

jr Newsletter

How to Run DOS 5.0 On Your PCjr

(Part 2)

By John King

In Part I, we covered four ways to install MS-DOS 5 on the IBM PCjr and the DOS 5 boot record patch which is essential for all but Racore Drive Two equipped systems. After a modification of the CONFIG.SYS file to include the STACKS=0,0 line, DOS 5 was ready to run.

In Part II, we will make some technical comparisons of MS-DOS 5 with PC-DOS 2.10 and solve a few more problems.

MS-DOS 5.0 VS. IBM PC-DOS 2.10

The files for DOS 5 are larger than for early versions and take up more disk space. For example, all boot disks must have three DOS files, COMMAND.COM and the two hidden system files. For IBM PC-DOS 2.10, these files occupy only 40,960 bytes of disk space. With MS-DOS 5.0, the same three files occupy 119,808 bytes. As a result, there is less room on DOS 5 boot disks for everything else. If you like to run programs from self-booting disks, you may not be able to fit everything on one disk if you upgrade.

Since DOS 5 is larger than earlier versions, it also takes longer to boot up. Fortunately, the boot sector patch reduces the time required by eliminating the warm reboot normally done by the memory management software. As

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PCjr Lives!



*Good--They're asleep.
Now I can play on their PCjr!*

a result, DOS 5 takes only nine to ten seconds longer to load than DOS 2.1 even though it is three times the size.

DOS 5 also occupies more memory. The amount of RAM used by DOS is shown in Table I for two configurations using JRCONFIG.DSK version 2.15 for memory management. In the first case, a minimum ramdisk was created by using -S0 on the "DEVICE=JRCONFIG.DSK" line in the CONFIG.SYS file. In the second, a ramdisk large enough to fill the first 128K of RAM was created by omitting the -S parameter entirely. This is a better memory configuration since programs will load in the expansion memory above 128K and run faster.

Table I (see page 12) shows that DOS 5.0 consumes only 35K more RAM than DOS 2.1 even when the decreased ramdisk size is included. If you normally copy COMMAND.COM to a ramdisk, the larger command processor for DOS 5.0 (47,845 bytes vs. 17,792 bytes for DOS 2.1) will require an extra 30K of RAM allocated to the ramdisk.

DOS 5.0 requires the use of HUSH.COM or the -X switch with JRCONFIG to reset the PCjr disk drive parameters to minimize drive noise. This is the same as with DOS 3.0 and higher.

PROBLEM FIVE: THE SHELL COLORS

When you start DOSSHLL.EXE, the screen will come up with several blinking areas which is very annoying. Happily, this is a minor problem compared to the ones we have dealt with so far. The easiest solution is to simply

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Understanding and Supporting "Shareware"

User-supported software is a gamble on human nature that is making us all richer.

Sometimes called "Freeware" or "Shareware," the user-supported software idea has provided us with excellent programs ranging from word processors and database managers to graphics programs and games. Many of them are equal to or better than their commercial counterparts which usually cost many times the fee requested by a user-supported software author.

Judging from the thousands of orders we have received for the user-supported software jr Newsletter offers, the idea is very popular among PCjr owners, who have proved to be a cost-conscious and discerning group of computer users. In fact several user-supported software programs were selected by readers as their favorite programs in our Reader Survey last year.

A Wild Idea

When you think about it, the user-supported concept is

a pretty wild idea. It's kind of like a car dealer handing you the keys to a new Oldsmobile and saying, "Here, take it home, pile in the kids and the dog, drive it around for a while, and if you like it come back and pay me, when you get around to it." That's about the way this nutty software idea works. You get a program free from a friend or for a nominal fee from a users group and you try it out. Somewhere within the software, either on the title screen or in the (sometimes abbreviated) manual that comes on the disk, you are asked by the author to send him or her a check if you decide you like the program.

That's a pretty risky proposition for the author, who has no idea how many copies of his or her software are out there in the universe or who is trying it out. The author obviously has no way to force users to make their contributions. All he or she can do is check the mailbox every day to see if anyone likes the software enough to send a check. How did something as bizarre as this get started? Economics or Altruism?

Andrew Fluegelman, who trademarked the term "Freeware" when he distributed his telecommunications program, PC-Talk, had this to say about the experiment he pioneered in the early 1980's, "Up to now, distribution of software has relied either on restricting access (and charging for the cost of doing so), or anonymously casting programs into the public domain. The user-supported concept is a way for the computing community to support and encourage creative work outside the traditional marketplace.

"This is an experiment in economics more than altruism. Free distribution of software and voluntary payment for its use eliminates the need for money to be spent on marketing, advertising, and copy protection schemes. Users can obtain quality software at reduced cost, while still supporting program authors. And the most useful pro-

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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. 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. My printer(s) start printing garbage during a semi-long printing session, but I can usually get back on track if I shut down for a couple of hours. I realize this generally means a heat problem. My Epson RX-80 and the Star Micronics NX-10000 color printer both do the same thing so I figure this is in the jr somewhere. I've checked for loose chips, connections, etc. Any Ideas?
A. N. Fried, Redwood City, CA

A. As your letter indicates, in the "original equipment" category is the parallel port - this has to be a sidecar. Be really sure this is firmly in at the side multi-connector and screwed snugly in place. Make sure the top and bottom are clear for proper ventilation. If it is at all possible to switch sidecars with a friend you could easily eliminate or point to the sidecar as the offender. The same goes for the printer cable or cables. We don't know if you have a switch box for the printers, but it is also a prime candidate for a faulty (hot spot) connection at the switch contacts. In this case it would be somewhere in the the "common" feed of the switch, because you say that both printers manifest the problem. If you plug and un-plug the printers, the stress and flexing of the cable at the plug joint is another spot to test carefully. While the printer is printing garbage, or even before, grab the plug and really give it a couple of good twists, and bend and pull on the cable. As a general rule, a broken, open or fatigued wire strand is best found by trying to stretch the whole cable. Don't overdo it, though. If a strand or strands are broken or not properly connected, the cable will stretch and permanently open the bad spot. Of course, this absolutely points to the buggy part and it must be replaced. If you can't prove the bug is between the jr sidecar and the printers you can send the sidecar with full confidence to any of our advertisers who do repairs. They can do a full de-

bugging session and an estimate of repair cost or replacement. We would also send all cables, switches etc. to be sure the whole path is included for them to work with. They'll have an intelligent "break-out box" or something similar to stick in the path to debug the system.

Q. Why does my jr. lock up when using the Num Lock on my new keyboard? E. Nagle, Portsmouth, VA

A. On the original keyboard you had to press Alt-Fn-"N" to get the numbers across the top to act like the numbers on a standard keyboard and to input ASCII characters directly by the number. This key combination "toggles" the jr in and out of Num Lock mode. If the chips in the new keyboard rely on the jr for the changeover the new keyboard acts like the jr keyboard in Num Lock condition. It shouldn't lock up but it might input strange characters until you toggle it back to non Num Lock. If there is a selector switch for PC-XT vs. AT under the keyboard be sure to check it in BOTH positions (we think AT is the preferred position) and be sure you are still running some version of the INT 9 patch (by using jrconfig or the patch itself, from Disk #56). If none of this corrects the problem, send the keyboard back. There are plenty of excellent pre-tested keyboards around, especially from our advertisers, and these DO work just fine! If our readers will let us know which make and models are successfully operating trouble-free, we could print a list.

Q. Why won't jrConfig give me back all my original memory after I "setram" and then zero out my ramdisk? P. Salois, North Bend, WA

A. There are hidden parts of this and any ramdisk which cannot be "zero'd out." These are the regions in memory required for a directory and the inactive tsr section of the program. These remain in memory so you can "make" another ramdisk. Remember, jrConfig can try to use up, even if it seems inefficiently, the first 128k of RAM. This allows the jr to run at maximum RAM access speed. You cannot zero out and back down into the lower 128k part of RAM once this program has been activated. One ramdisk program which can start anywhere in memory and be truly zero'd out is the RAMDRV - RAMDISK system available from the Software Store on Disk #75 RAMDISK MASTER. The only trade-off is that if you haven't already used up or "marked" as used up, the first 128k of RAM this program

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Questions and Answers

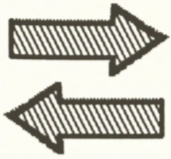
(Continued from page 3)

won't do it for you. We've found, however that you can make a ramdisk size which will take up enough RAM to insure that the application or program will load at RAM addresses above 128k. They then run at the best speed. If in one session you are willing to trade off the speed advantage for all the RAM you can get, just type RAMDISK OFF and ALL of it disappears, freeing up all possible RAM. This program requires a DEVICE=RAMDRV.SYS statement in your configuration file and it leaves a tiny TSR in place, ready to activate any size ramdisk at any time. By the way, the .doc file with it has a way to activate only three different sized ramdisks. You can ignore these and just type (or have in a BATCH file) a statement such as RAMDISK 233 and you'll actually have a ramdisk of 233k! RAMDISK OFF will clean out whatever size you used, returning your memory right down to the previous byte. The nice thing about this system is that you needn't re-boot to reconfigure the ramdisk. It is completely compatible with every configuration, every DOS version, on any computer we have ever tried. To answer another question you and others have asked:

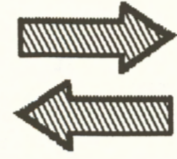
Q. When there is no disk in a drive and you or a program try to access that drive the message "Abort, Retry, Fail?" or "Abort, Retry, Ignore?" comes up, how do you get out of it?

