

Jr Newsletter

June, 1989

What?? - An 80286 Board For My PCjr?

No, it can't be. Transform a PCjr into an AT? Impossible, you might say. Or, you might also say "That's like turning Charlie Brown into Arnold Swartzenegger." Grotesque. But intriguing.

Well, it seems to be possible. Ed Strauss, inventor of the jr Hotshot, says he's done it. He's modified an 80286 speedup board intended to upgrade XTs so it will work in a PCjr -- giving the "peanut" 16bit 80286 processing power comparable to an AT operating at 9 MHz.

Called the MESAjr286, Ed is still testing it for compatibility with a variety of PCjr memory expansion units. So far, it works with IBM sidecars, but not with Ed's own jr Hotshot or with Racore units with DMA. He's obviously going to try to overcome those limitations.

The MESAjr286 plugs into the PCjr's 8088 socket with an umbilical cord that runs out the back of the PCjr to an external box. It achieves it's speed through the use of 16K of 0 wait state cache memory, according to Ed.

He says this system, which operates at 12 MHz, leaves the rest of the PCjr to run at its normal speed (4.77 MHz) avoiding some of the problems caused by other PCjr speedup devices. He clocked his PCjr with the MESAjr286

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Books for PCjr Users

Compiled by James Carter

The following is an alphabetic list of many of the books that were written for the PCjr. Some are for other PC's too, but if the name jr is in the title, it was included in this list. Most are no longer available, but some can still be found in book stores or through retailers that sell PCjr products.

TITLE	PAGES
AUTHOR	[PUBLISHER]

Basic Exercises for the IBM PCjr, 251p.
J. P. Lamoitier

Basic Programming With The IBM PCjr, 198p., 1984

Willen, David [Sams]

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PCjr Lives!

The Most Dangerous Character in DOS

DOS provides many, many enhancements to make computing easier. One of these is the availability of the WILDCARD character "*" to help manage your files quickly and easily. This lets you do the same thing to a number of files at the same time. Among the things that you can do is to ERASE or DELETE.

DOS has two WILDCARD characters. One is the "?". It replaces a single character while the other, the "*", can represent ALL the characters in the filename or the extension. Like the jungle hunter said when he encountered the Rhino with piles, "Now I know what makes him the most dangerous animal of all." Now you know what makes the asterisk (*) the most dangerous character in the DOS jungle.

Lets look at some of the ways you can use the asterisk. You can use it in searching, copying and erasing files. Since the asterisk (wildcard) represents more than one character, it is the most used wildcard. In searching for a file or number of files, you might use something like this: DIR LETTERS.*. The computer will then respond by listing every file named letters whatever the extension. It should be noted here that the asterisk can also stand for a single character or any number of characters as the examples below show:

L* All files that start with L and have no extension

L.* All files that start with L whatever their extension

LETTERS.A* Files named letters with extensions starting with the letter A

LETTERS.8* Files named letters with an extension starting with the number 8.

These designations would apply if you wanted to find, copy or erase files.

Now for a brief, BUT IMPORTANT, discussion of the imminent DANGER in using the asterisk wildcard. When using the wildcard you must program yourself to be extra careful, especially if the command can change the files. This is particularly true with the DELETE or ERASE command. It is late, bed beckons and you have a disk almost full of files named LETTERS.JAN, LETTERS.FEB, and so on. It is December and you are adding a letter to the LETTERS.DEC file but you need some space. So, you enter DEL LETTERS.* and then call LETTERS.DEC to work on. DOS smiles as it responds with "File not found."

Or even better, you are on the hard disk in the root directory working on drive A. You want to clear the disk in A to provide you with a blank disk. No problem, just erase it.

You type DEL *.* , knowing that it will erase everything from the diskette in A. You hit the return and answer Y to the question "Do you really want to do this?" A bigger smile from DOS as it wipes out your root directory, all 97 programs including COMMAND.COM. You can't even boot from the C drive now. Yep, you forgot to direct the DEL command to the A drive. You're too alert to do something like that? Believe me, there are only two kinds of people when it comes to making a mistake with DEL *.*; those who have done it and those who are going to do it. ME? I'm in the first group. What is worse, the more experienced you become the more positive you are about knowing what you are doing. That is when you do it to yourself. Remember, DEL can be HELL and you wouldn't go THERE without careful consideration.

Wildcards, like anything else, should be used carefully and in moderation. Not only should you learn HOW TO USE THEM, you must also learn how NOT to use them.

DANGER

What do you have to risk?

With DEL or ERASE

You have your "*"

(The above article was originally published in the Palmetto PC Chronicles)

Tell Us When You Move

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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. The 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. Does PC-Paintbrush work on the jr? I have trouble with the "Undo" function. It will sometimes undo several of the last operations, and sometimes only one. I called Microsoft and they said to have the jr repaired. F. Leland, San Jose, CA.

A. Your jr. does NOT have to be repaired! This paint program works identically on all IBMs. You must have spoken to someone at Microsoft who was simply not familiar with the program, or they are backhandedly not interested in dealing with jr. owners and have developed some "smart answer" for us. Though not explained directly in the manual, the Undo command WILL undo more than one of the previous operations if you have not switched drawing tools. Switching tools (or any other real operation, not just changing color or pattern) accepts the existing drawing and blocks the undo from going "backwards" any further. In other words, do a fill and change tools, then change to do another fill, and the Undo will only undo the last fill. If you fill an object, then go to another object and fill it, when you Undo, you will undo BOTH recently filled operations, if you have changed only the fill pattern.

Q. Does the patch for QuickBASIC work on version 4.5? Does QuickC or Microsoft Works need anything special for the jr? What CAD program is recommended? J. McLean, Worcester, MA.

A. The patches needed for QBASIC 4.5 are corrections for the keyboard de-code interrupt (Int 9) and the arrow keys, the same ones as used for previous versions of QuickBASIC. There are a couple of ways to implement the corrections and they are available from the Software store, one of which (the new Jr Fast-Boot) requires no entries in

the config.sys or autoexec.bat files. You should really have a hard disk and at least 540k to access the hypertext help system which is one of many new features in version 4.5. QuickC does not have the cursor keys problem, but does need the Int 9 patch, as it has the same editing environment. The reasons for the large memory requirements are the heaps of library files which need to be accessed, and the context-sensitive help available. Microsoft seems to have standardized on this editing environment for their programming languages.

Works is reported to run O.K.

To recommend a CAD program is difficult, because we don't know if you need 3-D, color etc. We can only remind you to look into programs which do not need a lot of memory and will work with CGA. One which runs well is Generic CAD, with their Dot-Plot option as a start. We have to recommend using the (optional) mouse because it simplifies menu selections. Keep the menu on-screen, at least until you have learned the various two-letter commands.

Q. Where exactly is the speaker in the jr? A. Peters, Cleveland, Oh.

A. UNPLUG everything from the wall and unplug the power cord from the rear of the jr! Take the cover off the jr. Place the round hole in the front face of the jr. against your belly. In the far left corner, inside the case, is a card where the power cable WAS plugged in from the rear. Next to this power supply, soldered down into the motherboard, near the rear of the case stands a short, fat metallic cylinder about 3/4" dia. with what looks like a hole in the flat top. That's it! It isn't really a speaker, as we normally think of it, but is instead a kind of vibrator, or beeper. You may have to pull the power supply card straight up and out to get at it.

Q. My jr is set up with one floppy drive and 640k of memory, using DOS 3.3. I have become involved with a project from the Newsletter and need the speed and convenience of a RAMdisk of 72k. (I don't need the reminder "Insert disk with command.com in drive a:") I remember that these ideas can be combined but seem to have lost the information. Can you help? P. Packard, Arrowsic, MI.

A. Thank you for including your present versions of CONFIG.SYS and AUTOEXEC.BAT files. As you are using

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Questions and Answers

(Continued from page 3)

DOS 3.3 you needn't worry about the COMSPEC correction. The bug is in various versions of PC- and MS- DOS 2.xx, not the jr. Be sure both VDISK.SYS (which is included with DOS 3.3) and PCJRMEM.COM are on the booting disk! We tried the configuration controls below, loading various programs as a test, and it worked on the ones we loaded.

Here's what you need in the CONFIG.SYS file; (You can reverse the order of the first two DEVICE= statements for spice!)

DEVICE=PCJRMEM.COM

(recognize your extra memory)

DEVICE=VDISK.SYS /C 72

(set up the C: ramdisk, per DOS 3.3)

BUFFERS=10

FILES=20

BREAK=ON *(optional, to get out of various pgms. with out re-boot)*

In the AUTOEXEC.BAT file, use the following;

MODE CO80 *(MODE.COM on the disk)*

CLS *(now clear and get 80 columns)*

CAPSLOCK *(CAPSLOCK.COM on the disk)*

COPY COMMAND.COM C:

(put command.com on RAMdisk)

SET COMSPEC=C:\COMMAND.COM

(tell DOS 3.3 command.com is on c:)

You also tried "PATH C:\" which will NOT be necessary for DOS to find COMMAND.COM because it uses the COMSPEC method. OTHER programs, however, will use the search path to find files, so you may want a PATH if you have something else on C:\. Be careful, though. It would be better to have "PATH C:\;A:\" so that if a file is not on C:\ then the search continues to A:\. This is the standard way to set up a search path.

Q. How do I use a RAMdisk and what does it do? Various readers..

A. A RAMdisk is (to the user) another disk drive. If you have just one physical drive now, you already know about the time consuming, disk swapping methods for copying from one drive (A:) to another (B:). If you have two physical drives, you have seen how efficient it is to make copies, to use one drive for pgms and the other for data, and a myriad of other ways to make life more bearable. Now to the RAMdisk...

