## DOS 5.0 Runs On PCjrs With Special Patches

*By John M. King*

*EDITOR'S NOTE: John King, one of the PCjr world's most knowledgeable supporters, has figured out how to use the newest version of DOS on PCjrs. In the following article John describes how to patch and use DOS 5.0. As usual, he does so in clear, easy to follow instructions. Once again, PCjr users owe John thanks for his work on our behalf.*

Microsoft has released the new and improved MS-DOS 5. You can read the reviews in the national computer magazines to find out about the changes and the added features which make this upgrade exciting. However, you won't find the answer to a key question: Will DOS 5 run on the IBM PCjr?

The answer is yes, but only after you overcome several problems. I'll describe those problems and how to solve them, so you can install and use DOS 5 on your Junior.

My experience with DOS 5 began last winter as a Beta tester for Microsoft. The first thing I learned was that the MS-DOS 5 disks are not bootable. You can't just put one of them in drive A and turn on your computer. Instead, you must run SETUP.EXE, which is on the first of the upgrade disks, to unpack the compressed files.

SETUP unpacks the appropriate files on the six 360K floppies in the MS-DOS 5 upgrade package and copies

### In This Issue:

*PCjr Lives!*
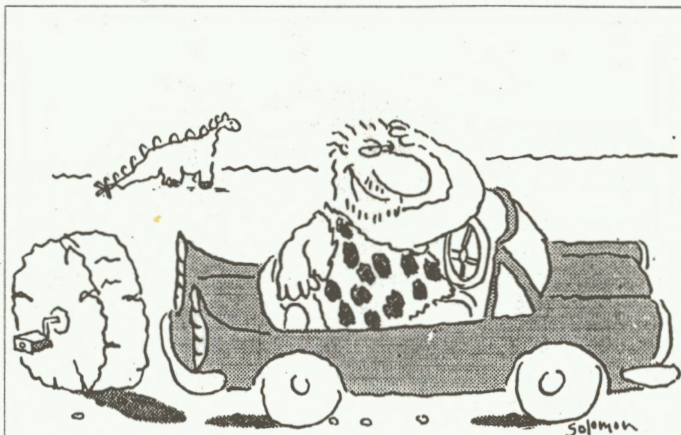


*They say I should trade it in, but it runs almost as good as my junior!*

them to seven working disks configured for your video system. The first disk, which you label "Startup", is bootable, and the other six contain supplemental programs. If you have a bootable hard disk as drive C, SETUP will install DOS there and create a subdirectory with all the supplemental programs. Approximately 2.8 megabytes of disk space are required.

### Problem One: MS-DOS vs. PC-DOS

The first problem is that SETUP.EXE with the Microsoft version of DOS 5 will not run under the IBM PC-DOS 2.10 that came with your PCjr. In order to unpack the MS-DOS 5 disks, you must be running a version of MS-DOS. IBM provides their own version of DOS 5 to upgrade IBM PC-DOS, but I have not tried it yet.

### Problem Two: SETUP.EXE Video

When you run SETUP, it automatically configures itself to the video system of the computer. Unfortunately, SETUP does not recognize PCjr video as CGA compatible. Instead, it reports that a monochrome Hercules graphics board is present and tries to set that video mode. Since this is incompatible with the PCjr, SETUP comes up in 40 column, black and white mode.

In 40 column mode, the SETUP screens are close to unreadable because the ends of many lines overwrite parts of others. In particular, I could not decipher the messages for when to swap disks and failed in my first attempts to create the seven DOS 5 working disks.

## Beginner's Corner
# Creating A CONFIG.SYS File
*By John E. Wilson*

Device drivers are small programs used for memory organization, video, disk management, mouse control and just about anything you can use with a computer. Writing device drivers is difficult, but installing them is not. Fortunately, just about any device driver you will ever need is already written, and all you have to do is to install them.

Usually the manufacturer of the computer peripheral (mouse, disk drive, memory expansion unit, etc.) will write the device driver and provide it along with the peripheral. IBM, Microsoft, Tecmar, Racore, jr Hotshot and other memory expansion units for PCjrs all come with their own device drivers and instructions for installing them. Independent programmers sometimes write them, too, when they think they can provide better ones.

Whenever your PCjr is started, it goes through a self-test, checks to see what is attached to it, and then looks for a disk to get some additional information about how to handle peripherals. Some of this additional information is generic and is in a couple of standard, but hidden, system files on the boot disk. More specific information is in a file called CONFIG.SYS on the boot disk. DOS automatically loads the information it finds in the CONFIG.SYS file. The computer doesn't have to use a CONFIG.SYS file, but if it finds one it will use it.

To show you how easy it is to use device drivers to set up your PCjr, we will run through an example using JRCONFIG.DSK which is on Disk #65, JR POWER PACK II, from the jr Newsletter Software Store. To make them a little easier to follow our examples will use a mixture of upper and lower case letters in the DOS commands, but DOS doesn't care what case the letters are.

1. FORMAT A SYSTEM DISK With the prompt showing A>, place your DOS diskette in drive A and type in: FORMAT A:/s

You will see a message to place the disk to be formatted in drive A and press a key. After you do this, you will get a message that formatting is proceeding, and another message when it is finished. If you are using PC-DOS 2.1, you will notice that 40,960 bytes on the disk are used by the system. About half of these bytes are in the file COMMAND.COM, and the other half is in two hidden files. These are the two files (IBMDOS.COM and IBMBIOS.COM) that will provide the computer with some system information every time the computer is booted up. They are hidden so that they won't be accidently erased or changed.

2. DECIDE WHAT YOU WANT IN YOUR CONFIG.SYS FILE

JRCONFIG.DSK has a lot of options, and we need to decide which ones we want to use. For this example we'll want Junior to boot up in an 80 column color text mode with white letters on a blue background, so we'll set the video

# Questions and Answers

## By Rene Waldron

**EDITOR'S NOTE:** jr Newsletter gets questions in the mail from PCjr owners every day. So many, in fact, that we apologize for not being able to answer them personally. This Questions and Answers column is our way of responding to the questions readers ask about their PCjrs. We can't answer all of the questions we receive, but we try to answer those that are either asked by several readers or those we feel will be of interest to PCjr owners in general. If you have a question that you do not see answered here, or elsewhere in this newsletter, please feel free to write to us at jr Newsletter, Box 163, Southbury, CT 06488

**Q. I am still having a problem with the Prodigy patch. On disk #56 PCjr PATCHES, the instructions are exactly the same as in the Dec. 1990 issue of the Jr Newsletter. C. Langenhagen, Hingham MA and others with similar problems.**

A. Patches problems again, and this time with some cause. We haven't inspected all of the other patches, but we have found that the patch as shown on this disk and printed in the Dec. issue might be tough to follow. In all cases (because we are using the "e" command) where a period is shown it is already on the screen, put there by debug.

We do the following when the "-" debug hyphen appears: Type e 1BAE <Enter>

-e XXXX:1BAE 1E._ (This is now on the screen, the underscore represents the cursor)

At this point, we type B8 and then press Enter. The screen should look like:

-e XXXX:1BAE 1E.B8

- _ Now here are the hyphen and the cursor one line below, waiting for the next command. Just type a "w" then press Enter. The screen will tell you that you've just written the changed file to the disk.

A line below that, at the hyphen and cursor, type a "q" and press Enter to quit debug. The patch is done.

DEBUG is normally tolerant about spaces but touching the space bar advances the address when using the "e" command! That space after the period in the original set of instructions is where the confusion might have started. When all else fails, reading the DEBUG section of the DOS manual...

By the way, it would be appropriate (and prevent the need for these patches and their attendant problems) when you are next on Prodigy to ask the Sysops about producing and distributing the almost-promised software which is supposed to be compatible with the jr. Remember, you can mention that our Guidelines For Programmers is available to them at any time!

**Q. What is INT 9 and what problems does it have? How do you know if a problem is caused by INT 9, lack of DMA or a bug? J. Crist, Shakopee, MN**

A. INT 9 is a routine in the BIOS of DOS computers which, among other things, gets the scan codes coming in from the keyboard and processes them. In a standard PC this information is acquired by the INT 9 routine from an input "port" which is fed by the keyboard. In the jr some "translation" of the keystrokes must be done first because of the different keyboard, before the scan code is fed to the INT 9 routine. Notice "fed to the INT 9 routine" and nothing about being fed to a keyboard "port." Normal software, using normal BIOS access and programming techniques cause no problems because the ROM BIOS INT 9 reads the (translated) input and does the processing. The problem arises because programmers are directly reading the "port" rather than letting the BIOS do the job. By the time INT 9 comes into play the THIRD layer of processed scan code is what is read. The code is by now processed to be what a standard PC would pass to the INT 9 routine. The code at this point is the same for the two machines and the keyboard differences have been resolved. In software for a standard PC you can program to get around the first two layers (the translate parts) and go to the third (the port). Programmers really believe they are saving either processor time (imagine, key input!) or program size (the reverse is true!) when they do this. The same goes for the video routines, but that is another story...

In any case, the BIOS in the jr does NOT do the same kind of of read from the port. It assumes the scan code will be input via the AL register from a buffer. When INT 9 is properly activated directly after the translation, that is exactly what it does. If INT 9 has been interfered with or bypassed it cannot handle the AL register properly. To insure the proper chain of events the INT 9 patch puts a tiny TSR program AHEAD of BIOS in the INT 9 chain, it reads the port value and places it in the AL register. Only then does it give control back to the BIOS. Now the PC-type program has all the pieces put back in place to read input. Thank you John Bongiovanni and others for this patch !

