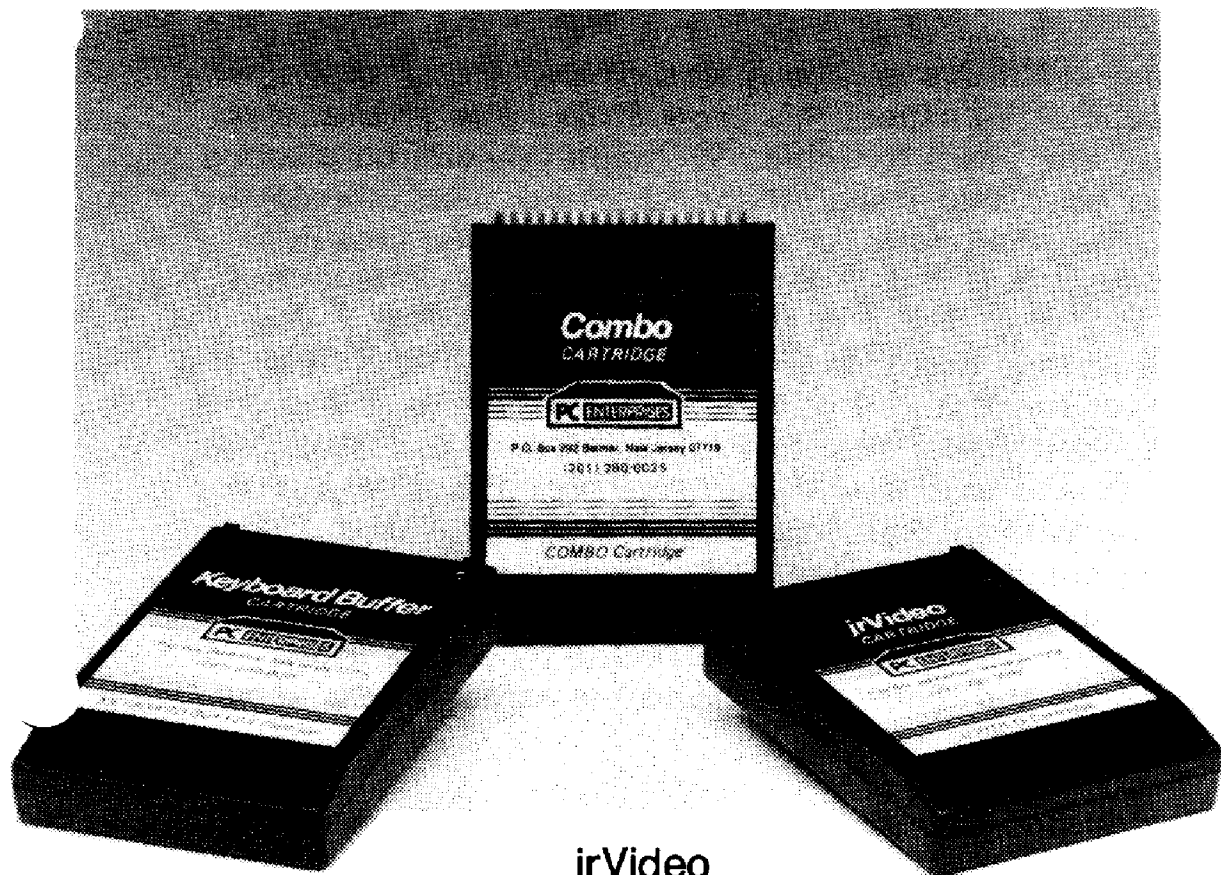


PC Enterprises' **jrVideo Cartridge**

Installation and Operation Manual



jrVideo

A Speedup Product for the PCjr

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PC Enterprises, P.O. Box 292, Belmar, N.J. 07719 (201) 280-0025

**If your PCjr has not already been set up at this time,
please do so before installing this option.**

This carton should contain the following:

- * jrVideo or Combo Cartridge**
- * jrVideo Cartridge Manual**

**Please inspect this package to determine whether any
item appears missing or damaged. If any item is
missing or damaged report the missing or damaged item
to the place of purchase as soon as possible.**

INTRODUCTION

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

The jrVideo cartridge replaces the normal PCjr video output functions of BIOS with equivalent routines which are significantly faster. Programs which use BIOS calls for screen writing will therefore perform significantly faster with the cartridge installed and activated. Programs which ignore IBM's recommendation and interface directly with the computer's hardware (beyond the level of BIOS) are not affected by the cartridge routines and therefore write to the screen at the same speed as before.