A. If you just keep pressing R of course it will keep re-trying. If you press A it will try to abort, but sometimes it still needs to clear the drive error flag to even abort so the message comes up again and again! If you press F to acknowledge failure it will try to over-ride the disk read-failure, doesn't even find a diskette to either ignore or read anyway and the message comes up again. If you press I there is no actual file error (no file with an error in it) to ignore so the message comes up again. The trick is to press F two or three times (depending on your version of DOS) and it will finally clear the error flag(s) with the message "No longer a valid drive" and it will drop to your previous drive selection or the drive with command.com on it. If the first or second "F" press gives you a new message such as; "...blah, blah, no longer a valid drive" but the cursor is hanging there waiting at the end of the line, it is really waiting for you to type in a valid drive. At this point you should type the letter (give it the input) of a valid floppy drive which HAS a disk in it, or your hard drive. If you type in any other letter, including R, A, I, F or just <Enter>, the ridiculous sequence starts all over again! We think that drive message is the WORST case of error reporting and input requirement of all the DOS messages. ...Sorry, can't think of any short-cuts. You should

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Reader Feedback



Reader Shares Tips on Tax Software

Tips on **TurboTax** (A reader recently complained about seven required floppies!). You need 2 floppy drives minimum. If you have one 5 1/4 and one 3 1/2, you can reduce the seven 5 1/4 floppies to two 5 1/4 (one to boot up, and one to run) and two 3 1/2 (one for standard running, one for help). If you want IRS instructions, you need another 5 1/4 floppy. *The TurboTax instructions on how to do this aren't great* - they must expect most two floppy systems to be either two 5 1/4's or two 3 1/2's. At least they haven't abandoned all non-hard drive system, as other tax software vendors have done! It's great software - I highly recommend it. It almost makes doing your taxes fun!

If anyone needs help in running it on one 5 1/4 and one 3 1/2 drive, they can write to me for instructions. (Neil Frankel, 134 Monteroy Road, Rochester, NY 14618)

Question: Has anyone else had troubles saving large SIMCITY files? The problem arose after we did the Tandy Modification. The error message refers to buffers, but increasing Buffers= and Files= in CONFIG.SYS didn't help. Any suggestions? (Currently using FILES=20 and BUFFERS=15, and the V80 option on JRCONFIG.NRD)

EDITOR'S NOTE: Try reducing V80 to V64 and increasing Buffers to 20. You may be trying to squeeze too much into the lower 128K with your current config.

Elderly PCjr Owner Learning About Computers

My wife and I are 70 plus and have necessarily adapted to advances from the crystal radio to hifi, stereo, TV and VCR; and from travel by steam locomotive to turbo jets. Now we find ourselves being increasingly influenced by computers (both our daughter and grandson have used one), so we decided we'd better join the program or get left behind.

But where does one start? How do we know what we want a computer to do for us if we don't know what computers can do? Which comes first, the chicken or the egg? Fortunately for us, a neighbor bought a new (and more powerful) model and was selling his PCjr at what seemed to us a reasonable price which included the original instructional manuals, some 5 1/4 software and his subscription copies of your newsletter.

With the help of the manuals and articles for beginners in your newsletter, I'm gradually learning a little about DOS and the BASIC cartridge and what's on the software I got. I'm enclosing my newsletter subscription and an order for (4) numbered disks. My wife is also interested in Contract Bridge. I vaguely recall seeing a software program on this mentioned in one of the earlier newsletters, but can't seem to find it by number. If it is still available, could you send it as the free disk mentioned in the order form?

Years ago, we saw **Life with Father**. Little did we think we would experience life with jr.

Kenneth Bartels, Saint Louis, MO

Editor's Note: Thanks for reminding us. We have found a bridge program that works well on juniors and we've added it to the Software Store. See review on page 19 in this issue.

Reader has Software Problems and Tips

In both **PC Globe 4.0** and **PC USA 2.0** if I try to use the Tandy mode I get horizontal lines in it. Do I need the Tandy Modification or is there a way to set up my boot disk in order to run it in 16 colors?

Anybody who likes astronomy should pick up **EZ Cosmos 3.0**. You can view what the heavens look like from any place in the world from 4000 BC to 10000 AD. You can view interesting features such as the solar eclipses as seen from Hido, Hawaii on July 11, 1991. You can view full color pictures of far out galaxies such as Andromeda. All in all I feel that this program is well worth looking into.

A program from Apogee called **Monuments of Man** states that it will not run on an 8088 PC but it will run on an 8086 or higher. Well, it will run on my PCjr without any problem!

In the January issue of this newsletter, PCE mentioned that they had a VGA graphics board for the jr. Are they still going to offer it to the public? I am also interested in upgrading my jr into a 386 machine.

David A. Bercellii, Highland, IN 46322

EDITOR'S NOTE: In our August, 1990 issue, James Prossick reviewed both **PC USA** and **PC Globe**, giving them high praise. He stated that he was running the 1990

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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)

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)

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)

EARLY LEARNING. A collection of colorful educational games for ages 6-8. Sing-along alphabet, letter match, counting game, maze, pattern matching and more. 128K, need Cartridge Basic. (Disk #48)

EQUATOR. An excellent way to learn and review 35 basic equations used in math, finance and science. Learn to compute the volume of a cylinder, compound interest, or average velocity and much more. Manual on disk. 128K (Disk #20)

GAMES FOR EARLY LEARNERS. Young children like Teach Tot's alphabet and counting games. Other activities teach spelling and telling time. For Preschool through grade 3. Cartridge BASIC, 128K. (Disk #63)

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)

LANGUAGE TEACHER. Helpful exercises for both French and Spanish language students. Hundreds of vocabulary words and verb conjugations. 128K ok. (Disk #72)

MATH FUN! A great way to get kids learning how to add, subtract, multiply and divide. Includes a program called Math Tutor which has cleverly designed exercises for kids in Grades 1-6. Also Funnels and Buckets, a nifty math game that makes learning math fun. 128K. Need Cartridge BASIC (Disk #42)

PLAY AND LEARN. Educational games for kids 5-12. Word match games, find-a-word puzzles, word scrambles, and many more made by teachers. 128K, need Cartridge Basic. (Disk #32)

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Reader Feedback

(Continued from page 5)

version with the Tandy/PCjr graphics driver. You may have a later version, which may require the Tandy Modification to your PCjr in order to work. Perhaps you could convince the publisher to exchange your version for the older one, if this is the case.

Tips From An Enthusiastic Junior Lover-Promoter

EDITOR'S NOTE: The following comments came to us via a jr Newsletter Reader Survey sent in by Ron Legro of Milwaukee, WI. His bold handwriting filled the page on both sides with comments and tips. We couldn't resist passing them on you, just as we got them.

Owning a PCjr is like owning a '57 Chevy. Out-moded? Maybe, but it gets you around and it's a classic.

Imagic's "Touchdown Football" written for the jr years ago, remains a game favorable in features to many much newer products. Jr sportsfans should try to find it. (Computer Reset has it for \$12 - ED)

I now have an Imiga (which reminds me greatly of an enhanced, 1990s PCjr -- better graphics, 4 voice sound, etc.) but I still use the jr often for productivity, speech synthesis, etc. I have a lot invested in MS-DOS and the jr. Plus, it is clear that owning both the PCjr and the Amiga, I LIKE underdogs.

Tips:

1. Everyone should use the NMI patch routine. (This is available on PCjr Patches, Disk #56, and is automatically installed when you use jrconfig as your PCjr memory management software. Jrconfig is on our PowerPack disks as well as PCjr Autsetup, Disk #99)
2. Everyone (with enough RAM) should use DOS 3.1 or above.
3. 'A Thinfont Module and high quality monitor (I have a Thomson Multiscan) will greatly improve readability and reduce eyestrain. EGA & VGA are unnecessary for many non-graphics applications. If monitor allows, compress vertical image for even better CGA readability.
4. Buy a used jr for spare parts, or to hook up to your existing machine as a kind of mini-network. The new Synectics LANjr product or Traveling Software's Desklink may be useful. I bought three jrs, refitted them and gave two to family members.
5. If you're giving up on your jr, try selling it at a used computer store. Better: donate it (and some personal

time for training!) to a non-profit organization or needy kid.

6. Write software makers, reminding them "PCjr Forever!" (Thanks, Apple) and ..."Peanut Power."
7. Retire the jr as your prime machine? OK, but how about using it for X-10 home automation, or to control a phone line for E-Mail, or as a handy disk copying station, or! Once friendh)0*0*0*w with a 386 PC has his jr packed in an IBM carrying case, ready to travel or to unpack in an emergency, or to take with him to the cottage.
8. The "Best of jr Newsletter" Disks are excellent! They help speed research into PCjr problems and issues. Like having an on-line tech manual. Plus I can give all those old jr Newsletters to family members with hand-me-down PCjrs!
9. Could we have a National Junior Convention? Sort of like an Edsel Convention -- could be fun! Plus, think of the PR potential. Let's invite the peanut design team! **Don't you guys ever stop publishing!**

Inexpensive Way to Fix Power Supply

I recently purchased a used PCjr with a Racore second drive and memory expansion. I got it real cheap since it was broken. After a few checks I found a shorted diode on the Racore power supply. I found a replacement diode at Radio Shack (cat# 276-1661) which fixed the power supply. The shorted diode had also caused the fuse which is in the Black Brick to blow. So I cut the brick open and removed the transformer and fuse. I bought a project box and fuse holder from Radio Shack and mounted the transformer and fuse holder in it. Now if the power supply should fail again and blow the fuse, I can repair the problems easier.

Timothy Friedenberger, Indianapolis, IN

Beginner Solves Problem With Accidental Push

Thank you for all your patience in helping me use the diskettes I have purchased from you.

My recent trouble with the diskette #43, Brain Booster, was that I thought I had INSERTED my BASIC cartridge, as instructed in my BASIC book instructions, but I hadn't.