One of the first ways the INT 9 problem was detected was the double keyboard input in Q-BASIC. Each key typed

## Questions and Answers
*(Continued from page 3)*

was presented as double on the screen and to the Q-Editing environment...such a mess! In this case the break signal (the code sent when a key is released) was not being read. This problem is the one which triggered John B. to write his now famous patch. A terrific by-product of the patch is that all kinds of other symptoms and bugs disappear when the INT 9 trick is implemented AND it does not affect any properly programmed applications! This means that It really should be in everyone's CONFIG.SYS or AUTOEXEC.BAT. INT 9 problems usually show up as wacky input or failure to read any kind of input at all. This includes communications input from modems, speech boards, game ports and other serial or parallel links.

DMA is a kind of temporary "parallel processing" system in that when it is a part of the chip system of a computer, the CPU can simply instruct these DMA chips to do something (disk read or write, for ex.) then the CPU can immediately go back to whatever task is next in line for processing WHILE the DMA system does ITS processing. The CPU puts any further instructions to the DMA on "hold." When the DMA system is finished it just signals the CPU and the routine repeats, if necessary. DMA problems usually show up as a genuine lock-up or crash. This will often happen right at the beginning of loading an application, during disk drive reading of the very firs overlay, for example. If the program loads nicely it might crash later during data read /write.

Excluding new, untested applications, one type of bug usually shows up as a CHANGE in the operation of the program. Remember a bug can be as small as the change of one bit! That's one eighth of a byte as a one instead of a zero, or vice-versa. A dirty disk drive head or a bad copy of a file or a glitch in the 110v A.C line while reading / writing... well you get the picture, something's CHANGED. Another bug is the one programmed right into the application either by design or ignorance. It shows up right away. This design type is generally meant to exclude certain conditions such as CGA operation if VGA is required for best performance. CADD applications commonly use this routine, or they write directly to the video registers instead of to the ROM which would do this for them. These bugs show up looking like ancient hieroglyphics on the screen and are often accompanied by a lock up of the whole system. Even the good old Ctrl-Alt-Del combo may be inoperable. Copy protection schemes act like this type of bug, too.

There really is a kind of logic attached to bug types, though we admit that most of the time we only see the logic AFTER we have blundered along and stumbled into a determination of the cause of a problem.
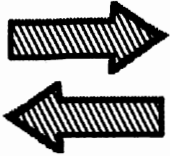
# Reader Feedback
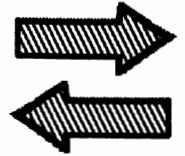
## 2.8 Meg Backpack
## Runs Well on Reader's Jr.

If you have a parallel port (and some money), you can have a fancy 3 1/2" disk drive for your PCjr without adding a lot of clutter, DOS 3.3, etc. Just as Lester Sizchke's letter appeared in the April issue of jr Newsletter, I had ordered a 2.8 Mb (2,931,712b) BackPack from my local dealer. Dealers are hard to find. I found mine by calling MicroSolutions and asking for an information package with prices and dealers. MicroSolutions didn't have the slightest idea if it would work with a PCjr but told me that I had a one month trial period with full money back guaranteed. Fortunately I had a dealer within about ten miles of my home and, when I had received my 1990 tax refund, I felt rich enough to buy a BackPack.

It is a small box, not much bigger than a 3 1/2" drive mechanism, that plugs into the parallel port. Set up is simple and described well in the instructions. It reads, writes and formats 720 kb, 1.44 Mb, and the rare 2.8 Mb disks. I am told by MicroSolutions that one can daisy chain a BackPack 5 1/4" (1.2 Mb and/or 360Kb), BackPack 3-1/2" and my printer to any of the above. I have only plugged in my printer, which still works well, to the back of the BackPack. It's power comes from a 12v 830 mA, non-polarized 2-prong transformer that plugs into the surge protector, just like an external modem. It comes with a 3-1/2" disk and a 5-1/4" disc for loading the device driver into your CONFIG.SYS and two utilities for formatting the 31/2" disks. One formatting utility sits on your disk and the other is a TSR that will format disks in the background. Formatting a 2.8 Mb disk takes a little time. The driver apparently loads a TSR program of 10.25 Kb. I have 487 Kb of RAM free as reported by CHKDSK. It works with all other DOS 2.1 (& 3.3) commands like CHKDSK, COPY, etc. I always load a little TSR program from PC Magazine called DSKWATCH because of my lack of faith in the original jr disk drive mechanism. Every time I first access a new floppy in the BackPack, DSKWATCH reports an "error unknown," but the driver works anyway.

I had mentioned at the local PCjr meeting that I had ordered one of these and one of the technical types warned me that it would be slower than a normal drive. He has been proved to be correct. The first thing that I did when it arrived was to copy a subdirectory from my hard drive to a 1.44 Mb disk. For no apparent reason I used the PCTOOLS V.6 "copy" command, and it took 74 minute to copy about 1.2 MB with about 40+ "seek error" reports from PCTOOLS. Apparently, the BackPack doesn't like to to mass reads or writes with non-contiguous directories (get a disk optimizer!). Note that which DOS you're using will affect what happens next: 2.1 will state "Write error reading drive *X*; Abort, Retry, Ignore", which is pretty pointless seeing as the next key you push will re-boot the machine, while 3.3 will scream "Write error reading drive *x*; in an ad infinitum manner . You can Breeak out of that, but if you have a "Prompt $p$g" and the current directory is in the BackBack, it'll just start screaming again. Anyway, my son discovered that the normal DOS Copy command is much faster, and I timed a 2.3 Mb transfer at about 138,000 bytes per minute or some fraction of the normal bus-connected disk drive rate. Quicken and Prodigy do take at least twice as long to load as the same process from the hard disk but it is acceptable.

My son used the 1.44 Mb disks to unload the 40Mb hard drive so that we could reformat the hard drive. I have a PC ST 84 key keyboard going through the Synectics adaptor, so I do not get the crashes when the keyboard is touched during a transfer to/from the BackPack that Mr. Sizchke reported in his article. I have solved the problem of buying 2.8 Mb disks: CompuAdd sells 3M disks in boxes of 10 for about $74.95 plus S&H. I bought four disks from my dealer when I bought the device, just so that I could check out that feature-- the 2.8 MB Extra-Density (ED is the symbol). Actually 4 Mb is the unformatted size of Barium-Ferrite Perpendicular Recording Media. My dealer supplied Toshiba disks from MicroSolutions.

I have an enhanced (128Kb) jr, with a Racore Drive II w/o DMA and with a total of 640 Kb of RAM. I also have an SPC hard drive adaptor and a Seagate 42 Mb ST-251-1. Contrary to Bob Richard's assurances, I had to add a PCjr Power Expansion Attachment to make the SPC sidecar work. I have the Tandy modification, thanks to the local jr users group, and the Synectics adaptor for XT keyboards. I use configjr.nrd -v32.

I consider it to be a great addition to my PCjr although I am apprehensive about durability due to its writing in three different formats. I think that it is a great addition to the folio of tools for expanding the capabilities of the Pcjr. It not only adds a 720Kb drive to the PCjr without having to buy DOS 3.3, but also a 1.44 Mb drive. and for about $40 more you can have a non-standard 2.8 MB drive. A 2.8 Mb drive for some jr owners would be a small, cheap, replace-

## Art & Music

**JR MUSIC MACHINE.** If you want to write and play music on your PCjr, this program allows you to do it. Displays music as you write it using jr's 16 colors, and plays music back in three voice harmony. Features allow you to adjust key, tempo, note values, etc. Color Display required. 128K ok. (Disk #62)

**PCJR MUSIC SAMPLER.** A collection of classical music "concerts" performed with great precision to produce the highest quality sound you've ever heard on your PCjr. Disk includes a separate program to activate Junior's sound generator before running game software to get highest quality sound. 128K ok (Disk #119)

**ORIGAMI.** Learn the art of Japanese paper folding. This program shows you how, step-by-step, to create amazing animals and other objects just by folding paper. Fun for kids and adults, too. 128K. Requires Basic Cartridge. (Disk #39)

**PC-KEY DRAW.** A powerful graphics program that allows you to draw, paint, produce slide shows, store and print your work. 256K, two drives. (Disk #37)

**PC-KEY DRAW DEMO.** Contains a slide show demonstration which allows you to see the amazing results you can get with PC-KEY DRAW. Helps to learn the many graphic capabilities of PC-KEY DRAW. (Disk #38)

**PCJR MUSIC SAMPLER.** A collection of classical music "concerts" performed with great precision to produce the highest quality sound you've ever heard on your PCjr. Disk includes a separate program to activate Junior's sound generator before running game software to get highest quality sound. 128K ok (Disk #119)

**PIANOMAN.** A great music program! Allows you to write your own music, store it and play it on jr's terrific sound system. 128K. (Disk #36)

**PRINTMASTER LIBRARY.** Two disk set full of graphic images for use with PrintMaster. (Disk Set #3 - 2 disks, $10)

## Telecommunications

**BOYAN.** Selected Best of the Year by PC Magazine, this outstanding telecommunications program will astound you with its smooth functioning and innovative features. Supports all protocols. Need 384K. (Disk #61)

**JRTELE V2.1.** Excellent, easy-to-use telecommunications software made especially for PCjrs, and the PCjr modem. Ideal for beginners, but has enough power and features for most users. Supports 300 and 1200 baud. PCjr internal or Hayes compatible external modems. 128K ok. (Disk #86)

## Reader Feedback
*(Continued from page 5)*

able media hard drive. I have seen ads for the 2.8 BackPack in PC Magazine at MicroWAREHOUSE for $259 (in the March 26, '91) issue) and that is a lot less than OOwl's recent ad of $348, which is probably for only a 720Kb drive. More recently the 2.8 BackPack went up to $299. Microsulutions lists the 2.8 Mb at $420.