The programs which make RAMdisks put ANOTHER disk drive at your disposal. It is usually labelled C: and is placed right in a part of your jr's Random Access Memory.

It will use up a little more memory than the size of the C: disk you choose because it needs a directory and a bit of overhead to work. Though this somewhat depletes the amount of memory left for your applications it more than makes up for it in other ways.

Some of the benefits are: the jr runs faster; the RAM-disk itself is lightning-like (after all it is a memory-to-memory transfer of data, nothing mechanical) and for the single drive user can make disk-swapping a thing of the past. It is actually quicker, for example, to copy multiple files from A: to the C: RAMdisk, then copy the files from C: to the B: drive, than it is to copy from A: to B: even if you have two physical disk drives! As a temporary data file-holding device for word processing, spreadsheet, or database programs, it is so fast and convenient that you will be amazed.

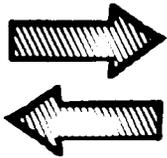
Once installed, just use the letter C: to use the drive; the rest is transparent. Remember though, copy any data that you wish to keep from the C: RAMdisk to a real floppy before either shutting down, re-booting or disabling the C: drive! Otherwise, your data will simply vanish. There are various RAMdisk programs available and each has its features and shortcomings. Some are installed at boot-up and cannot be re-sized or deleted without re-booting while others can. Some are like Terminate-and-Stay-Resident programs and can be installed from BATch files or the DOS prompt. Some can be completely removed from memory, freeing up the RAM for the times the user needs maximum memory. A selection of RAMdisk programs is on the #65 Power Pack II diskette, available from the Software Store.

Q. What is a CONFIG.SYS file and what does it do? Various readers..

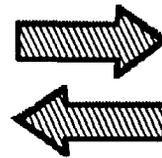
A. The name almost says it... After the pre-programmed memory banks (ROM) in the jr go through the testing of memory, etc., the jr looks for special setup and trigger information on the very first track of the diskette in A: if there is one and if the drive door is closed. On this track (the boot sector) is information which you cannot read from DOS even if you wanted to. It has information about various default values, such as disk drive(s), memory, keyboard etc. and it gives the go-ahead to continue to set up the jr for use. Next, the drive head MUST go to the very next physical sectors of the track(s) to find IBMBIOS.COM, IBMDOS.COM. and COMMAND.COM, which continue to prepare the jr for basic memory allocation, serial and parallel ports, various parameters for data exchange to/from diskettes, etc. When all this is done and tested by the ROM, the jr is instructed to look for a CONFIG.SYS file. At this point the jr can operate even if there is no CONFIG.SYS file to read; it will simply go on to look for an AUTOEXEC.BAT file.

If either or both the files exist, the jr reads them and follows the instructions they contain. To you, they are ordi-

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Reader Feedback



Reader Added 3.5" Drive Without Using New Controller

I would like to clarify a point raised by M. Bean of Merchantville, NJ, in the April Questions and Answers section. He asked if a 3.5" drive could be added without extra hardware, and the Editor's response was "no". My system might offer proof that a 3.5" drive can, in fact, be added without a new FDC (floppy drive controller) card.

Ages ago, I made the hardware modification to my stock FDC board (as described in Home Computer Magazine, long since defunct) that allowed for not just the added "B:" drive, but for a third, added "C:" drive. Note that in this modification, "C:" is NOT a hard disk, just another floppy. For a time, I thus had 3 floppy (5.25") drives on my system. Then, I purchased a Toshiba 3.5" drive, and swapped it for the 5.25" "C:" drive. Initially, it did not format or read past 360K, but after purchasing 3.5" disk drive device driver software, I now regularly use my mini-drive at 720K, and can go up to 808K bytes read/write.

I presume that the only limitation jr owners would have in adding a 3.5" drive, then, would be what device driver software is used to tell the FDC to do the work of alternate 720K (and 808K) byte formatting, writing and reading. I emphasize that I CANNOT get 1.2M or 1.44M (megabyte) formats on the mini, because the driver software just doesn't do it. I think the driver software I purchased came from PC Enterprises, and might be called "MicroDisk".

Hard drives connected to a PCjr MUST have a PCjr-specific hard drive controller attached. No amount of hardware modification to the stock FDC in the Junior could allow it to interface to a hard disk. I have, however, corresponded with an individual who claims to have added a home-brew sidecar that ADAPTS THE JR I/O BUSS TO AN XT=STYLE BUSS. He further claims to have them plugged into a standard XT-style hard disk controller, and says it works. This is what all PCjr owners have dreamed about for a long time: slots! Keep formatting ...

Bob Magnuson, Wheaton, IL

Many Microsoft Programs Require Patch to Work on PCjrs

Recently I ran into a problem with my IBM PCjr that I understand you might be able to help me with. I upgraded

from Microsoft Multiplan 3.01 to Multiplan 4.01. When I received the upgrade and prepared to set up, all went well until I was in the program. When I called Microsoft Product Support, they first informed me that they do not officially support Multiplan 4.01 on the jr (which I already knew), but the technician said similar problems had been encountered on jrs with Microsoft Works. He further explained that they were aware of a patch program that you had available on Patches Disk #56 that might help this problem.

I have a Racore Keyboard Adapter and use a full PC-style keyboard. My jr has been expanded to 640K using an expanded Microsoft jrBooster.

Larry S. Couch, Cedar Falls, IA

EDITOR'S NOTE: Many programs written by Microsoft can be run properly on PCjrs once the INT 9H patch has been installed. You can get this patch from Disk #56 JR PATCHES, or you can use jrconfig on both Disk #52 and #65 for your memory management software. Jrconfig (2.14 and higher versions) installs the INT 9H patch automatically, which probably explains why many jr users have reported they have no problem with Microsoft software.

A Way To Maximize RAM Disk Efficiency

Enclosed is remittance for my subscription renewal and an order for disks from the Software Store.

I am also enclosing a copy of SEARCH, a path program that searches out all types of files that DOS 2.1 PATH can not.

I find it especially useful in running programs from a RAM disk with only enough memory for the .exe file, the minimum necessary other and only the very frequently accessed overlay files, leaving the maximum K in remaining RAM for the program. With the appropriate Search command any other file is automatically accessed on one of the floppy drives. It saves time in loading to a RAM disk. It allows one to operate a program like SuperCalc3 from RAM disk with a larger spreadsheet, or run from a RAM disk a database like Cornerstone that requires 384K.

Using SEARCH I was able to consolidate all of the files of Flight Simulator V3.0 together with the DOS system on two floppies to go directly from power on to the running

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Reader Feedback

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program without any intermediate disk insertion, similar to running the program from hard disk.

I had obtained a CAD program that required a hard drive or alternately for all of the files to reside on a single floppy of 720K minimum. With Search I am able to run the program with the files on two 360K floppies.

Perhaps you are already aware of SEARCH. Being a program probably promoted for hard drive users, you may not have investigated the potential for jr owners who want the speed of a RAM disk together with maximum RAM for the program, or who want to access on any disk all types of files other than command or batch files to which the DOS 2.1 PATH command is limited.

In the February, 1989 edition of JrNewsletter you note that ZANSI.SYS with FASTSCRN and SLOWSCRN are on Disk #52. I purchased Disk #52, Jr Power Pack, quite some time ago. The above files are not on my copy. Were they added in some version revised since I procured my copy? If not, should I return my copy of Disk #52 or should I purchase a current version?

I know you have received many compliments on your publication, but please accept mine also. How can I feel orphaned or disadvantaged with the abundance of practical hands-on help that you provide me with every issue of the JrNewsletter. No other user segment has it so good.

U.E. Leimkuhler, Cantonsville, MD

EDITOR'S NOTE: You have developed an ingenious use for SEARCH that never occurred to us. Thank you for pointing this out and for explaining how you use it to add power and convenience to your PCjr computing.

We are currently assembling a new collection of particularly useful utilities and we will include SEARCH on this new disk. It should be ready next month.

As for ZANSI.SYS, it apparently is missing on some early versions of Disk #52, JR POWERPACK. The other programs you mention never were on that disk and, as far as we know, are not public domain or shareware programs. If any reader has Disk #52 without ZANSI.SYS, you can send us your copy and we'll put it on your disk for you. Sorry for any confusion that may have resulted from this omission.

Wondering how to run new software on your PCjr?

Get the latest version of the PCjr COMPATIBILITY DISK -- Disk #60, page 23. It has compatibility info on more than 800 titles!

Using DOS 3.21 To Improve Compatibility

In your January issue of JrNewsletter, Ms. Barbara M. King of Meriden, CT asked about running JEOPARDY on the PCjr. It will run if you use DOS 3.21 or later. Also some time ago there was an inquiry about running PRINTSHOP on the jr with a RACORE Drive II. Printshop will run fine if you put the Racore switch to jr mode.

There are a lot of programs that will run fine with the later versions of DOS. I have tried DOS 3.1 also, but I have found DOS 3.21 or 3.3 does the job. There are programs that extend the format of a 360K to 400K and 420K. They also require DOS 3.21 or later.

Nabe Mitsuoka, Visalia, CA

Clever Mom Made "Happy Games" To Help Her Children Learn

Ruth Grove of Somerville, Texas, says her three wonderful ("most of the time") children inherited her love for pushing buttons. So she put her programming knowledge to use by creating these Happy Games on her PCjr to help her children learn while pursuing their inherited passion.

The games are for preschool age children. They teach shape and color recognition, sorting, eye-hand coordination and basic logic. And, they're fun.

The four games on disk are selected from a colorful main menu. The first one (and the easiest) is Color Sort. It displays a set of four colored shapes and waits for the child to respond with one of the letters associated with the four shapes. The object is to find the one that's different from the others.

To encourage selection of the correct letter, a happy face is displayed. When the child accumulates five happy faces a short song is played.