After receiving the diskette you returned to me, I tried again and was once more frustrated with no response. In my exasperation, I leaned a little too hard on the cartridge and heard a snapping sound, as though clips were slipping into place. Then everything went like clockwork. I had a great time with the Brain Booster.

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Software

(Order form on page 23)



More Educational Software

SPEED READ. If you'd like to double or triple your reading speed, and increase comprehension as well, Speed Read can help you do it. It provides instruction and exercises designed to break bad habits and improve reading efficiency. 256K (Disk #90)

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! 256K ok (Disk #82)

STUDY AIDS. Three great programs to help students. PHLASH - a computerized version of flashcards which you make and use for any subject. Multiple choice, true/false, and/or fill in blanks. FRACTIONS - a series of interactive exercises in fractions (many levels). And PHRASE - a program that picks out examples of bad writing in any document and suggests improvements. 128K ok (Disk #92)

THE WORLD V.2.6. Fascinating way to see the world on your PCjr! Just use the pointer to move over full screen map of world and press Enter to zoom in on any region, country or city. Many features. Even shows you hurricane tracks by year. 256K Reviewed 2/90 (Disk #105)

TIME TRAVEL IN HISTORY. A maze adventure game in which you have to answer questions about different periods of American History in order to get gold pieces--and save your life! 128K (Disk #21)

TYPING INSTRUCTOR. Disk contains both PC-Touch, a great typing exercise and speed testing program, and Touch Typing Tutor, a combination of lessons, including finger positions, speed tests and a typing game. 128K ok. (Disk #18)

WIZQUIZ. The Wizard keeps track of your progress in solving math problems that range from elementary level through fractions and negative numbers. Extensive exercises, with scores and times recorded under each "player's" name. Compete against your personal best as you improve your skills. Grades 4 through adult. 128K ok. (Disk #95)

WORD PROCESSING FOR KIDS. Simple, fun and easy-to-use word processor designed especially for beginning writers. Allows children to express their ideas easily and then print them out in large type on your printer. Colorful opening menus make learning the simple commands very easy. Parents/teachers manual is on the disk. 128K. (Disk #41)

WORDCRAZE. Create your own word search puzzles and print them out for friends and family. Just make the list of words you want in the puzzle and it's printed out for you. Or try 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! 256K (Update review 8/90) (Disk #87)

WORD GALLERY. Help your child learn to read with this colorful program that presents pictures and words to match. It's fun to use, has four levels, the last with a missing letter for the child to fill in for beginning spelling. 256K (Reviewed 4/91) (Disk #125).

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How Your PCjr's VGA Display Works

By John E. Wilson

Did you know that your PCjr has a VGA display system? That's right. No less of an authority than the IBM PCjr Technical Reference, on page 2-45, says: "The video color/graphics subsystem is implemented using a Motorola 6845 CRT controller device and a Video Gate Array (VGA)." However, and this is a big however, the Video GATE Array used in the PCjr is not the same as the Video GRAPHICS Array used in IBM's PS/2 computers. Junior's display system has the same initials as the high resolution display system used in today's computers, but the resemblance ends there. The VGA system in every PCjr is actually a close relative to the CGA (Color Graphics Adapter) video system introduced with the original IBM PC and it has little in common with the VGA system of the PS/2 computers.

Still, Junior's graphic system was an improvement over CGA. It offered the same screen resolutions as CGA, but in more colors. We'll take a look at Junior's VGA. We'll see how it works and we'll learn how to set Junior's screen colors.

If you turn on your PCjr color display, but leave the computer off, and look at it with a magnifying glass, you will see that the white screen is made up of thousands of very thin illuminated red, green, and blue vertical stripes, and that these stripes are divided by extremely thin black lines to make tiny, short, vertical bars. The display appears to be a rather passive device, but it isn't. The short vertical bars are made of phosphorus which momentarily glows whenever a beam of electrons strike it. In the back of your computer display is a "gun" that continually sweeps a stream of electrons across and down the screen turning on the phosphorus bits selected by the computer. This sweeping beam of electrons is called a raster scan.

Reader Feedback

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Apparently the trouble was due to my not pushing the cartridge in far, or hard enough, for it to come into contact with the mysterious innards of the cartridge slot. Of course, the instructions say nothing about pushing, or snapping in, they just use the word "insert" which led to my problems.

Thank you for your patience. I am truly a novice at my computer, for I have used it only as a word processor for many years. Your newsletter has given me the incentive to go further in utilizing my JR to its full potential. I intend to upgrade my CPU very soon, using one of your advertisers.

Liz Violante, Marco Island, FL

Junior's Resolution

The phosphorus bits are grouped into a unit that the computer is able to control, which is usually called a pixel (which stands for Picture Element.). The resolution of a computer display is given as the number of pixels across the screen (horizontal) and the number of pixels down the screen (vertical). On an IBM PCjr Color Display in the 640 by 200 resolution, Junior's highest resolution, each pixel is round and about six bars wide so that it contains, roughly, two sets of a red, a green and a blue bars. In the medium, 320 by 200, resolution each pixel is oval in shape. It is the same height as in the high resolution, but it is twice as wide.

All of the colors that your PCjr is able to make come from just the three colors; red, green and blue. Cyan, for example, results when just the green and blue phosphorus bits are turned on. Brown is a combination of red and green. White is a result of all three colors being turned on, and when none of the colors are on the pixel is black. Your PCjr Color Display is also able to control the intensity, or brightness, of the colors, which effectively doubles the number of colors. Black becomes grey, red becomes pink, brown becomes yellow, etc.

Chips and Tube Work Together

Controlling the tiny illuminated bars that make up pixels is hard work for the computer and your PCjr uses three different hardware components, in addition to the video display, to accomplish the task. These hardware components are all integrated circuit chips located on Junior's system board. One of these chips, mentioned earlier in our PCjr Reference Manual quote, is the 6845 CRT controller made by Motorola. CRT stands for Cathode Ray Tube, which is an exotic term for the computer display. This chip controls a variety of items, including the horizontal and vertical characteristics of the display, the cursor size, and video display buffer addresses.

The 6845 is used by several computer video systems including CGA, but the second hardware component we'll cover is used only on the PCjr. This is the Video Gate Array that we also mentioned earlier. Junior's VGA has two important jobs. One job is to control color and character blinking, and the second is to manage video related memory. You may remember from previous articles that all PCs use a memory mapped video system in which data for whatever is to be displayed on the screen is first placed into a specific memory location. This section in memory, often called the video display buffer, always starts (in color displays) at memory address B8000. Junior's video display buffer is different from most other computers in that it can be at almost any location, and it is probably never at address B8000 (which is the cause of most software incompatibil-

ity). Your PCjr has to be very sure that whenever a program directly accesses the video display buffer at address B8000, the call is sent to the actual address Junior is using. Junior's VGA does this rerouting. The other job that the Video Gate Array performs is to control screen colors.

These two chips are programmable and can be used to control Junior's video system on a very basic level but they seldom are. Programming them is fairly complicated and usually the same results can be achieved by easier methods. Programming video related chips also leads to almost certain compatibility problems.

The third hardware component in Junior's video system located on the system board is the Character Generator ROM. This chip, the MCM68A316E, just stores instructions for forming characters used in text modes. It cannot be programmed, but it can be switched with other character generator ROM chips to display characters in a little different form. The graphic modes do not use this chip. Instead, they draw each character using data from system read-only-memory.

Graphics Mode and Text Mode

As we have implied, there are two basic video modes - text and graphic. Within each of these two basic modes are several sub-modes for differences in resolution and in color use. IBM has named these two basic modes the alphanumeric mode and the all points addressable mode. The IBM terms are more cumbersome than the more often used terms, but they are probably more accurate, especially for the graphics mode. In the graphics mode (or using IBM's term, the APA mode) every pixel on the screen can be controlled. That is, each pixel can be turned on or off and set to a specific color when it is on. Since your PCjr is capable of handling up to 128,000 pixels, this is a very versatile and powerful mode. You can turn on pixels to draw objects with lines and circles and also fill in those objects with different colors and patterns. You can draw and erase pixels in a sequence to create animation, or just about anything else that your imagination and programming skills lead to. Of course, in the world of computers, power and versatility also means complicated and (often) slow. The task of controlling each pixel requires a lot of effort from the computer and programming routines to draw graphics are usually long and complicated.

The text, or alphanumeric, modes are the most often used modes. Junior, as all other PCs do, boots up into a text mode, and most of us stay in a text mode until the computer is turned off. The text modes are capable of displaying all of the characters in the ASCII character set. ASCII (Which stands for American Standard Code for Information Interchange, and is pronounced "ask-key".) is a standard code that represents characters by numbers that can be used by computers.