Note that MicroSolutions sells a line of products called the MegaMate/Overdrive that is basically the normal external-floppy-moun t scheme in that you need a half-length expandion slot. It comes in all the sizes/formats that the BackPack comes in. If the mythical "Universal Sidecar Adaptor" exists, then you should wind up with a faster floppy for about the same price as our 2.8 Mb BackPack. What a Bargain!

Note also that none of the above will help you get away from using a memory disk or hard drive to log (a.k.a. buffer) your BBS sessions; a MegaMate/OveDrive is probably as fast as the internal 5.25 floppy (which won't do the job)and the BackPack is slow. They'll make a great place to store completed logs, and maybe even to down-load or to upload from, but don't have your communcations program write to them!

*Jim & Chris Searls, Gaithersburg, MD.*

EDITOR'S NOTE: For many Junior users, a 2.8 meg drive could be all they need for storage. However, with the prices of hard drives coming down (Rau has a 20 meg for $299), spending $232 for 2.8 megs of SLOW storage doesn't sound like a good buy. A hard drive operates so much faster than 5.25" and 3.5" drives and provides large amounts of storage space. Those who already have hard drives on their Junirs, such as the writer of this letter, who want the convenience of being able to use several disk formats, the purchase seems more reasonable.

## Reader Provides Tips On Running Software

The following software from Keypunch Software, St. Paul, MN, will operate on the Junior:

**Club Casino** - Four casino-type gambling games. When you purchase Club Casino the front of the box will not mention PCjr, but it will work and if you have color monitor, it will show 16 colors, even without the Tandy Mod.

**Pro-League Baseball** - Almost like the real thing! Just press the space bar and the computer does the rest. For some reason internal programming numbers pop up in the players' stats, but you should be able to clear this up by changing the batting line-up. Operates in 4 colors.

Arcade Bonanza - 1. **Frog.** Finally a similar version of

Frogger that runs on the Junior! There are several levels of play, but if you want to play a higher level than 1, the score mysteriously climbs. 2. **Pac-em**. When this game decides to run it's similar to Pac-Man except in this version the ghost monsters are represented by the usual suits in a regular card deck. It also informs the player how many dots are left to devour. 3. **Red Alert**. The two games just mentioned operate only in four colors. So does this game, but here's the oddity-hit a tanker, sub or PT boat (watch out, they're very fast) and watch the rest of Junior's colors not used in the program shoot up like a fire cracker! 4. **Tank**. You need two players to operate this game. Operates in four colors. I've had trouble with some of Keypunch Software programs, but was surprised how well these ran-and I only paid $2.50 each at Circus World, now Kay-Bee.

**Galaxian**, from Thunder Mountain Software, Northbrook, IL is based on the popular video game of the 80's. Operates in four colors. 256K required on a PC, nothing is mentioned regarding the Junior. I purchased a copy for $4.99 and found it runs with some difficulty including crashing of the screen, not being able to use a joystick, 1 player operating mode using the keyboard is only possible. This program may require more memory or a patch to resolve these problems. Thunder Mountain has been notified. One day I calibrated the joystick using the program provided on the disk. However, haven't been able to operate it using the joystick since that one time.

*R.M. Lombardo, Talahassee, FL*

## Software Reportedly Provides Expanded Memory from Hard Drive

I've recently come across a device driver that you may find interesting. It seems to have some possibilities for the jr. It's called MEMSIM. It's an expanded memory manager simulator.

For those who don't (or can't) have a lot of memory over DOS's limit, it will use a portion of the hard drive for memory swapping. It provides the LIM expanded memory specifications ver . 3.2 functions. You can specify a maximum of about 32 megabytes. It's shareware, with a $25 registration fee.

The following line is placed in your config.sys file: device=memsim32.0x

MEMSIM will then be resident from boot up until the machine is turned off. It requires a minimum of 262,144 bytes of disk space.This will allow about 16 pages of expanded memory. Each page is 16K). There are two switches for the device entry in the config.sys file: one for the name and location of the data file, and the other to specify the size.

The documentation recommends that it should first be tried from a bootable floppy disk, until you find the most appropriate configuration. I think that's an especially good

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  ◎          Software          ◎
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**PROCOMM PLUS TEST DRIVE.** This is the upgrade of the already powerful and popular Procomm V2.42. It's got many new features including an improved host mode, context sensitive help screens, more powerful scripting. In addition to its power, it's very easy to use. (Reviewed 3/90) 256K (Disk #108)

**PROCOMM.** This powerful, yet easy to use telecommunications program has become the one favored by more PCjr users than any other. Dialing directory, auto redial, XMODEM, Kermit and other file transfer protocols, auto log-on, DOS gateway, keyboard macros, exploding windows and many other features. The editor of PC Magazine called Procomm "competitive with the best comm programs on the market." Manual on disk. 256K (Disk #15)

**TELIX V3.12.** Powerful, yet easy-to-use telecommunications program, with variety of built-in transfer protocols. Features Z-Modem-- one of the most efficient and reliable transfers available. If you're disconnected while downloading, Z-Modem will pick up where it left off when you next log-on, thus saving connect time and telephone toll charges. Need 180K free memory after loading DOS and either two floppy disks or a floppy disk and a hard drive. (Reviewed 7/91) (Disk Set #4)

## Data Bases

**3 X 5.** An information management program that works just like a 3 x 5 card file. It offers speed, versatilityy and simplicity in entering, indexing and retrieving data. Has an integrated word processor, powerful search commands, multiple windows so you can edit in one and search in another, etc. Requires 256K. (Disk #19)

**FILE EXPRESS.** (V4.22) Very easy to use database manager. Extensive menus and prompts to guide you. Excellent choice for maintaining mailing lists, etc. Many powerful features. 256K (Disks #83 and #84)

**MR. LABEL.** Extremely versatile, this software enables you to make labels ranging from the very simple to the very sophisticated. It's the best of many we've tried. 128K ok. (Disk #97)

**NAMEPAL.** An excellent utility program for maintaining and printing name and address lists, address books or mailing labels. Keeps business and personal references and allows user to maintain free-form notes as well. Requires 128K Memory. (Disk #70)

**PC-FILE III.** This excellent database manager will handle up to 9,999 records, such as names and addresses, notes, product descriptions, etc. Uses generic, embedded, soundex and wildcard searches. Global updates and deletes. Sorts on any field. Too many features to mention. (Disk #3 runs on 128K, Disk #4 needs 256K)

# Trimmed Down Version
# Of A Great Word Processor

We decided to add PC-Write Lite to the Software Store this month because in many ways it is ideal for PCjr users, many of whom have already tried and loved the original, more powerful versions of PC-Write.

PC-Write Lite seems to have been designed for laptop users. It uses much less disk space (150 to 340K) and memory 256K without the spell checker, and yet it offers all the features most of us need--with a few more new ones thrown in.

Indexing, microjustifying and mail merge are some of the features that have been trimmed out of Lite. On screen page format previewing, fast print menu, and a formatting menu have been added.

Lite is so versatile and easy to use that the publisher of the best selling college English textbook bought the rights to package Lite with its books.

As with most full featured word processors, Lite takes some time to install and learn. But it comes with a tutorial and has extensive help menus, which, in our experience, are almost complete enough to teach you all you need to know.

We don't like PC-Write's spell checker much, but since Lite (as well as other versions of PC-Write) produces a straight ASCII text file, it is easy to use other spell checkers, such as the recently updated ShareSpell, disk #94 in the Software Store.

Lite's ASCII text means you can write batch files and config.sys files with it.

Lite has all the usual word processor features for writing, editing and printing, so we won't bother to list them here. We'll just mention a few of it's strongest features, at least in our opinion. Having used and tested many of the top word processors, we find PC-Write's block editing features the best of all. It is easy and fast to mark a block of copy and either delete it, move it to another place in the same file or to another file being edited simultaneously, or to copy it to a file of its own.

Search and replace features are especially good, too. Lower case letters match upper case and accented letters, and spaces match other "white space" such as boundaries. Special wild cards can be used to find whole words only, text at the start or end of a line, or other special patterns.

Split screen editing shows two files at once and allows you to jump back and forth between them for editing, copying blocks of text, etc. A file directory is available from all filename prompts, so you don't have to remember all your filenames. Just highlight the file you want to load or show in the other side of the split screen, hit Enter, and up it comes.

Because students are a target group for Lite, it includes footnote features, with both bottom of page and endnote support. Automatic numbering of notes and other elements are taken care of too.

Although the full tutorials and manual are on the disks, in order to get a preprinted manual you must register PC-Write Lite. It is distributed as shareware and registration costs $79 which entitles you to the latest version, manuals, technical support for one year and a quarterly newsletter. It is well worth it if you find you use and enjoy PC-Write Lite, as we think you will.

To order PC-Write Lite (Disk Set #5 - $10), please use order form on page 23.

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# Most Recent Volume
# Of PCjr Reference Now Ready

Volume Five of the Best of jr Newsletter disks is now available in the jr Newsletter Software Store. This disk contains the most informative articles, columns and letters from the June 1990 through May 1991 issues -- all on one disk for your handy reference.

The disk also includes two powerful search programs to help you run two levels of search for any PCjr topic you may want to read about. We also include a program which enables you to read the articles on your PCjr screen and page through them at your own pace.

