzle. Allows you to also make your own phrases! 256KB. Requires DOS v3.3 or later. #87032-1

Tune Trivia

Features both tunes and trivia questions for up to six players. Plays the most familiar part of a well know song and you must guess the title. 128KB. #87033-1

Solitaire

A collection of five different solitaire games. Includes CANFIELD, GOLD, MONTECARLO, GRAND DUTCHESS, and FROG. 256KB. #87035-1

Dungeon Explorer

Explore the 64 different rooms in search of hidden treasure. Avoid traps, pits, and deadly demons who will stop at nothing to protect their dungeon! Role Playing Game (RPG). 256KB. #87036-1

Our United States

Fun and easy game to play. One hundred questions, with four possible answers each. Convenient way of learning the correct answer without having to make a blind guess. 128KB. #87037-1

Another Lifeless Planet and Me with No Beer

One of the funniest adventure games you will ever play. Solutions are just logical. Compressed. You will need six blank diskettes to uncompress. #87038-1

Lemmings

Fun packed arcade game. Lemmings are cute little creatures who live in caves. You must guide them past dangers and traps out to safety. To do this, you must make them walk, dig, build steps, climb, etc.. The problem is, Lemmings are so stupid! 640KB. #87039-1

Hit Songs

A rock-n-roll trivia game. You will be shown when a song was a hit and who recorded it. From the list provided, you choose the correct title. 384KB. Requires DOS 3.3 or later. #87040-1

McMurphy's Mansion

An all text adventure game that provides hours of challenge and fun. Your demented uncle McMurphy has left you a ten-million dollar inheritance - if you can find it! 640KB. #87034-1

Pharaohs Tomb

Explore the great Egyptian Pyramid while trying to escape all twenty levels of this most challenging game. 384KB. #87021-1

Games for Children

Play and Learn

A collection of games to help learn the alphabet and computer use. Includes AMANDA'S LETTER LOTTO, WORD WHIRL, COLOR MATCH, and more... 256KB. Requires DOS v3.3 or later. #87041-1

School Mom

Four education programs for ages 4 to 14. Covers math, music, spelling, and art. 640KB. #87042-1

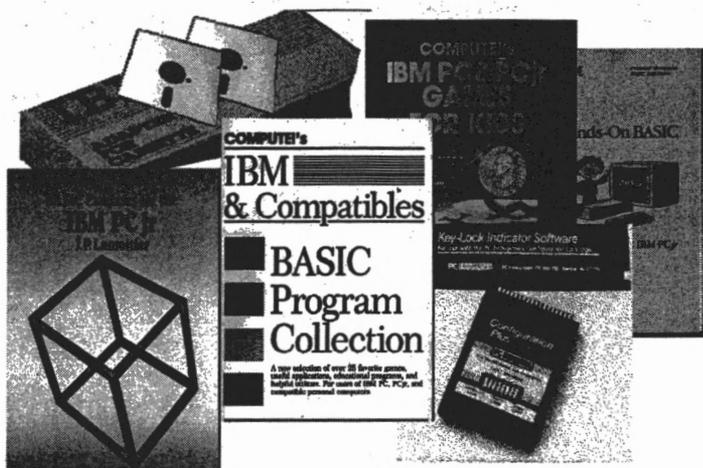
Kid's Games

A collection of many games guaranteed for fun. Includes ALPHABET, ANIMAL MATH, CLOCK, HANG-MAN, and MOSAIC. Excellent! 128KB. #87043-1

Math Drill

Math for children. Ages grade school to high-school. Varying levels, keeps track of answers and wrong answers. Fun! 128KB. #87044-1

BASIC Language Starter Package only \$44.95



This package allows you to get started using your PCjr without adding additional memory. Regardless whether you have the Entry or the Enhanced Model PCjr, you'll be able to take full advantage of the Cassette BASIC language that is built into all PCjrs. In addition, PCjr owners that have the superior Enhanced Model PCjr, as well as any version of DOS 2.1 through 4.01, will also be able to use Diskette BASIC and all the BASIC programs provided on the included diskettes.