In addition to speeding up the computer's screen writing routines the cartridge also includes video buffer management software. This software permits your system to recognize memory beyond 128K - without slowing down the computer's screen writing routines. The use of this portion of the cartridge is strictly optional.

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WHAT YOU SHOULD KNOW

The speed at which a program runs is primarily affected by three operations: input time, processing time, and output time. Input time is normally the time it takes to load the program, overlay file, and data from your drive. Processing time is the time it takes the computer's microprocessor to execute the required instructions. And last, but not least, is output time. In most cases this is the time it takes to display results on your screen.

Accelerating any of these operations will cause your computer to run more quickly - however, to maximize the performance of your system you must make improvements in all three areas.

Input Time

Input time can be improved by using the BUFFERS command to increase the number of buffers used by DOS. A good number to start with might be 20. To increase the number of buffers to 20 add the line `BUFFERS = 20` to your CONFIG.SYS file. Refer to your DOS manual if you would like additional information.

Another way to improve input time is to run your application program from a hard disk drive, or if you have enough memory, a RAMDISK. The improvement you see will be particularly evident while running programs which use overlay files such as Writing Assistant, WordStar, and dBase.

Processing Time

The second principle operation is processing time. If your PCjr has at least 256K you can gain a measurable improvement in execution speed if you force your

software to load and execute inside your memory expansion unit - instead of inside the PCjr.

This technique works because wait states are added to the PCjr's internal memory to permit sharing with the video buffer. Your memory expansion unit, if properly designed, does not add these unnecessary wait states.

A video buffer management routine named JRVBUFDD.SYS is provided on the cartridge. This device driver not only permits your system to recognize memory beyond 128K without slowing down the screen writing routines, but it also permits you to force application software to load and execute inside your add on memory expansion... assuming of course that you have already expanded your system's memory.

Another way to improve processing speed is to replace your factory supplied 8088 microprocessor with a faster microprocessor, such as the NEC V20 chip. Improvements in the V20's microcode enable faster processing - especially when using arithmetic functions. However, the most significant improvement in processing speed occurs when you actually add hardware to the computer which increases the clock speed. Under normal circumstances the PCjr system clock runs at 4.77 MHz. The PC Enterprises Speedup Board is a device which doubles the clock speed of the computer increasing it to 9.54 MHz.

Output Time

Output time is the third principle operation. This is usually the time it takes to display results on the screen. It is here where the jrVideo Cartridge makes a significant improvement.

The PCjr's normal video output routines are much slower than the equivalent routines on an IBM PC. An easy way to illustrate the slowness of these routines is to ask for a directory of a diskette which has a large

number of files on it. Pay close attention, not only to the rate at which information is displayed on the screen, but also to the disk drive's indicator light. Notice that the PCjr's diskette drive momentarily stops reading and waits for BIOS to finish writing information to the screen. After BIOS catches up, the diskette drive turns back on and finishes reading the diskette.

USING THE JRVIDEO CARTRIDGE

WHAT THE SOFTWARE DOES

The jrVideo Cartridge replaces the sluggish PCjr BIOS routines with new improved routines which execute more quickly. The JRVIDEO routines are activated automatically when the computer is turned on with the cartridge installed in either slot. Graphics will now literally explode onto the screen while running programs which use BIOS.

The JRVINT21 command is an optional DOS command designed to activate support of the speed up while using DOS. The improvement you with the JRVINT21 command activated will also be quite dramatic.

