IBM Pledges to Continue Supporting Our PCjrs

In case you've been feeling that your PCjr was on Death Row, take heart — its sentence has been commuted. In an announcement to **jr Newsletter**, a spokesperson for IBM said, "While we may have stopped producing the PCjr, it is still a viable member of the IBM PC family and we will continue to support and service it in that manner."

This statement is encouraging to those of us who remember that IBM promised to support PCjrs for five years when it announced a halt to the production of new jrs on March 19, 1985.

That was two years ago. During an exchange of letters and phone calls to IBM recently, we asked, "Are we now beginning Year Three? How much time do we have?"

The answer came back a few days later: "The clock has not yet started," the spokesperson said. He went on to say that the five year clock would not begin until the PCjr has been withdrawn from marketing — and that hasn't happened yet.

Although you won't see new PCjrs in many dealers'
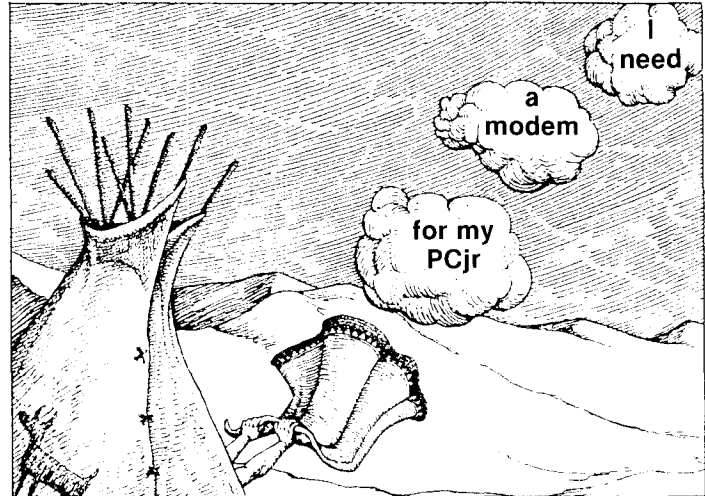
What's the Difference Between Pcjrs and PCs?

By LeRoy Tabb, Jr.
Philadelphia Area Computing Society

A frequent question about the PCjr is "What is the difference between a PCjr and its full-grown big brother?"

The differences can be listed briefly. The PCjr does not have direct memory access (DMA); its video RAM is not located in memory block B0000 or B8000 hex; it cannot accept an 8087 Math Coprocessor; it has two slots for ROM cartridges; and it has only one disk drive and no expansion slots (but can be upgraded by using sidecars). Also, it has a larger allocation for video RAM and uses the TI SN76469N sound generator chip. Got it? If not, join the crowd, but I'll try to shed some light on all of this.

The PCjr does not have DMA. This means that, unlike its big brothers, the PCjr does not have a DMA controller (the 8237A) to allow the diskette drive to interact directly with memory. Therefore, diskette input/output must be handled by the 8088 CPU through a process called bit nibbling. The most apparent result of this difference is that you can't type ahead while the disk drive is being addressed. The most important result is probably that the CPU has to suspend running our programs while it writes to or reads from the diskette drive, so our PCjr is a bit slower than the rest of the family. The

How to Upgrade An IBM Memory Sidecar

EDITOR'S NOTE: The following article describes how to replace the chips in an IBM 128K memory expansion sidecar, so that your jr will have a total of 640K. The article appeared on the IBM BBS recently and we reprint it here for the benefit of those readers who are willing to tackle a job that takes patience and skill with a soldering iron. We recommend that you read the article carefully to determine whether or not you are capable of doing the job yourself.

If you have upgraded your IBM PCjr to 256K with IBM's 128K memory sidecar you are in luck. IBM designed the 128K memory board to support both 64K DRAMs and 256K DRAMs although this fact is undocumented. The upgrade requires replacing the 64K DRAM chips with 256K DRAM chips, cutting a jumper trace and adding a jumper wire. We, Turning Point Logic Corporation, have upgraded two IBM PCjr's from 256K to 640K via this method with excellent results. If you are interested in upgrading, the directions are given below.

WARNING: THIS UPGRADE IS FAIRLY DIFFICULT AND SHOULD ONLY BE ATTEMPTED BY THOSE WITH SUBSTANTIAL SOLDERING AND CHIP REMOVAL EXPERIENCE. IN ADDITION THIS IS NOT AN IBM SUPPORTED OR ACKNOWLEDGED UPGRADE AND THEREFORE THIS UPGRADE IS PERFORMED AT THE USER'S OWN RISK.