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Software

(Order form on page 23)



More Educational Software

MATH & LOGIC GAMES. Designed for kids in Grades K-6, but fun for kids of all ages. Six different games can be played against the computer, or with another human. Each game teaches a different logic and/or math skill. (Reviewed 5/91) 256K required. (Disk #126)

Games

ADVENTUREWARE. Six different text adventures with titles like "Island of Mystery," "Terror in the Ice Caverns," and "Moon Mountain Adventure," all test your wits and take you to strange mysterious places. 128K (disk #14)

ARCADE GAMES. Includes Kong, Pango, PC-Golf, Pyramid and other exciting, colorful games for hours of fun. 128K. (Disk #30)

BOARD GAMES. Eleven different games on one disk! Hours of fun with Monopoly, Yahtzee, Cribbage, Backgammon, Othello, and others. All run great on your PCjr! 128K. Need Cartridge BASIC (Disk #31)

BUSHIDO. Test your skills in martial arts combat. Fighters kick, spin, duck, punch, etc. Requires 256K and keyboard with function keys (Disk #16)

CASTAWAY/S. AMERICAN TREK. Test your survival skills as the survivor of a shipwreck in the South Pacific. Or as an explorer of South America. Two novice text adventures from Jim Button. Ages 12 and up. 128K. (Disk #53)

COMPUTER JOKER. Disk full of jokes, wisdom, and visual tricks to play on your computing friends. 128K ok (Disk #64)

DOUBLE TROUBLE. Two of the most challenging, highest quality arcade style games we've seen -- Amazing Mazes and Willy the Worm. Ten different mazes and five levels of play will tie your brain in knots. And Willy, who is the fastest, jumpingest worm you'll ever see, will beat you for sure! You can even modify Willy to give yourself more (or less) trouble. 128K ok. (Disk #68)

DUNGEONS & WARS. In Dungeon Quest you can choose to be a dwarf, elf, magic-user, fighter or other type of character. You select your strengths and weapons, too. Then you enter the dangerous dungeons on your Quest. Thermonuclear War pits the US vs. the Soviets in a very real demonstration of what a nuclear war might be like. Combat is a strategic battle on the ground. 128K ok. (Disk #9)

DUOTRIS. Two great Tetris-like games on one disk. Similar to the popular Russian strategy game, both of the versions add new twists of their own. Written in Turbo Pascal, both are high quality games. 128K ok (Reviewed 8/90) (Disk #116)

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)

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How Your PCjr's VGA Display Works

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What is ASCII?

The ASCII character set has been around for a long time. When it was set up it only used seven of the eight bits in a byte, reserving the eighth bit for error checking. Since seven bits can represent a maximum of 128 numbers, the original ASCII character set only contained 128 characters. The first 32 ASCII characters are called control characters because they are used for things like end-of-line and end-of-file markers, the Enter key and beeps. These characters were not intended to be printed out, but they are represented by symbols, including smiling faces and playing card symbols, that sometimes can be printed. The remaining 96 ASCII characters are the upper and lower case letters, the numbers and all of the other characters on your keyboard (including the space character).

The error checking bit is no longer needed so IBM begin using all eight bits and extended the ASCII set to 256 characters. The additional characters include some foreign language characters, mathematical symbols and some characters that can be used to draw lines and boxes. Your PCjr can print all of the extended set of ASCII characters on the screen using the keyboard, even though they are not normal keyboard characters. It is rather awkward to do so with the standard PCjr keyboard since you have to use the number key pad keys.

There are two different resolutions of text modes. One corresponds to the medium resolution graphic mode (320 X 200 pixels) and displays up to 40 characters across the screen. The other, corresponding to the high resolution graphic modes (640 X 200 pixels), displays up to 80 characters across the screen. All of the text modes have 25 rows. In both of these text resolutions there is a color mode and a monochrome mode. These four different text modes are numbered as shown in Table 1.

TABLE 1
Text Modes

Mode Number	Number of columns	Screen Type	Dos Mode Command
0	40	Monochrome	MODE BW40
1	40	Color	MODE 40
2	80	Monochrome	MODE BW80
3	80	Color	MODE 80

The IBM PCjr always boots-up into mode number 0, the 40 column monochrome mode, while all other PCs boot-up into mode number 2. Most programs will then set the mode to the one they need, usually an 80 column mode, but occasionally you will encounter one that doesn't. Then the

screen becomes confused and garbled with many lines wrapping where they should not wrap. You cannot change the way Junior boots-up, but there are several ways you can switch modes after Junior comes up to speed. One way is to use the DOS MODE command as shown in Table 1, making sure that MODE.COM is on your default drive when you type in the command. Another, more convenient way, is to use a configuration program, such as JRCONFIG.DSK (on Disk #65 in the jr Newsletter Software Store), to set the mode in a CONFIG.SYS file.

In both the 40 column and the 80 column text modes the characters are made within a box that is 8 pixels wide and 8 pixels high. Information on which pixels within a character box to turn on to form a character are retrieved from the Character Generator ROM we mentioned earlier. The computer just has to say what character it wants to print and the Character Generator turns on the pixels in the 8 by 8 box to form the character. Text is handled very efficiently, with a minimum amount of computer effort and memory.

In the IBM manuals you will often come across the word "attributes." Attributes refers to the features that determine the appearance of a character. They could include size, color and shape. However, in the text modes available on the PCjr (as well as most other computers) the only character attributes you can control are:

Foreground color - the color of the letter
Background color - the color of the pixels in the character box that are not used by the letter
Blinking - the letter is flashed on and off

These attributes are stored in one byte, and each character on the screen has its own attribute byte. Therefore, it is possible to have characters of several different attributes on the screen at any one time. You can also set the attributes globally so that they will all have the same colors, and blinking too, if you want. There isn't anything to stop you from having invisible characters in which the foreground color is the same as the background color.

Figure 1 shows the normal format of the attribute byte. You will notice that the first four bits in the byte set the foreground color, the next three bits are for the background, and the last bit, when it is on, causes the letter to blink. The foreground can be set to any of sixteen colors, but there are only eight colors available for the background. It is possible to change this. You can change the format of the attribute byte so that four bits, and thus sixteen colors, are available for the background. In this alternate format the ability to have blinking letters is lost. It isn't hard to set up the alternate attribute byte format, but we don't have space in this article to explain how to do it.

You can use the bit decimal values given in Figure 1 to set screen colors using programs such as JRCONFIG.DSK. One of the switches in JRCONFIG.DSK is the -fnnn option,

where nnn is any number from 0 to 255. To determine what nnn should be, first decide what screen colors you want and what combination of bits will make those colors; next, add up the decimal values of those bits. For example, suppose you decide that yellow letters on a blue background would be nice to work with. Yellow results when the green, the red, and the intensity bits are all turned on. So, looking at Figure 1, you can add up 2 for green, 4 for red and 8 for intensity. To this, add 16 for the background blue and the result is 30. Therefore, -f30 will set your screen colors to yellow letters on a blue background. These colors are more-or-less temporary, and will be eliminated with a CLS command.

What if you don't have a program such as JRCONFIG.DSK, can you still set your screen colors? Yes, but it is a little more work. You can use DEBUG.COM to make a short program that will activate some routines built into your PCjr's Read-Only-Memory to set your screen colors. There are many routines, or, to call them by their usual name - functions, in ROM that will set video characteristics. They are all called by way of the INT 10 assembly language instruction. Function number 6 will initialize a specified window on the screen using specified attributes. The window is specified by placing the column and row of the upper left hand corner of the window in register CX, and the column and row of the lower right hand window corner in register DX. The character attributes are placed into register BH and then the function is activated by placing the function number in register AH and invoking INT 10. If you are not acquainted with assembly language this probably won't make any sense to you, but you can still pick out your screen colors and set them with the following program.

With DEBUG.COM on your disk type in DEBUG <Enter> at the DOS prompt. You will get a blinking dash, which is the Debug prompt. Then type in:

```

a          <Enter>
mov AX,0600  <Enter>
mov CX,0000  <Enter>
mov DX,1950  <Enter>
mov BH,1E    <Enter>
int 10      <Enter>
int 20      <Enter>
<Enter>
n YELBLUE.COM <Enter>
rcx        <Enter>
F          <Enter>
w          <Enter>
q          <Enter>

```

You can now set up your screen with yellow letters on a blue background by just typing in YELBLUE. Of course, you can change the name to any that you choose, and the attribute byte placed into the BH register can be whatever

	BIT NO.	BIT CONTROLS:	BIT VALUE
FOREGROUND	0	BLUE	1
	1	GREEN	2
	2	RED	4
	3	INTENSITY	8
BACKGROUND	4	BLUE	16
	5	GREEN	32
	6	RED	64
BLINKING	7	ON/OFF	128

FIGURE 1
THE ATTRIBUTE BYTE

you pick. The numbers are all hexadecimal because DEBUG doesn't know about decimal numbers. The 19 in DX,1950 is row 25 and the 50 is column 80 to establish the lower right hand corner of the window. The upper left hand corner is row 0 and column 0. The attributes, placed in BH, are as we figured out previously, but converted to the hexadecimal base. I usually convert from one number base to another by looking in a table of something that gives numbers in both hex and decimal. DEBUG doesn't care whether you use upper or lower case letters, but you must be certain to have the extra <Enter> after the INT 20 instruction. The INT 20 ends the program.

We have covered a lot of information in this article, yet we have just touched the surface of a very interesting topic. The more you learn about Junior, the more you find out there is to learn. I believe that the real asset in owning a computer like the PCjr is in exploring it and in experimenting with it. It has enough differences from other computers to present interesting challenges, and enough similarities to provide a valuable learning experience. The things you learn on your PCjr are, for the most part, applicable to all PCs.

Do You Know What the Bible Says?

One way to boost your knowledge of what the Bible says is to use Bible Quiz, Disk #85 in the jr Newsletter Software Store. It tests your knowledge of both the Old and New Testaments, and provides the answers when you can't come up with them yourself.

Run DOS 5.0 on PCjr

(Continued from page 1)

select the Eight Colors or Mono 2 options from the Colors selection of the Options menu as described in the manual.

The source of the problem is the DOSSHELL.INI file for the CGA display. Background colors used for some areas of the screen, which are normal with the standard CGA card, blink on the PCjr. You can correct the problem by editing the INI file with the new DOS Editor. Look for the "title = Ocean" line which identifies the default color selection. Scroll down to the "background =" section and replace the offending "brightwhite" color with "white" and "brightcyan" with "cyan." For a final touch replace the "white" color for "elevator" and "titlebar" with "cyan" or another color so they will stand out from the background.

PROBLEM SIX: SOFTWARE INCOMPATIBILITY

Most programs will work as usual with DOS 5. However, disk optimizer (defragmenter) programs will require an upgrade as will any other programs such as PC Tools or the Norton Utilities that deal with disks in special ways.

