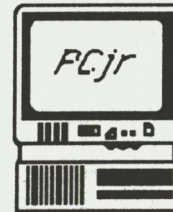


# The Junior Report<sup>®</sup>



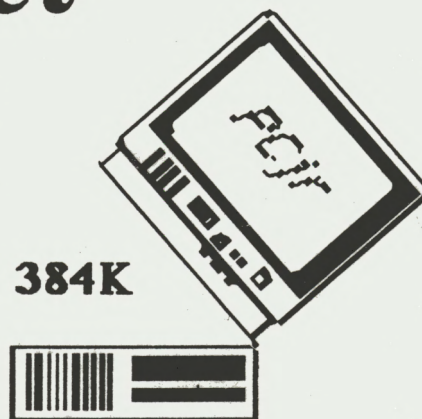
October 1988 Volume 4 Number 10

The National Newsletter for PCjr Owners

## A PCjr Memory Expansion Project

**David Collins shows us how to increase the PCjr's memory to 384K without the use of bulky and unsightly external sidecars.**

*As with any technical articles of this nature, it is best you know what you're doing before you do it. Read through this article and decide if it is within your technical expertise. Since the Junior Report or David Collins can not be there in person to help you, we are not responsible for anything that may happen to your Junior because of these directions.*



### Contents

<b>PCjr Memory Expansion Project</b>	<b>1</b>
<b>Editor's Notes</b>	<b>2</b>
<b>PCjr Compatibility</b>	<b>3</b>
<b>Letters</b>	<b>4</b>
<b>Communication with Jr</b>	<b>18</b>
<b>PC DOS Power Tools A Review</b>	<b>24</b>
<b>The Versatile PCjr</b>	<b>25</b>
<b>Classified Ads</b>	<b>27</b>
<b>Jack Nicklaus Golf</b>	<b>28</b>
<b>Eye on Shareware</b>	<b>30</b>

The following is a fairly simple method by which the PCjr may be expanded to 384 KB of memory. It consists of two sections, a hardware modification and a software modification. I will address the hardware problem first.

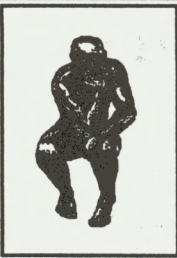
The PCjr, as originally configured, can hold only 128 KB of memory, 64 KB on the mother board, and 64 KB on the optional video memory expansion board. All of the address and data lines, as well as the relevant control lines are brought out of the side of the machine at the expansion port. RAM attached at this point and suitably mapped can be addressed by the processor just as if it was in the main unit. This project assumes that the user already has a 128 KB unit. The system RAM is mapped into the first 128 KB of the 8088's address space (0000:0000H to 1000:FFFFH). The video memory can claim anywhere from 4 KB to 32 KB of this system RAM (1st 128 KB), depending on the video mode set. This project assumes

that a worst case video mode of 32 KB is used, and that only the top two (16 KB) pages of the memory are used for video. This should be a fairly safe assumption, as the ability to use other portions of the memory for video is unique to the PCjr, and only programs specially written for it could use it.

The expansion RAM is mapped into the 256 KB of address space immediately above the system RAM, (2000:0000H to 5000:FFFFH). As stated earlier, all the necessary signal lines for the expansion can be found at the expansion port, on the right side of the machine.

Looking at diagram A (on page 16), we see ten chips, one 74F138 three line to 8 line decoder (U1), one 74F86 quad, two input exclusive or gate (U2), and a stack of 8 43256-12L, 32K x 8 static rams (U3-U10). The static rams are piggy backed and the pins soldered in parallel (except for pin 20, chip select which is bent out and left free).

(Continued on page 12)



By Harrison Day

## Finally, a real IBM keyboard for a real IBM computer

I've never been one to complain, but since the beginning of PCjr time, I've always lamented the junior's lack of a "real" IBM PC keyboard. Certainly, the enhanced PCjr keyboard was light years ahead of the original PCjr "chicklet" keyboard, but with its spongy key response and the lack of true function keys, it still left much to be desired as an input device. Clone PCjr keyboards such as Keytronic and Datadesk models improved the picture considerably, but I still wanted my MTV and IBM PC keyboard, with its positive tactile response and clickity-clack key action for my PCjr. Finally, someone is offering the original IBM 83 key PC/XT keyboard with PCjr keyboard adapter that will make my junior sing like my PC at work. Synectics Software & Systems (P.O. Box 53501, San Jose, CA 95153-0501, 408-281-7780) is my keyboard rescuer. The key is Synectics new PCjr Internal Keyboard Adapter which provides more PCjr compatibility with PC keyboards than ever before. It is called "internal" because it replaces the PCjr's infra-red keyboard adapter that is found inside the PCjr CPU. A flat cable extends from this new internal adapter to the rear of the

CPU where it connects with the PC/XT keyboard of your choice via a 5-pin DIN socket. Synectics reports that they have not found a PC/XT keyboard that does not work with PCjr in this setup. That's great news. More features of the adapter is that it does not use the LP socket on the back (like several PCjr keyboard adapters do), and it promises to eliminate the beeps and lost keystrokes that occur when typing during jr's disk drive spinning. We'll be reviewing the adapter with Synectics' **Keytronic 101 XT/AT keyboard** combination in the coming months.

For those of you who have decided to get into the spreadsheet scene, here's an offer you can't refuse. Norman Shatz, President of the Puget Sound PCjr Users Group (6021 140th SW, Edmonds, WA 98020), has obtained new copies of **Super-Calc3 especially designed for the PCjr**. This integrated spreadsheet with data management and graphics originally retailed for \$195.00, but can now be obtained for the remarkably low price of \$13.95. If you would like to reserve a copy, you can call Norm at (206) 745-9685, but please, use some consideration in calling so that you do not call at crazy hours.

We have received letters that some of you are having a problem with The Rubik's Cube program (Disk #135). We failed to mention in last month's edition that you can only use 128K memory with the program, or in other words, use a standard DOS disk without a PCjr memory recognition file if you have expanded memory. Sorry about that.

Here's an interesting development that may be of interest to you. Insite Peripherals of Santa Clara, CA is developing a specially designed high density 3.5 inch floppy diskette that may be able to read and write



### BORLAND'S GUNSIGHT

1,250 tracks per inch, for an unformatted total of 25 megabytes! Currently, there are 720K and 1.2 Meg disk drives for the Junior, and who knows, maybe we'll see these tiny "hard disk"-like drives for the PCjr someday.

John Wilson's third and final installment of Looking At Junior's Video Display - Part III will be in next month's issue due to its length. Look for this great ending next month.

R.M. Lombardo of Tallahassee, Florida (an avowed Mets fan) has provided us with some great information about some PCjr books still being offered. They are published by Arcsoft Publishers, P.O. Box 132, Woodsboro, MD 21798. They are:

IBM PCjr Games Programs	-\$7.95
40 IBM PCjr Programs for Home, School, and Office	-\$8.95
101 Programming Tips and Tricks for The IBM PCjr	-\$8.95
222 BASIC Programs	-\$18.95

Ruth Grove has informed us that Borland's Turbo C 1.5 runs great on the Junior except for one problem - it crashes whenever you use a program which uses floating-point

(Continued on page 29)

# The Junior Report

\*\*\*A Publication of The PCjr Club\*\*\*

## EDITOR

Harrison Day

## ASSISTANT EDITORS

Dolores Jack

## MANAGING EDITOR

Marilyn Dai

## CONTRIBUTING EDITORS

Blair Bieser

Jim Booth

Ari Feldman

Tim Hallen

Jim Prossick

Jim Streater

John Van Dyke

John Wilson

Vincent Yuan

## SUBSCRIPTION SERVICES

Marie Tabers

## SHAREWARE COORDINATOR

D. Glanville

## TECHNICAL ADVISORS

Brian Cook

Jacqueline B. Leddy

The Junior Report is published 12 times per year by the PCjr Club, P.O. Box 59067, Schaumburg, IL 60159-0067. Though we make every attempt to verify the accuracy of the statements and articles in this publication, the publisher, editors, or writers accept no responsibility for the accuracy or the reliability of the information in The Junior Report. In other words, we are not responsible for anything that may occur to you or your equipment. In fact, if you know of any other good disclaimers, let us know. We collect them. Reprint permission is freely given to any PC or PCjr user group publication provided proper credit is given to The Junior Report. IBM and the PCjr are registered trademarks of the International Business Machines Corporation, and is not affiliated with The PCjr Club.

# PCjr Program Compatibility: Part I

By Steve Mark

It has often been my experience that programs that are not supposed to function properly on the PCjr actually run just fine. The purpose of this article is to share, with other PCjr owners, the factors I have found that do and do not affect PCjr compatibility.

I will try to keep this discussion very non-technical. I don't know much about interrupt levels, assembly language, or soldering irons, and have no burning desire to learn now. I promise to get no deeper than an occasional reference to the CONFIG.SYS file and some Internal Modem command codes.

I also promise that everything in this article is based on my personal experience unless otherwise noted. There will be no "I think I heard somewhere that..."

My present system has 640k with two diskette drives. I started in September 1985 with a 128k, single drive PCjr. A month later, I bought a PCjr Internal Modem. Then came a 128k Microsoft Junior Booster, a Quadram Expansion Chassis that included a second drive, 384k, and a parallel port. A Hayes 1200 bps external modem and an IBM Proprinter finished the configuration (and my bank account).

Most reasons that programs supposedly will not run on the PCjr can be categorized as follows:

1. Configuration
2. Communications issues
  - o The PCjr Internal Modem
  - o Comm port addressing
  - o DMA
3. DMA
4. The Video Buffer
5. It actually won't work on a PCjr.

This article discusses each of the above considerations and has a section that contains some simple techniques I have used to get the best performance from my PCjr.

## Configuration

One of the earliest sources of misinformation regarding PCjr compatibility was the original maximum configuration. Many programs were said not to run on the PCjr simply because the programs required two diskette drives and/or more than 128K. To confuse matters more, many dealers and software vendors seemed unaware that several accessory manufacturers made it possible to add a second diskette drive and/or a fixed disk to the PCjr. Some software manufacturers, however, came out

*(Continued on page 8)*



By Dolores Jack

*Thank you for your letters and comments. We're sincerely sorry that we are not able to answer all letters personally, but will attempt to cover as many questions and topics as possible in this column. All letters become the property of The PCjr Club and are subject to editing for length and clarity.*

### HAPPY AND PRODUCTIVE PCJR OWNER

I have been a very satisfied and proud owner of the PC Junior for the past 4+ years. I bought my PCjr complete with Racore 2nd drive, RAM memory to 512k and a Jr color terminal in late 1983. I have since added a mono terminal for use with some of the different programs I use, and I began to use a cord on my keyboard a couple of years ago, having found the infrared eye of doubtful value. I originally bought my machine with the intention that I could use it for/with some of my outside interests and activities, and my children could use it as required for their 'school' work. I have yet to be surprised by its inability to accomplish our respective goals. In fact the format I use in my records are now being accepted as the standard for our Province. A recent letter from our National body has requested details of my data entry and the program I am using. All this produced from the lowly Junior.

For the past few months I have thoroughly enjoyed sharing the newsletters you send to a friend of mine in North Vancouver. It was through

my friend that I first saw and learned of your very informative newsletter.

I think it is time I bought a subscription of my own. Keep up the good work!

Keith Harris  
Canada

*We're sure that you're not alone in your praise of the Junior and its many capabilities. It's not what machines we have, it's what we do with our machines that matters. We can see that you have done a lot, and we congratulate you.*

---

***I****t's not what machines we have, it's what we do with our machines that matters.*

---

### UNINVITED AND PCJR KEYBOARDS

I have been a subscriber to your fine newsletter for two years and up to this point have been very satisfied just gleaning the information from each and every issue as it arrives in the mail. Now however I have some questions with which you may be able to help.

I am writing this letter on my jr, with 640k thanks to the help of the Jr Hotshot board, two disk drives and the

standard enhanced Jr Keyboard (not the Chicklet type). My problem concerns software from Mindscape called Uninvited. This fascinating adventure game (I know its fascinating because I have run it on a friends Wyse system) will load fine, all the title and the first screen appears to come up without a hitch then the problem comes up, the game will not respond to any of the key presses that should activate it. Although the instructions say tell you to use the numeric key pad to move the cursor on the Wyse system the cursor arrows and the number keys at the top of the keyboard also do the same thing as the numeric keypad. The cursor however will not respond on the PCjr. All that will happen is that after the first key press of any key the program locks up. Will an enhanced type of keyboard solve my problem or is there some way of configuring the system to get around this glitch? If the keyboard is the answer can you recommend one that will attach easily and give me good service for the money. Perhaps a feature on the best aftermarket keyboards, their advantages, disadvantages and features would be of interest to more than just myself. Thank you for the help and keep up the good work, I look forward to The Junior Report every month.

Ray Ott  
Cheektowaga, NY

*We have tried The Uninvited on our PCjr's equipped with all kinds of*

PC-XT keyboard clones, and we haven't had any success either. This may be a problem for the software boys to handle. As far as keyboards are concerned, we still like the original IBM PC keyboard that can now be used with the Junior (see Editor's Notes for this month), and then it's a toss-up between the Datadesk and Keytronic keyboards for second and third place. We will be doing a new review of the Keytronic keyboard soon, so don't change that dial.

**IBM REPORTING ASST.**

When I purchased my PCjr I also received IBM Writing Assistant, IBM Filing Assistant & IBM Assistant Home Solutions. Each of these programs refer to IBM Reporting Assistant for printing out various reports. I have been unable to obtain any information on this program as to availability or if it will run on the PCjr w/ 128KB of memory. I am also interested in obtaining IBM Home Budget Jr and a some PCjr clubs keyboard overlays.

Any information you can give me on the above would be appreciated.

Thanks for your help and for publishing a great informative newsletter.

Larry Hannis  
Newton, NJ

*The Reporting Assistant was one of the original Assistant programs produced by PFS Software company for IBM. IBM marketed these programs in hopes of bolstering the PCjr 128K market. Yes, the Reporting Assistant runs on a 128K junior. Finding the program poses a more difficult problem. Some Nynex Business Centers still have access to some of these Assistant programs, and any IBM authorized dealer should*

*have the capability of ordering any IBM software program. But the best solution may be to buy the PFS version of The Reporting Assistant called PFS Report since most of the Assistant programs can exchange data with their "sister" PFS programs.*

**MEMORYMATE: PROBLEM OR SOLUTION?**

I would like to report a PCjr compatibility problem with Broderbund's MemoryMate you might want to pass on to the readers. After purchasing their demonstration disk, and having no trouble, I purchased the regular program. I had trouble getting it to install but got it going after talking to technical support. A day later I had some problems so I called technical support. After a little talk and some consultation at their end, I was informed that MemoryMate would not work on the PCjr and to send it back for a refund. This I did and got my refund. As a PCjr owner I wondered why it wouldn't work so before I sent it back I experimented for a while and had the program working perfectly as far as I could see. I was able to do all of the functions listed in their main menu even to the point of creating new files. Since I didn't want to waste a lot of time creating files that I might not be able to use, I sent the program back. I no longer could have a legitimate complaint with Broderbund.