The JRVBUFDD.SYS program is a device driver included for video buffer management. This software is normally referred to as memory management software because relocating the video buffer is what you must do to permit your PCjr to recognize memory beyond 128K.

If you have already expanded the memory of your PCjr beyond 128K you may wish to use this program to recognize your added memory instead of the software provided with your added memory. The unique feature of the JRVBUFDD.SYS program is that it moves the computer's video buffer without slowing down the screen writing routines.

In addition, the program has two special options. When used with a /E parameter the program will reserve 32K for the video buffer. This option is normally used when a program will not otherwise run correctly on the PCjr because it needs more memory allocated to the video buffer. If you try to run a program and the information displayed on the screen appears "all messed up" try running the program again after rebooting with a diskette configured to use the /E option.

The /C option will configure your PCjr to operate in, what IBM has called the compatible mode. In this mode the computer will reserve all internal memory for use by the video buffer - forcing application programs to load and execute in your memory expansion unit. The advantage of this is faster execution. The disadvantage is that the 128K of memory inside your PCjr is no longer available for use by application software you run.

INSTALLING THE HARDWARE

To install the jrVideo Cartridge simply plug it into either cartridge slot. The cartridge slots are located beneath the PCjr's internal disk drive. A reset tab on the cartridge allows it to be inserted with the computer's power on - although doing so will cause your computer to reset. If you already have either the BASIC Cartridge or another PC Enterprises cartridge installed in one of your cartridge slots you may install the jrVideo Cartridge in the other slot. If you are presently using both the BASIC Cartridge and the Keyboard Buffer Cartridge we recommend you remove the BASIC Cartridge and install jrVideo instead.

If you ever try to run a program which needs the Basic Cartridge the computer will display a "Cartridge Required" message. If this should happen, simply remove the jrVideo Cartridge and insert the BASIC Cartridge in its place. This should not be a significant disadvantage because Cartridge BASIC programs can not

make use of more than 64K of memory and do not generally use BIOS calls for video output.

USING THE JRVIDEO ROUTINES

The main routine in the cartridge is the jrVideo routine - although you will never need to enter the jrVideo command to activate the routines. No device drivers or DOS commands are needed as the routine is automatically activated when the cartridge is inserted. The jrVideo routine therefore works when running either DOS or non-DOS diskettes.

USING THE JRVINT21 COMMAND

This command causes text output via DOS to be intercepted and processed directly by the jrVideo routines. You may either type JRVINT21 from the DOS prompt or insert this line anywhere in your AUTOEXEC.BAT program.

The improvement you see when DOS is used to display text on the screen will be quite dramatic - in fact, perhaps too fast to be comfortable for some people. You may find it necessary to start typing DIR/P instead of DIR, or to use the MORE filter instead of the TYPE command. Refer to your DOS manual if you need more information on these commands.

USING THE JRVBUFFDD.SYS DEVICE DRIVER

The JRVBUFFDD.SYS program is a device driver which permits those who have already expanded their computer's memory beyond 128K to recognize their memory without slowing down the computer's screen writing routines.

If you decide to use the JRVBUFFDD.SYS program be sure to understand that you must use this program **INSTEAD** of any other software to recognize additional

memory. For more information refer to the section of this manual titled, "Compatibility".

To use the JRVBUFDD.SYS device driver you must start by copying the device driver from the cartridge to your working DOS diskette. To do this, simply insert your working copy of DOS into the default drive with the write protect tab removed, then type: JRVBUFDD.

If you wish you may now use the DIR command to inspect the directory of your diskette. You should see a file named JRVBUFDD.SYS on your diskette.

Next, the following line must be added as the first line in your CONFIG.SYS file:

```
DEVICE=JRVBUFDD.SYS
```

If you do not already have a CONFIG.SYS file you must create one. To create a CONFIG.SYS file type:

```
COPY CON CONFIG.SYS    Then press ENTER  
DEVICE=JRVBUFDD.SYS    Then press ENTER
```

The cursor will move to the next line.