UPGRADE DIRECTIONS

1. Tools needed (if you do not have these tools then please do not proceed, this procedure is very delicate and it is VERY EASY to DAMAGE the board).

   a. Small screwdriver
   b. A good pair of side cutters
   c. A good soldering iron
   d. Solder
   e. A good solder extractor
   f. An X-acto knife
   g. A small pair of needle nose pliers or tweezers.

2. Parts needed.

   a. 16 - 16 pin low profile solder tail sockets (sockets are not necessary but are advantageous if a memory chip is bad or found bad).
   b. 16 - 16 256K DRAMs 150 ns
   c. A small piece of 28 or 30 AGW wire (1" is more than adequate).

3. Power down the PCjr and disconnect the power cable.

4. Remove the IBM 128K memory option sidecar.

5. Completely unscrew the four mounting screws.

6. Remove the interior sidecar panel with a small screwdriver. The panel is held in by eight tongs; four on the top, four on the bottom.

7. Remove the printed circuit board from the sidecar case.

8. Using a pair of side cutters (we highly recommend purchasing a good pair of side cutters, if you do not have a pair, before attempting this step. They cost about $10 and can make the difference between success and failure of this project) completely cut legs of all of the installed 64K DRAM chips. Do not attempt to salvage the 64K chips. Cut the legs at the edge closest to the DRAM chip, NOT by the board.

9. With good electrical solder, re-tin the solder pad at each cut leg. This step may seem a waste but makes the overall job of removing the cut legs and solder much, much easier. Please take the time of performing this step - we did not with our first upgrade and it took eight hours to complete compared to two hours for the second upgrade.

10. With a pair of needle nose pliers or tweezers and a soldering iron, remove each cut leg. Apply the heat of the soldering iron from the component side. Grip the leg to be removed with as little contact of the pliers as possible. The pliers become a heat sink and the less surface contact of the pliers with the leg the less heat drawn off by the pliers.

11. Again re-tin all of the solder pads with a fair amount of clean solder. Taking this step may take a longer amount of time in the short run but can save a significant amount of time and headache in the long run.

12. Remove all of the solder from the holes with a solder iron and solder extractor.
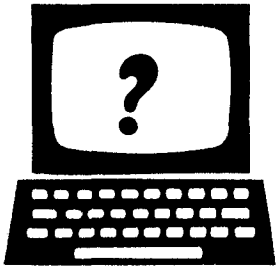
13. With a lightly tinned soldering iron apply enough heat to each hole so the remaining solder melts around the edge of plated through hole and solder pad.

14. Scan the bare solder holes and surrounding area

EDITOR'S NOTE: jr Newsletter gets questions in the mail from PCjr owners every day. Some of the questions are asked, in one way or another, by several people so we assume there are more of you out there who have similar experiences and/or problems. The questions in this column are those that we feel will be of interest to many PCjr owners. If you have a question that you do not see answered here, or elsewhere in this newsletter, please feel free to write to us at jr Newsletter, Box 163, Southbury, CT 06488. We PCjr owners are all in this together!

Q. I keep seeing references to what seem to be several different kinds of BASIC, BASICA, and Cartridge BASIC. Are these differences significant?

A. DOS 2.1 has files labeled BASIC.COM and BASICA.COM, which are known as disk BASIC and Advanced BASIC. They are there for the IBM PCs and XTs to use. Your PCjr was designed to use Cartridge BASIC, which is actually superior to the others because it supports the PCjr's more advanced sound and graphics. Also, because Cartridge BASIC is stored in ROM, it runs faster and leaves more memory free.

If you have booted DOS and type either BASIC or BASICA at the A > prompt, you will be running Cartridge BASIC, assuming you have it in its slot. Normally, you can't actually run the files labeled BASIC.COM and BASICA.COM on your PCjr without having Cartridge BASIC. And, since typing BASIC or BASICA at the A > prompt will start running Cartridge BASIC, not BASIC.COM or BASICA.COM, if you ever wanted to run BASIC.COM or BASICA.COM, you would have to change their names to something like BATHIC.COM, keeping the .COM extension and with Cartridge BASIC in its slot. There is a public domain patch which can enable you to use BASICA without Cartridge BASIC installed (another example of jr users' ingenuity). We plan to offer this patch, along with other jr specific utilities on a disk in the next month or so.