I think PCjr users should be warned what Broderbund's technical support staff told me and not buy it. If they have already gotten it and are having trouble they should contact the company. I personally believe it will run on a PCjr but

didn't have the courage of my convictions enough to keep it.

By the way, I tried the program on a PCjr enhanced to 640k of RAM and a second disk drive added.

Ivan J Phillips  
Huntingtown, MD

*We haven't tried MemoryMate ourselves but others have included the program on their PCjr-compatible list, while others have written to inform us of its PCjr-incompatibility. We believe several factors could be involved including the type of expansion hardware as well as memory configuration software. If all of those who have used the program with or without success could write us, defining their system and software, we could solve this problem better. We think you made the right decision in sending it back until a verdict comes in on MemoryMate.*

**EPYX AND THE PCJR**

I am always amazed at the ingenuity of your readers in solving compatibility problems etc, and I am delighted with the programs you publish each month. Perhaps someone can help with my problem?

Epyx software had a special in Compute! magazine so I sent for PRINT MAGIC. It will load and display the menu screen but there is no highlight bar to choose any option so I can't run the program. I wrote to the company and found out that the expansion boards must be 100% IBM compatibility and as mine is the PC Enterprise 512K sidecar it appears this is the problem. I wonder if any of your readers have had this problem and can anyone resolve it? Can I lift the graphics to be usable with my Printshop?

(please keep any answer simple!!)  
I have enclosed copies of the letter from Epyx for your information.

H E Naylor  
Clearbrook, BC

*Thanks for sending us this information (follows). It will help many PCjr owners. And the answer to your question is simply no.*

Dear Mr. Naylor,

I am sorry that you experiencing this problem with your Print Magic program. Print magic will work with the IBM PC Jr as long as the computer has 640K of memory and the expansion cards are truly IBM compatible. One type of memory expansion card which we have found not to be 100% compatible with our software is the RACORE card. This card will produce the type of error which you are experiencing.

Epyx currently has over 17 programs which will work on the IBM PCjr, many of these programs are listed below:

PROGRAM	MEMORY REQ
Destroyer	256K
Rogue	128K
Road Warrior	128K
World Games	128K
Spiderbot	512K
Spy vs. Spy III	128K
Winter Games	128K
Summer Games II	256K
L.A. Crackdown	256K
Death Sword	256K
Create A Calendar	384K
Sub Battle Simulator	384K
World's Greatest Baseball	256K
Temple of Apshai Trilogy	128K
Boulder Dash	
Construction Kit	256K
California Games	640K

Death Sword may only be run in the

single player mode. The Epyx Graphic Scrapbook collection will also work on the IBM PCjr, provided that a compatible graphics package is used. If you have any further comments or questions, please do not hesitate to contact us anytime at (415) 366-0606.

Daniel Beyer  
Service Supervisor  
Epyx Software

---

***If we make wise hardware and software purchases based on our true needs rather than on peer pressure or glossy magazine ads, we will all be happier at the keyboard down the road.***

---

**WE COME TO PRAISE JR, NOT TO BURY IT**

Hugh R. Taylor's article, "Is the IBM PCjr Finally Dead?" (The Junior Report Vol. 4, No. 9) spelled out plainly how the PCjr is falling farther behind state-of-the-art computing. But he didn't say anything we didn't already know. I think any of us who have used the junior for a while realize the difference between what we have and a 25 Mhz 386 with 8 MB of RAM, 8 expansion slots, and a 120-MB hard disk.

Nonetheless, the real question in intelligent computing is not "What is available?" but rather "what do I

need?" I am tempted by all of the new hardware, and, to a lesser degree software, that continues to emerge. Anybody who uses computers is bound to be. But I always ask myself if the new product would really get me that much more. The answer usually is no.

However, I do have a short wish list for utilities that would increase Junior's performance. I challenge the junior programmers out there to come up with these for the good of all PCjr owners.

1) A popular computing magazine recently published a utility that speeds the cursor on IBM compatibles. How about the same thing for junior? WordPerfect 4.2 would then be perfect.

2) The same magazine also published a utility that allows you to make the memory refresh rate less frequent. This gives the 8088 (the PC and PCjr microprocessing chip) more time for computing. On an IBM compatible XT this utility caused a calculation-intensive BASIC program to run nearly 50% faster. The junior could handle this too.

The PCjr will not last forever. But neither will a Compaq 386 or even a Cray II supercomputer. What will last forever is the direction that the computer industry takes. That direction is, in turn, shaped by consumer demand. If we make wise hardware and software purchases based on our true needs rather than on peer pressure or glossy magazine ads, we will all be happier at the keyboard down the road.

Terry Rich  
Dickinson, ND

*Very eloquently stated. Thank you for hitting the nail right on the head.*

**SAVE YOUR PCjr FROM COSTLY REPAIRS!**

## **DUST IS YOUR COMPUTER'S WORST ENEMY!**

**THIS POWERFUL MINIATURE BATTERY-OPERATED VACUUM IS PERFECT FOR REMOVING DANGEROUS DUST FROM HARD TO REACH AREAS. GREAT FOR HAM RADIOS AND VCR'S, TOO!!**

**ONLY \$14.95**

*Mail check or money order plus \$2.50 S/H.*

*Il. residents add 7% sales tax.*

*Canadians please send U.S. money order.*

**Creekside Computer Products  
P.O. BOX 73  
Elk Grove Village, IL 60009**



*Make someone really happy: give a gift subscription to*

# **The Junior Report**

*The perfect gift for the PCjr owner who has everything. Give 12 months of **The Junior Report**. If you know someone who loves his PCjr as much as you do - the best way to show your love is with a gift subscription to **The Junior Report**. Your friend or relative will gain a year's worth of insights, reviews, and reports of the PCjr world. It's a PCjr survival kit for just \$20.00 a year. They'll love you for it.*

*And it's easy to do: just fill out the form to the right, include a check or money order, and mail it to The PCjr Club, Gift Subscriptions, P.O. Box 59067, Schaumburg, IL 60159-0067. We'll also send you attractive cards announcing your gift for you to send to your friends. Remember: It's 12 presents in one!*

TO: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

TO: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

FROM: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## PCjr Compatibility....

(Continued from page 3)

with PCjr versions of their packages. These versions usually included one or two cartridges and were designed to run on a 128K, single-drive machine. The use of the ROM cartridges resulted in a reasonably good performance, but prevented the PCjr version of these programs from running on anything other than a PCjr. The trade-off was that the user gained performance, but lost upward compatibility.

Because there were special PCjr versions of these programs, and because these versions would not run on other PCs, people believed that the PC version would not run on the PCjr. Wrong! In most cases, the "regular" version will run just fine on PCjrs that meet the package's configuration requirements.

Vendors created versions of their software (e.g. IBM's "Planning Assistant") that utilized an overlay structure to fit into 128K, although with substantial performance degradation. Many PCjr users who have upgraded their machines to 256K and more are still suffering unnecessarily from the poor performance of the PCjr version of their software because they do not realize that the original constraint was memory, not the "jr" on their machine's nameplates.

The PCjr has one unique memory consideration. The Color/Graphics Adapter on a PC contains a 16k video buffer. The PCjr's display adapter does

not include memory for this buffer. Therefore, when you boot the PCjr, DOS allocates 16k of the system's memory for a video buffer. (The positioning of this buffer is the reason you need drivers such as PCJRMEM.COM in order to recognize memory beyond 128k, but that is beyond the scope of this article.)

### Communications

The PCjr Internal Modem: Where do I start? This jewel has caused more confusion and consternation than all the tax simplification measures that the U.S. Congress could ever dream of! Most of the problems in getting communications programs to run on the PCjr are really problems getting the programs to send the proper commands to the PCjr Internal Modem. The modem does not accept the Hayes (AT) command set. Most popular communication programs (QMODEM, PC-TALK, CROSSTALK, etc.) are set up to issue the Hayes command set, with some method of specifying a different command set if necessary. In browsing through bulletin board systems around the country, it appears to me that many people have problems using non-Hayes compatible modems, regardless of whether the attached PC is a PCjr. The PCjr's internal modem just seems to get more criticism because it is concentrated in one environment.

Some programs (including the IBM PC Videotex Connection and the terminal program on the PCjr Sampler Diskette) support

the Internal Modem's command set and will dial, communicate and hang up correctly. However, they often will not properly do things such as changing data format from 8-n-1 to 7-E-1. Other programs allow the user to specify the control sequence for dialing, etc., but also will not issue the commands to change format. The result is that the modem will not dial, or else the received data looks like garbage. It is usually very simple (at least it is with QMODEM and PC-TALK) to manually issue modem commands from the "terminal" screen of your program. Therefore, the best advice I can give you is to keep the PCjr's command reference handy. There is a better one in the small supplement to the PCjr Technical Reference. It's not really as onerous as it sounds, though. The only time you should need to enter commands manually is when changing format or entering transparency mode.

Now comes the fun part. If all you want to do is exchange messages and download files, you can skip this discussion. However, if you want to endear yourself to your favorite SY-SOP and be a good BBS citizen, you will occasionally want to upload a file or two. The PCjr's internal modem makes that a real adventure. To understand why, you need to realize that the modem attempts to execute commands even if it finds them in the middle of a data stream that you are sending to

(Continued on next page)



## PCjr Compatibility....

(Continued from previous page)

another computer. If you try to upload a binary file (like a .COM or .EXE file), sooner or later the data will include a bit pattern that the modem thinks is its command character down the line, but will try to execute the "command" it thinks comes behind it. Without going any deeper into what happens when the modem receives what it thinks is an invalid command, or delving into how to put the mode, into transparency mode, it should be obvious that the problem we are discussing is a function of the modem being used and not that the fact that the system is a PCjr. Try all the tricks you can find documented on many bulletin board systems until you find one that works.

### Communications Port Addressing

This is one problem you won't have if you use the internal modem. Some people cannot get their communications programs to recognize external modems. If you have program, then you may be facing the COM1 versus COM2 addressing mystery.

When the PCjr Internal Modem is installed, it is COM1, and the external serial port on the back of the system is COM2. When there is no modem in the internal slot, the external port becomes COM1. So far, so good. The problem is that, regardless of whether an internal modem is installed, the base address and interrupt level of the external port remain the ones normally used for COM2.

If your communications program is well-behaved and does not try to bypass the system BIOS, none of this should cause any problem. Just tell the program that your external modem is COM1. QMODEMjr (version 1.07) works fine this way. Other programs seems to use the base address and interrupt level associated with whatever comm port you have specified for your modem. To use these programs (e.g., QMODEM 2.0 and 2.2), just tell them your modem is a COM2. That is how these three programs worked on my system after I removed the internal modem.

But I have heard of different people who got different results, supposedly using the same programs! In fact, on several bulletin board systems there are routines available that claim to swap COM1 and COM2 so you can use an external modem. The SYSOP of the IBMjr forum on CompuServe tells me the problem appears to be a function of the compiler used to compile the program and/or any external port drives that the compiler uses.

If you think you have this problem you have two choices. The first is to find an internal modem and plug it into your machine. This will straighten out the addresses so you can use your external modem as COM2. The second is to get one of the programs that logically swaps the addresses back to where they belong. These programs have names like SWAPCOM or COM-SWAP, and can be found on

***Because there were special PCjr versions of these programs... people believed that the PC version would not run on the PCjr. Wrong! In most cases, the "regular" version will run just fine on PCjrs.....***

---

many PCjr-oriented bulletin board systems.

There has been an interesting development on this issue. The QINSTALL program for QMODEM 2.2 lets the user specify the base address and interrupt levels for each comm port. The defaults are provided by the program, so all you have to do is switch the specifications for COM1 and COM2. Because I was unable to recreate the problem on my system, I could not test the effectiveness of this new feature. In theory, however, it should solve the problem.

*This article originally appeared in the Metro PCjr Journal of June 1988. Part II will appear in next month's issue.*

# COMPUTER RESET - YOUR #1 SOURCE FOR PCjr PRODUCTS

## "PCjr FALL SPECIALS"

IBM PCjr INTERNAL MODEM reg \$ 79 NOW \$ 29  
 ( includes free software - when ordering please )  
 ( specify the memory capacity of your PCjr )  
 AVATEX 1200E external modem reg \$ 99 alone  
 NOW \$ 109 with software, serial adapter cable  
 and information guide for the SOURCE

## jr HOTSHOT MEMORY / CLOCK / DISK DRIVE UPGRADES

jrHOTSHOT Memory Board ( without memory chips ) \$ 110  
 256 or 512K jrHOTSHOT Memory Expansion CALL  
 256 or 512K jrHOTSHOT with Real Time Clock, Calendar  
 with 2nd Floppy Disk Drive Controller CALL  
 256 or 512K jrHOTSHOT with Disk Drive Controller CALL  
 jrHOTSHOT can control 5 1/4" or 3.5" disk drives

Our PCjr Memory & Disk drive expansions each have  
 PCjr Selected Utility Software including:  
 RAM DISK, File Transfer, Screen Color Control, etc. etc.  
 ( due to the present unstable price of memory chips )  
 ( we can not publish a fixed price for these memory )  
 ( products: please call for the current sale price )

## " IBM " BRAND ACCESSORIES

PCjr JOYSTICK \$ 29  
 128K MEMORY EXPANSION sidemounted unit \$ 175  
 PARALLEL PRINTER ATTACHMENT \$ 79  
 KEYBOARD CORD for PCjr keyboard \$ 15  
 ADAPTER CABLE FOR COLOR DISPLAY  
 (connects PCjr to a standard RGB color monitor) \$ 15  
 BASIC Cartridge (very hard to find) \$ 95  
 POWER ATTACHMENT (recommended if 2 or more side  
 mounted expansions are used on the computer) \$ 55  
 300 baud INTERNAL Modem (with software) \$ 79  
 CARRYING CASE (great for VCR or tools also) \$ 25  
 CASSETTE CABLE (usable for joystick adapter) \$ 12  
 CHICKLET KEYBOARD (the original PCjr Keyboard) \$ 19  
 CHICKLET KEYBOARD OVERLAYS (pkg of 5) \$ 1  
 CLUSTER ATTACHMENT (local area network interface) \$ 95  
 PCjr ENHANCED KEYBOARD (standard PCjr keyboard) \$ 55  
 REPLACEMENT POWER TRANSFORMER \$ 45  
 HARDWARE MAINTENANCE MANUAL (how to find problems) \$ 55  
 TECHNICAL REFERENCE MANUAL (has schematics) \$ 39  
 TV ADAPTER (connect PCjr video/audio to TV or VCR) \$ 25  
 WORD/SOUND "SPEECH" ATTACHMENT (with software) \$ 109