Add this new volume to the first four and you'll have the most complete PCjr reference library available anywhere. All you have to do is pop a disk in your drive and perform a search for any topic you're interested in. Or put all volumes in one subdirectory on a hard drive and perform a complete search at top speed.

Included on Volume Five are compatibility tips, children's software reviews, PCjr's sound system, printer tips, adventure software reviews, Prodigy analysis and tips, PCjr mice, menu making, how to run Tandy software, PCjr users' questions and answers, new PCjr products, DOS explained, beginner's corner, and much more.

To order Best of jr Newsletter V (Disk #130), please use order form on page 23.

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## Reader Feedback

*(Continued from page ?)*

idea for jr. owners because of the wide variety of compatibility issues. It may work for some, but not for others.

I don't have a hard drive, so my testing has been very limited. I tried it, though, from by B; drive and also from a RAM disk. It worked fine both ways. I coincidentally had downloaded a newer version of QEDIT during the same bbs session as when I had downloaded MEMSIM.

I have an old (Fall/Winter 1989) PC Enterprises Catalog which describes a memory board which they call the PCE Megaboard. It allows 736K of DOS memory, plus up an additional 1 megabyte for a RAM disk. I don't have one myself, but for those who do, MEMSIM could be something they might want to try. If it works, it would have the effect of allowing the jr to have a megabyte of expanded memory!

My config.sys file consists of the following:

```
DEVICE=A:\SYSTEM\JRCONFIG.DSK -C -D2 -E2 -L -
P12 -S320 -T3 -v32 -x
DEVICE=A:\SYSTEM\ZANSI.SYS
BREAK=ON
BUFFERS=20
FILES=20
LASTDRIVE=G
shell=command.com /E:300 /P
device=a:\system\memsim32.08x /b:sim.dat /22
```

The /22 on the end specifies 22 pages of expanded memory, which is all I could fit on a 360K floppy.

My autoexec.bat file consists of the following:

```
echo off
cls
copy command.com c: > nul
set comspec=c:command.com
path=c:\;a:\dos;a:\ batch
prompt $e[1;33;41m$p$e[m$e[ C
a:\system\read_clk > nul
a:\util's\fastoff > nul
cls
dir
beep
```

I have a 3.5" 720K drive for A: and a 5.25" 360K floppy for B:. I have a Jr. Hotshot board with 512K and recently purchased a 192K internal memory card from PC Enterprises which replaces the original 64K card. So, I currently have a total of 736K usable memory.

Finally, I want to say thanks for publishing the jr newsletter. I've received much useful info from you and those who've shared their letters, questions, and stories. I decided that maybe it was time I shared something too.

*Larry Hutchinson, Holt, MI.*

**EDITOR'S NOTE:** Great idea, Larry! We'll see if we can find out more about MEMSIM and how well it works on a junior with a hard drive.

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## Software
### *(Order form on page 23)*

## Print Utilities

**IMAGEPRINT V3.33.** Produces near letter quality print on dot matrix printers. IBM Graphics Printers, Proprinters, Epsons and compatibles. Contains many format features, three quality levels, interfaces with word processors. 128K ok. (Disk #50)

**PRINT HANDLER.** Excellent printer setting utility allows you to set features from a menu. Other software on disk for banners, sideways printing, custom font generator (Epson), print spooler, count pages before printing and more! Will work with most dot matrix printers. (Disk #51)

**Print It!** Selection of programs allows you to print large banners as well as tiny (but quite readable) documents on most dot matrix printers. Compress four pages on one sheet with Docsmash, print on both sides of computer paper with Both,reformat into tiny columns with Microtext (many other options), make wall-length banners with Bannerific! 256K (Disk #111)

## Spreadsheets

**AS EASY AS.** Excellent, easy to use, spreadsheet program. Works like Lotus 1-2-3, with all spreadsheet functions. Can load and operate 1-2-3 files. 256K ok (Disk #67)

**AS-EASY-AS V.4.00** This is a MAJOR upgrade of the popular, powerful Lotus 1-2-3 look-alike spreadsheet software. Many useful features have been added to an already full-featured program. Earlier 256K version (2.05) is Disk #67. This upgrade requires 384K. Reviewed 2/90 (Disk #107)

**MINICALC.** A small, easy to use, spreadsheet program. 11 columns by 22 rows. On-line help function and manual on disk. In addition to performing calculations, will generate bar graphs. (Disk #27)

**PC-CALC.** A versatile spreadsheet program that can do up to 26 columns of adjustable size and 256 lines. Features on-screen prompts, many math and statistical functions, hidden column capability, many formatting options, 64 character cells, automatic global recalculation, and more. Has some limits on 128K, but still very useful. (Disk #5 runs on 128K, Disk #6 requires 320K and two drives )

**PC CALC PLUS.** V2.0 More advanced than PC Calc (Disks 5 and 6), this is a very powerful spreadsheet program which includes graphing features. Excellent. 512K (Disk Set #2 (2 disks) $10.)

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# Improving Your PCjr's Memory

*By John E. Wilson*

Memory in the PCjr is arranged in its own way, which is different from the way memory is set up in other computers of the PC family. This means PCjr owners have to start up their computers with drivers and configuration files that are not needed by other computers. In this article we will take a look at Junior's memory to see how it is different, why the extra start-up effort is needed, and how to set up the memory.

Memory is one of the most basic components of a computer. Without it computers would not exist, and the availability of cheap, reliable memory reason has enabled computers to become commonplace. Rapid advancement in memory technology is probably the main reason computers have progressed so far and so fast.

What memory is, physically, and exactly how it works is extremely technical and complicated, but fortunately you don't have to be concerned with the physical details of memory. You just need to know it's purpose and how, in general terms, it is organized and used.

Computer memory is not strictly analogous to human memory. It does have the ability to recall information, just as human memory does, but computer memory is much more that. Computer memory is an electronic work space for the computer. It is somewhat comparable to an office which contains files for information storage and retrieval, scratch pads for notes and calculations, reference books and instruction guides, and a place to keep tools and supplies for doing whatever needs to be done. Just as the size of an office room and the way it is arranged has an effect upon the work accomplished in an office, the size and arrangement of computer memory has an effect upon how work is accomplished by the computer. Memory is where a computer finds its instructions and where it keeps its tools and data.

The office room analogy helps to show what computer memory does, but it doesn't show how it is organized. You can think of computer memory as a bunch of boxes, each identified with a number; or, if you prefer, you can think of computer memory as a town of houses and buildings with specific addresses. In a computer in the PC family each memory location contains a set of eight switches, and each switch can be set to either on or off. In print, these eight switches in each memory address are often represented by a set of ones and zeros as in: 01101011.

Each switch is called a bit, and the set of eight bits is called a byte. Since a set of eight ones and zeros can be arranged in 256 ways (ranging from all zeros to all ones with each combination in between), each memory location can effectively contain a number ranging from 0 to 255.

## How the Computer Uses Memory

That is basically all there is to computer memory, but if we left it at that you would probably conclude that it served no useful purpose. What good is a bunch of boxes which can only contain a number from 0 to 255? Using the computer's Central Processing Unit (The CPU, which in the PCjr, is the 8088 microprocessor.) a computer program is able to both place and to read and interpret the numbers in memory, and it is surprising how versatile and useful the numbers can be.

One way the numbers in memory locations can be interpreted is as instructions for the CPU to carry out. The number 246 could mean, for example, that the computer is to perform a multiplication; with additional instructions, also in the form of numbers, on what is to be multiplied in follow-up memory bytes. Each memory location contains an instruction, or part of an instruction, and the microprocessor simply steps through memory acting on the instructions. The last instruction in a program has to be for the microprocessor to stop processing instructions, or else it continues to march through memory attempting to carry out what it thinks are instructions.

The numbers in memory locations can also be interpreted as data. The number 74, for example, can stand for the upper-case letter J. Of course, the computer program has to know that it is looking for characters and how to transform the code numbers into letters. Depending on the program, that same 74 in a memory location could be interpreted as the number 74 or as a code to set a screen pixel, or to turn keyboard clicking sounds on, or just about anything else. The power of the computer comes from its ability to interpret and use these eight bits in each memory location. Of course, it takes a lot of bytes of memory to do anything useful and the computer has to be able to process them very quickly.

## ROM and RAM

The type of memory that we have been discussing is called Random Access Memory - RAM. The term "random access" does not mean that data in memory is handled in a random, haphazard manner. Rather, it means that data in any byte, anywhere in memory can be accessed directly. If you want to get data that is in memory location 34,781, you can go directly to that byte without having to go through the first 34,780 bytes of memory.