Next, press Function Key F6. To do this on the PCjr keyboard press the Fn key followed by the 6 key. The symbol \wedge Z will appear on the screen. Then press ENTER.

The message, "One file(s) copied" will be displayed.

If you prefer you may use one of the optional parameters /E or /C. To do this, type the line

```
DEVICE=JRVBUFDD.SYS /E
```

or

```
DEVICE=JRVBUFDD.SYS /C
```


instead of `DEVICE=JRVBUFD.D.SYS`.

The next time you re-boot, the device driver will relocate the video buffer as follows:

If you only have 128K of RAM, the top 32K will be reserved for the video buffer, regardless of any parameters on the `DEVICE` statement. This will allow you to make full use of the PCjr's extended graphics modes (9 and A). However, only 96K of memory will be available for DOS and the programs you run.

If you have more than 128K, the parameter on the `DEVICE` statement operates in the same manner as the `PCJRMEM.COM` program provided by IBM with their PCjr memory expansion product.

A `/C` will reserve all memory up to 128K for use by the video buffer. Use this option if you have more than 128K of memory and would like to operate in what IBM has called the Compatible mode. In this mode execution speed is increased. The disadvantage of this option is that programs you run are not able to use any of the first 128K of your computer's memory.

The `/E` parameter will set up one 32K buffer. Use this option only if you are running a PCjr program which requires the extended graphics option.

Anything else, or no parameter will set up one 16K buffer.

Again, the advantage of using `JRVBUFD.D.SYS` in place of other PCjr memory management routines is that it relocates the video buffer without adding extra overhead to the BIOS video routines. This means when using the cartridges memory management software your system will operate even more quickly than it does with the software you currently use even if the programs you run do not go through BIOS.

The disadvantage of using the JRVBUFDD.SYS device driver is that the file copied onto your diskette works in conjunction with routines on the cartridge and therefore can not be used if the cartridge is removed.

OTHER ENHANCEMENTS

Various enhancements have been added to the cartridge to simplify operation and to increase the level of compatibility with PC software. These enhancements may permit you to run certain PC programs which will not run otherwise.

Better BP Register Protection

A bug in the operation of the PCjr BIOS causes BIOS to destroy the caller's BP register when a video output causes the screen to scroll up a line. This problem, which is documented on page 41 of the July 86 issue of PC Tech Journal, may prevent certain PC programs from running correctly on the PCjr. The cartridge preserves BP and therefore permits these programs to run.

Better Mode Defaults

Without the cartridge the PCjr BIOS always sets mode 0, 24x40 B&W, when a program requests a mode which is not valid on the PCjr. The cartridge causes more logical modes to be selected.

- o Mode 2 will be selected if mode 7 (PC mono) is requested.
- o Mode 9 will be selected if mode D (EGA) is requested.
- o Mode A is selected if mode E (EGA) is requested.

These changes may enable you to run PC programs which are set up to operate in otherwise invalid PCjr video modes.

Better Program Protection

In video modes 9 and A, BIOS can overwrite your program if invalid parameters are passed to it. If this should happen, your program will stop running without giving you a chance to save your changes. With the cartridge installed invalid parameters will be ignored or at worst, garbage would be put into the video buffer, and this will not over-write or interfere with your program.

Maintaining Shifted Screen Positions

If you have shifted the screen left or right using Ctrl-Alt-left or right arrow the new position will now be retained when the MODE command is used, instead of being reset as it is without the cartridge installed.

NEW FUNCTIONS

TECHNICAL DOCUMENTATION

int 10h, AH = 13h

Newer computers such as the AT support a BIOS call for handling strings of text instead of handling only one character per call. The cartridge adds this function to the PCjr.