## 2ND FLOPPY DISK DRIVES

MODEM SLOT SYSTEM - Controller uses modem slot  
 Comes Ready to Connect  
 5 1/4" 360K disk drive model \$ 199  
 3 1/2" 720K disk drive model \$ 219  
 (720K operation requires DOS 3.2 or greater)  
 Modem slot 2nd Disk Drive Kit \$ 79  
 (includes controller, signal cable, software)

2nd DISK DRIVE - jrHOTSHOT SYSTEM  
 Controller board mounts the microprocessor chip.  
 Can be used with IBM PCjr internal modem.  
 Comes Ready to Connect

5 1/4" 360K disk drive model \$ 234  
 3 1/2" 720K disk drive model \$ 254  
 (720K operation requires DOS 3.2 or greater)  
 jr HOTSHOT drive control kit \$ 79  
 (includes: controller, signal cable, software)

5 1/4" 360K 2nd Floppy Disk Drive in Case, with  
 Power Supply \* for use with jrHOTSHOT Upgrade or  
 the above kits \$ 155

3 1/2" 720K 2nd Floppy Disk Drive in Case, with  
 Power Sharing Cable for use with jrHOTSHOT Upgrade  
 or the above kits \$ 145

PCjr Three Disk Drive Controller:  
 modified PCjr disk drive controller with cable  
 and software - with exchange \$ 89

## HARD DRIVES

20 Megabyte Complete System \* ready to use \$ 700  
 HARD DRIVE KIT ( jrSASI interface and SASI drive  
 control card, for ST-406 interface drive,  
 with case & power supply) \$ 325  
 HARD DRIVE BUILDER KIT prototype board, instructions  
 IC's, connection cable for jrSASI interface board and  
 software: Requires SASI drive control card, hard drive,  
 case, power supply and electronic technical skill \$ 125

## RACORE PCjr EXPANSION PRODUCTS

A 5 1/4" 2nd Floppy Drive, Clock, and Parallel Port in  
 a nicelooking expansion chassis mounted on top of the  
 PCjr with expanded memory contained inside

DRIVE II PLUS ( with DMA ) \$ 340  
 DRIVE II PLUS ( without DMA ) \$ 290  
 512K memory board for the DRIVE II PLUS \$ 175

## OTHER ACCESSORIES

MODEMS - Avatex 1200E 300/1200bd external \$ 99  
 Avatex 1200 HC 300/1200bd external \$ 129  
 ( includes software )

MICE - LOGITECH SERIAL with Plus Software \$ 89  
 - with serial adapter cable for the PCjr \$ 109  
 - with serial adapter cable & jrCOLOR PAINT  
 ( limited quantity of this software ) \$ 145  
 Logitech paint software alone \$ 35

LARGE KEYBOARDS - 84 key AT Style with adapter \$ 116  
 - 101 Key ENHANCED AT Style with Adapter \$ 132

CLOCK - PLUG IN CARTRIDGE CLOCK  
 give your jr the gift of time for only \$ 42

QUICKSILVER CARTRIDGE -  
 for keyboard compatability and quicker boot up \$ 29

## PRINTERS ETC.

Star NX - 1000 The best of everything dot matrix  
 printer for graphics, near letter quality (30 cps)  
 and plain text (160 cps), built in fonts \$ 199


Star NX - 1000 Rainbow - same as above and with  
 seven colors \$ 239

Chrono Steel wire type printer stand \$ 19

## SWITCH BOXES & CABLES -

PCjr parallel printer cable 6 foot \$ 19  
 Serial male - male 6' - DB-25 connectors \$ 19  
 Serial male - female 6' - DB-25 connectors \$ 19

I LOVE MY PCjr bumper stickers \$ 2 (no shipping chg)



**COMPUTER  
RESET**

**New & Used Computers**

**P.O. Box 461782 (214) 276-8072**  
**Garland, Texas 75046**

## SEND FOR OUR FULL CATALOG OF PCjr ACCESSORIES & SERVICES

No Credit Cards: \$5 Minimum Shipping and Handling:  
 Add \$2.75 for COD, All COD's sent to Cash or Money  
 Order All checks held 15 days for clearance; Immediate  
 shipment of stock-items when paid by Money Order or  
 Cashiers Check.

## OPEN ACCESS BULLETIN BOARD

for our complete list of PCjr & Other Products (214) 272-  
 7920, 300 to 2400 BD, 8bits, 1 stop bit and no parity,  
 no password or access fee, 24 hour operation.

## PC DIMENSIONS

2700 56 St., N.W. #1-4  
Rochester, Minnesota 55901  
(507) 288-1396

### KEYTRONIC KEYBOARDS

KB5150J - 83 key keyboard for the PCjr \$115.00 (retail \$139.00)  
KB5151J - 99 key deluxe keyboard for PCjr \$145.00 (retail \$199.00)

### DATADESK KEYBOARDS

DATADESK 88 key keyboard for the PCjr \$120.00 (retail \$134.95)  
DATADESK TURBO-101 keyboard for PCjr \$140.00 (retail 169.95)

### MEMORY BOARDS

256K RAM sidecar for the PCjr - \$187.00  
512K RAM sidecar for the PCjr - \$287.00

## *This Is It!*

### *The Official Junior Report Coffee Mug*

Be the first kid on your block to own one of  
these great looking mugs

PLEASE PRINT CLEARLY

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

St \_\_\_\_\_ Zip \_\_\_\_\_

X \$6.95/mug = \_\_\_\_\_

S&H = \_\_\_\_\_

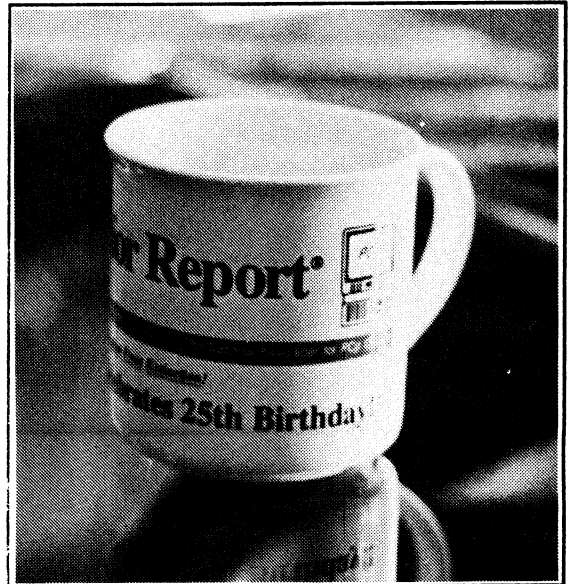
Total = \_\_\_\_\_

Please add \$1.50 shipping and  
handling per mug.

Mail Form and Remittance to :  
The PCjr Club: MUGS  
P.O. BOX 59067  
Schaumburg, IL 60159-0067

*These mugs are  
black type on  
white with the  
blue band*

Illinois Residents  
must add 7% sales  
tax.



Inscription Reads:

## The Junior Report



January 1, 2009 Volume 25 Number 1 The PCjr Club

*United Jr Owners Save IBM Orphan From Extinction!*

## The PCjr Celebrates 25th Birthday!!

## PCjr Compatibility Expansion ....

(Continued from page 1)

This makes the wiring much simpler, as only one socket has to be wired, and then the whole stack is plugged into this. A0-A13, D0-D7, MEMR, and MEMW are attached directly to the RAM socket (see diagram A for pin-out). A0-A13 select the correct address within the 32 KB space of a selected chip (CS active from the decoder circuit). D0-D7 carry the data to and from a selected chip. MEMW (write), and MEMR (read), are control signals that determine whether a particular operation on a selected chip will be a read or a write. The remaining signals go to the decoder circuit, which determines which, if any, of the RAM chips is selected (active). The 74F138, in combination with the 74F86, are used to decode the address bus and map the ram chips into the correct space. The correct space is the address range between 2000:0000H and 5000:FFFFH. In this memory area, the following are true: (Note: here high = active)

1) A19 is always low. With A19 low, the memory being addressed is somewhere in the lower 512 KB of the total 1 MB address space.

2) Either A17 or A18, but not both, are high. Assuming A19 low, if both A17 and A18 are high, the memory being addressed lies between 6000:0000H and 7000:FFFFH. If neither is high, the memory being addressed lies between 0000:0000H and 1000:FFFFH. A17 high and A18 low puts the memory between 2000:0000H and 3000:FFFFH (the lower 1/2 of the desired address range). A17 low and A18 high puts the memory between 4000:0000H and 5000:FFFFH (the upper 1/2 of the desired address range).

The problem, then, is how to achieve this decoding in hardware. A19 is connected to 4 of the 74F138, one of two

negative enable inputs. A positive signal on this pin disables the 74F138, de-selecting our expansion ram. Thus A19 high disables the 74F138. A19 low is a necessary (but not sufficient) condition for our expansion RAM to be selected. This meets the first condition above. A17 and A18 are fed to pins 1 and 2 of the 74F86, two inputs of an exclusive or gate. The output of this gate is high if and only if exactly one, but not both of A17 and A18 are high. The output to this gate is taken from pin 3 of the 74F86 and routed to pin 6 of the 74F138. Pin 6 is a positive enable input, that is the 74F138 is enabled if and only if the input on this pin is high. Thus A17 or A18, but not both, being high (active) is a necessary (but not sufficient) condition for our expansion ram to be selected. This meets the second condition above.

The third enable input of the 74F138, pin 5, is also a negative enable input, and is tied to ground, thus leaving the enable/disable function to the inputs discussed above.

Our RAM is now mapped into the correct section of memory. A15, A16, and A17 are routed to pins 1, 2, and 3 of the 74F138, the three decode inputs.

There are 8 possible high/low combinations of the three lines, and each one activates a different one of the output lines of the 74F138 (providing the chip itself is enabled as discussed above). These lines are active low, and one is routed to each of the chip select pins of our stacked RAM chips (also active on low input). Thus, for each 32 KB block of the desired memory space, one and only one of the 32 KB x 8 static rams is enabled. The lower address lines, which are lead directly to the chips, determine which byte within the chips 32 KB is being read/written.

As far as construction, you need one 14 pin socket, one 16 pin socket, one 28 pin socket, and a board to hold them.

I suggest a board with solder pads at both the pin locations of the sockets, and at the edge. If such a board is selected, wiring is much easier. The board should also be as small as possible, as there is little free room inside the PC Jr. I suggest opening the system unit and making sure that the board will fit somewhere in the space to the left of the disk drive unit before proceeding. First wire the board sans chips or cable (to connect to the expansion connector on the Jr). Make the chip to chip connections shown in the diagram (A), and wire all external output/input lines to the appropriate edge pad (diagram A). Next make up the cable. Use a 60 pin socket connector (Jameco S60 or equivalent), and 60 wire flat cable. I couldn't get 60 wire cable, and so made the cable from one strip of 24 wire cable and one strip of 36 wire cable. The pinout of the expansion adaptor for the PC Jr is shown in diagram B. A1 is at the top, closest to the front of the machine. B1 is at the bottom, closest to the front of the machine. Increasing numbers move toward the rear of the machine. I suggest attaching the cable to the connector first (make the cable about 2 feet long). Separate about 4 inches of each strand at the board end, ohming out and labelling each wire used. Cut off the last 4 inches of unused signal wires, then solder the desired wires one by one to the correct pads at the edge of the board. Next piggy back the RAM chips, being very careful to avoid static damage (i.e. don't do it standing on a rug, etc.). Use a grounded soldering iron and solder each line of pins together to make a permanent connection (remember to leave pin 20, chip select, of each chip bent out and unsoldered). Examine the finished stack for bad solder joints. Ohming out between the bottom and top pins of a line is a good way to test for continuity. Resolder as necessary. Plug the chip stack into the 28 pin socket, and solder one of the output leads from the

74F138 to each chip select pin.

Plug the connector into the PCJr and boot the system. The RAM test at startup should go to 384 Kb. If not you have a loose or misplaced wire somewhere, so examine the board until you find it. Once this is accomplished, I strongly recommend sinking the edge pads (where the cable joins the board) in silicone sealant, for physical strength. Lead the cable up the side of the machine. You will have to notch out the top ridge of the plastic of the main body of the machine wide enough for the cable to go through. Lead the cable under the disk drive unit to the space where you plan to put the board. I put the board inside an antistatic plastic bag, but in any case, since the board is loose, you will need to enclose it in some kind of an insulator to prevent shorts. A second choice might be a couple of layers of plastic food storage bags. Put some kind of padding around the board to hold it in place, and replace the top cover of the PC Jr. To replace the right hand cover plate of the system unit, you will probably have to use some glue, as the cable going under it causes it to bulge and render the original fasteners inadequate.

You now have 384 KB of RAM. Using debug, you can read and write to it. Unfortunately, the PCJr ROM will not recognize this RAM. It makes a note of its presence, as demonstrated at boot up, but when it actually sets the word in low memory (0040:0013H) which indicates to DOS how much memory is present, it will not set this any higher than 128 KB. The reason for this is that DOS needs contiguous memory to function. The hardware in the PC Jr maps the video memory to the top of the bottom 128 KB and no higher. If DOS were to recognize the 384 KB under normal circumstances, it

would end up loading programs over the video memory, resulting in system crashes. The solution to the problem is twofold. First, DOS must be forced to recognize the extra memory, and secondly, it must be forced to load all programs above the video memory. The details follow.

To force DOS to recognize the new memory, all that is necessary is for the word at 0040:0013H to be set to the right value when DOS is loaded. As mentioned earlier, the ROM will not set this any higher than 128 KB. After the ROM carries out its initialization, the next step in the boot process is to load the bootstrap loader, located at absolute sector 0 on all disks. My solution was to alter the bootstrap loader so as to set the desired value at 0040:0013H. Thus, when the loader begins loading DOS, DOS finds a value of 384 KB at this location, and adjusts its tables accordingly.

The first three bytes of the bootstrap loader code are either a near (three byte) JMP, or a short (2 byte) JMP + a NOP, jumping to the entry point of the code. At the end of the bootstrap loader there is an error message section. One of the messages will read (approximately) "Non-System disk or disk error. Replace and strike any key when ready." This message comes up when you try to boot from a disk not containing the required system files. It is not essential, and, starting at the y of System, I used it to enter my patch. The patch is entered as follows:

1) Boot from the disk you want to modify.

2) Type Debug (make sure DEBUG.COM was on the disk)

3) Enter the command: L 100 0 0 1  
<enter> This loads the boot sector to offset 100H of the debuggers work

space.