This RAM is physically located in semiconductor chips. When the PCjr was introduced, RAM chips typically held 65,536 bytes of memory with a set of eight chips (one for each bit in a byte) needed. (Because discussions on

computer memory addresses very large numbers, addresses are often written as a multiple of 1,024 bytes and given the suffix K. Thus 65,536 bytes becomes 64K bytes.) The PC needs nine chips per set because it requires an extra bit in each memory location for error detection. Later, 256K memory chips became available. That is why some PCjr side car memory expansion units which were designed to hold only 128K of memory can now hold up to 512K bytes.
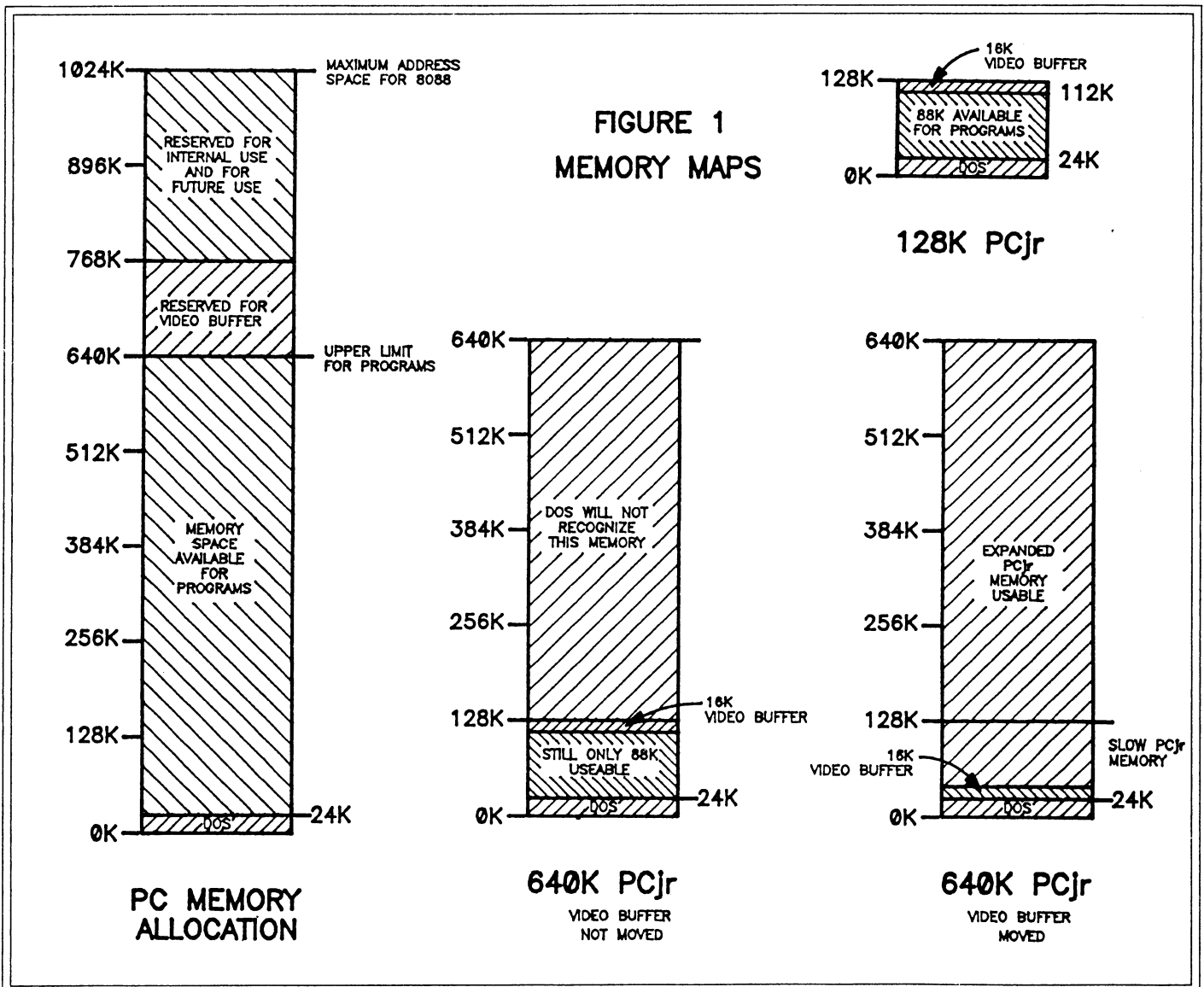
ROM, which stands for Read Only Memory, is another type of memory in your PCjr. ROM is, like RAM, located in semiconductor chips and has addressed memory boxes with eight bits in each location just like RAM but that is where the similarity ends. The CPU can read the data in ROM and act on it, but it cannot change it. ROM is used by the computer to store the permanent, built-in programs it needs to start up and to support the operating system.

## Memory Organization

The 8088 microprocessor in your Junior is able to directly access up to 65,536 bytes (That's 64K) of memory, and with only slightly more effort it can address up to 1,048,576 bytes (Which is 1,024K bytes) of memory. However, not all of that space is available for programs to use. ROM and the operating system take up some memory address space (There are 64K bytes of ROM in the PCjr.), video display mapping takes up some more space (Up to 32K in the PCjr.) and some memory space is reserved for special uses (such as the PCjr cartridges.

Since, especially in the PCjr, memory for the video display has an effect on memory organization, we need to explain it a little. All PCs use a memory mapped display system. This means that data for everything that appears on the screen is first placed in RAM and then transferred to

FIGURE 1
MEMORY MAPS

PC MEMORY ALLOCATION

640K PCjr
VIDEO BUFFER NOT MOVED

640K PCjr
VIDEO BUFFER MOVED

128K PCjr

## Utilities

**4DOS V2.21.** This is the "ultimate utility" since it replaces almost all DOS commands with new, improved versions. And it adds 35 more useful commands of its own! It will replace many of your favorite enhancement utilities. For example, 4DOS allows 40 character file descriptions, more flexible wildcards, multiple commands per line, handy conditional commands, command stacking, alias commands, faster batch processing -- and MUCH more! A must for all serious computerists. Reviewed 1/90 (Disk #102)

**LHA V.2.11** Powerful archive software will compress even more than PKZip, (though not as fast). Many extra features to update, delete, list files in arcxhive, even extract and run. 256K (Disk #128)

**POWERBATCH.** Compiles batch files into .EXE files, which run as much as three times faster. Additional commands add power, control, & flexibility. Requires DOS 3.0 or above. (Disk #127)

**BAKER'S DOZEN.** 13 powerful utilities by shareware star Jim Button. Recover zapped files, save screen to files, print sideways, sort files, file management, locate text, pop-up calendar, powerful one screen spreadsheet, set screen colors, and more. (Disk #73)

**BATCH FILE UTILITIES.** A tutorial on how to create batch files and six utilities to use. 128K (Disk #26)

**DOSAMATIC.** A nifty way to view the contents of disks, easily manipulate files and carry out DOS commands. Features a Mac-like "point and press interface which allows you to select the commands you want from pull down menus. Also permits loading several programs at once and jumping from one to the other. 128K ok, but more memory needed for "multi-tasking." (Disk #49)

**ASIC.** Excellent BASIC compiler turns your BASIC programs into executable COM or EXE files. A shareware alternative to costly compilers. 128K (Reviewed 12/90) (Disk #122)

**LZEXE.** Cut down dramatically on the disk space required for software. LZEXE compresses EXE files into 2/3 to 1/2 their original size and allows them to be run from compressed form. Great for keeping RAM disks small and memory free. Utility will also convert COM files. 256K (Reviewed 5/90) (Disk #112)

**MORE SUPER UTILITIES.** A collection of excellent screen and keyboard enhancements, useful file managers, color selectors, and more. Under 128K ok (Disk #29)

**NEW KEY.** Powerful popular program that allows you to redefine keystrokes and assign series of keystrokes to one or two keys. Customize software to meet your needs. Many other useful features included. 128K. (Disk #35)

## DOS 5.0 Runs on Jr.

*(Continued from page 1)*

Here are four solutions that I have found. First, run SETUP on a PCjr equipped with a Racore second disk drive. It ran correctly on the Racore system I tried. Second, install DOS 5 on another computer. Create a boot disk with the FORMAT /S command and copy the supplemental programs to additional disks. You will also have to manually change the video selection for the DOS Shell if it was not installed for CGA. Third, run SETUP as best you can which should, at least, get you a bootable disk. You will then have to unpack the supplemental programs individually with the EXPAND.EXE program. Fourth, create the memory resident program HOLD80JR.COM which is described in the next paragraph. Running HOLD80JR before SETUP will keep the screen in 80 column mode and eliminate the video problems with SETUP.

### HOLD80JR

To create HOLD80JR, start DEBUG.COM from your current version of DOS. Type in the commands exactly as shown in DEBUG Listing 1. After the "A 0100" command, DEBUG will return numbers which are memory addresses. You can disregard these as you type in the rest of the commands. The semicolons and the comments which follow them do not have to be typed. They are only to explain the program. For the blank lines to end assembly, simply hit the Enter key.

If you prefer, you can create a script for DEBUG by typing the commands in a word processor and saving the file in ASCII format with the name HOLD80JR.SCR. This has the advantage of allowing easy correction of any typos. Create HOLD80JR.COM by redirecting the script file into DEBUG with the command:  DEBUG < HOLD80.SCR. (Both DEBUG.COM and HOLD80JR.SCR must be on disk in the default drive if you do not specify paths.)