The Hands on BASIC book provides an easy to follow beginners tutorial that teach you how to use BASIC and the PCjr. Three additional books are filled with BASIC programs that you can type into the computer, and examples. Two diskettes full of ready-to-run BASIC programs are also included, along with the PCE Configuration-Plus Cartridge that lets you run Diskette BASIC from your DOS diskette. Finally, the Adapter Cable for Cassette Recorders allows you operate a Cassette Recorder with a BASIC program.

PCE Configuration-Plus Cartridge (#18026 Reg. \$29.95)

Hands-On BASIC (#85031 Reg. \$19.95)

BASIC Exercises for the IBM PCjr (#85014 Reg. \$9.95)

IBM PC & Compatibles BASIC Program Collection (#85034 Reg. \$9.95)

IBM PC & PCjr Games for Kids (#85033 Reg. \$9.95)

Adapter Cable for Cassette Recorders (#79005 Reg. \$19.95)

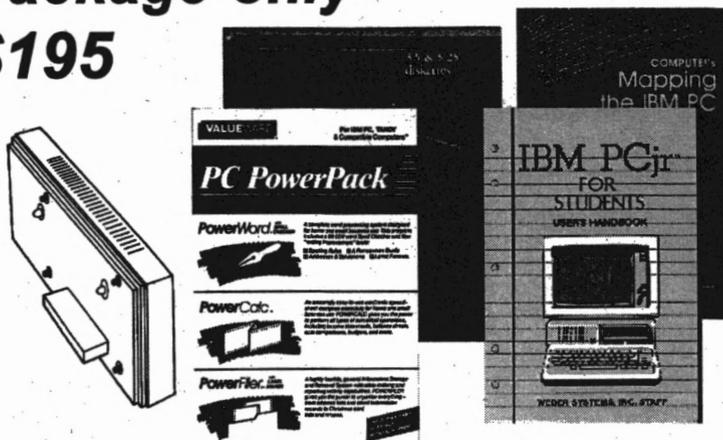
PC-Professor Diskette (#87009 Reg. \$10)

BASIC Video Game Collection I (#87027 Reg. \$10)

Regular: \$119.70 Clearance Price: \$44.95 Order #10145

Hurry while supplies last. All sales final.

Memory & DOS Upgrade Package only \$195



Includes everything you'll need to run most DOS-based software on the Enhanced Model PCjr. If you purchase this package, you'll be able to run virtually all software compatible with the genuine IBM Personal Computer.

The 512KB Memory Expansion Sidecar increases the memory of a 128KB PCjr to 640KB, providing adequate memory to run virtually all DOS-based software. DOS 3.3 is the best operating system you can use on a PCjr that does not have a hard disk drive. PC PowerPack is a powerful software package that includes spreadsheet, database, and word processing software. The two books included are the two most popular books we sell that teaches about the PCjr.

512KB Memory Sidecar (#14019 Reg. \$149)

DOS 3.3 (#6044-1 Reg. \$69.95)

PC Powerpack (#86337 Reg. \$29.95)

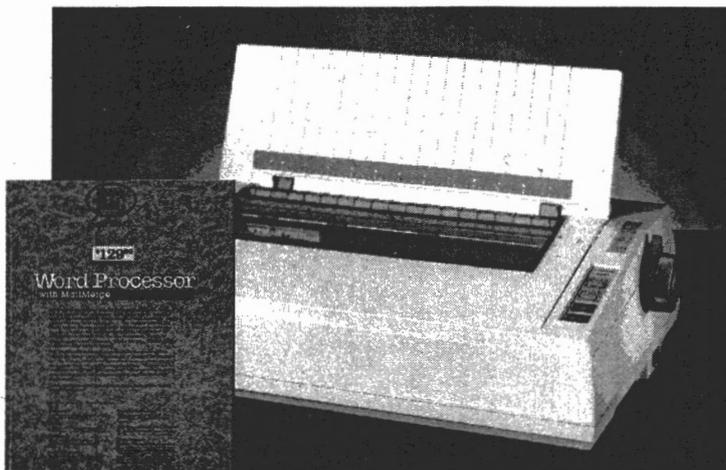
IBM PCjr for Students (#85004 Reg. \$9.95)

Mapping the IBM PC and PCjr (#85035 \$9.95)

Regular \$278.80 Clearance Price: \$195 Order #10144

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Word Processing Package only \$169



Includes everything you'll need to use the PCjr for word processing, including the true letter quality NEC Spinwriter printer.