4) Enter the command: U 100  
<enter> This unassembles the code beginning at offset 100H in the debugger's work space. The first instruction will be of the form JMP XXXX, where XXXX is a HEX number. Write this number down, as it will be needed later.

5) Enter the command D 100  
<enter> This displays the HEX values (left side of the screen) and ASCII equivalents (right side of the screen) for the code beginning at offset 100H in the debugger's work space. Next press D <enter> repeatedly until the above mentioned message appears in the ASCII display. Note the offset address of the y in System (Addresses are given as segment:offset at the left side of the screen. The last digit of the offset will be 0, and represents the leftmost character of the ASCII display. It increments by one for each place to the right one moves. The digits are HEX, so the increments go 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F (far right). The offset of the y is the offset given at the left side of the screen, with the last digit changed to reflect how far to the right it is. Note this address down, and call it YYYY.

6) Enter the command: A YYYY  
YYYY is the address noted above. This puts you in the assemble mode. Enter the following (each line is terminated by an <enter>):

```
PUSH  BX
PUSH  DS
MOV   BX,0040
MOV   DS,BX
MOV   BX,0013
MOV   WORD PTR [BX],0180
POP   DS
```

```
POP    BX
JMP    XXXX
```

Now hit Control C to exit assembly mode

The XXXX is the HEX number noted down in step 4 above. This code changes the low memory location which indicates how much RAM there is to 180H, which is 384 in decimal notation. At the end of the code, it jumps to the original entry point, and the bootstrap loader proceeds as usual. If the error message ever comes up, it will look strange, but that's harmless, and a small price to pay for the expanded memory (the message will only occur if you try to boot from a disk with this bootstrap loader, which doesn't contain the system files necessary to boot).

7)Enter the command: A 100  
This puts you in the assemble mode at the initial JMP instruction. Now enter the following:

```
JMP    YYYY
```

Now hit Control C to exit assembly mode

The YYYY is the address of the beginning of the patch noted down above. Thus the bootstrap loader now jumps to our patch, alters the total memory word, and proceeds to execute as usual after that.

8)Enter the command: W 100 0 0 1  
This writes the altered bootstrap loader back to the disk.

Now when DOS boots, it finds a value of 384 KB, and sets its tables accordingly.

The above solves half the problem.

DOS now knows that 384 KB are present. The second half of the problem is that DOS loads into low memory, loads all of its drivers and other files, and then starts loading user programs immediately above this. Under normal circumstances, DOS plus its system drivers will take up substantially less than 128 KB. Thus, program loads will begin below 128 KB. A large program, going past 128 KB, will be loaded right through the video memory, trashing it. The solution is to trick DOS into thinking that the system occupies the entire 128 KB of lower memory. Use an adjustable ramdisk or some other useful device, such as a large spooler to use up all but the top 32 KB (video memory) of the lower 128 KB. I used a ramdisk set at 64 KB as the last system device. I have written a Nul Character device, called SPACER.SYS. The last line in the CONFIG.SYS file should be DEVICE=SPACER.SYS. SPACER.SYS does nothing except claim all the memory up to and including 1000:FFFFH as its buffer. DOS will never access the driver, as it does nothing, but as far as DOS is concerned, all the memory before 2000:0000H is part of the system, and it begins loading user programs at or above this address. The video RAM is thus protected from being overwritten by user programs. The RAM below 128 KB is not lost, as that which is not already being used as video RAM can be used as a ramdisk or for a number of other memory consuming virtual devices, freeing all of the upper 256 KB for user programs. I include the source for SPACER.SYS, and a HEX listing. For those without access to an assembler, here follows the procedure for using the debugger to create it.

1)Using a disk with DEBUG.COM on it, Type DEBUG to load the debugger.

2)Enter the command: E 100  
This puts you in the enter mode of the debugger. You will see a HEX address, followed by a HEX number, followed by a period. Enter the first value in the HEX listing. Hit the space bar. Another HEX number followed by a period appears. Enter the next number in the HEX listing. Hit the space bar again. Another number appears. Continue entering numbers in this way until the entire listing is entered. Hit Control C to exit from the enter mode.

3)Enter the command N SPACER.SYS <enter> This names the file that you will subsequently write to disk.

4)Enter the command: R BX  
<enter>  
Enter the command: 0 <enter>  
Enter the command: R CX  
<enter>  
Enter the command: 9A

The above series of commands load the BX:CX register pair with the number of bytes to write to the file.

5)Enter the command: W 100  
This command writes the file to the disk.

You now have the file SPACER.SYS. Used as outlined above, it will enable you to use your new RAM without system crashes.

In Table 1 on the next page is the Hex Listing. The three digit numbers at the far left are not for entry, they represent relative offsets from the beginning of the code segment. Your file entry begins at offset 0100. The other numbers are entered from left to right, top to bottom. Enter only the HEX numbers (those on the

left side of the display), skip the AS-CII display on the right.

One note regarding SPACER.XXX, where XXX is any extension. If you try to use the copy command to copy them to another disk, while spacer.sys is installed, you cannot. This is because spacer.sys is installed as a device driver, just like LPT1, and when you try to copy, the system thinks that you are trying to read and write the device, rather than a disk file. There are two solutions to this. If you simply want to copy the file to another disk, boot from your original, unaltered DOS disk. You can then copy SPACER.XXX with no problems. The second method is adapted to making new boot disks. It is as follows.

(1) Make a boot disk template as follows:

(a) Boot under the unaltered DOS

(b) Use DISKCOPY to make a copy of the altered system disk. (c) Type DEL \*.\*

(d) Copy back COMMAND.COM, SPACER.SYS, AUTOEXEC.BAT, CONFIG.SYS and any other installable device drivers used by CONFIG.SYS. In my case, this was VDISK.SYS, which configured with a 64K buffer, makes excellent use of the otherwise wasted portion of lower memory between the system files and the video memory.

(2) You now have a boot disk template. Try booting from it to make sure that it works. Henceforth, simply use DISKCOPY with this disk as the source, to make new boot disks, and then copy the desired files to the new boot disk. DISKCOPY will copy the files SPACER.XXX.

(3) The above problems are only encountered with boot disks. For data disks, simply use the FORMAT command as always.

### TABLE 1 HEX LISTING:

```

0100 FF FF FF FF 00 80 16 00-21 00 53 50 41 43 45 52 .....!.SPACER
0110 20 20 00 00 00 00 2E 89-1E 12 00 2E 8C 06 14 00 .....
0120 CB 50 53 51 52 55 56 57-1E 06 9C 2E C5 1E 12 00 .PSQRUVW.....
0130 E8 10 00 C7 47 03 00 00-9D 07 1F 5F 5E 5D 5A 59 ....G....._^]ZY
0140 5B 58 CB C6 47 0D 01 C7-47 0E 00 00 C7 47 10 00 [X..G...G...G..
0150 20 0E 1F BA 5B 00 B4 09-CD 21 C3 53 50 41 43 45 ...[.....!.SPACE
0160 52 20 49 4E 53 54 41 4C-4C 45 44 20 54 4F 20 43 R INSTALLED TO C
0170 4C 41 49 4D 20 52 41 4D-20 55 50 20 54 4F 20 32 LAIM RAM UP TO 2
0180 30 30 30 3A 30 30 30 30-20 46 4F 52 20 4E 55 4C 000:0000 FOR NUL
0190 4C 44 52 49 56 45 52 0D-0A 24 LDRIVER..$

```

### PARTS:

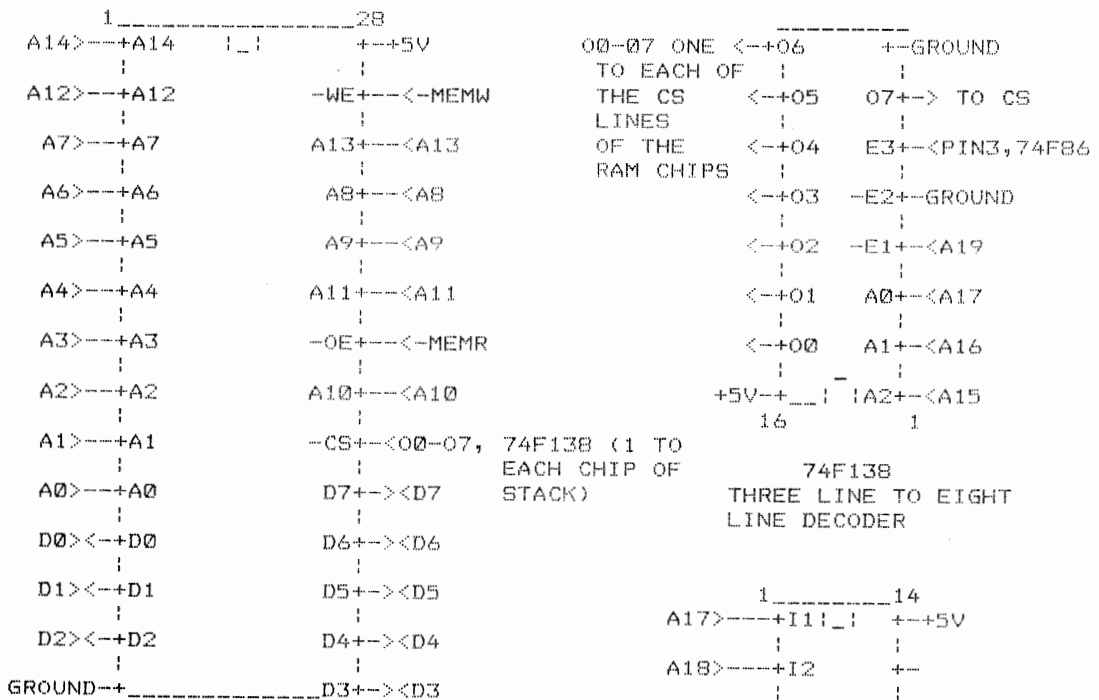
- 1 Board, as described above
  - 1 74F86 quad exclusive or gate
  - 1 74F138 three line to 8 line decoder
  - 8 43256 12L 32 KB x 8 bit static RAMs
  - 1 Jameco S60 60 pin connector or equivalent
  - 3 Feet of 60 conductor cable (or equivalent as discussed above)
  - 1 14 pin DIP socket
  - 1 16 pin DIP socket
  - 1 28 pin DIP socket
  - 1 grounded soldering iron
- sufficient solder and wire to complete the project

```

A0 A2 A4 A6 A8 A10 A12 A14 A16 A18 D0 D2 D4 D6 -MEMW
| | | | | | | | | | | | | | | |
|A1 |A3 |A5 |A7 |A9 |A11|A13|A15|A17|A19|D1 |D3 |D5 |D7 | -MEMR
| | | | | | | | | | | | | | | |
+-----+

```

TYPICAL SIGNAL INPUT PAD LAYOUT. TAKE THE SIGNALS AS SHOWN. BRING IN +5V AND GROUND, ALSO AVAILABLE FROM THE EXPANSION BUS (SEE DIAGRAM B) WHEREVER CONVENIENT. HERE, EACH + REPRESENTS AN EDGE PAD



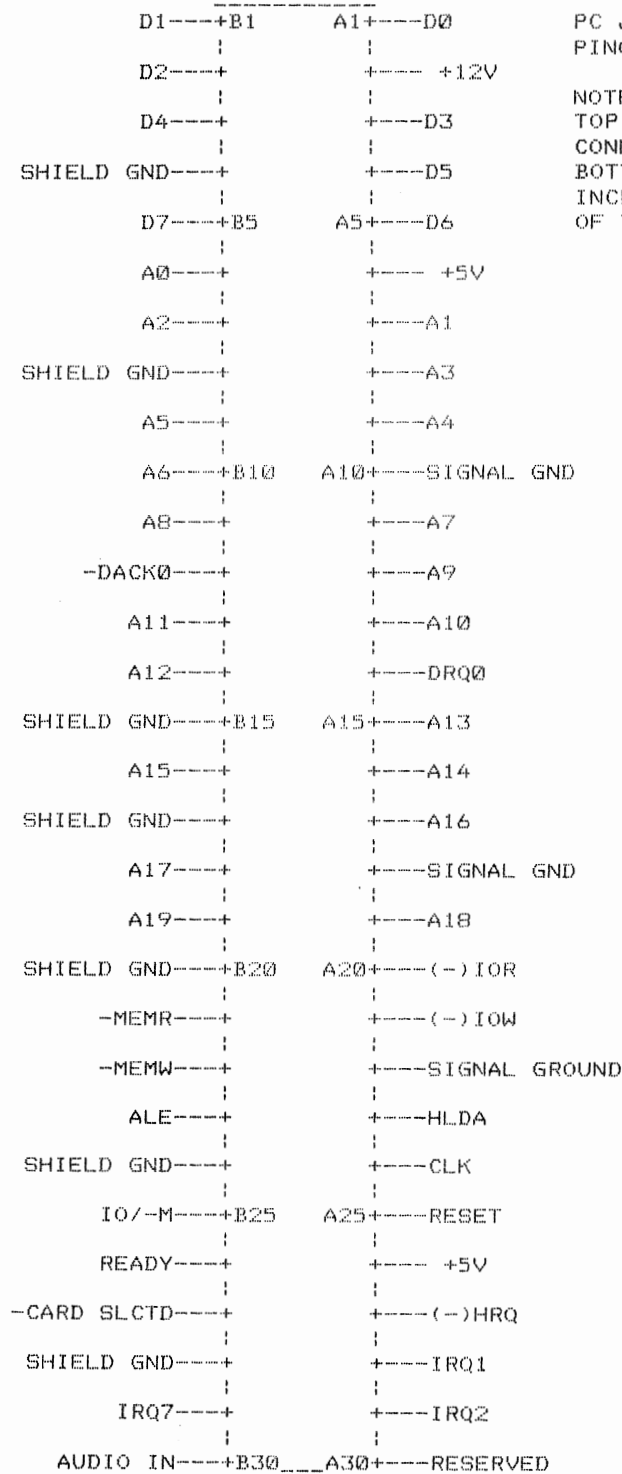
STACK OF 8 43256 12L 32KB x 8BIT STATIC RAMS. ALL PINS IN PARALLEL EXCEPT CS, WHICH IS LEFT FREE.

TO E3, 74F138<---+01

74F86  
 QUAD EXCLUSIVE OR GATE  
 I1, I2 = INPUTS, GATE 1  
 O1 = OUTPUT, GATE 1

DIAGRAM A





PC Jr. EXPANSION PORT  
PINOUT

NOTE: A1 IS THE FRONT  
TOP PIN OF THE EXPANSION  
CONNECTOR. B1 IS THE  
BOTTOM FRONT PIN. NUMBERS  
INCREASE TOWARDS THE REAR  
OF THE MACHINE.

DIAGRAM B

# COMMUNICATIONS

# IN THE BEGINNING...

there was communication.