(In the DEBUG Listing, please note the difference between the letter O and the numeral 0. The typestyle we use does not offer the zero with the line through it, which would have been clearer. Sorry. -ED)

```
N HOLD80JR.COM
F 100 L500 90
A 0100
;
; HOLD80JR prevents calls to Int 10 hex from changing video
; mode to 40 column text.  All video calls are converted to
; a call for 80 column color, mode 3.
;
JMP 0300          ;Jump to initialization code, 3 bytes
;          '
; Store old INT 10H offset and segment here at Offset 0103
DW 0000
DW 0000
; Blank line follows to end Assembly

A 0108
STI               ;Turn interrupts back on
PUSH DS           ;Save DS and CS
PUSH CS           ;Move CS into
POP DS            ;     DS
CMP AH,00         ;If AH=00, Service 0 of INT 10H was called.
                  ;Video mode is being set.
JNZ 0120          ;If greater than 00, exit via old INT 10H
MOV AL,03         ;Reset call to 80 column color mode 3
JMP 120           ;Exit via INT 10H
; Blank line follows to end Assembly

A 0120
; This is the Exit via old INT 10H.
PUSHF
CALL FAR [0103]
POP DS            ;Restore DS register
IRET
; End of resident code at Offset 0127
; Blank line follows to end Assembly

A 0200
; Installation Message.  This will not remain resident.
DB 0A 0D
DB ''All attempts to change video mode will be ignored.''
DB 0A 0D 0A 0D'
DB ''Reboot to remove HOLD80JR from memory.''
DB 0A 0D 24
; End of message
; Blank line follows to end Assembly

A 0300
; Initialization code.  This will not remain resident.
MOV AX,3510       ;Use Service 35 to get INT 10H address
INT 21            ;     Segment:Offset returned in ES:BX
MOV [0103],BX     ;Store old INT 10H offset at 0103
MOV [0105],ES     ;     and segment at 0105
MOV AX,2510       ;Point new INT 10H vector at our routine
```

# DOS 5.0 Runs on Juniors

*(Continued from page 13)*

```
MOV DX, 0108      ;Start of our new routine
INT 21
MOV AH,09         ;Set up to display message
MOV DX, 0200      ;Point to start of message
INT 21            ;Display it
MOV DX, 0127      ;Point to end of code to remain resident
INT 27            ;Exit with Terminate and Stay Resident
; End of Initialization at Offset 0321
; Blank line follows to end Assembly

RCX
0221
W
Q
```

After you type Q and press the Enter key (or after the Q is read from the script file), you will quit DEBUG and return to the DOS prompt. HOLD80JR.COM will have been written to the disk.

When you want to install DOS 5, run HOLD80JR.COM first, then start SETUP. The screen will stay in 80 column mode, and all the messages will be readable.

### Running SETUP.EXE

To install DOS 5 on floppies, give the command: SETUP /F. Follow the on screen instructions to select installation on disks in drive A for single drive systems or B for two drive systems. Next change the "Display Type" from Hercules to CGA. This will allow SETUP to select the correct driver files for the DOS Shell program. Continue to follow the on screen commands for swapping the six DOS disks and the seven new disks in and out of the drives until all the files are unpacked

and copied to the working disks. The whole process takes about 15 minutes.

At the end of the SETUP program, you are instructed to reboot your computer with the new disk you have labeled "Startup", the boot disk, in drive A. If you try it, you will be dropped into Cassette or Cartridge BASIC, just as though there were no disk at all in the drive. We have two more problems which must be solved before you can run DOS 5.

### Problem Three: DOS 5 Requires 256K RAM

DOS 5 will only load on computers with 256K or more of RAM. Although your PCjr may have 640K of RAM, the system initially informs DOS of only 128K. Later in the boot process, your memory management software (JRCONFIG.DSK, PCJRMEM.COM, etc.) is supposed to change this initial 128K value to the true amount of RAM. With DOS 5, this approach fails.

When DOS 5 sees only 128K initially, it refuses to load. Your PCjr drops into BASIC, and the memory management software never runs. What we need is a way to change the amount of RAM reported initially from 128K to the full amount before DOS is loaded. Fortunately, we can patch the boot record on the disk to do this for us.

The boot record is a small program

written to the first sector of every disk when it is formatted. Although it is on every disk, the boot record is normally accessed only on boot disks because it has the instructions for loading DOS from the disk into RAM. We can edit the boot record of our DOS 5 boot disk with DEBUG to include the instructions we need to solve the 256K RAM problem.

Since altering the boot sector is a bit unusual, you may want to make a DISKCOPY of the DOS 5 Startup disk to experiment on first. Use DISKCOPY not COPY so that the hidden files are copied.

The easiest way to do this patch is to copy the old version of DEBUG to the DOS 5 disk. (You must use DEBUG from your old version of DOS since you cannot yet boot up with DOS 5.) You can delete one or more files which cannot be used with the PCjr from your DOS 5 disk to make room. Deleting EGA.SYS and EGA.CPI will free up 63K which is more than enough.

If you have more than one drive, be sure to put the DOS 5 disk in the A drive. Start DEBUG and type in the commands exactly as shown in DEBUG Listing 2. The semicolons and comments which follow may be omitted. Since you may want to patch more than one disk, I suggest you create a script for DEBUG as described for HOLD80JR.SCR. I call this one DOS5BOOT.SCR. Copy it to the DOS 5 disk in drive A and issue the command: DEBUG < DOS5BOOT.SCR.

If the first command, "U 0000 L 3" does not display "xxxx:0000 xxxx JMP 003E" and "xxxx:0002 xx NOP", where xxxx are any characters, this patch will not work. The "D 01A0" command will display the message: "Non-System disk or disk error. Replace and strike any key when ready." The command "E 01BF" followed by 00 will replace the R of "Replace" to end the message at that point. The new code will be written in place of the remainder of the message following the "A 01C0" command.

```
L 0 0 0 1
U 0000 L 3
A 0000
JMP 01C0
; Leave blank line to end assembly

D 01A0
E 01BF
00
A 01C0
; Put PCjr code here, overwrite after R of ''Replace...''
PUSH DS        ;Save current DS segment
MOV AX,40      ;
MOV DS,AX      ;Point at ROM BIOS data area at 0040:00
MOV AX,[0015]  ;Point at True RAM size
MOV [0013],AX  ;Put it in Usable RAM size instead of 128K
;
; If you have 2 or 3 drives, omit the ;; (two semicolons) in
; the left margin of line 1 and either line 2 or 3 (not both).
;
;;AND BYTE PTR [0010],3F ;1. Point to byte at 0040:0010
                        ;   Zero bits for number of drives
;;OR.BYTE PTR [0010],40  ;2. Set bits to indicate 2 drives
;;OR BYTE PTR [0010],80  ;3. Set bits for 3 disk drives
POP DS         ;Restore original DS
JMP 003E       ;Jump back to normal start of boot record
;Leave blank line to end assembly

W 0 0 0 1
Q
```

After the "Q" command, you will be returned to the DOS prompt, and the modified boot sector will have been written to the DOS 5 Startup disk in drive A. When you boot up, DOS 5 will know the true amount of RAM your PCjr has (up to 640K) and the number of disk drives as well. If you have 736K of RAM, replace the "MOV AX,[0015]" line with "MOV AX,02E0" (note that there are no brackets). Don't forget to delete the old version of DEBUG from this disk when you are done.

Before attempting to boot DOS 5, copy your memory management software and any other essential files such as clock utilities to the new boot disk. Write or modify the CONFIG.SYS and AUTOEXEC.BAT files as necessary.

### Problem Four: The Stacks Command

You are almost ready to boot up DOS 5. All you have to do now is edit the CONFIG.SYS file to include the line "STACKS=0,0" (without the quotes) as the very first line.

Put this ahead of everything, even your memory management device driver if you use one. When I omitted this line, my keyboard was locked up after booting, and all my PCjr did was beep at me.

That's it! You are now ready to explore the intriguing new features of DOS 5. Your modified Startup disk will boot DOS 5 on any PCjr with 256K or more RAM. You can create additional DOS 5 boot disks by using DISKCOPY to copy your first boot disk, or you can use the DOS5BOOT.SCR procedure on every new boot disk. Ordinary data disks do not need to be modified.

Next month, I'll compare DOS 5 and DOS 2.1 in terms of the space occupied by the essential files on bootable disks and the amount of memory consumed. There will also be solutions for the DOS Shell blinking problem and a patch for FORMAT.COM that you can try.

# Questions and Answers

The other species of bug is the hardware bug and it is most like the above described CHANGE in performance bug. These will often be heat or vibration related. A socket, connector or a chip is fine for a time then warms up enough to expand and change position or break contact. Turn it all off, wait a while for things to cool down a bit and everything is hunky-dory again, at least for a little while, then repeat failure. We don't mean really hot here, just warming up to operating temperature can cause expansion and the re-lated glitches. You see, this is another kind of CHANGE business. If the connections are tight and the chips are properly seated in the sockets or well-soldered then the problem can be inside the chip housing, but will usually be the same; a temperature related expansion which breaks or changes a microscopic connection. A single bad con-nection is all it takes, and there are over a million in there!

**Q. Is there any way to have a 3.5" 1.44 M drive on a jr? R. Campbell, Evansville, IN**

A. The only drive capable of High-Density operation either 5.25" or 3.5", was the system available from PC-Enter-prises. They had developed a drive / controller combo which worked on the jr. Separately marketed "clone" drives are not compatible with the controllers available for the jr. as they are usually set up as standard PCs or PC-XTs, whereas 1.2 Meg and 1.44 Meg drives were devel-oped for PC-AT and later models.

PC-Enterprises had some trouble with the special drives from their supplier and withdrew the product. They were going to do some more research and try to get out an improved model. They may have this completed by now and you might give them a call to check for availability. You should request their catalogue of jr. products while you're at it.

**Q. What is a bootable hard drive – aren't they all bootable? Can you explain the different types of hard drive for the jr? J. Albeno, Mission Hills, CA**

A. You're absolutely correct; all hard drives are bootable. The only thing is - the ROM BIOS in the jr. isn't set up to look for a hard drive if it doesn't find a floppy disk in the A: drive. Here's how these things work: In a standard IBM and most other MS DOS computers, the ROM BIOS tests the A: drive and a B: drive if one is installed during the Power On Self Test (POST) and also determines if A: has a disk inserted. A little later when the memory chips have been tested, etc. and the computer has been set up and made ready for DOS, the first sector of the first track is read to start the DOS installation. This is actually the stage of the booting-up where the ROM switches to whatever version of DOS is on the diskette. If the inserted floppy is not a booting disk the machine beeps and a screen write tells the operator to put in a proper booting disk and to press a key. So far, so good; this is what we've all seen with our jrs.