Are you still with us? If so, there's more: The PCjr comes with Cassette BASIC built in. If you turn your computer on without a diskette or Cartridge BASIC in its slot, you get Cassette BASIC, which is a more limited form of BASIC, designed to store its information on cassette tapes and unable to interact with diskettes or DOS as Cartridge BASIC does so well.

Q. How do I enter extended codes using the PCjr keyboard? The directions on the Keyboard Difference Chart that came with my jr do not seem to work.

A. The Keyboard Difference Chart is somewhat misleading. When using the ALT key to enter the extended codes, the keyboard has to be in Numeric Lock first. To do this, hold Alt and press Fn, release Fn, then press N. This series of keys is a toggle which will switch Numeric Lock on an off. Once the keyboard is in Num Lock all 256 extended codes can be entered by holding down the Alt key and then typing in the numeric value of the extended code. Your PCjr Guide to Operations has more about this on pages 4-9.

Q. I want to use a language compiler on my jr. Do you know whether there are any special problems I should watch out for?

A. Both FORTRAN and Pascal Compilers through Version 2 run well on the PCjr, provided you have enough memory and remap it correctly. You also have to have 2 drives. According to the IBM Software Guide (9-84) you need 512K on your PCjr to run either FORTRAN or Pascal compilers. The 512K should be configured as follows: 32K for DOS, 16K for Video Buffer, 160K for the compiler and 314K for a RAM disk.

Q. I recently bought a disk from your public domain Software Store and it said I should send them $35. I thought I already paid for the software. I think you should warn people about this.

A. Our Software Store has both public domain and user-supported software, which is confusing to some people. It should not cause problems for buyers of this software. But it may be helpful to understand the difference between the two. Public domain software is not copywritten by the author and is offered for distribution without restrictions. User-supported software, sometimes called shareware, is software that is sometimes copywritten, but is offered for widespread distribution by anyone who cares to share it with others. Usually this is done for a low cost, as we do.

Shareware is usually superior to public domain software, except in the case of some very high quality public domain games. Some shareware programs, including many of the ones in our collection, are as good as or better than their commercial counterparts. Shareware is
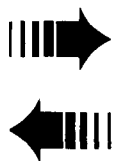
Tips on Freeware, Books, Screen Sharpness and Word Perfect

Now that I have the two back issues you just sent, I'm sorrier than ever to have missed the others. You're doing a great job with some of the most interesting and readable copy I've found. Some quick thoughts for future issues:

1. How about a column, with reader contributions, on good freeware utilities that enhance jr? My top nominees:

a. Zansi.sys with fastscrn — a sensational screen utility that speeds up screen writing faster than the drive can run in a directory display. This is an improvement on fansi.sys and nansi.sys, both of which speed up and avoid the flickering problems of ansi.sys. Available from Robert Blatcher's BBS (I'll by happy to send you a copy if you don't have it).

b. Burndev.sys with burnout.com — a screen display killing device driver that gives you unusual latitude in the time delay, and the option of killing the video through a hardware interrupt (like scrn.com) or by resetting the colors to black-on-black through the software. As a device driver, its status can be checked by other programs, or used to trigger their operations. For some of us who use Racore with dma and can't get regular hardware interrupt screen blanking programs to work (.e. hash when you hit a key to bring the screen on) the software option is a godsend. (P.S. I'd love to hear from any reader who knows how to get the hardware interrupt programs to work with Racore.)

c Amdisk.dvd and adjram.com — a fantastic utility that permits you to change your ramdisk size without rebooting. With most ramdisks, you have to reboot if you want to change the ramdisk size from a program where a large ramdisk helps (e.g. Microsoft Word) to one requiring maximum free memory. (e.g. Lotus 1-2-3). Not any more.

2. I am also a fan of the jr keyboard, having used PCXT (ugh) and Keytronics 5151 keyboards at work. But I am dying to read the September article on other alternative keyboards for jr. Can you send me a photocopy? (I'm particularly interested in evaluations of the datadesk keyboard and the cherry infrared XT style keyboard offered by PC Enterprises.)

3. I'm a Peanut Gallery member and haven't heard word one about Mintz' 10 Meg speed modification. Any further word reported in an issue I missed?

4. A lot of the need for greater screen sharpness than the jr monitor provides comes, in my opinion, from use of eyestrain-causing color combination options with word processing programs. I find amber foreground on black background the most restful so far, but would be interested to hear other views. (The kolor freeware utility works on jr and will set these colors in DOS.)