Some programs won't run only because they expect a lower DOS version number than 5. SERVER.EXE is provided to handle this problem as described in the manual.

Some mouse drivers will have to be upgraded to work properly under DOS 5. Logitech provides free upgrades on their BBS to version 5 drivers.

Microsoft provides a text file on one of the upgrade disks detailing some additional incompatibilities.

PATCHING FORMAT.COM

As a final touch, I patched FORMAT.COM to provide the modified boot sector required for DOS 5

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Table I.
RAM Usage for IBM PC-DOS 2.10 and MS-DOS 5.0.

	PC-DOS 2.10	MS-DOS 5.0	Difference
Free RAM with Minimum			
Ramdisk (-S0)	588K	562K	- 26K
Ramdisk Size	10K	1K	- 9K
Free RAM with Ramdisk			
to Fill first 128K	508K	498K	- 10K
Ramdisk Size	89K	64K	- 25K

DEBUG Listing 3. Patch for FORMAT.COM

```
D 0F0C
U 0D6C L 3
A 0D6C
JMP 0F2C      ;Replace with JMP to our PCjr code at 0F2C
; Leave blank line to end assembly

E 0F2B
00
A 0F2C
; 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 0DAA    ;Jump back to normal start of boot record
; Rename the file FORMATJR.COM, write it to disk, and
quit.
; Leave blank line to end assembly

N FORMATJR.COM
W
Q
```

How to Run DOS 5.0 on Your PCjr

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boot disks, so that disks prepared with the `FORMAT /S` command would not have to be patched separately. As you might expect, the changes made to `FORMAT.COM` look a lot like the boot sector patch.

The easiest way to do this patch is to place `FORMAT.COM` and the `DOS 5 DEBUG.EXE` on the same disk. Give the command to start `DEBUG` and load `FORMAT.COM`: `DEBUG FORMAT.COM`. Type in the commands exactly as shown in `DEBUG Listing 3` omitting the semicolons and comments.

A `DEBUG` script is always a good idea, and I called this one `FORMATJR.SCR`. As with the boot sector patch, if you have more than one disk drive, you will have to edit `FORMATJR.SCR` for the number of drives. Execute the patch with `FORMAT.COM`, `DEBUG.EXE`, and `FORMATJR.SCR` on the same disk, by issuing the command: `DEBUG FORMAT.COM < FORMATJR.SCR`.

If the "U 0D6C L3" command does not display "xxx:0D6C xxx JMP 0DAA" and "xxx:0D6E xx NOP" this patch will not work.

When you are done, `FORMATJR.COM` will have been written to the disk. This is the special version for your number of disk drives. If you want to format a disk for a system with a different number of drives, you will have to repatch `FORMAT`.

NOTE: you must not use `FORMATJR.COM` to create boot disks for use on any computer except the IBM PCjr because of the special changes in the boot sector which `FORMATJR.COM` creates.

IN CONCLUSION

Well, that summarizes all I know about DOS 5.0 and the PCjr at this time. I'm not sure if I was the only Beta tester with a PCjr, but there must not have been many because Microsoft sure didn't feel compelled to make it easy to run their new DOS on our Juniors.

Print Sideways On Dot Matrix Printers

Side Writer is a handy little program designed to print text files and spreadsheets sideways on dot matrix printers. We decided to add it to our Software Store in response to requests from readers.

Side Writer works with IBM and Epson compatible printers. It can be configured by the user to print specified page widths and lengths. A help menu is provided. It will work on computers with 128K or more.

To order **Side Writer** (Disk #132), please turn to page 23.



Software
(Order form on page 23)



More Games

GAMES I. An assortment of games for hours of fun and excitement. Includes `Spacewar`, `Airtrax`, `Life`, `Wumpus`, `Wizard` and more. All good with 128K. Need Cartridge BASIC (Disk #8)

GAMES II. A wild bunch of games to test your wits and skills. Includes `Slither`, `Xwing`, `Torpedo`, `ABM2` and `Overreact`, where you are in charge of a nuclear plant. 128K. Need Cartridge BASIC (Disk #34)

GAMES III. `Kingdom of Kroz`, an award-winning arcade action game. `Go-Moku`, a challenging Japanese strategy game, also known as `Pente`. `Zigsaw`, the first really good on screen simulation of a jigsaw puzzle. All three on one disk. 256K Reviewed 12/89 (Disk #101)

GAMES IV. `Turbo-Car` tests your skills at driving a fast car on a two lane highway. Can you keep from crashing? Return to `Kroz` is a colorful, exciting arcade-strategy sequel to `Kingdom of Kroz` on `Games III`. `Trek Trivia` tests and expands your knowledge of `Star Trek`. Three great games on one disk! 256K Reviewed 2/90 (Disk #106)

GOLF/SAILING. Two great games! The golf game has three courses, user definable club ranges and a swing control that determines whether you hit a slice, hook or straight shot. Three nine hole courses (Novice, Pro, and Sadistic). In the other game, you try to sail the three legs of the Bermuda Triangle avoiding, if you can, the creeping mists, alien crystals, vortexes and storms. Your boat is equipped with radar, rudder and sail (all of which you control) and an engine for emergencies. 128K ok for sailing. Need 256K for golf. (Disk #47)

MEAN 18 GOLF COURSES. Three excellently designed courses for those who play "Mean 18," the commercial golf game. Disk #79 has `Boca Woods North`, `Boca Woods South`, both with especially challenging water holes, and `Kearsage Valley`, with fall foliage in full color. Disk #80 has `TPC of Avenel`, `TPC of Sawgrass`, with massive sand traps and a tough 17th green on an island, and `TPC of Woodlands`, which may be the most challenging of all. (Disk #79 and #80)

PC-CHESS. Two great chess games on one disk! A full-color, many featured chess program with four levels of play, allows such things as switching sides, setting up the board yourself, validity checking, en passant, etc. The other works on color or monochrome, has window showing options it considers before moving, adjustable difficulty level -- but a powerful opponent at any level. 128K ok for one, 256K for other. (Disk #44)

PHRASE CRAZE. Based on the TV show `Wheel of Fortune`, you get to be the guest who guesses the mystery phrases and wins piles of money! The wheel spins to select the amount of money you win for correct guesses. It gets harder with each round you play. You can add your own phrases to this game or try to guess the ones provided on the disk. Lot of fun for adults as well as older kids. 128K. (Disk #46)

PINBALL RALLY. A colorful collection of amazingly realistic pinball games. Using the Shift keys as flippers, the games get more and more complex until you get to `Twilight Zone`, the hardest one of all. Runs on 128K. (Disk #10)

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Questions and Answers

(Continued from page 4)

know by the way, this is a DOS bug which shows up just about the same way on other machines, so it is not a Jr. quirk. DOS 5.0 has a new and different error report which clears in a single keystroke, so you KNOW Microsoft has had some lively customer input about this.

Q. I have a jr with 640k (Hotshot) with two drives. I want to replace one of them with a high density 3.5" drive. Do I have to buy any new boards? G. Shaw, Loveland, CO

A. This bears repeating as the question comes to us often and readers help us out the same way! See pg 2 and pg 8 in April '91 jr Newsletter. PC Enterprises has tried a special drive system (speed controlled) and special software drivers to allow a 5.25 drive to format, read and write at high density. (1.2Mb) The drive(s) supplied to them in the early stages of development were not reliable enough for their standards and they chose not to market them. They were looking for another supplier and may have found one by now, so check with them. We do not know of anyone who has done the work necessary for 3.5" high density drives. The problem is one of controllers, as it always has been for disk drives. The PC-AT had a completely re-vamped disk drive controller board when it was introduced because standard controller boards could not handle high density drives.

Q. My Date & Time are consistently inaccurate from one session to the next, but not during any one given session. The clock (Quadram) is battery powered, I understand, and mine is six years old, so it must be ready for replacement. Can I do this myself? I've heard that batteries can explode when heated by soldering etc. Would I be better off with some kind of new Date - Time function. P. Shafer, St. Petersburg, FL

A. The battery IS on the Quadram board. Any computer shop can change this battery whether it is soldered or snapped in place. The cost, both for labor and the battery should be practically negligible. If you do not have any experience with printed circuit boards, we advise this route. They can do this little job in a jiffy. It would certainly be worth looking into for yourself first, however, no matter your electronic expertise. Even though the literature for one of our Techmar side-cars advises "Only technicians etc" should change this battery, it is actually very easy to replace. We just don't use a sledge-hammer or a blow-torch to get the job done. While we are on this subject, let's expand a bit. In some instances, where the clock chip is one which either sits under another chip "piggy back" style or

which sits directly in a 28 Double In-line Pin (DIP) socket, the battery is a really miniature button under a diminutive cover on the clock chip. Remember, the electronics required are less than in a \$3.00 quartz watch (sometimes the same chip assembly is used!) so the transistorized part of the assembly is really tiny! If the battery is soldered in and you're inexperienced you'll do more damage to the clock chip than to the battery. In most cases the battery is slid, snapped or pressed in place and there is no big deal to replace it. It is always the odd-ball chip or clock we are concerned about. In later computers, the battery powers so much more than just the clock that it is a rechargeable unit and gains recharge every time the computer is turned on, like an automobile battery! It is also usually a snap-on module. Can't figure out why a different Date / Time function would change anything.

Understanding "Shareware"

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grams survive, based purely on their usefulness. Please join the ex-periment."

Like Public Tv

Bob Wallace, whose word-processing software PC-Write has been ranked above Wordstar by some of the top software reviewers, calls his product "Shareware." He says, "Shareware is like public television: the programming is freely distributed, but support from users is encouraged." Wallace adds a twist to the user-supported concept that is somewhat unique.