Computers came later. The universal example of an early communications system is that of one person speaking with another. The person speaking is the *transmitter*, the air is the *medium* that carries the communications, and the person listening to the message is the *receiver*. This illustrates the basic requirements for communication: The transmitter must initiate the communication, the medium must be able

to accept and carry the message without distorting or altering it, and the receiver must be able to understand the message. The connection of these three creates a *circuit*, or *link*.

The simplest circuit normally used in computer-to-computer communications, the *half duplex* circuit, allows communication in two directions, but only in one direction at a time. Like sand flowing through an hourglass, information can be sent via a half duplex circuit in one direction, be stopped at any time, and the flow reversed, but information can't go in both directions at once. The *full duplex* circuit allows communication in both directions si-

multaneously and is probably used more frequently in microcomputer-based communications systems than the half duplex circuit.

Information that passes through a circuit involving a PCjr is translated to and from the American Standard Code for Information Interchange (ASCII), which has 128 standard characters. Each character is broken into a defined combination of seven pulses of equal duration, called *binary digits (bits)*, each either on (mark, or one) or off (blank, space, or zero). In addition, the beginning of each transmission is defined by a *start bit*, a space pulse of the same duration as the *data bits* that make up the characters. The start bit tells the receiving computer, "Get ready, I'm sending more information." The end of each transmitted character is defined by a *stop bit*, a mark pulse 1½ times the duration of each data bit. The stop bit tells the receiving computer that a character is finished.

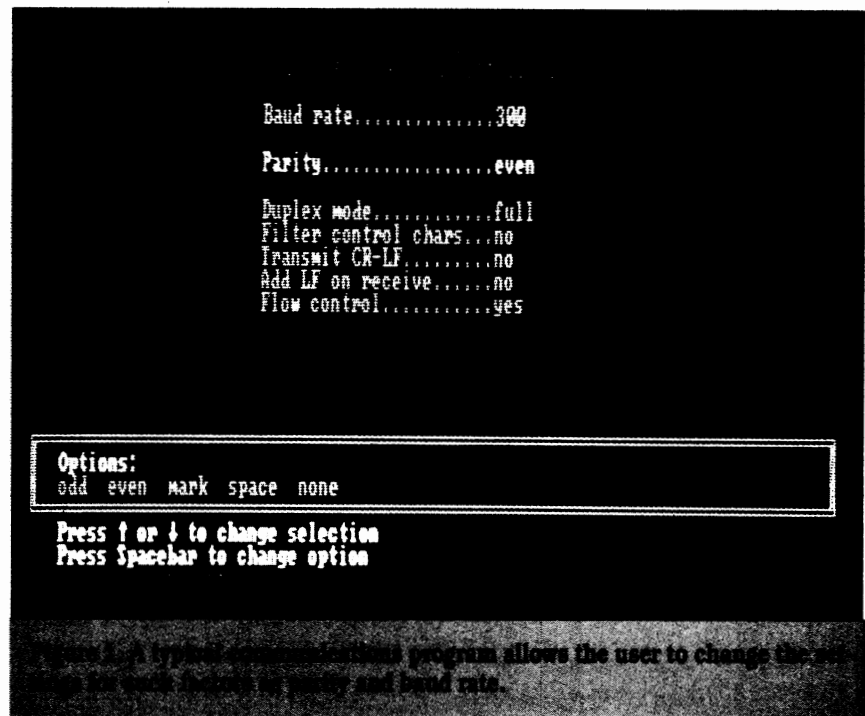
**Overseer** ASCII adds yet another bit for *parity* checking, used to assure

the accuracy of the transmission. The parity bit is added to each character as it is transmitted and is set so that the number of mark bits in the transmitted character is always odd or always even, depending on the selected parity.

For example, assume the transmitted character is "A," expressed in ASCII as 1000001. If odd parity were selected, a one bit would be added to make the resulting character 10000011. That gives three one bits, an odd number, to satisfy the odd parity requirement. If even parity were selected, then a zero bit would be added to the original character, giving 10000010. The character sent now contains two one bits, an even number, providing an even parity check.

The receiver expects transmitted data to be either odd or even parity, if a parity check is done. Some communications systems choose to ignore parity altogether. If the wrong parity is received, the transmission is assumed to be in error.

While the character-by-character check is better than no error checking, there are more sophisticated and accurate means of verifying the data transmission. In *cyclic redundancy*



*checking (CRC)*, both transmitter and receiver apply the same algorithm (or step-by-step set of instructions) to a block of transmitted data. If the result of the operation is the same on both ends, the transmission is considered

correct. If there is a discrepancy, the receiving computer may request that the transmitting computer send the suspect block of information again. This send-check-send sequence can continue until all the data has been

# GLOSSARY

**Analog**—The type of signal used to transmit data across telephone lines. It uses electrical signals that are a direct representation (or analogy) of the sound being transmitted; as the frequency of sound changes, the electrical waves change proportionately. Analog signals are not compatible with most computers. Compare to digital.

**Asynchronous**—The method most microcomputers use for timing the signals they send to other computers. Data is transmitted character by character. Each character includes a bit signal that a character is about to be sent and another signal that the character transmission is finished. Compare to synchronous.

**Autoanswer**—A modem's ability to automatically answer an incoming call.

**Autodial**—A modem's ability to automatically dial an outgoing call.

**Baud**—The rate at which information is transmitted over a communications line. For telecommunications, 300 baud is slow and 4,800 baud is fast.

**bps**—Bits per second. Used to define data communications rates; in most cases, the bps and baud rate are the same.

**cps**—Characters per second; usually one-tenth the baud rate.

**Digital**—The type of signal produced by most computers, derived from the binary numbers used to symbolize characters or values. It is not

a continuous signal and cannot be transmitted across telephone lines unless converted to analog. Compare with analog.

**Download**—The process of capturing information transmitted to your computer from another computer, using data communications.

**Handshaking**—Procedures to insure that two computers are communicating properly. Also known as protocol.

**Modem**—A device that transforms digital computer signals into an analog form that can be transmitted over telephone lines and translates analog signals transmitted to a computer back into digital. Short for MODulator/DEModulator.

**Parity**—The addition of one or more bits to each byte of information to help detect errors in transmission. In ASCII, seven bits are used to represent the value of a character and the eighth bit is for parity. Parity can be set at even or odd; if even, the computer checks to see that there is an even number of 1's in each character.

**Protocol**—The rules and formats for conducting communications between two or more computers. Compare with handshaking.

**Start bit**—A bit sent before a character in asynchronous transmission to notify the receiver that information is about to be sent.

**Stop bit**—One or two bits sent after a character in asynchronous transmission to create a pause so the receiving machine has time to act on the character before the next is sent.

**Synchronous**—A method of timing signals sent between two computers. Data is transmitted by line or block. Clock signals are used to "synchronize" information—define the beginning and end of the message. Compare to asynchronous.

**XOFF**—Stands for "transmitter off." A signal sent by a receiver to a transmitter, telling it to stop sending.

**XON**—Stands for "transmitter on." A signal sent by a receiver to a transmitter, telling it to resume transmission.

transferred without any errors.

Obviously, this method can be used only if the transmitter and receiver use the same series of checks on each data block. Further, they must agree on what constitutes a data block. CRC/16 and XMODEM are two of the more predominant CRC transfer methods. CRC/16 is extremely accurate, allowing only one bit of undetected error for every  $10^{14}$  bits transmitted. XMODEM, 99.99 percent effective, is in the public domain and is the protocol used by most bulletin boards and some information services.

Notice that CRC and parity checking may occur at the same time. Further, because of the higher degree of data integrity CRC offers, you may want to insist on it in any communications software you buy for your computer and modem.

Because of physical limitations in telecommunications equipment that is currently available at a reasonable price, reliable telephone line communication usually is limited to a rate of 1,200 bits of data per second (bps). The term bps frequently is expressed as baud, so that a 1,200 bps link can also be called a 1,200 baud link, and this translates to about 120 characters (letters, numbers, punctuation) per second. (If we assume that it takes 10 bits for each character, then 1,200 bits per second is roughly equivalent to 120 characters per second.)

Many of today's microcomputer modems use a slower speed, either 110 baud or 300 baud, because it is cheaper to build electronic circuitry to communicate at the slower speed. Advancing technology, however, is replacing 300 baud with 1,200 baud as the microcomputer standard, and lower prices are making 2,400-baud and even 4,800-baud modems for microcomputers more feasible.

## Computers and Communications

.....  
Available at IBM Product Centers and Authorized Dealers

**List price:** \$35; *Private Tutor*, \$50

**Requires:** 128K, disk drive, *Private Tutor*

.....  
CIRCLE 426 ON READER SERVICE CARD

**Making a Match** Before successful data communication can occur, both transmitting and receiving computers must have the same settings for baud rate, parity, duplex, and start/stop bit combinations. (See Figure 1 on page 37.) Additionally, most communications software looks for specific characters at the end of each line of transmitted data.

Most communications packages come with default settings for these characteristics. The combination may be slightly different for each software package, but unless you are positive they are incorrect, make your first attempt at communication with these preset values, because they're usually set at the most commonly used values.

Let's look at each one of these settings.

One setting which may require changing is the speed at which data is transmitted. It is usually set at 300 baud; if you have a 110-baud or 1,200-baud modem, you should change this accordingly. Always be sure the rate you select matches the rate your modem expects and the rate being used by the receiving computer. Note, too, that most modern modems and software will choose the speed setting for you as the connection with the other computer is made.

The duplex setting, usually set to full, should be changed to half if your keyboard entries do not appear on your screen once you have established a communications link with the receiver.

# INFORMATION PLEASE

*A communications tutorial should clarify concepts, but this one only clouds the issue.*

**T**here's a multitude of chores a microcomputer can do far more easily and accurately than the naked brain. And there seems to be a school of programming and/or software publishing which counts on microcomputer users to be so gaga over that fact that they'll automatically shun such time-tested but mundane a medium as ink on paper.

Take, for example, a tutorial program from IBM entitled *Computers and Communications*. It works symbiotically with IBM's *Private Tutor* (a generic teaching program that "plays" information contained on specific course disks) to teach you what it takes to communicate among computers. It's a subject that, at least in the incarnation given it by this program, requires none of the computer's special skills to make it comprehensible. (We think we've done a perfectly acceptable job of explaining computer communications in the pages of this very issue, for example.)

What's truly amazing is the way *Computers and Communications* goes beyond pointless and actually turns the computer into a massive source of frustration.

For instance, the charm of the printed page is that it's there to refer back to, quickly and easily. As you read about computer communications in this issue, you can turn the pages forward or back at your leisure, skimming or reviewing as the need arises.

Maneuvering through *Computers and Communications*, on the other hand, is as simple as finding your way out of a traffic jam on the circular and one-way streets of downtown Washington, D.C. Should you decide you've studied enough for one sitting and want to return later to the middle of a lesson, you'll find you have to start over again at the beginning of that lesson—pressing the Enter key after each page and answering the same questions you answered the previous time around. Get to the end and decide to check on something that was in that lesson, and you have to perform four disk swaps to do it.

**Joy of Scrolling** The help screens at the start of the program assert that you can use the Home, End, PgUp, and PgDn keys to flip through screens

In full duplex the character you transmit is received by the computer on the other end, interpreted, then sent back to your computer screen. If the receiving computer isn't sending your characters back to you this way, you won't be able to see what you type. When you switch to half duplex, what you type is displayed on your computer screen at the same time it is sent to the receiving monitor.

Parity normally is set to none. But if parity checking is done, it seems more software expects even than odd. If everything else seems correct but you still get strange-looking characters on your screen from the other computer, try changing the parity setting. Obviously, if you have information about

the parity used by the system you're calling, use these settings.

The number of stop bits usually will be set to one to correspond with the 300-baud setting. Change it to two if you drop to 110 baud, but leave it at one if you go to 1,200 baud.

Most dial-up computers require seven data bits, but your communications package may be preset to eight. If it is, try that setting first, then go to seven if you don't get good data transfer.

Some communications packages let you choose whether your computer will automatically add a carriage return or a carriage return/line feed combination to the end of each line. If you send both carriage return and line feed and the

receiving computer is expecting only carriage return—or the other way around—you may not get successful data transfer. If you get unreadable characters on your screen, and everything else seems set properly, try changing the end-of-line character your computer sends. This usually can be done within your communications software.

**Checklist** If you successfully establish a communications link with the receiving computer, but still are unable to communicate, contact someone at the site you are trying to call. They should be able either to tell you the required settings or to put you in contact with someone who can.

Should you be unable to establish a communications link, check the following:

- Is your modem cable securely fastened at both ends?
- Is your modem plugged in? Is it turned on?
- Have you set the switches on your modem according to the communications software documentation?
- Do you have the correct version of the software for your computer and operating system?
- Are you dialing the correct number? You may be set for 1,200 baud but dialing a 300-baud access number.
- Have you set the proper communications port? You may have your modem connected to COM2. Most software is preset to COM1.
- Are the pins between your computer and the modem connected properly? You may need help with this one, but the documentation you receive with your communication software or modem should describe the required connections.

Some software packages provide an access number for a computer system tested to work with documented settings. It is wise to try this before you assume something is wrong either with your software package or your equipment.

Above all, be patient. Setting up your computer for reliable data communications sometimes takes a little effort, but once you've figured it out the first time, you should be able to "talk" with just about any other computer system you choose. And if you're like most computer communicators, you'll soon be hooked on reaching out with your computer, modem, and telephone. □

(but only through the ones you've already read). What they don't tell you is that this doesn't work on a question screen immediately after you've answered the question; in that situation, you have to move to the next screen before you can back up. And you can quit a lesson only at a question screen, which sometimes is quite a few screens away.

The joys of getting around *Computers and Communications* are demonstrated again in Lesson 4 of the five included. That lesson, mysteriously but mercifully, is the only one which ends with the suggestion that you go back and review what you've just learned. If you're so naive as to follow that suggestion, you find yourself back in the middle of the lesson, rereading the same screens you've just read, with the same torturous wait to get out.

For the sake of argument, though, let's assume you enjoy moving through a program with the speed of a mule slogging through quicksand. Is the program worthwhile otherwise?

Well, it does cover the topic of modems, communications software and standards, and networks thoroughly—almost too much so. Its plodding patience gives the impression of being aimed at a child, even though the program implies it's meant for adults, too. (It promises that, by the end, you'll know what you need to know to buy communications equipment and software.) For the most part, the information is accurate, except for one question which splits hairs so thin you can't tell the difference between the right answer and the wrong one, and another which refers to Baudot as a type of program when in fact it's a code comparable to ASCII.