Shape Sort, the second game, follows the same format as Color Sort, but it focuses more intensively on recognition of shapes.

The third game, Super Sort, carries the first two concepts a little further. The child has to go through a process of elimination to discover which object is not like the others.

The fourth game is not, strictly speaking, educational. Wiggleworm is an arcade-style, two-player game written especially for children. Mainly, it's fun. But in the process of playing it, youngsters will improve their eye-hand coordination, and will learn to love "playing the computer."

To order Happy Games, Disk #88, see page 21. Requires 256K and joystick.

A Game Sampler for the PCjr

By Carl and Peter Haub

EDITOR'S NOTE: The following collection of game reviews was written by the father and son team of Carl (father) and Peter (son) who live in Gaithersburg, Maryland. This collection runs the gamut from great games that no PCjr game lover should be without, to those you probably wouldn't want to spend a nickel on. We should point out that they readily admit their ratings are based upon their own "completely biased" opinions.

RATING SYSTEM: 10 = Buy it today; 7 = it's more or less fun and I only paid \$xx for it; 5 and below = well, I wasn't hit by a bus buying the thing. Minimum memory required and 4 OR 16 color capability are given along with the publisher's name. Prices are representative of mailorder sources; in-store prices will be higher, but some stores, such as Egghead, will take software back if you don't like it.

Ancient Art of War (Broderbund). (128K). 4 colors, combinations vary from screen to screen. An engrossing, excellent strategy game in which the object is to capture the enemy's flags. Player can fight against Napoleon, Athena, Sun Tzu, Caesar and others. Allows user-designed battlefields which take some time, but provide the real fun. Excellent graphics and riveting action, "zooms" into battle scenes. Definitely different. "Ancient Art of War at Sea" is the nautical version which is as good as the original. Also, if you have trouble getting a joystick to work, it may be that your disk doesn't have a write-protect notch cut into it. Make one with a sharp knife or an XACTO knife. Also try it with only one joystick plugged in. RATING:8. (\$25).

Flight Simulator Version 2.x. (Microsoft and Sublogic). (128K) 4/16 colors. THE ultimate. Your PCjr is transformed into a Cessna 172, almost literally. Will use the PCjr's expanded memory to speed up the action and add control smoothness. FS is so accurate that the plane's nose will rise briefly when the pilot extends flaps. Instrument panel reflects attitude changes exactly. With properly tuned radios, one can fly through bad weather, even at night, and arrive at the destination perfectly given FS's highly accurate geography. It even has a good manual! Features geography for New-York -Boston, Chicago, Los Angeles, and Seattle areas. From the Statue of Liberty to Marina del Rey, the sightseeing is decent. FS even includes a WWI "flying aces" game as a bonus. Landings are not difficult, but nonpilots should check the manual: set flaps at 10 or 20 degrees, reduce power to 1500, use throttle (not stick) to control altitude on approach. "Scenery disks" enhance FS even more. (See note on Scenery disks for 16 color enhancements)

This original version (it came in the familiar squarish green box, later blue) is rapidly disappearing from the shelves as FS 3.0 replaces it. RATING: 10+ (About \$30, may be available on closeout; used copies should be easy to find.)

Flight Simulator Version 3.0. (256K) Runs in 4 colors out of the box, but will run in 16 colors with a patch written by Lou Davidson and available on BBSs and the jrNewsletter; the patch creates the file "CUSTOM.GRA" which you copy to your program disk. Select 16 colors by selecting option "n" from the opening menu. The PCjr to Tandy 1000 modification will also produce 16 colors just fine. FS 3 is so feature-laden, that any FS addict will want to buy it. But, use of its many new bells and whistles such as multiple windows and weather features will greatly slow the action on an 8088-based machine such as the jr. It is obviously meant for the faster, newer-generation PCs. FS 2.x is actually preferable for its smoother action when you have no need for 3.0's features. (\$35).

The American Challenge: A Sailing Simulation (Mind-scape). (128K) 4 colors. An excellent sailing simulator along the lines of Flight Simulator. It manages to produce a great feel of sailing. Graphics are skimpy, but functional.

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PCjr Specials

- * Memory Expansions
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Game Ratings

Continued from page 8

One races another boat controlled by the computer which makes few mistakes but can be beaten. A course-replay feature shows a diagram of the course you sailed, although you may not want to see it. Has provision for modem-to-modem play. It also has a motorboat mode which is fair. RATING: 6 (10 if you're a sailor). (About \$27)

Pinball Construction Set (Electronic Arts). (128K) 4 colors. Very realistic pinball game, but the real fun lies in designing your own. Manual a bit brief, but program allows a form of "bit-mapping" to design bumpers and other features. Good action which allows for four players. RATING: 8. (\$17).

World's Greatest Baseball Game (originally IBM, now EPYX). (128K). Nice 16 colors. A good game about middle of the road with other baseball games. Good action with averages and ERA's of real World Series Teams. Takes a bit of practice to learn. May now only be available from IBM's Personally Developed Software, Wallingford, CT 06494. RATING: 7 (\$20 or less)

Touchdown Football (originally IBM). (128K). 16 colors. One of my (Peter's) favorites. A great game with excellent graphics and many plays to choose from. It even talks! (In English). The real fun is in actually controlling the players, unlike others where one simply watches the action. A real steal! Buy it! Now published by Electronic Arts. RATING: 9 (\$20 or less)

Solo Flight (Microprose). (128K) 4 colors. An unusual flying game where you're outside the airplane. Moderately good graphics. Things like failed engines and instruments complicate your flight. An interesting map mode traces your course after a flight. Includes a "mail pilot" game. Not bad, but not great. RATING: 5 (\$22)

Night Mission Pinball (Sublogic). (128K). 4 colors. Fun pinball with color and fun. Complex features in the game. But, unlike Pinball Construction Set, there is only one pinball machine, with no user-designed games. Based on a B-17 bombing run. Enjoyable. RATING: 8 (\$29)

Castle Wolfenstein (MUSE). (128K). 4 colors. Escape from the SS baddies in a complex castle with simple graphics. Game shows that graphics need not be detailed if action is fast. The guards talk to you, but the computer's speaker garbles the deutsch. This oldie now seems to be distributed by "Main Street Publishing" on your dealer's discount rack. RATING: 7. (about \$7)

Return to Castle Wolfenstein. (128K). 4 colors. Back already? Yes, and this time Herr Hitler awaits. Sneak through the castle, kill Hitler. Be nice. RATING: 7. (\$7, discount rack).

By Fire and Sword (Avalon Hill). (128K). 16 colors. Map-based conquest game in the Middle Ages. More or less engrossing. Stresses thinking more than graphics. Not too simple. RATING: 5. (\$20)

Flight Simulator Scenery Disks 1 -6. (SUBLOGIC). (128K) 16 colors. The first disks to expand FS's horizons. These cover the Western U.S. from Texas to Washington. Details limited to rivers, some highways and mountains, and coast-line detail, but no buildings, etc. While many VOR's are featured, there are no instrument-equipped airports. But, a fun addition and worth the low price. The best appears to be the Denver disk (#5) with mountains around Denver and Salt Lake City. Buyers get a note saying that scenery disk development is a slow process and that enhanced versions of these disks will be available for a \$2.00 fee. The note says that these may be available in Fall '86. What year is this? What is this, Luftware? RATING: 7, wish it were higher. (\$15).

Flight Simulator Scenery Disk #7, East Coast from New Jersey to the Bahamas; #11, Detroit, Lake Huron, JAPAN Scenery Disk, the "Western Europe Scenery Tour," and the San Francisco "Star" Disk (SUBLOGIC). 16 colors. These fantastic scenery disks offer all sorts of scenery variety and features. Geographic detail in Japan is topnotch, you can fly the Niagara River Canyon to the Falls on the Detroit disk, fly the Channel from London to France and much more. Highly recommended. NOTE: all Scenery disks update older copies of Flight Simulator to make the instruments MUCH MORE READABLE when using 16 colors. Buy one for this purpose alone. Go get it. RATING 10+. (\$20).

Jet. (SUBLOGIC). (128K). 16 colors. Substitutes Flight Simulator's flight management for speed. Land on an aircraft carrier, battle the MIG's, bomb the (pre-glasnost) Soviet ships. Top guns will love it, some FS fans think it arcade. Works with FS scenery disks, although version 1.0 requires a free fix from Sublogic. Version 2.0 is now out, untried by us; it requires 256K and there are reports of joystick and 16 color problems. RATING: 7. (\$33).

Chuck Yeager's Advanced Flight Trainer 2.0. (512K) Electronic Arts. 4 colors. An expanded version of the very popular original. AFT emphasizes flight maneuvers in contrast to Flight Simulator's navigation and flight management in the real world. All kinds of features such as formation flying, outside views, etc. Aircraft types vary from Spads to the Space Shuttle. We still like Flight Simulator

better. RATING: 8 (\$35).

(NOTE: SIERRA ON-LINE HAS RENEWED FULL SUPPORT OF THE PCjr. Full compatibility will be incorporated in future releases. If a Sierra game still on the shelves says "512K, not PCjr," it won't run without a patch.)

King's Quest. (SIERRA ON-LINE). 16 colors. "KQ" was designed by Sierra for IBM to show off PCjr's color graphics. Boy, did they succeed. The KQ series I, II, and III resulted in a yet-to-be-duplicated group of programs which have set a gaming standard. Superb graphics lead you through a series of mind-boggling quests for magic mirrors, damsels, and carrots. More fun than barrel of knights. For the stuck, "hint books" can be had in software stores, but the fun is figuring it all out. RATING: 10+. (\$33). Versions I and II work with 128K, others 256.