Like most of the other authors he prods the user's honesty along by rewarding those who send in their contribution. The reward, in addition to a clear conscience, is a hard-bound copy of the manual, telephone support and notification of upgrades which can be obtained for a nominal fee once you've registered (in some cases, such as PC-Write, you get the first update free).

Wallace's addition to this customary list of benefits is that he will send a commission to anyone whose registered copy is cited by another person who sends in their registration fee. Thus if you register your copy and then pass the software along to a friend and he or she registers, you will be paid \$25 by Quicksoft, Bob Wallace's company. Get three friends to register and you've covered your \$75 registration fee. At that point you've really got yourself some "freeware."

We hope that readers of jr Newsletter are doing their part to encourage the development of user-supported software by sending in the requested donation for programs they enjoy using. This is the only way we can do our part to support an idea that has made us all richer in terms of high quality software at reasonable prices.

UPS Delivers When You Need It.

By Skip Mann

This article is about UPS and I don't mean the United Parcel Service. UPS here means the uninterrupted power supply available for computers. It is an electrical/electronic device that provides power to a computer when regular power is lost. Have you ever been working on your computer when the lights went out? If you were working in random access memory (RAM), you lost all the information in a flash. I use a very large RAMDISK which means I lose a great amount of information in a blackout or power loss. The lights go out, darkness follows, penetrated by words unrepeatable in mixed company. That is usually followed by a hollow feeling in the pit of your stomach.

Well, it doesn't have to be. I am here to tell you that there is a preventative measure, and it works. The solution is called an uninterrupted power supply (UPS) and this is how it works: When the power source, normally from your wall socket or other 110AC power source reduces current below that which will operate your computer or it stops completely, a sensor switch in the UPS switches power from the normal source to the batteries of the uninterrupted power supply in a matter of nanoseconds and you never see the power loss on your monitor. You are automatically switched so that there is no loss of power in your computer. To put it in the vernacular of the technically oriented, when electric power fails, the UPS provides power to an inverter which converts DC power to AC power to run the computer.

That leaves some questions about using a UPS such as:

1. How do I select a UPS unit for my computer?
2. How much is it going to cost?
3. Are there any alternatives?

The answer to question 1 is easy. The first thing you need to find out is what capacity unit you are going to need. Most computers and computer hardware have a label somewhere on them which states the nominal voltage and amperage used. The stated amperage is usually the peak load and is a good number to shoot for with a 10% overload factor. You will have to add together all the current ratings on all the equipment you want to protect. That usually means your computer, the monitor and anything else you have externally connected. Let's take an average PC with a couple of floppies and a harddisk (about 5 amperes) plus a VGA monitor (about 1.5 amperes). Then you multiply the amperes by 120 volts (6.5 amps x 120 volts=780VA). That would indicate that you need a UPS which will handle that load. Interestingly enough I have found that a UPS rated at 350VA will power my 386 with 2 floppies and two harddisks for 17 minutes. Since that gives me more than adequate

time to power down and save all the information in RAM, it is adequate for me. I would recommend a UPS rating of 450 for a normal 2 floppy, 1 harddisk PC. The cost of a 350VA UPS is about \$220 and a 450VA is about \$270. The extra power for \$50 is well worth it. If you have other external devices like a Bernoulli box or CDROM, you will have to measure the power required and increase the UPS power rating.

The UPS comes in a variety of sizes but suffice it to say the basic unit is about the size of a small box and contains batteries to provide emergency power. One big advantage is that once you hook it up and give it 24 hours to become fully charged, you can forget about it for a number of years. The protection is there and usually does not require much in the way of maintenance. The serious computer user almost has to have this power insurance.

If you really want to investigate UPS and its alternatives, the COMPUTER SHOPPER magazine, March 1991, issue has a super article discussing all aspects of UPS, provides comparative charts of the equipment available and provides a manufacturer's listing.

It is better to have UPS protection than exclaiming "OOPS" (or uttering other words of disdain and disgust) when the lights go out.

*(Originally published in the
Palmetto Personal Computer Club Newsletter).*

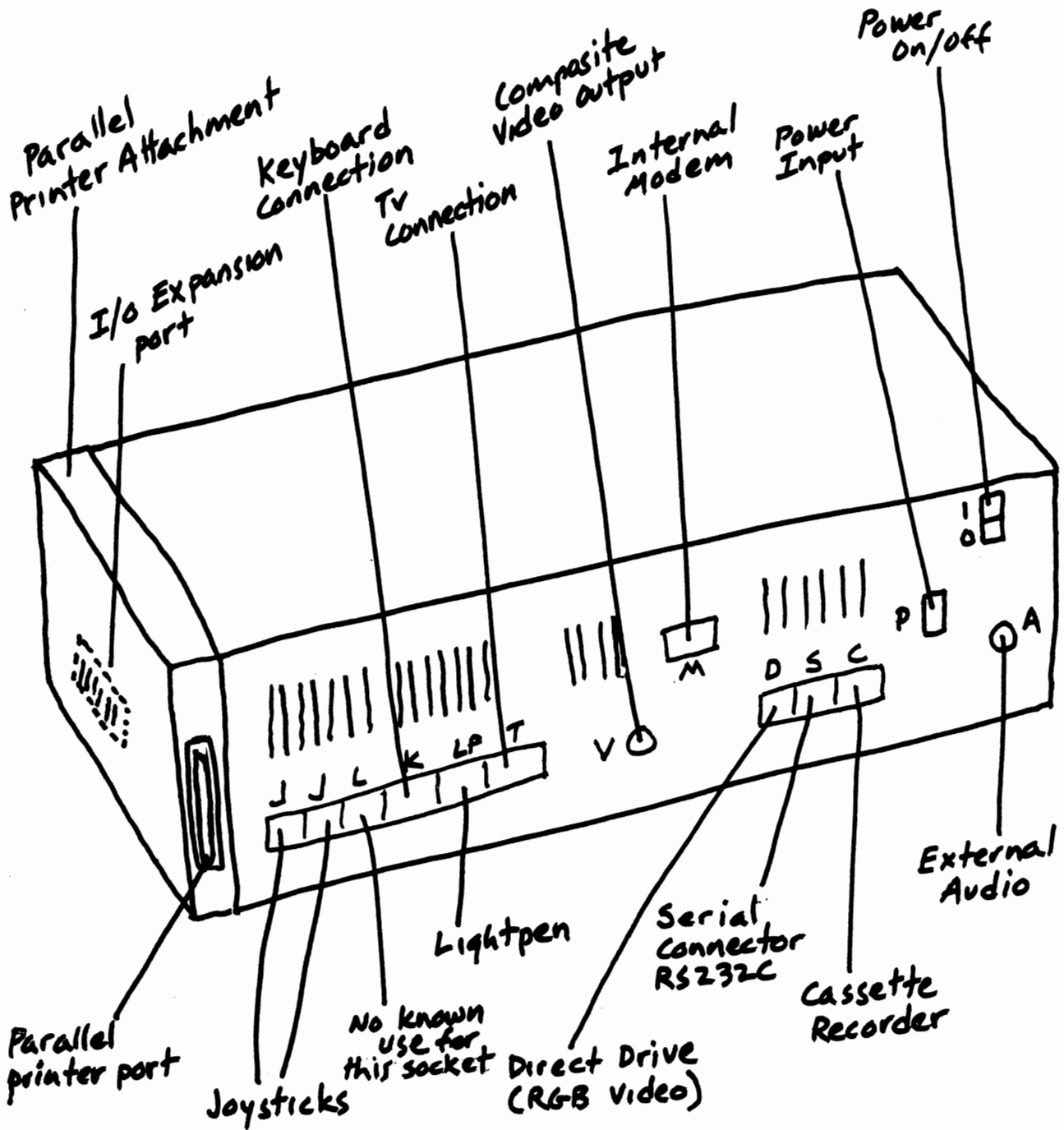
Sidecars and the PCjr

"Sidecar" is a word used to describe the external attachments to the PCjr such as the printer attachment, power attachment, and the 128K memory attachments. These attachments are installed on the *side* of the PCjr just like a "sidecar" on a motorcycle. The other PC models have adapter cards that plug *inside* the PC itself.

The power supply inside your PCjr provides enough power for the PCjr itself plus two additional sidecars (printer and 128K additional memory). If you add an internal modem, a third sidecar, or increase a 128K sidecar to 512K (with a special modification) then you should purchase a power attachment sidecar. The power attachment sidecar should be installed *first*, followed by the printer and additional memory sidecars.

PCjr sidecars have been made by a variety of manufacturers over the years. Many times you can purchase a 512K sidecar that has both a printer adapter and a clock/calendar built into it.

What PCjr Sockets Are For



What's It Worth?

This question has come up many times during the past few months. Well, to help everyone with prices, here is a list of current "market" prices for Junior and junior components:

128K Junior	\$125 to 175
256K Junior	\$175 to 200
512K Junior	\$250 to 300
640K Junior	\$275 to 350
(includes CPU, Power Brick, Keyboard and DOS)	

Add:

\$75 to 100	for PCjr Color Display
\$25	for parallel printer sidecar
\$50 to 75	for 2nd disk drive
\$10 to 20	for BASIC cartridge

Individual Components:

PCjr Color Display	\$75 to 125
Other Color displays	\$50 to 100
Mono displays	\$15 to \$30
"Big Blue" Thermal Printer	\$15
9-pin Printers	\$50 to 100
128K Sidecars	\$75 to 100
TV connector	\$5
64K Internal Memory Card	\$15
Disk Controller Card	\$25
Internal 300 Baud Modem	\$10
Cartridge BASIC, w/documentation,	\$25 to 35
BASIC cartridge alone,	\$10 to 20
2.1 or 2.11 DOS	\$10

(read the license agreement (d) inside the cover; you'll have to get rid of all your disks that have COMMAND.COM on them!)