**Letter Imperfect** But even though what it teaches is mostly right, *Computers and Communications* doesn't seem to be able always to recognize an answer, right or wrong. For one multiple-choice question, I answered "a." It replied, "Just type your choice of letters a through e." Since my choice was "a," I typed it again. The program was adamant: "Sorry, I don't understand. Try a selection of the letters a-b-c-d-e."

In another instance, I gave the wrong answer, and instead of highlighting the correct answer, as usual, the program deleted it. And on yet another screen I answered only "c," when the correct answer was a, c, and d. The program congratulated me with, "Of course."

Some of the line drawings used to illustrate the lessons are hard to decipher, while a couple of other diagrams—used to illustrate the availability of communications programs in DOS—are downright baffling, since there's no explanation anywhere to what's referred to in them.

*Computers and Communications* lets you be a conspicuous computer consumer. Be a smart one, instead. You've already spent \$2.95 on this issue, which covers the topic rather thoroughly. Put your software dollars into something more edifying, like *Mouser*. —Gloria Sturzenacker

### Is Your Junior An Artist?

The PCjr has its drawbacks, but it performs a lot of computer chores admirably, such as word processing and database management. Another strength is Junior's graphic abilities. With or without a mouse, there is an abundance of good to great drawing programs that run well on the PCjr, and the best part is that they are all coming down in price. Whether you draw for fun or for profit, we would like to see your work. Just send in a printout of your masterpiece to The Junior Report, The Guggenheim Collection, P.O. Box 59067, Schaumburg, IL 60159-0067, and we'll feature some of the best pieces during the year, and at the end of the year, we'll pick the very best drawing and award a first, second, and third place prize. Just send your masterpiece, a description of your PCjr setup, and the software you are using. So let's see how good your PCjr really is with a brush. You may surprise your Junior and yourself.

### SUBSCRIPTION SERVICES

Are your newsletters coming to you mangled, torn, or like they've been through the laundry? Or have you missed an issue that you shouldn't have? Well, the mailing process is the only thing that we do not control, but if you could write a short note to The Junior Report, P.O. Box 59067, Schaumburg, IL 60159-0067, to the attention of Marie Tabers, Circulation Manager, or call our new number (312) 310-9033 (M, W, F 9AM to 3PM CST) explaining your problem, we might be able to do something. Remember, this number is for subscription problems only, and NOT for technical assistance. Please include your telephone number in your correspondence. We send out thousands of issues each month, so we expect some problems, and the best we can do is to solve them as quickly as we can to keep you happy. We would like to make your subscription with us as carefree as possible.

### REPRINTS

*Below is a list of reprints that are currently available for purchasing. Please use the order blank below and send remittance and form to: The PCjr Club, Reprints, P.O. Box 59067, Schaumburg, IL 60159-0067.*

- NOV 1986** - PCjr ColorPaint Review jrHotShot Internal Memory Expansion Gato Review
- DEC 1986** - Readers' Survey #3 Jr BBS's Fontrix Converting IBM's Expansion Board to 512K
- FEB 1987** - PC-Write 2.7 Review PCjr Clubs DOS 2.1 Patch Basic Programming on the Junior
- APR 1987** - Inside the Jr Part II Microsoft Booster Upgrade StarFlight Fix Pockets Educational Software
- MAY 1987** - IBM Model 30 Hard Drives For Jr Part I NewsMaster Review Speeding Up Basic Programs
- JUNE 1987** - PCjr Trade-In PCjr & Comdex Inside the Jr Part III Powertext Formatter
- JULY 1987** - Hard Drives II Adding Color to DOS Sylvia Porter's Financial Manager Music on the Jr
- AUG 1987** - Updated PCjr Compatibility List Home Banking on Jr Inside the Jr Part IV Dam Busters Review
- SEPT 1987** - PCjr Turbo Boards Jr Diskette Drive Maintenance Corrected DOS 2.1 Patch  
Setting Preferences on Jr BASIC and the PCjr
- OCT 1987** - New Clock and ROM Cartridges Turbo BASIC Patch Survey #5 Drawing on the Jr Part I  
BASIC & Ramdisks Microsoft Letter
- NOV 1987** - PC File Vs. File Express SPC's 20 Meg PCjr Hard Drive Review More Than 640K on Jr  
Learning to Draw on the PCjr
- DEC 1987** - Preventative Jr Maintenance jr Vendors Speeding Up jr Dual Fonts Review  
QuickBASIC 4.0 on PCjr Mickey and Donald
- JAN 1988** - Starflight and Psi 5 Trading Co. ProComm & jr Pt. I Giving jr the Boot Microprocessors & jr  
FIXQBjr Revisited PCjr Magazine Reprint #1-Bringing Up Junior
- FEB 1988** - Upgrading a PCjr PCjr Magazine Reprint #2 - A Hard Look at the Jr ProComm & jr Pt.2  
PFS Professional Write on the Jr DOS and the PCjr: Getting the Most Out of Debug
- MAR 1988** - PCjr Magazine Reprint #3 - Clustering PCjrs Adding a 3.5 inch drive to jr Turbo Pascal 4.0 on jr  
Making WordPerfect Perfect on the PCjr The 128K PCjr
- APR 1988** - Shareware Survey Results Bankstreet Writer Review DOS Revealed Pt I  
PCjr News Chuck Yeager's Flight Trainer SETBASjr and BASICjr
- MAY 1988** - Replacing jr's Disk Drive Microsoft PCjr Mouse DOS Revealed Part II  
Writing Assistant & Racore Drive II Test Drive on the Junior Running GEM Software on a 1- floppy PCjr

*Please Circle One or More Below*

Nov 1986 Dec 1986 Feb 1987 Apr 1987 May 1987 June 1987 Jul 1987 Aug 1987 Sept 1987  
Oct 1987 Nov 1987 Dec 1987 Jan 1988 Feb 1988 Mar 1988 Apr 1988 May 1988

Number of issues \_\_\_\_\_ times \$2.95 = \_\_\_\_\_ Amt. enclosed (Canada please use US m.o.)

Name: \_\_\_\_\_

*Please allow 4-6 weeks for delivery. All orders outside of the United States and Canada please add \$10.00 (U.S.) per order.*

Address: \_\_\_\_\_

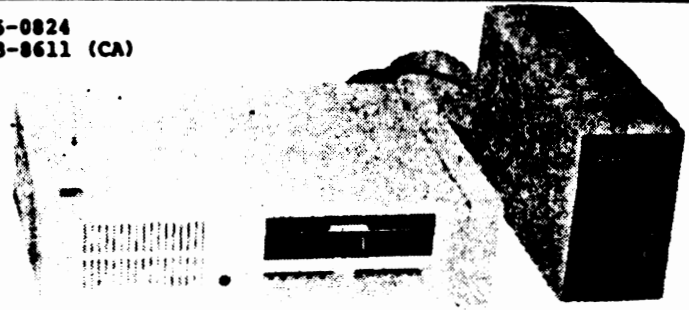
City, St, Zip: \_\_\_\_\_

SYSTEMS PERIPHERALS CONSULTANTS  
8747 Businesspark Avenue  
San Diego, CA 92131

(800) 345-0824  
(619) 693-8611 (CA)

## SPC DISKITjr HARD DRIVE

DISKITjr 20C(22MB).....\$695.  
DISKITjr 30C(33MB).....\$795. Reg. \$995.  
DISKITjr 40C(44MB)....\$1195.  
NEW! 35ms. option.....\$200.



### Feature

#### IBM/PC Compatibility

If you ever decide to upgrade to any PC/XT compatible computer, just call SPC and arrange for a swap to an XT-compatible booting controller. Your Diskit will **never become obsolete**, and there's **no charge**.

#### Upgrade flexibility

Since our installation software is menu-driven, you can easily install a higher capacity Winchester in the future.

#### REMEDY OPTION

For a system with ever-expanding storage requirements, the REMEDY drive allows the user to remove the entire 20 Mb. file and replace it with another. It offers the same capability as the popular **Bernoulli Box** but at a fraction of the cost, only \$145.

#### Compatibility

The Diskitjr will work in conjunction with almost all other vendors' add-on products. The Diskitjr side-car simply plugs into the extended 60 pin expansion bus on the side and connects to the drive with a cable pair. It works with Tecmar, Quadram, Impulse, Racore (non DMA), Microsoft, etc.

The Diskitjr hard disk is the best system available at the lowest price. Terms are COD cashier's check or prepayment by mail (5% discount with order). Add \$15 for UPS two day delivery, or \$25 for next day. Call SPC at (800) 345-0824 to order, or mail your order to the address above, including the model desired. Prepaid orders or orders with deposits receive first priority. Please call for additional information.

\*\*\* ONE YEAR WARRANTY \*\*\*

### Benefit

## PCjr Owners

### Everything you'll ever need!

- Memory sidecars which increase memory to 736K
- Second & third disk drives which snap on top
- Disk drives which read & write 1.2 MB AT diskettes
- 3½" disk drives which store up to 813K
- 20 MB hard disk drives which are DOS compatible
- ROM's which make your display easier to read
- Upgrades which expand 128K sidecars to 512K
- Speed up & pseudo DMA cartridges
- Clock modules, printer ports & speech attachments
- Joysticks, optical mice & light pens
- Adapters to use your PCjr monitor with a PC
- Switching boxes for monitors and/or serial devices
- Full size keyboards & numeric keypads
- Keyboard, modem, printer & monitor cables
- Basic manuals & also Cartridge Basic
- Game cartridges, software & Paint programs

PLUS MUCH, MUCH MORE!!

Write to us or call our toll free number to receive a FREE catalog of PCjr add-on products.

### PC ENTERPRISES

"The JrProducts Group"

Box 292 • Belmar, NJ 07719

(800) 922-PCJR

(201) 280-0025

## The Junior Report

The National Newsletter for PCjr Owners

**YES** Enter my subscription to The Junior Report as indicated below:

- One year (12 issues) for only \$20. for U.S.  
One year (12 issues) \$26. U.S. Money order for Canada
- Two years (24 issues) for only \$36. for U.S.  
Two years (24 issues) \$48. U.S. Money order for Canada
- This is a RENEWAL

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ St \_\_\_\_\_ Zip \_\_\_\_\_

Telephone ( ) \_\_\_\_\_

Mail completed form and remittance to:

The PCjr Club  
MEMBERSHIP DEPT.  
P.O. Box 59067

Schaumburg, IL 60159-0067

oct 88

# PC Magazine DOS Power Tools

A Book Review by Tim Hallen

Even before I bought my IBM PCjr, I began reading "PC Magazine" (Ziff-Davis Publishing). It always seemed to have just the thing I was looking for, or the answer to one of my questions. Once I bought my jr, and as my knowledge grew, PC Magazine kept pace with me and the PC world.

Many times I wished for a compilation of their tips and hints, or at least an easy way to locate that valuable information. Well, both wishes have now come true. PC Magazine has just published a compilation of these useful tips, from the editors of the magazine, as well as submissions from the readers. They have even included some never-before-published information.

This impressive volume (over 1270 pages, measuring 2 1/4 inches thick) is full of easy-to-read, informative hints and history, as well as excellent advice on getting the most out of your computer. Some of the many subjects covered are "The Development of DOS", "Hard Disks Made Easy", "Chips and Memory", "Batch Techniques", "Favorite Tips", and "When It All Goes Wrong".

This book also goes into great detail on using EDLIN (DOS's ASCII file editing utility), and DEBUG (the DOS utility that allows you to display and change memory locations, as well as disk data). Hints on getting the most out of these

programs are included.

You'll find explanations of little-known or undocumented ways to use your computer to make your computing life easier and more efficient. There are many new ideas brought out in an interesting, thought-provoking style, making it easy for you to put them right to use. Even the poorly documented DOS utility ANSI.SYS receives its share of coverage, explaining how to use it, and listing the proper syntax to get it to do what you want it to do.

Included are several BASIC programs for you BASIC fans, which step you through problem-solving right to the solution.

To top off this already handy volume, the book includes a 5 1/4 inch diskette, filled with over 200 utilities from the editors and readers of PC Magazine (including the BASIC programs I mentioned earlier, so you need not fear typing in a lengthy program). Although I haven't had a chance to try them all, most of those I have tried work well on the PCjr. Batch file utilities, editing utilities, screen utilities - they are all there, waiting to be put to use. Complete documentation on each utility is provided, and in most cases as notes from the author explaining reasons the utility was created, and ways to use it to your best advantage.

One for my favorite sections is named, aptly enough,

"Favorite Tips". It lists many 'slick' ways to get around some of DOS's shortcomings, as well as faster ways to accomplish things with your jr. And don't we all strive for getting things done faster and more efficiently?! Setting the DOS prompt is explained, as well as what the IBM program COMMAND.COM does, and how to use it, as well as other things. A comprehensive index is included, which helps greatly in locating just the thing you need in a hurry.

The book, along with the diskette, retail for \$39.95 in the U.S., and \$49.95 in Canada, and I feel it is well worth the price. You may be able to find the book at discount book stores in your area, making it an even better value. I would not hesitate to recommend it to novice or expert alike.

"PC Magazine DOS Power Tools"  
Published by Bantam Books  
\$39.95 U.S., \$49.95  
Canadian



# The Versatile PCjr

By Robert Magnuson of The Fox Valley PCjr Association

When I drove home from the local mall December '84, and carried my new PCjr computer into my apartment, I knew absolutely nothing about computing. As time changes all things, in time I have become a fanatic. I'd like to tell you just how far one can go with an IBM PCjr, and if you sense that I'm satisfied with the junior, you're right! Since the at-work Junior (#2) is nothing to talk about. I'd like to tell you about the hardware aspects of my sit at home Junior, at this moment helping me "word process" this article. While some of the things I have done are left for experienced electronic hobbyist, most of the hardware things I have added could be done as simply as removing the top cover of the system unit.

Extra memory. While there are PCjr owners out there with the standard 128K amount of memory, Tecmar helped me to 256K first with the JrCaptain, and then to 640k with the addition of a JrCadet. Big deal, you say. So what about extra memory, that's old hat. Read on...In one shot, I got information from a computer magazine and a fellow Junior owner, and added 2 external disk drives in a power supply cabinet. Yes, that's A:,B:, and C: physical 5.25" disk drives. For the Junior to accommodate this addition, 2 integrated circuit chips (IC's like your memory chips) had to be hard-wired onto the DCB soldered to and from places on the DCB, and that makes the DCB look like a birds nest. However, to this day, this mess has functioned without a glitch, driving 2 Shugart SA455;s. Recently, the stand-alone disk drive cabinet gave way to a Toshiba 3.5" mini-drive. (My Junior sits on top of what looks like a PC-XT computer!). So as we add up the drive letters, we've got A: and B: being

standard floppies, and C: is the mini-drive, which formats beyond 800k disk space by the way! Then there's D: as a ramdisk, and E:. Here I can bluster a bit, because E: is a 20 meg hard disk, which keeps B: and C: company in the PC-XT case. The hard drive is connected to the Junior via a sidecar, in line with an IBM parallel printer port (and printer), and the Tecmar memory sidecars.