King's Quest IV. (Sierra). Magnum opus of the KQ series. In early releases, PCjr used the 256K version which can be obtained by contacting Sierra if you bought the 512K version. If you have 640K, current releases should run fine on your jr. Great! RATING: 10+.

Space Quest I, II, and III. (Sierra). (256K). 16 colors. Similar to King's Quest in that instead of medieval it's in space. Tough game but worth it. Nice action and aliens try to stop you on your escape. RATING: 10+ (\$33) (Note: the new SQ III, 512K version ran "out of the box" for a friend although it didn't say PCjr on the box).

Police Quest I, II. (Sierra). (384K). 16 colors. The King's Quest theory is adapted to the modern day police story. This game leaves other non-Sierra quest games in the dust. Clues are not impossible and fun to play. RATING: 10 (\$32)

Leisure Suit Larry I and II. (Sierra). (256K, perhaps 512K in newer editions). The "quest" concept carried to the "adult" level. The somewhat raunchy adventures of polyester Larry as he seeks true love. Don't run out of breath spray. The first version is relatively short by Sierra standards. RATING: 8 (\$32)

Hellcat Ace. (Microprose) (128K). 4 colors. A fast-reacting flight game with simple graphics. Features various WWII scenarios with hostile enemy fighters. Plays anthems after battles. Hope you like anthems. Dated. RATING: 3. (\$20 or less)

F-15 Strike Eagle. (Microprose). (128K). 16 colors, older 4 color versions may not work. Realistic flight game with

(Continued on page 10)

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Game Ratings

(Continued from page 9)

simple graphics. Tough to fly. Dodge the incoming SAM's and enemy fighters. Bomb Libya! RATING: 6. (\$20).

GATO. 4 colors. (128K). A somewhat dated submarine version of Flight Simulator. Your sub is assigned different missions during an annoyingly noisy opening "teletype" screen. Things get better as this seemingly simple game proves a bit stickier for new sub captains. Not bad, really. RATING: 6. (\$20).

Zork I, II, and III. (Infocom). (128K) A text adventure series that set the standard for all others. Zork requires a heavy application of imagination with its black and white text screen. But that's one of its stronger points. A very complete vocabulary, an acquired taste. RATING: at least 8. (under \$20 now).

Mean 18. (Accolade). (256K) 16 colors. You don't even have to like golf. This program makes owning a PCjr fun. Combines highly realistic and colorful courses with a zero learning curve. One can start playing right away and have fun, but making par... Has to be one of the best sports games ever. Includes a "course architect" to design your own courses. Public domain courses are on most BBS's and in jr Newsletter Software Store. Bad point: in one year, our system disk has gone bad twice for no apparent reason. Accolade sent a replacement, but not quickly. If you buy it and like it, send for the \$10 factory backup disk (trying to copy it with a backup program will damage the disk, we're told) Other than that, go for it. RATING: 10. (\$33).

Ghostbusters. (Activision). (128K) 16 colors. An unusual game with decent graphics. Plays Ghostbuster's theme incessantly. Kill ghosts and the Stay Puf Marshmallow man. Good for 16 and under if they liked the movie. RATING: 6. (\$25).

Infiltrator. (Mindscape). (256K) 4 colors. A relatively complex but fun helicopter action game with good graphics. After landing your helicopter you engage in James Bond type action. Great added bonus! Neat flying action and good staying power. Close to a "must" game for PCjr. RATING: 8.5 (\$27).

Summer Games II. (EPYX). (128K) 4 colors. Nice sports action game with long jump, pole vault, rowing, cycling, rowing, equestrian events, and more. Only annoying because the box shows the full color Commodore screens but we get 4 colors - cyan, purple, etc. Has provision for up

to eight players. Not bad. RATING: 7. (\$27).

Dam Busters. (Accolade). (128K). 4 colors. Different flying game which originates in Australia. Fly your Lancaster bomber through the searchlights and bomb the German dam. Exciting action, but the game can become monotonous, which brings the rating down. RATING: 6. (\$33).

TETRIS. (Spectrum Holobyte). (256K). 4 colors, 16 with Tandy mod. Glasnost brings this deceptively simple stack-em-up game of falling shapes or perhaps it's a Soviet plot to keep us from getting enough sleep. A habit forming game - "I'll get it JUST right, the next time..." Could do with more variety, though. RATING: 8 (\$24)

Murder on the Zinderneuf (Electronic Arts). (128K) 16 colors. A nifty whodunit with a Clue-like game board on a 1930s dirigible (ok, blimp). You must find the murderer before the airship lands. Get moving! Fun, not super. RATING: 6.5 (\$20 or less, an older game)

Tennis. (IMAGIC). (128K) 4 colors. Fun, exciting game with aces and hard forehand shots make a simple designed game into a great tennis game. Either face the Lendl of a computer or another human. Definitely a sleeper! RATING: 7 (\$20)

Hardball. (Accolade). (384K) 4 colors. One of the best baseball games around. Good action, with plenty of features including: two full rosters, complete with names and personalities. Also has a split screen for a realistic effect. RATING: 9 (\$24). Some versions may use 16 colors with Tandy mod.

NFL Challenge. (XOR). (384K, 640K to store team data). 4 colors. This is an armchair quarterback's dream. Act as head coach who has to deal with injuries, penalties and mistakes by players. However, it might take a real coach to understand what a Sam & Will Blitz is. Aside from that, run to your local store and buy it! RATING: 10 (60\$)

California Games. (EPYX). (512K) 4 colors (16 color patch available). In order to appreciate this game you must be from California. This Maryland native is not a big skater or surfer. Does have realistic action and is a competent game, but lacks something for the non-surfer types. RATING: 6.5 (\$24)

Gauntlet. (MINDSCAPE). (256K) 16 colors. One the most intense arcade games has been made into a computer game. Big mistake. This game lacks the riveting, sweat producing action of the arcade version. The action is slow and the graphics are average. RATING: 3 (\$15)

Test Drive. (Accolade). (384K). 4 colors, should work with Tandy mod. Is your pulse ready to take on the Countach or Testarossa? If your answer yes, get ready for the simulated ride of your life. Great action and realistic feel. Take on the mountain at 160 mph and leave the fuzz in your exhaust. RATING: 9 (\$24)

Thexder. (Sierra). (256K). 16 colors. Decent futuristic arcade game from Japan. Switch from a robot to a fighter and weave around a maze and multiple levels. Good action, but no rave reviews here. RATING: 7 (\$24)

Top Gun. (Thunder Mountain). (128K). 4 colors. An excellent dogfight game, probably one of the best, but that's all it is. No sense of flying and effect of G forces. Simple, yet fun. This is one of those games that you find in stores' "\$10 and under rack." Some of these can be real sleepers. RATING: 6 (\$7)

Street Sport Basketball. (Epyx). (640K). 4 colors. Basketball games are poor on computers, but this one does a nice job. Choose four street scenes and about ten people to be on your team. Good three on three action. RATING: 7.5 (\$23)

Sub Mission. (Mindscape). (256K). 4 colors. An unusual futuristic sub game in which you save two prisoners from a warlord by outdueling him in a strategic duel with subs. Unusual feature that if you fail to rescue the prisoners they die and are erased from your disk. RATING: 7 (\$25)

Unprotecting Basic Files

By Colin Tuttle

If you have saved a BASIC file, for example, YOURFILE.BAS with the protected P option, you can easily deprotect the file using the following command: (from BASIC)

```
NEW
BSAVE "ZAPPER.BAS", 1124,1
LOAD "YOURFILE.BAS"
BLOAD "ZAPPER.BAS"
LIST
```

The program will now be listed on your screen. If you want to unprotect the file forever, make sure you resave YOURFILE.BAS in the unprotected mode, else you will have to go through these steps again every time you want to list the file. The file named "ZAPPER.BAS" is created by the BSAVE command, and can be called anything.

Double Font Thin Character Chip Developed by E S Quality Products

Ed Strauss, who developed the jr Hotshot and most recently an 80286 speedup board for PCjrs, has announced another new PCjr product: a dual font chip.

The chip enables you to select a serif or non-serif style, both in a thinner line format for easier reading. A switch located on the chip can be moved to change the font style. The chip is placed just behind the infra-red sensor in a PCjr. The chip produces a denser line than the normal PCjr display letters have, making it easier to read. The effect is similar to the Thin Font Module offered by PC Enterprises. The double font chip sells for \$29.95. A single font chip is available for \$19.95. The chips are available from Owl Software, Computer Reset and Paul Rau Consulting. Check ads in this issue for addresses and phone numbers of these companies.

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How PCjr Memory Works

(Part 2)

By John King

Last month we covered the physical design of PCjr memory and defined several terms which we will need in future articles. For this article, you need to recall that the PCjr can address 1024K bytes, or one megabyte, of memory. The first part of this is RAM, Random Access Memory, which consists of transistor switches that can be turned on and off by the programs you run. Everything in RAM "evaporates" when the power is turned off. The higher parts of memory are ROM, Read Only Memory, which do not change even when the power is turned off, unless you take a chip out and put in a new one. This is just what you are doing when you change program cartridges.

This month we'll look more closely at how the PCjr gets up and running from a cold start. This will set the stage for a discussion next month of "memory management" software (PCJRMEM.COM from IBM, Racore's JRVIDEO.COM, Tecmar's CONPCJR.EXE, and EXTRARAM.EXE from Impulse, etc.) These utility programs allow the PCjr to use memory installed on expansion boards.

Assuming your PCjr has at least 128K of RAM and a disk drive, then after a power up without any memory management software, the memory will contain the information shown in Table 1. (This table is repeated from last month's article.) Instructions for loading information into the bottom 128K of RAM are in the ROM BIOS at the top of memory. When the power is turned on, the 8088 CPU chip looks for instructions from the ROM BIOS which is a program on a chip at addresses 1016-1024K bytes.