ES:BP - pointer to the string to be written

CX - number of characters in the string

DX - row, column for first character

BH - page number

AL - options:

bit 1 = 0 : string is bytes, BL = attr

bit 1 = 1 : string is word, (char,attr)

bit 0 = 0 : cursor not moved

bit 0 = 1 : cursor is moved

int 10h, AH = 10h, AL = 3

EGA boards support a BIOS call which determines whether the high-order bit of each attribute byte in character modes is used for blink control or as an additional bit of color/intensity data. The PCjr video system provides this function but there is no BIOS support for it. The cartridge supports the function, which can also be used in graphics modes to alternate between the two halves of the palette. See the PCjr Technical Reference Manual, pp 2-67 for details.

BL = 0 : enable intensity

BL = 1 : enable blink

int 15h, AH = 84h

The PC/AT provides a BIOS call for joystick input. On the PCjr, joystick input can be read via BASIC but there is no documented BIOS support. The cartridge provides the same function as the AT BIOS.

**DX = 0 : returns switch data in AL,
bits 7-4**

**DX = 1 : returns resistive inputs:
AX=A(x), BX=A(y), CX=B(x), DX=B(y)**

COMPATIBILITY

OTHER CARTRIDGES

The jrVideo Cartridge can be inserted at the same time as Cartridge Basic or most other cartridges.

There are 4 possible addresses for each normal PCjr cartridge. The address used by a particular cartridge is determined by the way the cartridge is assembled, not by the slot in which it is

inserted. Two cartridges can be used together as long as they are not set up to use the same address.

The PC Enterprises jrVideo Cartridge and Combo cartridge both use address cs3 (D8000). Cartridge BASIC uses address cs5 (E8000) and the Keyboard Buffer Cartridge uses cs2 (D0000). The PC Enterprises Configuration Cartridges and QuickSilver Cartridges are both BIOS nibblers and therefore do not use any cartridge addresses.

JRVINT21

The JRVINT21 command is not compatible with ANSI.SYS or any other programs which change the interrupt vector for the undocumented DOS call int 29H.

Also, when you use the JRVINT21 command TAB characters will be expanded to spaces. This means alignment may be different from that produced by DOS. EDLIN is one program where this is apparent.

When using the print ECHO function the JRVINT21 command must be issued before setting up any print utilities such as the DOS PRINT command. Also, with JRVINT21 activated you will not be able to use the print ECHO function at all if you have a serial printer and have also redirected printer output with the MODE LPT1:=COM1: command. Remember you should only be using this command if you have a serial printer and also have a parallel printer port attached.

THE MOST COMMON PROBLEM

As previously discussed the JRVBUFFDD.SYS program is a PCjr memory management program which enables your computer to recognize memory beyond 128K. You may choose to use this program INSTEAD of the memory management software you are currently using - but you

must NOT try to use it at the same time as other memory management software.

This means you should NOT use the JRVBUFDD.SYS program if you are also using any of the following: JRCONFIG, PCJRMEM, JRMEMORY, CONPCJR, or any other memory management program which may have been provided with your PCjr memory expansion.

If you do run this program at the same time as any other memory management program you may receive the "JRVIDEO cartridge not found" message.

Other Possible Problems

Registers specified by BIOS to be undefined on return may contain different values than those produced by BIOS. Well-behaved programs should not be affected by this.

Also, some parameters considered invalid by BIOS may produce different results using the cartridge.

In addition, Set-Palette, int 10h, AH = 10h, AL = 2 is documented as using a table at ES:DX although BIOS actually uses DS:DX. The cartridge also uses DS:DX in order to be compatible with BIOS. We recommend programs set ES=DS for maximum compatibility with other PCs.

We'd Like To Know

We would be interested to hear of any problems you encounter. Please write to us if you encounter any compatibility problems which you would like to tell us about. We can't guarantee a solution, but we'll try.

If you discover any commercially available DOS program which does not execute properly with the jrVideo Cartridge installed (JRVINT21 not activated) please advise us in writing. If the problem is in the cartridge and an updated version of the cartridge is created which fixes the problem, we might just upgrade your cartridge free of charge.

Limited Warranty

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

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