BASIC Programs Can Be Fixed

If you are tormented by a BASIC program that gives you an "Illegal function call in Line XX", you might be able to run that program by simply eliminating the line referred to in the message.

Try LISTING the line, see what it says (better yet, make a note of it) and then eliminate it by typing the line number and pressing Enter.

If the line was simply making a command that cartridge BASIC can't handle, the rest of the program may run just fine with that line eliminated.

PC ID Cartridge,	\$5 to 15
QuickSilver Cartridge,	\$15 to 20
Jr Keyboard Cord,	\$7.50 to 10
Jr Keyboard,	\$20
PC Keyboard Adapter, RACORE,	\$20
PC Keyboard Adapter, Synetics (I've never seen a used one for sale!)	
Used Disk drive,	\$15 to 25
Parallel Printer Sidecar,	\$15 to 20
"Brick" power supply,	\$15
Internal Power supply, short,	\$20
Internal power supply, long,	\$30
Most PCjr Manuals,	\$5
Technical Reference Manual,	\$25

These prices reflect those shown in various PCjr Club newsletters and in other places during the last six months. Use caution when purchasing used software--especially if you wish to abide by shrinkwrap and licensing agreements of software manufacturers. Many agreements do not allow the sale of software.. which is why we need to support Shareware programmers.

(This article was originally published in the Eugene PCjr Newsletter.)

EXPAND YOUR PCJR

5 1/4" or 3 1/2" External Disk Drive, Case & Power Supply, and 512K Memory.....	\$326.
jr Hotshot 512K Memory.....	\$149.
3 1/2" External Disk Drive.....	\$179.
20 Meg Hard Drive System.....	\$299.
30 Meg External Hard Drive System.....	\$419.
2400 Baud External Modem/serial cable.....	\$138.
1200 Baud External Modem/serial cable.....	\$79.
Enhanced 101 Keyboard w/adaptor.....	\$89.
Tandy Modification.....	\$10.
Quick Silver Cartridge.....	\$30.
JR-RS232 Modem Cable.....	\$19.
Siamese Slots (cartridge expansion).....	\$25.

For a complete list with monthly specials call or write:

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(209) 745-9284

P.O. Box 682, Galt, CA 95632

Fixing My "New" PCjr

By John W. King

Recently I purchased enough parts to put together a second PCjr. It started with a scrapped PCjr without keyboard, monitor, or disk drive that I found at a swapmeet. The controller card and mounting hardware for the drive were still present, so I bought a new Fujitsu drive and installed it. (For instructions on installing a disk drive, see jr Toolkit (Disk #110) The computer booted up off the new drive without a hitch.

The keyboard and cord came from my first PCjr since I have upgraded that machine to a standard-size keyboard. I added a used Impulse 100 sidecar which brought the RAM memory up to 640K and provided a clock and printer port. Finally I bought a used color monitor from someone whose PCjr which had died of a defective motherboard.

My initial pleasure and excitement were dampened

considerably when I discovered a problem with the image on the monitor. A bad chip on the internal 64K Memory and Display expansion board was about to teach me some important lessons about computer repairs. The particular problem I had is really not important, but I'll use it as an example of how to approach a computer hardware problem. My "new" PCjr behaved normally until I ran a word processor. Text on the screen had a most peculiar appearance. Every other character was high intensity with the others normal. For an intended brown on black display, every other character was bright yellow rather than brown. Very odd.

A standard approach might have been to take the computer to a shop for repairs. Typical charges are \$65 per hour labor, plus parts at full retail. It's hard to get anything fixed for less than \$200 - \$300. Since I wanted a cheap computer, this was not the way to go.

The alternative was to try and fix the computer myself, but where do you start with something as complex as a computer? The answer is the PCjr's built-in diagnostics.

Pressing and holding Ctrl-Alt-Ins brings up the diagnostics menu on a PCjr. Most of the computer's functions can be tested. I selected the video tests identified by the picture of a monitor. Video appeared normal in 40 column mode, but the 80 column screens showed alternating intensity characters when there was text and vertical lines on others. This was an important piece of information. The internal 64K Memory and Display expansion board is required for 80 column mode but not 40. Here was a likely source of the problem.

I checked out the monitor by attaching it to my old PCjr. It worked perfectly. I also checked the Advanced Diagnostics which come with the Hardware Maintenance and Service manual. These suggested the motherboard was bad which turned out to be wrong. There were also some voltages listed for the display output, however I skipped these. I already knew that the problem was inside the Junior since the monitor worked fine on my original PCjr.

The next step was to remove the internal 64K board from the defective unit and replace it with the known good one from my other PCjr. Eureka! The display was normal. Also, the bad board installed in my other PCjr made the characters alternate in intensity. The problem was isolated.


There is some hazard in swapping parts this way. A good board may be damaged by a faulty computer, or a bad board could damage a good computer. None the less, for those willing to take the risk, this is a fast way to find bad parts.

IBM PCjr & CONVERTIBLE SPECIALS

PCjr	CONVERTIBLE																																																																												
<table style="width: 100%; border-collapse: collapse;"> <tr><td>128K External Memory</td><td>CALL</td></tr> <tr><td>256 K Internal Memory</td><td>CALL</td></tr> <tr><td>512K Internal Memory</td><td>CALL</td></tr> <tr><td>Second Floppy Drives</td><td></td></tr> <tr><td>5 1/4", 3.5" \$ 199</td><td>\$ 219</td></tr> <tr><td>20 Meg Hard Drive</td><td>\$ 495</td></tr> <tr><td>Parallel Attachment</td><td>\$ 69</td></tr> <tr><td>Serial Cable Adapter</td><td>\$ 20</td></tr> <tr><td>Mouse & Dr Halo 3</td><td>\$ 59</td></tr> <tr><td>Keyboard Cord</td><td>\$ 15</td></tr> <tr><td>Internal Modem</td><td>\$ 29</td></tr> <tr><td>101 Key Keyboard</td><td>\$ 134</td></tr> <tr><td>JOYSTICK</td><td>\$ 29</td></tr> <tr><td>Cluster Network Adapter</td><td>\$ 96</td></tr> <tr><td>PCjr Tech Ref Manual</td><td>\$ 39</td></tr> <tr><td>New Computers</td><td>\$ 349</td></tr> <tr><td>Refurb Computers</td><td>\$ 169</td></tr> <tr><td>Refurb Monitors</td><td>\$ 199</td></tr> <tr><td>REPAIR SERVICE</td><td>CALL</td></tr> </table>	128K External Memory	CALL	256 K Internal Memory	CALL	512K Internal Memory	CALL	Second Floppy Drives		5 1/4", 3.5" \$ 199	\$ 219	20 Meg Hard Drive	\$ 495	Parallel Attachment	\$ 69	Serial Cable Adapter	\$ 20	Mouse & Dr Halo 3	\$ 59	Keyboard Cord	\$ 15	Internal Modem	\$ 29	101 Key Keyboard	\$ 134	JOYSTICK	\$ 29	Cluster Network Adapter	\$ 96	PCjr Tech Ref Manual	\$ 39	New Computers	\$ 349	Refurb Computers	\$ 169	Refurb Monitors	\$ 199	REPAIR SERVICE	CALL	<table style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;">New Convertible with</td></tr> <tr><td>256K, Backlit LCD</td><td>\$ 895</td></tr> <tr><td>128K Memory Card</td><td>\$ 79</td></tr> <tr><td>256K Memory Card</td><td>\$ 225</td></tr> <tr><td>384K Memory Card</td><td>\$ 295</td></tr> <tr><td>Serial /Par Attachment</td><td>\$ 120</td></tr> <tr><td>CRT Adapter</td><td>\$ 99</td></tr> <tr><td>Enhanced LCD</td><td>\$ 79</td></tr> <tr><td>20 Meg Hard Drive</td><td>\$ 495</td></tr> <tr><td>Portable Printer</td><td>\$ 165</td></tr> <tr><td>Printer Cable</td><td>\$ 15</td></tr> <tr><td>Std. 1200 bd Modem</td><td>\$ 75</td></tr> <tr><td>Enh. 1200 bd Modem</td><td>\$ 175</td></tr> <tr><td>New Battery</td><td>\$ 89</td></tr> <tr><td>IBM Carrying Case</td><td>\$ 39</td></tr> <tr><td>LTI Carrying Case</td><td>\$ 49</td></tr> <tr><td>Auto Power Adapter</td><td>\$ 12</td></tr> <tr><td>9" Mono Monitor</td><td>\$ 115</td></tr> <tr><td>12" Color Monitor</td><td>\$ 329</td></tr> </table>	New Convertible with		256K, Backlit LCD	\$ 895	128K Memory Card	\$ 79	256K Memory Card	\$ 225	384K Memory Card	\$ 295	Serial /Par Attachment	\$ 120	CRT Adapter	\$ 99	Enhanced LCD	\$ 79	20 Meg Hard Drive	\$ 495	Portable Printer	\$ 165	Printer Cable	\$ 15	Std. 1200 bd Modem	\$ 75	Enh. 1200 bd Modem	\$ 175	New Battery	\$ 89	IBM Carrying Case	\$ 39	LTI Carrying Case	\$ 49	Auto Power Adapter	\$ 12	9" Mono Monitor	\$ 115	12" Color Monitor	\$ 329
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I checked on the cost of exchanging my defective board. One company offered a replacement for \$69, and this appeared to be as low a price as I was likely to find.

Just identifying the defective board had dropped the repair cost from over \$200 to \$69 plus shipping. Not bad, but more than I was willing to pay. After all, this was my second computer.

The Technical Reference manual was the next stop. This provided a schematic diagram of the expansion board as well as specifics about how video attributes which control intensity are handled. The schematic showed the board contained 16 memory chips and only four others. The diagnostics had not revealed any memory chip errors, so that strongly suggested that one of the four other chips was the culprit. I did check the two resistors on the board with an ohm meter, and they were fine.