The ROM BIOS includes the Power On Self-Test, or POST, to check out the computer and put the IBM logo on the monitor while checking memory. The BIOS program, or Basic Input/Output System, also initializes the keyboard, video, and disk drive and provides primitive communication with these devices.

Information found during initialization, such as memory size, number of disk drives, and the presence of a BASIC cartridge, plus a copy of parts of the ROM BIOS itself are recorded at the very bottom of memory in RAM. In future months, we will look into this data area with DEBUG.

If the ROM BIOS program finds a bootable disk in the drive, one with the DOS (Disk Operating System) programs IBMBIO.COM, IBMDOS.COM, and COMMAND.COM, it transfers control to these programs; and they are also loaded into RAM. If you have a CONFIG.SYS file on the boot disk, commands in this file are executed before COMMAND.COM is loaded into memory. More on this next month.

Table 1. Contents of PCjr Memory
Before Memory Management

Memory Contents	Starting Address
Bytes	(Hex)
ROM BIOS Image (data area)	0K 00000
IBMBIO.COM	1K 00500
IBMDOS.COM	5K 01500
CONFIG.SYS Files	20K 05000
BUFFERS	
DEVICE DRIVERS	
COMMAND.COM (resident portion)	21K 05400
Program Area	24K 06000
Your program runs here.	
COMMAND.COM (transient portion)	88K 18900
PCjr Video (128K memory unit)	112K 1C000
Expansion Memory (128-512K added)	128K 20000
Reserved (used by EGA video)	640K A0000
Video on other IBM PCs	
Monochrome	704K B0000
Color	736K B8000
Special Purpose ROM	
Impulse Board ROM	768K C0000
Hard Disk ROM	800K C8000
Cartridge ROM (games/programs)	832K D0000
Cartridge ROM (games/programs)	896K E0000
PCjr Basic	928K E8000
General ROM	
PCjr ROM BIOS	960K F0000
ROM Diagnostics	968K F2000
Basic ROM	984K F6000
ROM BIOS	1016K FE000
Top of Memory	1024K FFFFF

boot disk, commands in this file are executed before COMMAND.COM is loaded into memory. More on this next month.

IBMBIO.COM and IBMDOS.COM extend the input/output ability of your PCjr. The ROM BIOS program allows reading and writing to a disk sector by sector, but the DOS programs set up disk directories and permit writing to file names which is far more convenient. Operating programs use DOS features constantly for keyboard input and output to the monitor. Also, since DOS is not a permanent part of the computer, the operating system can be changed easily. All you have to do is buy a new version of DOS or patch your old one.

COMMAND.COM is the program you are using when you see the DOS A> prompt. When you boot your computer, COMMAND checks for an AUTOEXEC.BAT file and runs it. The commands DATE, TIME, COPY, and DELETE, as well as the batch file commands ECHO, PAUSE, etc. are all part of the command processor. Since many of these are not needed when you run other programs, COMMAND is divided into two parts. The essential, smaller part, about 3K bytes, loads right above IBMDOS.COM (or above CONFIG.SYS file items, if present) and remains there until the machine is rebooted.

The rest of COMMAND, about 14K bytes, is loaded as high in memory as possible. For the case in Table 1., this is just below the video memory space. Even if there is memory present above 128K, DOS doesn't know about it because no memory management utility has been run. So, nothing can be loaded by DOS into this area.

Some programs overwrite the high portion of COMMAND in order to have as much memory available as possible. This is fine because when you return to DOS, the lower part of COMMAND checks and reloads the high part if it has been messed up. If a disk with COMMAND.COM is not in the drive (and you haven't told COMMAND to look on a ramdisk or another drive), you will see the message:

"Insert COMMAND.COM disk in drive a:
and strike any key when ready."

The amount of free memory reported by CHKDSK.COM includes the 14K-byte high part of COMMAND since this can be used by other programs.

The final item in the lowest 128K of RAM is the PCjr video buffer. While other members of the PC family have memory chips with addresses between 704K and 768K bytes for video, the PCjr does not. A special Video Gate Array, VGA, chip initially redirects all color video information down to the 16K bytes from 112-128K as shown in Table 1. The VGA chip is flexible enough to allow the video buffer to start at any 16K boundary (i.e. 16, 32, 48, 64K, etc.) and to be 16K bytes for text or 32K bytes in size for graphics. How-

ever, it cannot place the video buffer above the first 128K bytes of RAM. This is the source of the PCjr's major compatibility problem.

Continuing with Table 1., even if RAM chips with addresses from 128K to 736K are present, nothing will be loaded here because DOS doesn't recognize more than 128K before a memory management utility is run. Other PCs use memory starting at 736K bytes for color video. Although the PCjr does not, these addresses cannot be used for anything else. If they were, the programs written for other machines would not run on the PCjr.

Starting at 768K bytes, there may be various ROM chips. The Impulse memory expansion board has a ROM chip at 768-772K bytes which transfers the time from the battery powered clock to DOS. Hard disk drives use ROM chips with addresses starting at 800K. ROM chips in plug in cartridges have addresses from 832K to 960K bytes.

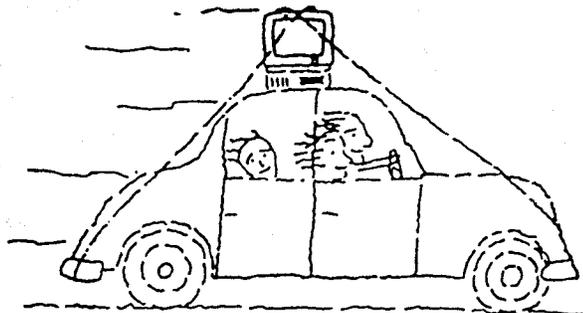
Finally, ROM chips on the mother board with addresses between 960 and 1024K bytes provide diagnostics, support for cassette BASIC, and the BIOS programs which we've covered. The diagnostic programs in ROM are the ones which are started by the Ctrl-Alt-Ins key combination.

For the configuration of Table 1., any program you want to run must fit in the roughly 88K-byte space from 24K to 112K bytes. Since programs require memory in solid blocks, even if memory is added above 128K bytes, the video buffer will remain a barrier to larger programs. The VGA chip won't allow placing the video buffer higher, so we must move it as far down as possible.

Memory management utilities, which we'll look at next month, are used to move the video buffer down as well as to let DOS know about the RAM above 128K bytes.

(The above article was originally published in the San Francisco PCjr Newsletter. John King, president, can be reached at (415) 472-7035.)

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PCjr Hard Drive Works Like "A Dream"

By Rene Waldron

The following is one PCjr user's report on buying and installing a 20 megabyte hard drive on his PCjr:

The especially knowledgeable, polite lady at Paul Rau Consulting fully answered all our questions, so we ordered the 20 Megabyte external hard disk kit. We normally use DOS2.1 and this version normally allows only 10 megabytes at a shot, but we planned to partition the 20 megs into two sections of 10 megs each, so it added up to the same thing.

We boot with various configurations for specific purposes which we have on various A: booting disks so we decided not to include the optional cartridge which allows booting from the hard disk. This cartridge also allows a single 20 Megabyte drive. The kit we chose has side-by-side drive bays for two hard drives and includes a power supply for anything we want to put in it. There are enough different cases and layouts available from Paul Rau to satisfy just about anyone, so an inquiry call is definitely worth while.

Next day, (Blue label) the UPS man delivered the box. We were pleasantly surprised at the ample packing used for shipping. We read the simple instructions in the booklet, slid the kit under the jr, plugged the adapter card into our unused modem slot, plugged the flat drive cable into the adapter and plugged the 115v AC power cord into our surge protector.

The housing of this kit is heavy gage steel, about 2 1/2 inches high, the same width as our PCjr with one side-car, and from front-to-back it is about 2 inches deeper. This little rear platform now supports the jr's plugs which were hanging directly into a recess in back of our desk.

We added the SCSI adapter device driver to our booting disk CONFIG.SYS file, then re-booted. Everything came up as anticipated, and we had two 10 Megabyte drives (C: and D:) ready to use. Total time from the doorway to a C: directory was about 15 minutes!

The hard disk is a Seagate ST-225 with a Shugart controller. The SCSI adapter and software are RIM products and this hardware-software combination seems to be fool-proof in the jr. It is also really fast, as all SCSI interfaces are! We are not using ramdisk utilities any more, except for the most time-intensive graphics files, so we have more RAM for the memory-hog programs, such as compilers, etc.

Paul Rau had already formatted and tested this drive with DOS 2.1 and conveniently included, both on the hard drive AND a floppy, all of the files necessary to get up and running. He also included some shareware programs for menus, de-arc-ing files, a couple of very necessary head parking utility and some other programs and suggestions. These little extras and the speed of shipping magnify the

differences between mail-order companies.

Paul Rau also supplied information and pictorial instructions with this kit to add a second 20 Megabyte drive. The adapter / controller combination is already set up for "daisy-chaining" more devices. This is possible because of standard SCSI interface specifications, the supplied controller, and especially the size of the power supply in the housing.

From the users' viewpoint, we are elated with this product!

P.S. We are now running the DEC Scholar Plus 2400 Baud external modem with all kinds of built-in error correction. It's a dandy.

PCjr User Recommends Several Inexpensive Programs

The following recommendations for software were given by Julie Hazen recently in the Compuserve PCjr Forum. We thought readers who have families and are looking for good, low budget software that runs well on PCjrs would be interested in Julie's suggestions:

1) BankStreet Writer/BankStreet Writer Plus by Broderbund (415) 479-1170 is an excellent word processing program that is VERY easy to use.