Our jrs, however, if they do not find a disk drive or do find a drive but with no floppy disk inserted, will jump to the ROM version of BASIC (this is on the motherboard) and set itself up in Cassette BASIC which is internal to all IBMs up to the PS/x line. When in this configuration, this is why the jr cannot access DOS or any of the DOS system: it never got installed!

The rest of the DOS family of computers, when they do not find a drive or a diskette in the A: drive immediately look for a C: drive and read the first sector of the first track of THAT drive for the DOS boot information. All hard drives can be set up as booting drives as necessary, it's a just a matter of putting the boot information in the right places, exactly as one does for a bootable floppy drive.

Well, then, what's the scoop for the jr? There are two systems in use for hard drives on the jr. and both make life quite simple.

One: Have a floppy boot disk in the A: drive and have on it, as a part of the config.sys file, a device driver to recognize the C: drive then use the autoexec.bat file (on either A: or C:) to switch to the C: drive and you're done! The C:> prompt awaits your every command. That is the software system.

Two: Purchase a Cartridge for use with the hard drive which intercepts the attempt to jump to ROM BASIC and divert the system to look for and read the boot sector(s) on the installed C: drive instead. This is the hardware system, sometimes called the "bootable hard drive" by the vendors to indicate that it will not be necessary to install other software or to have a floppy in the A: drive. With this system, as with any other DOS machine a booting floppy inserted in A: will still allow the machine to boot from the A: drive. This allows booting in the event of a hard drive failure and also retains the original flexibility of the different booting configurations we value so much.

The usual interface for the drives is SCSSI and you can read about that in any magazine or text on hard drives. It's a good, fast, efficient method to connect hard drives to any machine and is in common use throughout the industry.

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### What Is A File Manager?

A File Manager is a very handy type of software for copying, moving, deleting, renaming and doing other useful things to files without having to use DOS commands. Scout, Disk #81 in the jr Newslet-ter Software Store, is one of the best we know of. It can be "memory resident," which means it'll pop up any time you need it by just pressing two keys.

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## Improving Your PCjr's Memory

*(Continued from page 11)*

the video system for display. It is called video memory mapping because a specific arrangement of memory addresses are directly related, or mapped, to specific points on the screen. The amount of memory used for video mapping (often it is called the video buffer) depends upon the video mode being used. Text can get by with as little as 4K of RAM, while the 16 color 320 X 200 graphics mode in the PCjr requires 32K. Junior's video buffer, as you will see later, is handled a little differently from other PCs.

When IBM established the basic design of the PC family of computers and for the operating system that would control them, they allocated 640K bytes of the address space for RAM while reserving the rest for ROM, video, other uses and they set aside quite a bit of RAM for future uses. We know now that they reserved much too much memory space for future uses. Very few future uses ever materialized and the 640K memory space limitation has been a problem as both computers and programs have grown in size and power.

Memory organization is often shown by means of "memory maps", which are sort of like stacked bar charts. A set of simplified memory maps is shown in Figure 1. The first one diagrams the entire addressable memory space for 8088 microprocessor based computers. The second one shows the memory space for a basic 128K PCjr.

The maps show that the lower 24K of memory is used by the operating system. This 24K is the approximate amount of memory used by PC-DOS 2.1. Newer versions of DOS use more memory (Ver 3.1 uses 37K), and even Ver 2.1 sometimes takes up a little more than 24K. You will also notice that the top 16K of RAM in the PCjr is used as a video display memory buffer. Thus, in a 128K PCjr only about 88K is really available for programs.

This video display memory buffer causes some complications whenever the memory in Junior is expanded beyond 128K. In the PC and AT line of computers, IBM located the video buffer between memory addresses 640K and 768K. The size and actual address depends upon the type of video used, but in all cases memory for video is supplied by the video adapter and the buffer is located up and out of the way of RAM used for programs. In the PCjr, however, IBM, in order to save money, decided to use normal program RAM for the video buffer. They located the video buffer at the highest point in RAM. Usually the amount of RAM used in the PCjr for video is 16K, but for some video modes 32K (with an additional 16K of program RAM being lost) is needed.

As a result of this "cost savings", every PCjr memory expansion beyond 128K has to relocate the video buffer. If you expanded Junior's memory, but left the video buffer in its normal position, DOS would neither recognize nor use

the expanded memory. This is illustrated in the third memory map. DOS requires memory for programs to be in one continuous piece. Before we discuss places to relocate the video buffer to, there is one more PCjr memory peculiarity which we need to cover.

Another consequence of Junior's video buffer being located in normal program RAM is that the 8088 microprocessor must wait whenever the video system needs to do something with the memory buffer. The video system is usually very active, and the result is that the 8088 wait periods cause programs to run slower than they do on a PC. That's the bad news. The good news is that only the first 128K of RAM is affected, and that programs using RAM above 128K will run just as fast on Junior as they would on a PC, and perhaps even a little faster.

### Organizing Junior's Memory

The slow first 128K of RAM combined with the need to relocate the video buffer leads to several alternatives for organizing the memory in an expanded PCjr. Usually the video buffer is moved to the location between DOS and main program RAM, as shown in the last memory map of Figure 1. This positions as much program memory as possible above 128K for improved program performance. It is possible to use the entire 102K between DOS and 128K

## Improving Your PCjr's Memory

*(Continued from page 17)*

for the video buffer. Most of the time only 16K is needed for video so this would seem to waste about 88K of memory, but if you were interested in maximum program speed and at the same time used graphics heavily, this arrangement would be suitable.

Another possibility for organizing the expanded memory in Junior is to use the space in RAM between DOS and 128K as a RAM Disk. A RAM disk is an area of memory set up to act just like a disk drive. An advantage of a RAM disk is that it is much faster than both floppy and hard disk drives. A disadvantage is that since data in RAM is lost when the computer is turned off, you have to make certain that anything saved on the RAM disk is transferred to a real disk. A RAM disk also reduces the amount of memory available for programs, but if you're running a program which uses the disk a lot and if you have the memory to spare, it makes sense on a PCjr to use a RAM disk and to locate it so that the program is loaded in memory above the 128K mark.

Which memory organization scheme should you use? Well, it depends upon what programs you want to run and what you want your PCjr to do; and, especially if you boot-up from a floppy disk, there is no reason to use only one method. You can make up several boot disks and use the one that matches your needs, and the needs the program, when you sit down to use Junior.

### Setting Up Junior's Memory

It would seem that it would be complicated and difficult to arrange Junior's memory, but it isn't. It is handled by short programs already written and available to every PCjr owner. Usually the manufacturer of the PCjr memory expansion unit provides a set of programs along with instructions as to how they work. You don't have to use the programs supplied with a particular PCjr memory expansion unit, however, and if you are missing the programs, or if just want to try some others you can use a generic one. These are available from a number of sources, including the jr Newsletter Software Store.

The Jr Power Pack II disk, for example, has JRCONFIG which is very versatile. It can set up screen colors, use memory even beyond 640K (if you have it) get the time and date from the battery backed clock (in certain expansion units), set up a RAM disk and about one dozen other things. Normally it sets up a RAM disk in the space between DOS and 128K, but you can change this to about any way you want. The instructions are in a file called JRCONFIG.DOC, and they are complete and clear.

These small programs (usually they are just a couple thousand bytes in size), such as JRCONFIG.DSK, that set up Junior's memory are called device drivers. They are input into the computer by means of a CONFIG.SYS file located on the disk that boots up the computer. (See the article on page 2 for details on CONFIG.SYS files.)

You will find that it is not difficult to set up your PCjr for maximum productivity, and that you will probably have several different boot disks to fit the needs of your programs. One program you use may need extra video RAM plus a mouse; speed may be important for another program; and another program may need a different version of DOS. You can be very flexible. Don't be afraid to try different methods, because about the worst that can happen is that you will have to turn off your PCjr and then try something else.

# Creating A CONFIG.SYS File

mode option to -t3 and the screen color option to -f31. We have a dual floppy PCjr (two disk drives) so we'll set the drive option to -d2. We don't want a RAM drive so we'll set that option to -s1.

All of the options for JRCONFIG.DSK are clearly explained in the file JRCONFIG.DOC, except for the color option number. Explaining the relationship of the number with screen colors takes more space than JRCONFIG.DOC, and this article, has. There are some other small programs that also set screen mode and color (There is one on Disk #65) which you may prefer to use anyway.

3. MAKE A CONFIG.SYS FILE.

The CONFIG.SYS file will have just one line. You have to use a text editor or word processor that saves in the ASCII format. Most word processors will do this. If you have any doubt about the one you use you can look at a file resulting from your word processor using the DOS TYPE command. If you can read the file and a bunch of strange characters don't appear on the screen then it is in ASCII format.

If you don't have a suitable editor, the JR POWER PAK II disk does have one, TSCRIPT.COM. It isn't a great editor but it is a lot better than DOS's EDLIN.COM.

Enter the following line using your editor:
DEVICE=JRCONFIG.DSK -f31 -t3 -s1 -d2

and save it on your newly formatted system disk as CONFIG.SYS. The order of the options is not important.

Copy the file JRCONFIG.DSK onto your system disk, and you are done.

4. TRY OUT YOUR DISK.

Turn your Junior off and then back on with your boot up disk in drive A, and it should boot up in color with DOS recognizing all of your expanded memory. In fact, my PCjr ends up with a couple thousand bytes more memory than it does when the Racore device drivers are used.

This file will not set your system clock, and there are a couple of other things that you might need also; so you will probably end up with a slightly more complicated set up than this. Nevertheless, it shows you how easy it is, and how much you can do with just one line in a CONFIG.SYS file.