I caught a really good price for a mail-order Volksmodem 12 modem, and it has seen countless hours connected to the IBM EBBS bulletin board. The modem slot is occupied by a speech board. Yes, my PCjr can talk. While the speech is somewhat robotic, it can sing, talk, make funny sounds, and if you give it some wine, it might even make some rude comments. It can give me the time on the quarter hour in the middle of an application program, speaking it out after a chime. The speech board and the standard audio output from Junior are routed to some nice Radio Shack speakers via a small amplifier. And then there is the Microsoft mouse. For most of the time, it sits in a corner of my desk, dormant. But for graphic programs, it comes out to run around. And then there's the joystick, a sturdy model with a button on the top of the stick. That makes flying programs so much more realistic. Oops, I forgot. With the mouse, and the modem together, I had to purchase an "A-B-C-D" serial port switch. But how many times do you find communications software that uses the mouse? When I bought and installed a NEC V20 8088 CPU chip (the actual "brain" of the computer) I splurged and purchased an EPROM programmer board. This conveniently connects to the JrCaptain parallel port, LPT2:. Just an open circuit board with a special socket in the middle for pro-

grammable IC chips, the EPROM programmer fits inside a clear plastic case, and now sits on my serial port switch. I hope someday I'll get the time to try my hand at making some custom cartridges. Oh, I found a source for the cartridges themselves, being "kits" with a plastic shell looking identical to our BASIC cartridge. Program the EPROM chip, put it in the cartridge, and away you go. And speaking of chips, very recently I purchased a chip that replaces one of the (few) socketed chips in the Junior. It has a short wire that easily clips elsewhere on the system board, and allows for standard characters (letters, numbers) AND an alternate character set that is virtually 1/2 as "thick". The thinner character style strongly imitates monochrome text clarity, and is keyboard switchable from "regular" to "thin". Price on that was very reasonable.

To round out the system, I'll mention one success and one failure. A power controller, that can apply power to all parts of the whole computer at the push of a button, sits under the PCjr RGB color display. That was the success. I wanted to build my own Light Pen, but try as I might, that project failed. There is a commercial Light Pen now available to Junior owners for the price of an inexpensive modem.

Now, I'm sure you are saying, "who has that kind of money to burn on crazy expansion stuff for a PCjr?". Well, I'll grant you this system did take some bucks, especially the hard disk drive. But in the end, I wouldn't regret any expense. Just the fun and opportunity to learn more about different aspects of computing has made it worth it. But the best part is telling somebody what things make up the system, and then telling them it's all hooked up to a PCjr.

## Classified Ad Section

**Software, All original with manuals,** Lotus 1-2-3 \$90., PFS Plan \$20., IBM Personal Communications Manager 1.0 \$15., Harcourt Brace S.A.T. Preparation \$20., Lotus HAL \$40., Easy Writer 1.1 \$10., Hayes Smartcom II software \$10., DOS 1.1 \$5., Sidekick 1.5 \$20.

Dick Wendelburg  
1335 Vernon North Dr.  
Dunwoody, GA 30338  
(404) 933-1877

**IBM PCjr with 640K RAM** via Tecmar sidecar with Clock/calendar, parallel port, power supply. This has original 5.25" drive, external 5.25" drive, and an external 3.5" drive, speech attachment, keyboard, and two joysticks included. Excellent Condition! Asking \$700.00.

George Suppes  
2700 56 St. N.W. #1-4  
Rochester MN 55901  
(507) 288-1396

**PCjr 640K with color monitor** new Fujica M2551 disk drive, Tecmar jrCaptain sidecar, all manuals, programs galore, joysticks, excellent. Send S.A.S.E for full details....best offer.

T.D. Gosman  
9 Warner Court  
Huntington, NY 11743

**IBM PCjr Parallel printer** attachment - \$50. or best offer. PCjr diskette drive signal cable and disk drive adapter - \$50. or best offer.

Libby Milito  
1060 San Marco Drive  
Marco Island, FL 33937  
(813) 394-0897

**New IBM cordless keyboards** \$25., 128K single drive Jr with IBM color monitor, modem, DOS 2.1, BASIC cartridge, Hands on BASIC & Jr

manual \$600. I would like to buy an Enhanced AT style keyboard for my Junior. (I would consider trading some items.)

Charles Mellinger  
110 S. Ronks Road  
Ronks, PA 17572  
(717) 687-8223

**IBM PC Compact Printer,** excellent condition, \$50., DAC Easy Accounting version 1.0, \$25., Numberworks, (small spreadsheet), \$10., Documentation for all.

**Wanted:** If you're selling your PCjr, or not using it, sell me your second drive, preferably 5 1/4, or hard drive okay, must be working, and reasonably priced. Will pay cash or trade.

June Stewart  
368 Park Avenue  
Wheeling, IL 60090  
(312) 459-4880

**One Centronics GLP Printer** \$30. plus shipping costs. Two 360K disk drives @ \$35 plus shipping. All items in perfect condition.

Chris Reeberg  
111-67 145 Street  
Jamaica, NY 11435  
(718) 529-1528

**Microsoft Mouse with Booster** of 128K, Color Paint by IBM, Software for Mouse and Ramdisk Configuration. Asking price for above \$200.00.

Ronald Rukan  
46 Rivercliff Drive  
Milford, CT 06460  
(203) 877-3035

**Wanted: Unmodified Microsoft** memory expansion sidecar w/128K for PCjr. Mouse preferred but not essential.

K.A. Edmundson

2317 Fairway Cir. S.E.  
Decatur, AL 35601  
(205) 895-5250 Day  
(205) 353-7395 after 5PM CDT

**IBM PCjr Speech Attachment** \$40.

Doug Inglis  
4111 E. Packard Hwy.  
Charlotte, MI 48813  
(517) 543-4499

**IBM PCjr 640K via Tecmar** with parallel port. Original color monitor, single drive, thermal printer, and manual. Software includes cartridge BASIC, Executive Writer, Numbers Works, Graph & Calc, etc. \$550.

Bill Tolson  
159 Via Los Miradores  
Redondo Beach, CA 90277  
(213) 373-4104 E & W

**IBM PCjr 512K, Legacy expansion,** 2 drives, parallel port, color monitor, enhanced AT style keyboard, 2 joysticks, cassette storage recorder and cables, BASIC cartridge, video adapter, assorted cable sets, 2 extra PCjr keyboards, manuals and software. \$650. UPS paid.

Tom Kravcar  
321 S. Hickory Ave.  
Bartlett, IL 60103  
(312) 289-5283

**Wanted: Lotus 1-2-3 for PCjr** 128K single drive  
Ted Rogers  
43 Hickory Lane  
Brewster, MA 02631  
(508) 255-5717

**IBM PCjr w/Racore 2nd drive** 640K expansion module serial port adapter cable, much more. \$700.

Bob Janacek  
877 Buffalo Ave.  
Calumet City, IL 60409

## MEMORY EXPANSION BOARD UPGRADES

If you want to be the first kid on your block to have 256K chips in your IBM, Tecmar, or Microsoft **expansion board**, this one's for you (you must already have 256K total RAM in your PCjr system. **IMPORTANT** If your Junior only has 128K total, you do not have a memory expansion sidecar attached, and you CANNOT utilize this service). After replacing the 64K chips originally soldered in your JrCaptain or IBM expansion sidecar, adding new sockets, and inserting 256K chips, you will effectively have 640K of RAM in your PCjr to play with. All work will be done by qualified technicians headed by Brian Cook. What we want you to do, is to fill out the form below to let us know if you're interested. Once we have your form on file, you will be notified by phone or mail when we would like for you to ship your board to us for prompt work, hopefully within three weeks time. The cost of mailing the board to us and insuring it will be your responsibility, and the cost and care of returning your upgraded board to you via UPS in a safe manner will be ours. We want you Tecmar owners to send your power supply along as well, so that we can test the board with your own power supply before we do anything to it. The cost of this service will be \$155.00 (U.S. Currency). If you should have any questions concerning this service, please let us know on your form. We will guarantee the work and the 256K chips for 90 days. Canada please write.

Name : \_\_\_\_\_  
Telephone no.: \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ St \_\_\_\_\_ Zip \_\_\_\_\_

Mail form to:

The PCjr Club  
P.O. Box 59067  
Schaumburg, IL 60159-0067  
ATTN: Brian Cook

(312) 730-1215

**Wanted - Desperately Seeking**  
PCjr Color Paint cartridges for small elementary school. Traded up to something more powerful or simply letting yours collect dust? Let me know, I'll buy it!  
Mike  
(215) 566-4640 leave message, and I'll answer promptly and gratefully.

**IBM PCjr 128K**, single drive, color monitor, IBM compact printer, Jr keyboard, BASIC cartridge, PCjr Sampler, Guide to Operations, one roll printer paper, all original manuals and documentation. \$600. or best offer.  
Chuck Larson  
10348 Yates Lane NW  
Bremerton, WA 98312  
(206) 830-4861 after 6 PM weekdays or anytime weekends.  
(206) 830-0153 for messages.

**IBM PCjr 128K**, PCjr color monitor, one disk drive, parallel port, V-20 chip, enhanced keyboard, Guide to Operations Manual, WordStar for the PCjr, Friendly Ware PC Introductory Set. All Excellent+ in operation and

condition. \$395, UPS paid.  
William Shimonkevitz  
8927 Park Forest Drive  
Springfield, VA 22152  
(703) 451-1751

**IBM Parallel Printer Attachment**  
with instructions \$40., IBM Diskette Drive Adapter and Signal Cable with instructions \$25.  
Jim Crowther  
7504 Bear Canyon Road, NE  
Albuquerque, NM 87109  
(505) 821-0172

**DESERATELY SEEKING IBM's**  
Writing To Read Program to send to missionary friends overseas who are teaching their children at home. I already have the speech attachment, now what I need is the program!  
Kathleen C. Jaeger  
712 Sedgefield Dr.  
Newport News, VA 23605  
(804) 595-5764

**IBM PCjr 512K**, Quadram expansion, 2 drives, jr Color monitor, internal modem, mouse, joysticks, manuals, and more...\$750.  
Steve Brown

1465 N.W. 178th Place  
Beaverton, OR 97006  
(503) 645-8727

**AMDEK ORANGE MONITOR**  
\$60., IBM Thermal Printer \$45.  
Charles Ellmers  
9690 Glenstone Dr.  
Kirtland, OH 44094  
(216) 256-3091

**WANTED:** 1 USED PCJR W/  
WILSON-JONES Color monitor, 640K, 2 dr., w/ Racore enhancement, 1 color graphics adapter, 1 ramdisk software, 1 book on mastering Symphony, 1 book on mastering Lotus 1-2-3.  
John Veltre  
P.O. Box 982  
Cartersville, GA 30120  
(404) 382-3841

**128K PCjr, SINGLE DRIVE**, parallel port, color monitor, dust cover, Filing and Writing Assistant, software manuals, other software. Excellent condition. \$500. or best offer.  
Brenda Royce  
263A West 19th St. #915  
New York, NY 10011  
(212) 677-3918

# Jack Nicklaus' Greatest 18 Holes of Major Championship Golf

A Review by Harrison Day

I've never been a golfing enthusiast. If it was sunny, I would rather be playing tennis against someone hitting a relatively soft, safe, felt-covered ball in a small field, than standing near three guys hitting a hard, dangerous projectile and then chasing it over a large field. Though either ball striking me in the wrong place would prove very painful, at least with tennis, I could still manage to father children.

My PCjr and Mean 18 by Accolade changed my attitude about golf forever. Here was a non-dangerous game that allowed me to swat a golf ball with drivers and irons onto beautiful fairways and into intriguing sandtraps and water hazards, sightsee exotic golf courses around the world, and munch on a taffy apple at the same time. All this I could do from the comfort of my computer chair. The game Mean 18 is addicting, and when The Golden Bear (you see you actually learn the nicknames of golfing greats when you become a Mean 18 Pro) Jack Nicklaus came out with his version of computer golf, I bit at the chance to go a few holes with the master. It really helped when we received a free review copy of the program too.

The software package, Jack Nicklaus' Greatest 18 Holes of Major Championship Golf, comes on two disks, a program disk and a course disk. Though the program is not disk copy-

protected, which means that you can make multiple backups and easily copy it to a hard disk, but utilizes a new method of copy-protection that is quite popular at the moment. At the beginning of the game, the program will randomly display one of 54 diagrams of the various holes that are played in the contest, and will ask you to identify the diagram by number. You are given a "course sheet" with each of the 54 holes numbered properly, and it is from this sheet that you will find the correct answer. It may take you a few seconds at the start, but it is worth the elimination of the disk copy protection scheme. If you fail twice in correctly naming the golf hole, the program will announce, "Looks like rain today, come back when the weather clears," which translated means "get lost, or buy your own program you cheapskate." This course sheet is printed on a special dark-purple paper called nocopi paper, manufactured by Nocopi International, Inc. of Toronto, that is virtually impossible to copy on a standard photocopying machine. Therefore, backups can be made freely, and the risk of outright pirating is diminished. If you lose the sheet, you must pay \$15. for a new one. I did notice that even after you have correctly identified the hole to start the game, if you should decide to travel to another golf course, you will again be prompted to identify another golf hole before being allowed

to play. I guess it's like showing your membership card at the club.

The program is considered a second generation golfing program from the same people who brought you Mean 18. Like Mean 18, a power bar controls the height of the upswing (power) and the timing of the drive. A tap of the space bar starts the swing, another tap stops the upswing, and a final tap times the strike of the ball. The New options include playing against a computer player including the Golden Bear himself, playing a "skins" tournament, and selecting pro, men's, or ladies' tees to start the game. It supports EGA (enhanced graphics adapter) 16-colors, which means nothing to PCjr owners, and has added a few more helpful screens and menus. Unfortunately for Junior owners, Mean 18's 16 colors for the PCjr are not part of the new package, and we are forced to endure the quite unattractive, somewhat unrealistic 4-color scheme that face mortal PC CGA (color graphics adapter) owners. The new screens provide more statistical data such as longest drive, last drive, closest to pin, and the number of shots from the greens and from putts. The total number of birdies and eagles are also tabulated. Now on to the game.

There are 18 famous golf holes that are chosen by Nick-

*(continued on next page)*

## Championship Golf..

(continued from previous page)

laus as the "greatest" holes he has ever played. These include the 8th at Pebble Beach, 14th at St. Andrews, 10th at The Riviera, and others. Additionally, you can also play at Castle Pines Golf Course at Castle Rock, Colorado and The Cochise Course at Desert Pines in Scottsdale, Arizona. Most of the time, Jack will provide some tips for defeating some of these monster holes.