2) Instant Programmers Disk Series by Scholastic, Inc., 2931 E. McCarty St., P.O. Box #7502, Jefferson City, MO, 65102 has 3 disks [Productivity/ Games/Holiday] for 19.99 (.66 cents per program) that are very useful.

3) The pfs series [I have pfs: FILE] by Software Publishing Corp. is a very useful data base. Address: P.O. Box #7210, Mountain View, CA, 94039-7210.

4) Homeword by Sierra On-Line (209) 683-6858 is a basic word processing program.

5) I have found inexpensive programs on sale at some Sears retail outlets that have computer centers. For \$7-\$15, games like PAC-MAN, TOP GUN [by Thunder Mountain, P.O. Box #1167 Northbrook, IL, 60065-1167], and GHOSTBUSTERS [by Activision, P.O. Box #7287, Mountain View, CA, 94039] have kept my children happy.

Now's the time to do your Family Tree!

All the help you'll need is on FAMILY HISTORY (Disk #33). See page 22 for a full description of its features.

Atlanta PCjr Users Group Expands Its Activities

The Atlanta PCjr Users Group has grown from a small group of PCjr enthusiasts who used to meet in each others' living rooms to an active group with a newsletter and a bulletin board system.

All this has occurred since last fall, according to David Wilson, Editor of the Orphan Peanut, the group's monthly newsletter. Since last September, he says, the group has grown from about 15 members to 49.

Group members decided to become more aggressive about publicizing their existence and it paid off. They were mentioned as a Special Interest Group (SIG) of the Atlanta PC Users Group in the parent group's publications as well as in local magazine users group listings. This brought jr users out of the woodwork and, although some people drop out, new people are joining all the time, Wilson says.

If you live in the Atlanta area and you'd like to join, call David Wilson (404) 255-2731 for more information. Their BBS, called the PCjr Workshop (404) 728-0166 operates 24 hours a day at 300/1200/2400 baud, N,8,1. Dues are \$20/yr for full membership, or \$12/yr for either the newsletter or the BBS.

Beginner's Guide To PCjr Compatibility

How compatible is a PCjr with an IBM PC? That question is often asked by PCjr owners. The answer is, the PCjr is not perfectly compatible with the PC, but it can be made very nearly compatible.

First, both the PC and the PCjr have the same CPU (Central Processing Unit) chip -- the 8088, made by Intel. And the PCjr is 100% IBM compatible at what is called the BIOS level, which gives the PCjr a compatibility advantage over some PC clones in terms of running software both now and in the future. However, some of the PCjr's quirks get in the way of running some software developed for the PC, AT and XT's, even when memory is added to the PCjr.

We won't bore you with the technical details, but the way the PCjr's memory is configured is different from that of the PC, particularly the placement of the video segment. Most of these problems can be fixed by using software modifications that are easy to install and come with all memory expansion units. (We discussed these modifications in the April 1989 issue.) Once this is done, MOST, but not all programs written for PC, XT and AT compatibles will operate very well on a PCjr.

Oowl Software Performs PCjr To Tandy Modification

The installation of a chip that will enable PCjrs to run games listed as compatible with Tandy 1000s in 16 colors is now being offered as a service by Oowl Software.

The modification, which is relatively simple for those who have experience with soldering, was described in detail in the April issue of jr Newsletter.

This modification will enable PCjr users to select the Tandy 1000 option on games which present such options upon start-up. Then the modified PCjr will run certain games in 16 colors. This is useful for games which only run in 4 colors on unmodified PCjrs.

It does not, however, enable PCjrs to run games which automatically check the computer to determine which mode to use, rather than presenting the user with a set-up menu. In these cases, the software does not give the user a choice, but checks the computer's internal identifier to see what type of computer is being used. With this type of software, the use of a PC-ID Cartridge (available from most PCjr support companies) in conjunction with the Tandy 1000 modification will fool the software into running in 16 colors.

The Tandy 1000 modification has been thoroughly tested. PCjrs with the modification will operate normally with all software. There do not appear to be any software incompatibility problems as a result of this modification.

On some PCjrs with 640K and parallel printer ports installed, the modification has caused the internal power supply to blow a fuse. Albert Allen of Oowl Software says he has solved this problem (which only occurs in a few PCjrs) by disconnecting the Infra-Red Receiver, thus saving the small amount of power necessary for smooth operation of the modified PCjr.

Oowl Software will perform the PCjr to Tandy 1000 modification for \$24.95 plus \$6.00 shipping and handling. Or they will send a modification kit with instructions for \$9.95 plus \$2.50 shipping and handling. Contact Oowl Software, 1435 Burnley Square North, Columbus, OH 43229 (800) 322-0219.

Want to improve the quality of your printer's output?

You need IMAGEPRINT, the software designed to produce near letter quality on dot matrix printers. Also helps with formats. See page 23 to order IMAGEPRINT (Disk #50).

80286 Board for PCjrs

(Continued from page 1)

installed at 11.5 on the Norton Advanced scale, and says it's like an AT running at 9 MHz.

The cache can be switched off by means of software, leaving the PCjr to run at its normal speed.

Essentially, the new board replaces the Central Processing Unit (the 8088 chip) in a PCjr. "It's like a brain transplant," Ed says. You have the same arms, legs, eyes and ears, but suddenly you're able to think like Einstein.

Speaking of math, the MESAjr286 comes with a socket for an 80287 coprocessor for super number crunching.

The boards will sell for about \$340, complete with extra power supply, and should be available in limited supplies by the time you read this article. Owl Software, Computer Reset and Paul Rau Consulting all plan to carry the board. See ads in this issue for phone numbers and addresses of these companies.

We'll have a more complete report on the MESAjr286 in a future issue.

PCjr Book List

(Continued from page 1)

Beginners Guide to Basic On the IBM PCjr
[Compute]

Beginners Guide to Machine Language on the PC and PCjr
Metcalf C.D. & Sugiyama, M.B. [Compute]

Computers for Kids: IBM PCjr edition, 96p.
[Creative Computing]

Compute's First Book of IBM PCjr(30 programs and articles from COMPUTE mag).
[Compute]

Compute's Guide to IBM PCjr Sound and Graphics, 1984
[Compute]

COMPUTE'S PC & PCjr Games for Kids
[Compute]

Cookbook of Creative Programs for the IBM PC and PCjr
Rinder, Robert [New American Library]

Cracking the Peanut, Your IBM PCjr Companion, 232p.
Mishkoff, Hank [Wordware]

Discovering the IBM PCjr
Norton, Peter [Microsoft]

Easy Basic Programs for the IBM PC & PCjr
[Compute]

Exploring the IBM PCjr Home Computer
Norton, Peter [Microsoft]

Great Games for the IBM PCjr: A Buyers Guide for Families, 280p.
Hunt,Greg [Banbury]

Hey jr, Using IBM's Most Personal Computer
Arnold, D. & Cortesi, D.E. [Holt, Reinhart, & Winston]

Hey, Lets Play with the PCjr, 128p.
Erikson, J. & Richards S. [Banbury]

Home Applications In BASIC On the IBM PC & PCjr
[Compute]

How to Create Arcade Games & Graphics on Your IBM PCjr, 256p.
Socha, John

How To Operate the IBM PCjr, 40p.
Rinehart, J. S. [Flip Track]

How To Use the IBM PCjr, 136p.
Willis, J. & Manning, W. [diLithium Press]

IBM PC and PCjr Computer Workout, 62p.
[Software Lab East]

New Prices, New Speeds! SPC DISKITjr HARD DRIVE

DISKITjr 22H (now 29ms)	\$695	\$595
DISKITjr 33H (now 29ms)	\$795	\$695
DISKITjr 42H (25ms)	\$995	\$895
DISKITjr HD Interface Slidecar		\$245

Features: Works with all other add-ons, including Tecmar, Racore,, jrHotshot, etc.

XT compatible upgrades, no charge.

1 yr. warranty, customer references available.

\$15 shipping charge - None if prepaid.

Systems Peripherals Consultants

7950 Silverton Ave., #107, San Diego, CA 92126
1-800-345-0824 or (619) 693-8611 CA

IBM PC and PCjr Subroutine Cookbook, 207p.
Busch, David D. [Brady]

IBM PCjr Assembler Language, 352p., 1984
V. en, David C. [Sams]

IBM PCjr. Basic Programming & Applications Including
Logo
Nashelsky, L. & Boylestad, R. [Prentice Hall]

IBM PCjr BASIC Programs in Minutes, 174p.
Stanley R. Trost

IBM PCjr Favorite Programs Explained, 189p. 1984
Donald C. Kreutner [Que]

IBM PCjr For Students, 564p.
[Weber Systems, INC.]