The next step was to measure voltages at all the pins on the four chips while the computer was in 80 column text mode. I recorded these, installed my good board, and

(Continues on page 20)

Play Bridge Or Mahjong With Bridge Plus

Two excellent games from overseas are available this month on our new Disk #131--Contract Bridge and Mahjong.

The Bridge game, by Gerard Passera of Elancourt, France, offers bridge players realistic practice in bidding and playing the game against the computer. Since bridge is as popular in France as it is in the United States, Passera has no handicap when it comes to designing a challenging game.

The game includes bidding options of one to seven in any suit, or notrump. You can pass, double and redouble as well. Your computer will keep score.

Since instructions for playing bridge are not included on the disk, you either have to know the rules, or have a rule book on hand. This would be an enjoyable way to learn the game on your own, without needing three other players.

The Mahjong game was programmed by P.E. King of Essendon, Australia. Similar to the card game called "Rummy" in which you try to collect sets of similar cards, Mahjong is played with "tiles" instead of cards, and has several interesting aspects to the game not found in Rummy. Rules are included on the disk.

To order Bridge Plus (Disk #131), please turn to page 23.



Software

(Order form on page 23)



More Games

PLAYER'S CHOICE. Six different card games, some easy, some hard, but all excellent. Youngsters can have fun playing Memory or Even-Out, which are quite easy to master. Blackjack is hard to beat, and Poker, which has the ability to modify its play in response to your methods, is a real challenge. Also two fine versions of Solitaire, one with great graphics. Some need 256K. (Disk #78)

REFLEX POINT. Patterned on the TV show Robotech, this game follows the show's storyline, with the Freedom Fighters trying to reach the Reflex Point and destroy the evil Invid Prince. 128K ok. (Disk #12)

SCRABBLE. At last, an excellent Scrabble game that runs in 16 colors on PCjr's! Plays just like the board game. Expandable dictionary checks words. Keeps track of all premium score squares and scores for up to four players. Also contains WORDWHIZ, a nice vocabulary building game. 256K (Reviewed 5/90) (Disk #113)

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 hordes 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)

SUPER BOARD GAMES. Excellent versions of two popular board games Monopoly and Risk. Very much like the board versions, except your computer keeps track of everything for you. All you have to do is make the right moves and have fun. 256K. Need Cartridge BASIC (Disk #55)

TOMMY'S TRIVIA. Excellent trivia game with 3 ways to play against computer, 2 against human opponent. 2,500 questions in many categories, from entertainment to history. More Q's available. 16 colors on PCjr. Need 256K. (Disk #98)

WAR ON THE SEA. Based on World War II naval battles, this game allows you to command a fleet in seven different campaigns in the Atlantic and Pacific. Not a joystick game, this one will allow you to see whether you have the strategic skills to be an Admiral. 256K (Disk #100)

ZAXXON/GALAXY TREK. Two exciting high tech shoot-em-up games. In Zaxxon you fly through an obstacle course, shooting while you go, up and over walls, and eventually through space. Galaxy Trek makes you the commander of a Star Ship which you maneuver through the universe seeking to destroy a fleet of Megaton warships before they conquer the planets. 128K. (Disk #45)

Home & Family Management

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)

(Continues on page 20)



More Home & Family

SKYGLOBE V2.5. View a map of the heavens customized for your location, date and time. Maps 10,000 stars, 300 with labels, 89 constellations. Many useful features such as brightness selection, zoom in and out, printing on dot matrix, a "find" feature, and an astounding on-screen demonstration of star and planet movement across the sky. 256K. Reviewed 7/91 (Disk #129)

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

WILLS. Written by a lawyer, this software helps prepare wills that are appropriate for many different situations. Includes 18 basic types, with many clauses that can be combined to create "customized" wills for most families. 256K (Reviewed 4/91) (Disk #124).

EDNA'S COOKBOOK. Will organize your recipes by subject, allowing for quick retrieval. Print out sorted collection for your own cookbook. 128K, 2 drives. (Disk #96)

FAMILY TREE. Powerful genealogy program with easy to use menu system. Prints handy research forms, checks your accuracy, prints variety of charts and can make your family tree into a book! 256K (Reviewed 3/90) (Disk #109)

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.

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 accounts, transaction reports, sorted ledger entries, etc. 128 K. (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)

RESUME SHOP. Makes preparing a professional looking resume easy. Guides you through all the steps of the process with a series of menus and suggestions. One page limit. 256K (Reviewed 12/90) (Disk #121)

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

SAVE THE PLANET! If you want to do your part to stop destruction of the earth's environment, this disk can help you. Let your PCjr explore this extensive database of information on the major environmental issues as well as what you can do to help. Charts, graphs, background facts, games and demonstrations all related to saving the only planet we have. Need 512K. (Reviewed 1/91) (Disk #120)

(Continues on page 21)

Fixing My "new" PCjr

(Continued from page 19)

repeated the measurements. Only pin 9 of ZM-1, a 74LS374 chip, differed. I rechecked this in other display modes and confirmed the difference. This was the bad chip.

I removed the chip by cutting off each leg from the top. This left all 20 pins sticking out of the board. With a 25 watt soldering pencil, I heated the back of each pin and pulled it out of the board with needle nose pliers. Excess solder could be cleaned out of the holes with a solder "sucker", a rubber bulb with teflon nozzle. I heated from the back and applied the sucker to the front of the board.

I chose to solder in a socket just to be on the safe side and plugged in the new 74LS374. This is a common chip which I found at Electronics Plus in San Rafael near my home for \$3.75. Radio Shack is another source of electronic parts.

The repaired board works perfectly. The key was a good PCjr for comparisons with the defective unit! Swapping parts made isolating the problem area rather simple. Being a member of a Users Group can be critical when you have a problem. Where else is it likely that you'll find someone with parts to swap or experience with the same problem and a library with reference manuals.

Fortunately, my problem was on a plug in board in the main unit for which manuals and schematics are available. IBM has not released the schematics for the PCjr color monitor to the public. Therefore, problems with the monitor often lead to junking it and buying a replacement. I have a friend who was charged just over \$200 to replace the power supply in his monitor. That's a lot considering that color monitors of comparable quality can be purchased new for about \$275.

(Hank Kennedy, 813 Chisholm Valley Dr., Round Rock, TX 78681 (512) 255-2812 is now selling reconditioned PCjr Color Monitors for \$150 -- ED)

File Transfers by Modem

When you consider sending or receiving files electronically by modem, it's useful to know approximately how long the transfer will take. At 1200 baud, files are transferred at about 5,000 bytes/min. The rate will be a bit over one-fourth as great at 300 baud and almost twice as fast at 2400 baud. A disk full of shareware programs that you can buy for three to five dollars will take over an hour to download at 1200 baud. If it's a long distance call, perhaps you should consider mail order.

*** PCjr CLASSIFIEDS ***

PCjr 128K, socketed 8088, color monitor, keyboard with Keytronic 5149jr number pad, parallel print card w/cable, cartridge Lotus 1A, DOS 2.1. \$295 plus shipping. Craig Braymen (913) 625-4953 (eve).

PARTING OUT PCjr: Numeric keypad-\$15, power attachment-\$35, serial cable-\$10, keyboard cable-\$15, cartridge games-\$15ea, cartridge Basic/manual-\$30, configuration, PC ID, quicksilver, keyboard buffer, jrvideo cartridges-\$15ea, joysticks-\$15ea, proprinter-\$100, parallel print attachment-\$45, 512K Microsoft jr booster with MS mouse/flight simulator-\$200, keylights with five more slots-\$30, siamese slots-\$15, Tandy mod ship-\$5, internal true com1 serial card-\$40, jr tech reference and hardware service manuals-\$20ea, 128 jr-\$100, jr color display-\$100. **ALL PRICES/SHIPPING NEGOTIABLE.** RICHARD SCHNEIDER, 3210 HAWTHORN ST., SAN DIEGO, CA 92104, (619) 563-4871.

FOR SALE: Impulse 512K external memory sidecar w/parallel port, \$125 + \$5 ship. Also, PCjr 640K, parallel port, color monitor, 360K drive, \$300 + ship. Pete (203) 763-1850 after 6pm.

PCjr - 640K, 20 meg hard drive (bootable), PC Enterprises speedup card, 150 watt power supply, 2 IBM joysticks, cartridge BASIC, parallel printer port, DOS 2.1, Filing Assistant, King's Quest, Flight Simulator, more, all manuals. \$550 or best offer. Will pack/ship UPS; Bob (713) 360-2854.

How to Submit a Classified Ad

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THE BEST OF JR NEWSLETTER III. Disk contains most of the major articles published in jr Newsletter from the June 1988 issue through May 1989. Articles on compatibility, PCjr hardware and software tips, regular columns, letters from PCjr users, and other informative articles. Utility to search for subjects included. (Disk #91)

BEST OF JR NEWSLETTER IV. For your handy reference, disk has the most informative articles, columns, and tips published in Jr Newsletter from June 1989 through May 1990. Easy to use search utilities provide quick ways to find any subject of interest. 128K ok (Disk #118)

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).

See August issue for listing of other offerings in the jrNewsletter Software Store.

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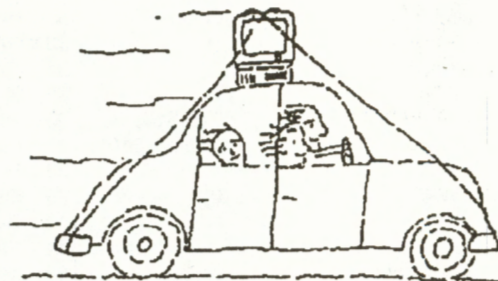
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