Game play, despite the lack of 16 colors, is very good. The graphics are more detailed, the golfer looks like the Golden Bear rather than a King's Quest character, and the sound effects such as splashing into a water hazard are more believable. The problem of screen refresh, or the

time taken to construct another scene on the PCjr monitor remains. On the average, it took about 12 seconds on the Junior, and about 10 seconds on an IBM PC AT. It did not diminish the enjoyment of the play, however.

All in all, I liked golfing with Jack very much. It's not like we're best friends or anything, but his computer golf game due to its superior graphics and options seems to be a winner.

*Jack Nicklaus' Greatest 18 Holes of Major Championship Golf Accolade, Inc.*

*550 South Winchester Blvd.  
#200*

*San Jose, CA 95128  
Retail price: \$39.95*

## Editor's Notes....

(Continued from page 2)

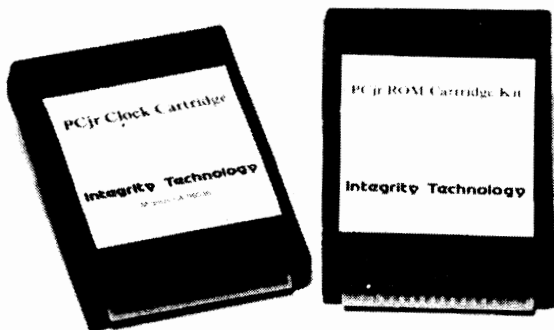
math (numbers with decimals in them), or in other words, any operations involving floating-point numbers or double-precision floating point numbers will not work on the PCjr. Thanks, Ruth, now can you translate that for me?

Borland is a little red-faced anyway because its phenomenally successful spreadsheet program Quattro has been shown to contain a few bugs. One of them occurs when one tries to save a Quattro spreadsheet to a Lotus 1-2-3 format. Sometimes you will end up with an encrypted file with password protection, with the password randomly chosen by Quattro. Let's see, sounds like? Is it one syllable or two?

## PCjr Clock Cartridge

Self-contained Clock Calendar inside PCjr Cartridge. Included programs to automatically set time & date at power-up or boot.

and PCjr ROM Cartridge Kits



Also, PC/XT No-Slot Clock Modules  
Dealers inquiry welcome

### Integrity Technology

105 Serra Way, Suite 230, P.O. Box 360604, Milpitas, CA 95035-0604.  
Phone: (408) 262-8640, Telex: 6972396, MCI Mail: 2098377.

## EXPAND YOUR PCjr

jr. Hotshot 512K Memory .....	CALL
Racore Drive II Plus w/DMA & 512K Memory .....	\$500
Quick Silver Cartridge .....	\$ 30
AT Style Keyboard w/adaptor cable .....	\$129
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.

# Eye On Shareware

By D. Glanville

Hey, what happened to the rest of the Shareware choices, namely Disks 27 to 120? Well, the staff here felt that listing the entire shareware library took up too much valuable editorial space, so starting in this month's issue, we have decided to highlight various programs that have proven to be popular among PCjr owners, and will offer the entire listing on a separate disk or article. I think everyone would rather see more articles than listings, and in this way, we are actually expanded The Junior Report without added more pages to our printing costs. So there.

Once they were lost, and now they are found. Yes, ladies and gentlemen, we have found the lost episodes of shareware disks that were inadvertently left off our list of shareware that last two months. They are great programs so "re-check" them out. Like the lost episodes of the Honeymooners, they are classics, and are numbered 128, 129, 130, 131, and 132. Now, let the games begin. New this month:

## **CANASTA and PCDARTS** (#137)

CANASTA is designed to let the

computer be both a tutor and player. The computer doesn't cheat. It checks your cards only to be sure you meld properly and forgets what it sees when it takes its turn. The computer keeps the score and gives you a message when you are breaking rules and tells you when to draw, discard, meld etc. When you have learned to beat the computer, you can be sure you are a pretty sophisticated player.

PCDARTS is a simple game of darts using a British style dart board. You choose the angle and make the toss. (No ale or stout is supplied.)

## **NEW YORK WORD v 2.2** (#138)

New York Word is a powerful word processor and now it is even easier to use. VS 2.2 has pull down help menus, permits the use of European character set. 2.2 has an integrated spell checker, cut and paste, footnotes, header and footer control, automatic hyphenation, keystroke macros, index generator, automatic table of contents, mail merge and even a calculator mode. Two new "shortcut" commands have been added to allow NYWORD to better emu-

late WordStar (TM of MicroPro) Easier to use than PC-WRITE.

NYWORD requires a supported printer. It supports Brother, Diablo, Epson or Epson clones, Gemini, Genicom, HP Laserjet, IBM Prowriter, Quietwriter, IDS Juki, Okidata, Panasonic and Toshiba printers. (My Star NX10 worked fine when I listed it as IBMPRO.) Requires 640k or 256 and 2 disk drives. This disk is distributed in archived form.

## **MORE DOS UTILITIES (#139):**

This is our writer Tim Hallen's favorite group of PC DOS utilities that help the PCjr owner. It contains programs such as LABEL, DOSEDIT, MYDOS, FASTFLOP, BIG-FONT, LISTS, CURSOR, RAMDISK, and lots and lots more. To this diskette, we have added QP, a program that will print our any file documentation in a quarter page size, or in other words, four pages of documentation will appear on a standard size sheet of computer paper! This is not just a good utilities disk, it is a great one that deserves to be in every PC and PCjr owners library. Don't let this one get by you.

**PC FILE III (#1):** the classic, updated, full-featured database program that has set the standard for shareware programs. Considered by many to be better than most commercial programs. Version 4.

**PC WRITE (#2):** this best-selling shareware program is equal to or better than most word processors on the market. This is the latest version (2.55) and will run on the single drive, 128K PCjr.

**PC TALK (#3):** PCjr adapted version of one of the most popular communications programs.

**HOME MANAGEMENT (#4):** a reliable, general purpose financial manager.

**KIDS (#7):** a special children's disk composed of a kid's word processor, an intermediate math program, and a colorful counting game for the preschooler.

**PC-KEY-DRAW (#9):** the most powerful graphics program available in shareware. **Requires 256K.**

**GAMES (#10):** one of the best selling game disks has Combat, Dungeons & Dragons, & Global THERM Nuclear War.

**PC TUTORIAL (#12):** a course in computer and the PC-DOS environment.

**EDUCATIONAL GAMES (#18):** features math exercises, thinking programs, and the classic Flashcards.

**LABEL MASTER (#19):** the original label making program has a variety of uses. **Requires 256K.**

**GAMES (#24):** Poker games, Battleship, Land Mines, Fire, Grime, and Hostages.

**IMAGEPRINT (#25):** A must-have printer utility that makes your dot matrix into a lean, mean, quality text producing printing machine. Can proportionally space text. Requires an Epson or IBM compatible printer.

**QMODEMjr (#26):** a special PCjr version of the popular communications program, allows easy access to BBS's.

## The Latest Additions To Shareware

**BY THE NUMBERS (#120):** A numerology program guaranteed to entertain even the skeptics among us. You can find your lucky numbers, your lucky colors and your destiny. We know this is all hogwash (isn't it?) but it's still fun to read. After all it did say I was versatile, quick-minded and courageous, all of which is true. Of course it also said I might be irresponsible and and vulgar, but then no program can be right all the time. **384k required.**

**TYPING ASSISTANT (#121):** If you want to learn to type or if you can type but need to increase your speed, this is the program for you. This program was designed to help the beginning touch typist and to help experienced typists sharpen their skills. Written by a fellow PCjuniorite, so give it a try!

**BOWLING LEAGUE SECRETARY (#122):** So many of you requested a bowling program similar to our GOLF HANDICAPPER that we found this disk just for you. Spare yourself all the work. This system can handle 18 teams, up to 5 bowlers per team, and up to a 50 week season. Programs are provided to enter scores, print standings (weekly), prepare Book average listings, and more.

**ABC FUN KEYS (#123):** This program was written with imagination and aimed at children aged two to five. There are four programs intended to help you teach your child letter recognition and to encourage him to pick out, from your computer keyboard, the letter showing on the screen. The color graphics are attractive and will be enjoyed by the very young child.

**FAST FOOD (#124):** Even though more Americans than ever are watching their calories, sodium and cholesterol, fast food restaurants are springing up all over the country. We all use them. This disk lists the nutritional values of the menu items of fifteen of the most popular chains in the country. **256k req.**

**SPANISH FOR TRAVELLERS (#125):** Even without an audio tape, you will find this disk a real help if you are planning a trip south of the border this summer. The program consists of eight formal lessons with a few tests and quizzes thrown in, and an additional phrase/verb menu. **256k required.**

**ASTROLOGY (#126):** A full-featured astrology program for those of you who want to cast their horoscope. This program will help you calculate your chart and print out the results. Charts can be displayed in either graphic or cartwheel form. This program **requires 256k** and two disk drives but it can be used with 640k using a RAM disk.

**FORM LETTERS (#127):** One hundred different forms and form letters for personal and business use. You will find a thank-you note, an absentee record, a demand for payment, a request for a refund, a letter of resignation and even a nasty letter cancelling an order placed with a pushy door-to-door salesman. All these letters are saved in ASCII form and can be imported to your word-processor. You can fill in the spaces or tailor the letters to your exact needs.

**MEAN 18 COURSE DISKS (#128 and #129):** There was so much interest in disks #118 and #119 that we found two more course disks for you. These disks are meant to be used with Accolade's MEAN 18. Disk #128 has Pebble Beach, Banff and Sanddune courses. Disk #129 has Augusta, Waterloo and Walden courses. Now if they only had a nineteenth hole....

**DOMINO (#130):** At Mack's Domino Parlor, you have a choice of nickel, dime or quarter games (Levels 0,1,2). There is also a game for high rollers in the back room, but it is by invitation only. To be invited you have to win a nickel, dime or quarter game by a big margin. The back room characters are unsavory to say the least, and you probably wouldn't want to go there more than once or twice even when invited.

**MY FAVORITE UTILITIES (#131):** Computer utility programs are the programs the smart guys write, so people like us can really enjoy our computers. This disk has some of my favorite programs on it, and I feel this is a must buy for all PCjr owners.

*(Continued on next page)*

Please circle one or more below

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32  
 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63  
 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94  
 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119  
 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146

Number of program disks wanted: \_\_\_\_\_ times \$5.90 = \_\_\_\_\_

\_\_\_\_\_ times \$10.00 = \_\_\_\_\_

Total enclosed: **AM BIA**

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ST \_\_\_\_\_ ZIP \_\_\_\_\_

PHONE # \_\_\_\_\_

*Check here if this order has  
six programs or more for  
FREE library case \_\_\_\_\_*

*(Continued from previous page)*

SMALDOC takes any text file and reformats it, paginates it and compresses it so it can fit into an IBM sized binder. The pages are marked with cut lines and punch indicators. You can print your file on regular paper and cut it down to IBM binder size. It's great for keeping all your doc files in binders and you don't have to worry about text being printed on the perforation. **256k req.** LIST by Vernon Bueg is probably the most used utility around. With LIST you can read your text files without printing them out. Simply typing LIST XXXX.DOC or LIST B:READ.ME lets you browse at your own pace. Version 62a lets you change colors, search for text and print to your printers as you scroll the text. **ADJRAM.EXE** is a RAM disk program. **ADJRAM** allows you to vary the size of your RAM disk without re-booting and without loss of any of the data stored in the RAM disk. You can start out with 64K of your memory allocated for the RAM disk, expand it later to 320K, copy a document file of 60K to the RAM disk, and still later reduce the RAM disk capacity back down to 128K -- without losing your document file. **640K req.** **COVER.COM** prints out a disk cover with a small list of all the programs on the disk. **VOLSER.COM** puts a volume title or number on your diskette. **FLU-SHOT** is some help against the dreaded disk virus. Like any vaccine, the program works best against a specific problem and no vaccine is 100% effective. We can't guarantee that this one is either but it's worth a try.

**ASTRONOMER, WHEEL, AND RECEIPT (#132):** Astronomer is a program designed to calculate important astronomical data for major planets for a specified place and time. The program uses current date and time when the computer is turned on. **256K REQ.** Wheel is another version of Wheel of Fortune and Receipt is a nifty little program created to print a cash register receipt for those refunds. You know how annoying it can be if you've ever got a refund form, bought the product and then lost your cash register receipt, or you have only one register receipt and several refunds requesting it. You can make a pretty credible copy of your receipt with this.

**WAR AT SEA (#133):** This program is a high level strategic and tactical situation using typical World War II naval campaigns. Some ships are limited to battles in which they actually took part and others may be used without having actually taken part in the battle. This is not a hand/eye coordination game, it is a strategy game. You may choose from seven campaigns including Pacific (U S. vs. Japan), Solomons (Japan vs. U.S.) and Atlantic (Germany vs. England). You will be asked to select your navy from a large stockpile and you are given information which will assist you in choosing your ships. Then you have to choose your targets. **MAN YOUR BATTLE STATIONS! 256K REQ.**

**BASIC TUTORIAL(#134):** Two basic tutorials, one for adults and one for youngsters. Introduction to Basic touches on statements, commands and functions. You will learn how to do simple programming. A friend told me she learned more from this program than she did from a whole semester of Basic Computing at night school. You'll learn how to LIST it, LOAD it, LOOP it, LET it, and that's just the L of it. You will understand RND, GOTO, INT, TRON, TROFF, DELETE, REM, DE-DUG, READ, RUN, SAVE and IF THEN. ARCHIE, the tutorial for kids is well presented and amusing. Your child will have the opportunity to study simple Basic structures at his own speed. This is an excellent disk for anyone wanting to learn more about the BASIC language. **BASIC CARTRIDGE REQ.**

**RUBIK'S CUBE (#135):** This is the original commercial program that has now gone the route of shareware. It can solve any Rubik's cube problem, is fun, and has nice graphics. If you find it entertaining, we emphasize that you reward the original author with some form of registration as with the other shareware programs listed in this section. **128K only.**

**BASIC PROGRAMS (Disk#136):** This disk contains six BASIC programs along with documentation that programmers will find indispensable. These include BASKEY, a utility for defining function keys 1-10 for use while working in BASIC (provides all information, options, and operations on a single screen), MENU and MENUEDIT for creating and maintaining a menu from which BASIC programs can be run, and MENU.DOC explains how to set up a library in which control returns to the MENU program after a called program ends. These programs, written and adapted by Mike Graff, afford flexibility and capability that you will find most desirable.

**THE PCJR CLUB**  
**1121 Tower Road**  
**Schaumburg, IL 60193**

**BULK RATE**  
**U.S. POSTAGE PAID**  
**PERMIT NO. 327**  
**SCHAUMBURG, IL**