IBM PCjr Graphics, 415p., 1984
Klowsky, D. & Abrash, M. [Sams]

IBM PCjr Programs for Learning and Teaching
Bell, F.H. [Reston]

IBM PCjr Software Guide and Handbook, 500p., 1984
VanDiver, Gerald

IBM PCjr User's Guide
Klowsky, D. & Abrash, M. [Sams]

IBM PCjr Users Handbook, 300p.
Weber Systems Inc staff [Ballantine]

IBM PCjr Users Reference Manual, 422p.
Held, Gilbert [Hayden]

IBM PCjr Primer, 168p.
Stern, Steve & Young, Greg [Reston]

IBM PC/PCjr Logo Programming Primer, 480p., 1984
Martin, D., Prata, S. & Paulsen, M. [Sams]

IBM PC/PCjr Programming for Learning and Teaching,
353p.
Bell, F.H. [Reston]

IBM Programs for the Home: For the PC and PCjr, 204p.
Sternberg, Charles D. [Hayden]

Introducing the IBM PCjr, 245p.
Cobb, D. F., & DeVoney, C. [Que]

Introducing the IBM PCjr, 160p., 1983
Seybold, A. [Sams]

Kids & the IBM PC & PCjr, 1985, 255p.
Carlson, Edward [Compute]

Kids, Basic, and the IBM PCjr, 200p.
Cassidy, Pat & Close, Jim [Prentice-Hall]

Learning Basic on the IBM PCjr
Bartee, T.C. [Harper & Row]

Mapping the IBM PC and PCjr, 336p.
Davies, Russ [Compute]

Porters Programs for the IBM PCjr
Porter, Kent [Signet]

Programs for the PCjr, 121p., 1984
D. Migicovsky, B. Madigan, S. Davis [Steve Davis Publish-
ing]

(Continued on page 18)

EXPAND YOUR PCJR

jr. Hotshot 512K Memory	CALL
Racore Drive II Plus w/DMA & 512K Memory	\$509
Quick Silver Cartridge	\$ 30
AT Style 84 key Keyboard, w/adaptor	\$ 88
20 Meg External Hard Drive System	\$579
1200 Baud External Modem	\$ 99
JR-RS232 Modem Cable	\$ 19
3.5" External Disk Drive	\$299
Nickel Express Jr 8MHz Turbo Board	\$ 79
Siamese Slots (cartridge expansion)	\$ 25

For a complete list with monthly specials
send a stamped, self-addressed envelope to:

Paul Rau Consulting

260 N. Lincoln Way * Galt, CA 95632

(209) 745-9284 (pst)

voice 9 a.m. - 4 p.m. / data 5 p.m. to 8 a.m.

PCjr Book List

(Continued from page 17)

Rainbow Quest: With Software for IBM PCjr computer, 120p.
Ramella, Richard [Green]

Sams ComputerFacts for the PCjr
[Sams]

Software Construction Set for the IBM PCjr
Anderson, Eric [Hayden]

Sound and Graphics with the IBM PCjr: Programs for Beginners, 256p.,
Zachmann, Mark [Creative Computing]

Taking Off With Basic on the IBM PCjr, 186p.
Watson, N. R.

Teaching Your Kids with the IBM PCjr, 255p.
Zeit, Leigh E.

Telecommunications With the IBM PCjr, 288p., 1985
Carroll, David [Prentice Hall]

The Complete Guide to Success with the IBM PCjr
Sondak, N. & Sondak, E. & Sondak, V. [Mosby]

The Complete Guide to Your IBM PCjr
Hergert, D. [Sybex]

The IBM PCjr Image Maker: Graphics on the IBM PCjr, 200p., 1984
Erikson, J. & Sayre R.J. [Osborne-McGraw]

The New jr., A Guide to the IBM PCjr
Rosch, Winn L.

The Plain English Maintenance and Repair Guide for Personal Computers:
IBM PC, PC XT, PCjr, and Compatibles 272p.
Beechold, H.F. [Simon & Schuster]

Things To Do With Your IBM PCjr
Willis, J. & Miller M. & Willis D. [Signet]

Using and Programming the IBM PCjr, Including 77 Ready To Run Programs, 256p.
Holtz., F. [Tab]

Using the IBM PCjr, 373p.
Lord, K. W. Jr. [Van Nostrand Reinhold]

Word Processing With Tour IBM PCjr(Home-Word), 160p.
Roth, T. & Mallowney, T. [Tab]

Your Second IBM PC & PCjr program, 240p., 1984
Lippman, Gary [Sybex]

101 Ready to Run Programs and Subroutines for the IBM PCjr, 320p.
Bretz, J. & Craig, J.C. [Tab]

88 IBM PC & PCjr Logo programs
Waite, M. & Martin, D. & Martin, J. [Sams]

Questions and Answers

(Continued from page 4)

nary ASCII text instructions, much like DOS commands or program names, but the programs used in CONFIG.SYS files have special features which, a bit like Terminate and Stay Resident programs, can make "resident" changes to the default parameters, such as the number and method of access to the drive(s), where the video memory is located, how much memory is usable, is there a mouse installed, etc. The extension of .SYS tells DOS (and you) that these are special programs. They are called "devices" in most cases. Because the CONFIG.SYS file loads different devices, depending on your needs, you "configure" the jr's active operating SYStem in a kind of "semi-custom" way. Carefully read any documentation about "system" files to understand what each does and how they affect the operating system before using them. Be especially careful of the order of loading, if the documentation mentions it. No damage can be done, but you can get some wacky configurations and freeze-ups! Don't be afraid to experiment...

To make a CONFIG.SYS file is simple enough. At the DOS prompt of A:> or C:> or whatever, just type in the following to write it to a booting disk. (A:CONFIG.SYS is our example)

COPY CON: A:CONFIG.SYS (note the one space) press enter DEVICE=PCJRMEM.COM (example; recognize memory) press enter BUFFERS=10 press enter (no spaces around ANY "=") FILES=20 press enter... and so on.

When the list of your desired devices is complete, do NOT press enter after the last entry, instead press the space bar, then press the Fn key then the #6 key. This combination tells the jr to write the list of commands to the disk in the drive. To see the file you have just written, type TYPE CONFIG.SYS then press enter, and there it is on the screen!

You see, the first line (COPY CON:) really is a COPY command. COPY from the CONsole, to a file called CONFIG.SYS, the following commands; DEVICE=, BUFF-

ERS= etc. right to the end of the list. Fn-6 is an end-of-file marker, so DOS then executes the COPY command to A:CONFIG.SYS. This technique may also be used to write any short files, such as .BAT (batch) files. We are reminded that CONFIG.SYS is a special kind of .BAT file, isn't it?

To see your new CONFIG.SYS in action, you MUST re-boot. Remember, the jr will automatically read and load the programs (devices) at a particular point during start-up. As a matter of fact, if you try to load it as a normal file by typing CONFIG.SYS then enter, you will get the message "Bad command"... This is a protection built into DOS to prevent clashes with devices already "permanently" installed and configured.

If You Like Word Puzzles, Word Craze Will Tickle You

Three different word games/puzzle makers are on a new addition to the jr Newsletter Software Store this month: Word Craze, Disk #87.

A program called Word Hunt generates word search puzzles from words you select. You make a list of up to 200 words and Word Hunt will include them in a word search puzzle which you can print and then give to any word puzzle nuts you may know.

This program might have many uses in addition to entertaining yourself. You could think of all the words to describe someone you love and send the word puzzle as a valentine. Or send it as a letter to a friend, making them think a little to figure out what you have to say. Parents can use these puzzles to grab the interest of kids learning how to spell, since the words you use can be easy or difficult -- it's up to you.

The sophisticated version of Hangman that's on this disk is not like other versions of the game we've seen. The words are challenging, even for adults, although good spellers of all ages will enjoy playing.

Quotefall, the third program on this disk, makes puzzles from quotes. Actually, the word "quotes" is a little misleading. You don't have to use famous quotations such as "Four score and seven years ago" The program will make a puzzle out of any sentence or series of sentences you write.

In fact, the program was written by a student whose mother loved word puzzles. So instead of writing her a normal letter, he'd send his letter as a quotefall puzzle. Another interesting way to communicate with friends and family, especially if they like word puzzles.

To order Word Craze, see page 21.

New Games Challenge You To....Stay Alive !!!

We called the newest addition to our collection of games disks "Stay Alive !!!" for a good reason. It's quite difficult to keep from getting gobbled up by nightmares, blasted by bombs or shot down by the enemy's Sopwith Camel.

In Dr. Sleep and the Nightmare Factory, you enter a many level world of life-threatening nightmares. Only your wits (and quick reactions) can save you, as you try to accumulate points and reach new (and ever more threatening) levels.

The next game puts you on the planet Iskib, where you battle hords of invading aliens. Your only hope is to gather ammunition, gain hovering ability and increase your fire-power as you move along the surface of this strangely low gravity planetary surface.

The trouble is, all types of equipment available for you to use to fight the invaders have a limited lifespan. When you pick up any special equipment, a meter in the top right corner of your screen begins to count down the brief time remaining before the equipment self destructs. You've got to be good to survive!

Then there's Sopwith, the game that puts you at the controls of a Sopwith Camel. Your mission is to destroy enemy tanks and installations while evading destruction by enemy planes. In the two player version, your opponent is the person next to you. Or you can fight the computer's pilots, who are devilishly talented.

All in all, if you can stay alive in all three of these entertaining games, you deserve a medal.

To order Stay Alive !!! (Disk #89), see page 21.

Hard Drive Controller Available At New Low Price

SPC is now offering to sell its Diskitjr Hard Drive Controller without the usual sidecar housing and cables for \$195. Bob Richards of SPC says this will provide a savings for those who may have an extra sidecar and who purchase a hard drive that comes with cables included. SPC sells the controller with sidecar and cables for \$245, so the savings is \$50.

Bob also says any PCjr users who want to purchase a laptop and use the jr hard drive with the laptop can get a trade-in from SPC.