If this seems too complicated for you, PCJR AUTOSETUP (Disk #99) can make several different PCjr boot disks for you automatically.

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### Use your PCjr to learn a Japanese art form!

ORIGAMI, Disk #39 on page 23, will take you step by step through the art of Japanese paper folding. It demonstrates how to make amazing animals and other objects right on your screen.

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# Software
### (Order form on page 23)

**PC DOS HELP.** Similar to PC-Prompt, but takes up less memory (16K) as a resident program. Geared to DOS 2.1 with special PCjr commands included. 128K. (Disk #24)

**AUTOMENU V4.7** Make your own menu system to greet you every time you start up your trusty Junior (or PC,XT,AT,PS/2). This is perhaps the easiest menu system to set up, and yet it has advanced features if you want them. Uses only 32k. (Reviewed 3/91) (Disk #123)

**PC-DESKTEAM.** Provides memory resident notepad, alarm clock, appointment calendar, typewriter, calculator, phone book, autodialer. Some say better then Sidekick! Quick, easy, powerful. (Disk #22 V1.04)

**PC-PROMPT.** A memory resident program that provides the format for DOS commands in an on-line mode. Help screen toggles on and off Also help screens for BASICA, Turbo Pascal, Debug and EDLIN. 128K. (Disk #23)

**PKZIP V.1.02.** The new and increasingly popular file compression utility used by more and more BBSs. Includes PKUNZIP, the one you need to uncompress downloaded ZIP files, and many other features. 128K ok Reviewed 2/90 (Disk #104)

**RAMDISK.** Use ADJRAM to create a RAM disk of any size and adjust its size at any time without losing the contents. Or use JRCONFIG to set up your PCjr. Both programs with complete instructions for creating and using RAM disks on you PCjr. Need 256K. (Disk #75)

**SCOUT.** Excellent memory resident (or not) file manager, DOS shell. Move, copy, rename, volume label, search, sort, printer control, view files, and more - fast and easy. Best we've seen. (Disk #81)

**SPEECH.** Make your Junior talk! With this software you can make your PCjr's internal speaker say anything you want. Very easy to use. No additional hardware required. (Reviewed 7/90) 128K ok. (Disk #114)

**SUPER UTILITIES.** The 15 utilities in this collection include Undelete, to recover a mistakenly deleted file; a powerful command editor; a clock, notepad, time and calendar; another to redirect file contents from printer to disk...and many more useful utilities. Under 128K ok. (Disk #28)

**TEXT UTILITIES.** Includes V7.0 of List.com, the powerful text viewing software, which adds many handy new features in this version. Also on disk: A versatile directory listing and disk labeler; the fastest text searcher we've seen; a handy copying utility with many features; a memory resident protection against overwriting precious files. 256K Reviewed 2/90 (Disk #103)

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**TYPEWRITER.** When you'd rather use a typewriter instead of a word processor, this is the one to use. Couldn't be simpler. Margins, tabs, type size all can be set. Disk includes two printer control programs for higher quality output. 128K ok (Disk #93)

## Writing Essentials

**MIND READER.** Experience the wonders of artificial intelligence! Use a full-featured word processor that guesses the words that you're about to type. Works like a charm! 128K ok. (Disk #74)

**PC-OUTLINE.** Organizes thoughts, notes, lists of just about anything. Powerful features create logical outlines, merge with your word processor, customizing allows you to rearrange and manipulate data. Outperforms many commercial programs, says PC Magazine. 128k. (Disk #17)

**PC-STYLE.** Perhaps the best of many programs that help you make what you write more readable. Jim Button made this a very slick, useful tool for improving your writing. It reads and analyzes what you write, then gives you a detailed analysis based upon several useful standards. Fast, easy to use. 128k (Disk #76)

**PC-WRITE.** This extremely popular word processing software is both powerful and easy to use. A review in PC World said, "PC-Write may well be more versatile than WordStar; it's certainly more straightforward." Version 2.5 runs well on 128K. Version 2.7 has more features and needs 256K to run without the spell checker, which needs 384K. Version 3.02, the most powerful, needs 512K. (Order Disk #1 for 128K V2.5. Order Disks #2A and 2B for V2.7. Order Disk Set #1 (3 disks) $12 for V3.02.)

SHARESPELL V2.2 This update of popular spell checker has 112,000 word dictionary. It checks your word processing documents for spelling errors and replaces with correct spelling. Works fast and has ability to add your own words to dictionary. 384K. Reviewed 7/91 (Disk #94)

## Educational

**ARE YOU READY FOR CALCULUS?** Excellent review of Algebra and Trigonometry skills you'll need before taking Calculus. Provides help in needed areas. Designed by professor in University of Arizona's Math Department. 128K ok (Reviewed 8/90)(Disk #117)

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**BRAIN BOOSTER.** Includes IQ Builder, a program that both teaches and tests your ability to solve number, analogy, synonym and antonym problems like those on IQ and SAT tests. Also includes Algebra and Chemistry programs. For high school and up. 128K (Disk #43)

**COMPUTER TEACHER.** For those who want to learn how to use DOS commands and to understand basic computer hardware terms, this interactive software will help you become computer literate. Helps you better understand those manuals and computer magazines, as well as how to do more with your computer. 128k (Disk #77)

**CROSSWORD CREATOR V3.30.** Make your own puzzles up to 36 columns by 22 rows. Many helpful sorting and placement features. Prints out on virtually any printer. 256K (Disk #71)

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## Complete PCjr Reference Library on Disk for $20

With the addition of Volume Five of the Best of jr Newsletter disks this month, we are offering a special discount for PCjr users who want to order the complete set.

The set includes all five volumes of the Best of jr Newsletter disks, including the most informative articles, columns, letters and reviews printed in jr Newsletter since we began publishing in June 1986.

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To order, please circle all the Best of jr Newsletter disks on the order form on page 23 and write "Discount Price — $20" on the form.

## Foundation Gives Donated Computers to the Needy

If you ever become disenchanted with your PCjr and want to give it to someone who could put it to good use, consider donating it to the National Cristina Foundation.

This not-for-profit organization accepts tax deductible donations of used computers, software, peripherals, etc. and then gives them to organizations dedicated to training people with disabilities, the disadvantaged and students at risk of failing to compete in today's work force.

We talked to the people at the Cristina Foundation recently and told them about the active PCjr users who are our subscribers. We also told them not to reject any PCjrs that might come their way since we can help them continue to be useful.

For more information write the National Cristina Foundation, 42 Hillcrest Dr., Pelham Manor, NY 10803 or call toll free 800-CHRISTINA (274-7846).

## Need Help?

The following disks from the jr News-letter Software Store can help you to get the most out of your junior. To order, see the coupon on page 23.

**PCJR AUTOSETUP.** A beginner's dream: Just select from a menu to make separate boot disks especially for each type of software you use. Automatically creates the right config.sys and autoexec.bat files for RAM disks, games, word processing, telecommunications and other software to run at maximum power and efficiency on your PCjr. Designed especially those who haven't mastered the art of customizing their computers. This one does it for you! 256K (Disk #99)

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**PCJR PATCHES V6.0** Patches to fix software to run on PCjrs. Most enable 16 colors. V6.0 adds patches for 1 on 1, 688 Attack Sub, Battle Chess, Battle Tech, Boxing II, Genius Mouse, Grand Prix, Indiana Jones, Jack Nicklaus, Knight Games, Paperboy, Prodigy (thru V3.1),Shanghai, Silpheed, Sim City, Space Rogue, Steel Thunder, Strip PokerII, Test Drive II, Tetris, The Games (Summer), Ultima IV, plus new patch to stop disk drive spin. Dozens of older patches, too. (Reviewed 2/91) (Disk #56)

## jr Newsletter Software Store

The software in the jrNewsletter Software Store is the best public domain and user-supported software for the PCjr we've been able to find. All software has been tested on our PCjrs and is highly recommended. Some of the programs are equal to or better than commercial programs costing hundred of dollars. These are offered for you to try at $5.95 per disk. Some shareware requires additional payment if you continue to use it.

### Software Listings In This Issue:

Art & Music, page 6
Telecommunications, page 6-7
Databases, page 7
Print Utilities and Spreadsheets, page 9
Utilities, page 12, 19, 20
Writing Essentials, 20

## Newest Releases

\* **NEW** \* **PC-WRITE LITE.** The most powerful shareware word processor in a condensed but still incredibly useful package. Unless you need things like microjustification, indexing & mail merge, Lite can do what you need. 384K recommended. Reviewed 8/91 (Disk Set #5)

\* **NEW** \* **BEST OF JR NEWSLETTER V,** The best, most informative articles, columns, reviews, Questions and Answers from the June 1990 thru the May 1991 issues. Includes powerful search utility so you can find and read any subject easily. 128 ok (Disk #130).

\* **NEW** \* **CALENDAR MATE V4.0** Design and print your own calendars with birthdays, meetings, events, appointments all listed for you. Many features. Easy to use with F1 help key available at all times. Need 512K. Reviewed 7/91 (Disk #115)

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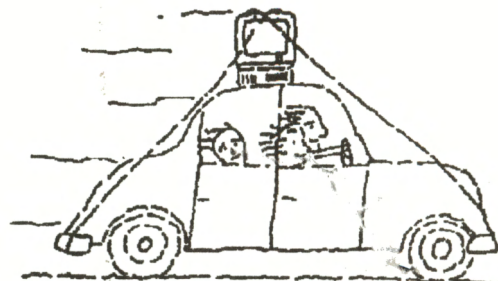Address _____

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