The NEC Spinwriter is offered at this low price because it is a daisy wheel NEC model that has been discontinued by NEC. PCE purchased these printers directly from NEC, and the printers are still in the original factory sealed boxes.

This package includes the printer, and word processing software. The printer does not require any additional hardware to attach to the PCjr because it plugs into the PCjr's S connector.

NEC Elf 370 Printer (#78601 Reg. \$149)

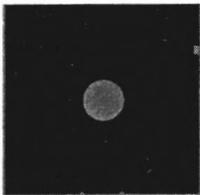
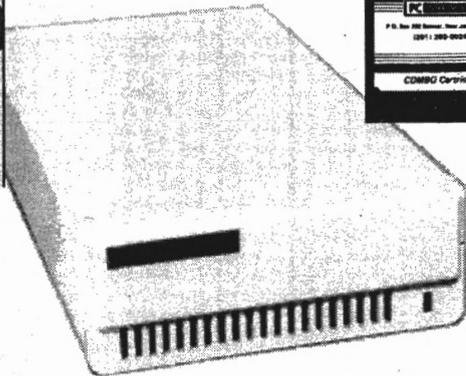
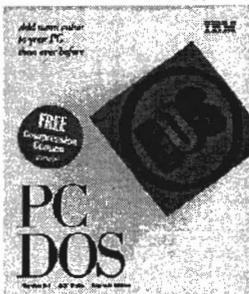
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Brown Bag Word Processing Software-128KB Required (#86322 Reg. \$29.95)

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PCjr Hard Drive Upgrade Package from \$199



Includes everything needed to connect an external hard drive to your PCjr. The hard drive comes with the latest release of PCjr Memory Management Software and PC-DOS 6.1 installed. The PCE Combo Cartridge updates your PCjr's BIOS to eliminate any compatibility problems you would be likely to encounter.

Installation is simple. Just plug the hard drive sidecar into the PCjr, the hard drive into the wall, and the Combo Cartridge into the PCjr, and turn on the power!

42MB (#12585 Reg. \$199)

or 107MB External Hard Drive (#12621-1 Reg. \$249)

DOS 6.1 installed (#86036-1 Reg. \$39.00)

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Regular \$256 **Package Sale Price: \$199** Order #10142

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The first PCjr product produced by PC Enterprises was introduced in 1984. The Junior Drive II Expansion System was the first product that allowed PCjr owners to install just a second floppy disk drive in their PCjr. The system soared to popularity, and was sold in computer stores throughout the country!

PC Enterprises continued to produce new PCjr products. Soon, the company introduced the jrSidecar Series of PCjr Memory Expansion Products. These products were also an instant success, and are today the most widely used third party memory expansion products for a PCjr that you will find.

Where a list of more than 200 companies that competed in the PCjr add-on product market was once compiled, PC Enterprises is the company whose products have passed the test of time. The current product line includes hard drive expansions, SVGA adapters, modems, sound cards, and hundreds of other products all designed to work on a PCjr computer!

Most products described in this guide can be ordered using a major credit card by calling PC Enterprises toll free ordering line (800) 922-PCJR. In addition, orders can be mailed to PC Enterprises, PO Box 292, Belmar NJ 07719. Mail orders received with a check are held ten days, so send a money order or bank check, if you are in a hurry. The company only charges \$5 to ship most orders, regardless of the number of items ordered. Regular UPS ground service is used, which takes up to ten days to receive. PCjr users in a hurry, should always ask for Priority Shipping Service. This service costs \$12.50. When Priority Shipping is selected, a rush is placed on your order, and the order is shipped UPS second day service. If everything ordered is in stock, your order will usually be received within three days. Shipping surcharges apply to monitors, printers, and systems. To avoid having your order held up, call the 800 number to verify shipping rates before ordering.

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