* * * **PCjr CLASSIFIEDS** * * *

PCjr ITEMS - 300 baud Internal Modem - \$35; Serial Adapter Cable - \$12; BASIC Cartridge and Manual - \$35; Keyboard and Cable - \$35; Parallel Printer Sidecar - \$40. Will consider any offers. Call Terry Cutshall (606) 223-4618 evenings or (606) 232-5665 days. (6)

IBM PCjr - w/ Racore expansion. 2 drives, 640K, DMA, plus color monitor, joystick, BASIC & PC ID cartridges, manuals, DOS 2.1, blank diskettes, some software, clock/calendar and parallel printer port. \$750 + shipping. Larry Tuczynski, P.O. Box 12, Pleasant Valley, NY 12569 - (914) 635-2051 (6)

640K PCjr - Includes IBM Color Display - 2 Joysticks - Basic Cartridge - DOS 2.10 - PC Enterprises Video Cartridge - 1200 Baud Modem - Numerous Software (Spreadsheets - Databases - Utilities - Games & Many More) All Documentation & Manuals. CALL KEN (201) 334-3044. Asking \$550 (6)

PCjr 640K - via Hotshot expansion & jr Monitor with DOS 2.10, IBM: Writing Assistant, Technical Reference for jr, Basic Cartridge & Manual, IBM Guide to Operations for jr, and both keyboards. Asking \$750. Call Garrett (203) 696-8071 leave message. (6)

FOR SALE - Racore Drive II Plus with DMA, (5 1/4' drive), 512K memory. Speech attachment. Original manuals. Cartridge Basic, Quicksilver and Racore PC ID cartridges. 2 IBM joysticks. Technical reference and hardware maintenance manuals. Power supply and cables. \$300 includes shipping. Call Bruce (407) 482-2383 before 2:30 pm. Boca Raton, FL (6)

TRADE - Have Okidata Microline 92 Printer (Plug n' Play - simulates IBM graphics printer, no printer cord) Good Condition. Want PCjr, 128K or higher with "black brick" in good operating condition. F.E. Johnson, S79 W22370 Pinecrest, Big Bend, WI 53103 (6)

PCjr w/RACORE EXPANSION - (640K, DMA, 2-5 1/4 drives), IBM CGA display, video speedup, DOS 2.01, various software, all for \$625. Also, 2 IBM 128K sidecars, \$50 ea.; IBM Power Expansion - \$30; IBM Parallel printer atch - \$50; IBM Joystick - \$10; Epson printer interface card for LX-90 or Homewriter - \$30. Or all for \$725. Ted Winther, 212 Wellman Ave., N. Chelmsford, MA (508) 251-3716. (6)

HARDWARE/SOFTWARE - for the jr. Too many to list. Please sent SASE to: Alfred G. Woelk, 28 Nutmeg Court, Ridgefield, CT 06877-3710 (6)

PCjr - The following additions: 640K Expansion, 2nd Drive, Monochrome monitor, 2 keyboards, thermal printer. Software: Printmaster, Writing Assistant, Signmaster, Chartmaster, Mind Probe, Home Budget Jr., Good Health, DOS 2.1 and more ... Great Deal ... Judy James, P.O.Box 588, Brazoria, TX 77422. (409) 798-2472 home, (409) 238-4485 work. (6)

IBM PCjr - 640K w/300 Baud Int. Modem, 2nd Drive (Racore), enhanced and chicklet keyboards, color monitor, Microsoft Mouse w/soft., 2 IBM joysticks, DOS 2.1, Basic Cartridge, MYM with manuals and much misc. software. \$750.00 Gene Lindstrom, 7577 Inskip Tr. S, Cottage Grove, MN 55016 (612) 459-8064 after 5:00 pm (6)

IBM PCjr - 640K, Color Display, Parallel Printer Interface, Modem, Clock, Joystick, 2 keyboards, all cables, DOS, Basic, excellent software, blank floppies, PCjr books, all manuals, Asking \$650. Printer optional - all in mint condition - Call Bill (615) 971-5820 in Knoxville, TN. (6)

IBM PCjr - 384K, Racore Drive II Plus w/DMA, PCjr Color Monitor, mouse, Datadesk AT-style keyboard, V-20 CPU, Epson R-80/FT printer w/NLQ board, 2 joysticks, DOS 2.1, Cartridge BASIC, IBM Assistant Series, games and much more, all w/docs. Asking \$950 complete. Call George at (414) 442-2128 (5)

640K PCjr - PCjr Color Display, 2 joysticks, Parallel Printer Attachment And Cables. Cartridge Basic, PC Enterprises Video Cartridge, Various Game Cartridges & Programs, DOS 2.1 & All Documentation. Asking \$500. Call Ken: (201) 334-3044 (5)

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jr Newsletter Software Store



This software is the best public domain and user-supported software for the PCjr we've been able to find. All the programs in this collection have been tested on our PCjrs and are highly recommended. Some of these programs are equal to or better than commercial programs costing hundreds of dollars. The programs in this collection are available for \$5.95 per disk.

* **NEW** * **HAPPY GAMES.** Written by a mother to help her own preschoolers learn on their PCjr, this set of colorful educational games makes learning fun. Teaches colors, shapes, logic, eye-hand skills. 256K and joystick required. (Disk #88)

* **NEW** * **WORDCRAZE.** Create your own word search puzzles and print them out for friends and family. Or tease their brains with Quotefall, a unique type of scrambled word puzzle. And then there's a high-level version of Hangman. Just try escaping from the noose in this one! 128K ok (Disk #87)

* **NEW** * **STAY ALIVE !!!** Three games that require all your wits to stay alive. Can you avoid the terrible nightmares and reach the highest level in Dr. Sleep? Or fight off the alien hords on the Planet Iskib? Bet you can't shoot down the clever enemy pilots in Sopwith. If you can, you deserve a medal! 256K (Disk #89)

PCjr COMPATIBILITY DISK v2.0. Lists over 800 software titles, along with info on how they run (or don't run) on PCjrs. Also tips on how to make software PCjr compatible. 128K. Updated Feb. 1989. (Disk #60)

PCJR PATCHES V.4.0 Patches to fix software that ordinarily won't run on PCjrs. V.4.0 adds patches for the 512K version of King's Quest IV, and for running Loderunner with a V-20 chip. Also patches for Flight Simulator V.3, Arctic Fox, Managing Your Money V.3, Autocad, King's Quest II (PC version), Turbo C, Quick BASIC V.3.0 and 4.0, Starflight, Advanced Flight Trainer, Double DOS, Bard's Tale (16 colors), Turbo BASIC, and BASICA. (Disk #56)

BIBLE QUIZ Excellent quiz game tests knowledge of both the Old and New Testaments. Provides answers and biblical references for each question. For one to three players. 128K OK. (Disk #85)

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)

SPELLING BEE. A game that builds spelling skills from Grade 3 level to adult. You are an Olympic athlete representing your country. Excellent color graphics. Four skill levels from very easy to very difficult words. Fun way to become a spelling champ! 128K ok (Disk #82)

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)

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)

GALAXY. One of the easiest to use word processors we've ever seen, Galaxy has all the features you need to write letters and do most word processing. It has many, but not all, advanced features. Its strength is its simplicity, with help menus always ready to assist you. You probably won't even have to read the manual. 128K ok. (Disk #69)

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. Easy, easy to use. 128k (Disk #76)

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)

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)

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)

(Continued on page 22)

IMAGEPRINT V1.5. 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)

JR POWER PACK II. Disk full of programs to make your PCjr more useful and powerful. Fix compatibility problems, set up ram disks, tiny wordprocessor, set up 3.5" drives, use DOS easily, and more. Need 256K for some, 128K ok for most. (Disk #65)

PC-WRITE. This extremely popular word processing program 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, comes on two diskettes and requires 256K to run without the spelling checker, which requires 384K. (Order Disk #1 for 128K V2.5. Order Disks #2A and 2B for V2.7)

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)

CHECK PROCESSOR - Easy to use software for financial record keeping. Balance checkbook, print expenses by category, etc. 128K (Disk #59)

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 logon, 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)

PC-TOUCH. Designed to teach and practice touch typing. As you type, an on-screen line shows the number of erroneous keystrokes, and your accuracy rating as a percentage of keystrokes. 128K. (Disk #18)

FAMILY HISTORY. Includes complete manual on disk with how-to info on tracing and setting up your family tree with detailed genealogical information. Easy to use

and modify as you gather more data. New compiled version runs faster than previous version. 128K order Disk #33 alone. 256K order #33 and #33A.

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)

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)

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)

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)

DOS 2.1 FIX. Patches to fix the bugs in DOS 2.1. Cures most problems encountered when running memory intensive programs. Also patches to run BASIC and BASICA on DOS 2.1 without having Cartridge BASIC installed. 128K ok. (Disk #40)

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)

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)

HOME BUDGET MANAGEMENT SYSTEM. Easy-to-use system for keeping track of income and expenses. Create separate accounts for income tax categories and get a summary at end of year. Provides chart of ac-

counts, transaction reports, sorted ledger entries, etc. 128K. (Disk #57) Or v. 3.13 for improved screenwriting and disk access speed. 256K. (Disk #57A)

HOME INVENTORY. Taking an inventory of your home might even be fun with this easy-to-use software that takes you through the process step by step. Gives a complete record for insurance purposes. Also good for listing collections. 128K. Cartridge BASIC required (Disk #58)

GALAXY. One of the easiest to use word processors we've ever seen, Galaxy has all the features you need to write letters and do most word processing. It has many, but not all, advanced features. Its strength is its simplicity, with help menus always ready to assist you. You probably won't even have to read the manual. 128K ok. (Disk #69)

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)

CROSSWORD CREATOR. Helps crossword fans design their own puzzles. Handles puzzles up to 200 words and clues. Makes a standard cross-word puzzle print-out, or can save the puzzles for solution on disk. Requires 256K and Epson or IBM compatible printer for printouts. (Disk #71)

3 X 5. An information management program that works just like a 3 x 5 card file. It offers speed, versatility 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)

PC-DESKTEAM. Provides memory resident notepad, alarm clock, appointment calendar, typewriter, calculator, phone book, auto-dialer. Some say better than 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)

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)

PC-CHECK MANAGER. A menu-driven program that can handle multiple checkbooks, unlimited payees and ledger account assignments. Requires 256K. (Disk #25)

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)

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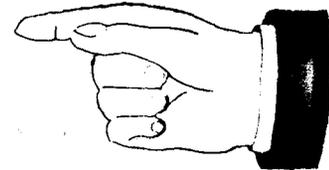
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