5. You might also consider a periodic column about good books on computing, computer programs, and jr. If so, *The Fully Powered PC* by the editors of PC Magazine and published by Simon & Schuster should be among the first mentioned. A paperback packaged with a software disk of utilities, its purpose is to teach readers what they need to know to create their own integrated system (with floppy or hard disks), complete with menus for the novices in the family, for the software they are using (as opposed to having to buy an integrated system at inflated prices that won't run favorite programs). The book is not cheap at a list price of $40, but can be obtained in some discount bookstores for $30.

6. Also, for jr users who use Word Perfect, I've found that in order to turn off right justification, you have to use Alt 4 instead of Ctrl F8, which doesn't work.

Craig Tregillus
Washington, D.C.

EDITOR'S NOTE: We'd like to thank Craig for his unusually informative letter. Letters such as his and others we have printed recently are an indication of how many well informed, active and interested PCjr users there are. As for Craig's questions: We are always happy to receive reader contributions (in writing or on disk — no cash contributions, please, until you get your renewal notice). We have assembled several disks of useful utilities, but we know there are many more coming along all the time. In fact, at Craig's suggestion, we plan to start putting together a new one with the ones he suggested, plus a few others we found recently.

As for the Peanut Gallery's turbo for the PCjr, we checked with Brian Mintz, the owner, who said it is "dead in the water." But there are rumors of other turbo modifications in the works elsewhere. If any of them

become more than rumors, we'll print the details.

We agree with Craig that the amber on black combination is easiest on the eyes. We use it all the time for word processing with PC-Write and if you look at all the words in your issue of jr Newsletter, you'll get some idea of how much time we spend looking at our jr's screen.

As for a column on books, we don't think there are enough books out there that pertain specifically to PCjrs., although we welcome reader recommendations regarding books they have found useful.

Please keep those informative letters coming. We're sure other readers benefit from the tips and information contained in such well thought out letters.

* * * *

Telecommunication Tips

This is my two cents worth on telecommunications. I've enjoyed your two part article on the subject and found it to be very helpful. There are just two little tips I would like to add.

First: On disabling call waiting. You can call the phone company in your area and confirm what code to dial in to cancel call waiting. In my area it's "*70." What I don't believe got mentioned is that you can add this code to the end of the dialing command in your communications software. I changed the command ATDT to ATDT*70. The call waiting service comes back on whenever you hang up.

Second: If you are using PROCOMM and you've used COMSWAP so jr can find your modem, then you also need to be sure that PROCOMM is set to COM2. The first time I used PROCOMM the default setting was COM1 and when I tried to dial somewhere of course nothing happened.

I also have a request. Could you include some information in some issue about using ANSI.SYS? Also, I would appreciate information about setting up CONFIG.SYS files. Things such as how many files and buffers and what devices, etc.

Thank for a great newsletter.

Jim Brevard
The Woodlands, TX

EDITOR'S NOTE: We plan to follow up on Jim's request by including articles on ANSI.SYS and setting up CONFIG.SYS files in future issues.

Questions About AutoCad

In your February issue under Favorite Software, AutoCad was listed. I am interested in using it. I have 640K using the Tecmar Jr. Captain - Cadet memory expansion. AutoCad, I believe requires 420K to run, not leaving enough for a Ram disk. I assume I will need a second drive.

Your advice would be appreciated on what upgrades in fact are needed, (i.e. drives, DMA, PC ID cartridge, etc.) and the best, compatible model for my system.

R. Grant
Hinsdale, IL 60521-3045

EDITOR'S NOTE: Since we have no experience with AutoCad, we are printing this letter so that an AutoCad user can provide information — which we will print in a future issue.

* * * *

Tecmar, keyboard, hard drives

I have just recently subscribed to your great newsletter. I never thought that I would get immediate benefit from the newsletter but the problems some of your readers have had with the Tecmar jr Captain board and the problems with DOS 2.1 are exactly the problems I have had. I thought I had a "heat" problem but the DOS fix you offered has seemed to solve the problem and I can now use the RAM disk that comes with the Captain board.

I wonder if you might be able to steer me in the right direction on something else. My system is configured as follows: I have the Tecmar jr Captain board that I have replaced all the 64K chips with 256K chips to bring the total system to 640K. I have also replaced the jr keyboard with the Keytronics KB5150jr Professional Series keyboard. This keyboard is great and I highly recommend it to anyone. It is well worth the money ($169). For software I use primarily Lotus 1-2-3, Volkswriter 1.2, and Quicken Checkminder.

What I have been considering recently is investing in a hard disk drive of about 10MB. I don't think a second 360KB drive makes any sense if you can use a RAM disk. Are there any reasonably priced hard disks that will work and take advantage of the additional memory? By reasonably priced I mean that I can't see paying $700 or $800 for a hard drive when I only paid $700 for the entire system.

Reader Feedback

Am I dreaming or can I get a good hard drive for about $400? My biggest concern is, after price, that the drive is known to work with a system configured as mine is. Whatever help you can give will be greatly appreciated.

Keep up the great work. The DOS 2.1 fix was more than worth the price of the subscription!!!

George Aboshar
Salem, NH

EDITOR'S NOTE: George wrote this letter before he had seen our April issue and its article on adding hard drives to PCjrs. That article had many examples of prices and probably answered that question. The answer in a nutshell is that you can add a 10MB hard drive to your jr for $400 - $600 depending upon how much of the assembling you want to do yourself. For further details, see the April issue of jr Newsletter or call one of our advertisers for current prices and configurations.

* * * *

'Pseudo' Random Numbers

I would like to put some light on the puzzling behavior of the PCjr random number generator that Mr. Ugincius mentioned in the February issue of jr Newsletter. My guess is that a MULTIPLICATIVE LINEAR CONGRUENTIAL PSEUDO-RANDOM NUMBER GENERATOR is the algorithm used to generate the data. This technique is based in the following equation:

$$X_{i+1} = (aX_i) \pmod{m}$$

where a is called the multiplier, X_i is the ith number of the sequence generated and m is called the modulus.

The problem illustrated by Mr. Ugincius was pointed out by Marsaglia (1968, "Random Numbers Fall Mainly in the Planes" Proc. Nat. Acad. Sci., 60, 25-28). He showed that successive overlapping sequences of n numbers from such an algorithm all fall on at most $(n!m)^{1/n}$ parallel hyperplanes. In this case, n = 2 and m may be computed from the information given by Mr. Ugincius:

$$(n!m)^{1/n} = 32 \text{ (32 lines)}$$

or

$$(2!m)^{1/2} = 32$$

therefore

$$m = 512 \text{ or } 2^9$$

It is very difficult to generate "REAL" random numbers and most algorithms only generate "PSEUDO" random sequences. For further information about random number generation I would recommend the book "Simulation and the Monte Carlo Method" by R. Y. Rubinstein.

Juan Jose Goni
Tulane University
New Orleans, LA

* * * *

More on Random Numbers

I refer to Jim Brevard's solution to Peter Ugincius' problem.

The solution is ingenious, but it does not explain the difference in behavior of the two programs.

Let's start with the basic "pset" program presented in the basic manual:

```
10 SCREEN 1
20 FOR N = 0 TO 100
30 PSET (N,N)
40 NEXT
```

This program produces a diagonal. We can now adjust this program to Peter Ugincius (without using random numbers):

```
10 SCREEN 1 : WINDOW (0,0)-(1,1)
20 FOR N = 1 TO .0001 STEP -.0001
30 PSET (1-N,N)
40 NEXT N: END
```

This program will still draw a diagonal in the specified window. Now, when you substitute these values for those used by Peter and add the randomize command, you are still getting the same drawing.

What this program does is obtain the numbers in random SEQUENCE, but with a large mathematical sample such as 5000 used in this program, the pattern of the drawing is maintained.

Now Jim Brevard's ingenious solution alters the game plan; by placing the randomize command inside the loop, it breaks up the original pattern of the program since he is re-seeding the random number on each pass of the loop.

Henry Rozenwaser
Forest Hills, NY 11375
Tel. 212-840-2000 x.272

* * * *

JR NEWSLETTER WELCOMES YOUR QUESTIONS. We enjoy hearing from fellow PCjr owners and will do our best to answer questions and help solve any problems you may have. Please, however, send your questions in writing. We are a part-time organization and are not set up to handle telephone calls. Please write to: jr Newsletter, Box 163, Southbury, CT 06488.

Here's a Pop-up Notepad You Already Have — In DOS

If you have been tempted to buy one of the many popular 'desktop" or "pop-up" programs that offer you a notepad and other handy gizmos, read on ..... you may already have what you need.

DOS provides us with many useful features which are easily overlooked because they are not promoted, or advertised. They just sit there and wait for us to discover them.

The notetaking ability is one of these little gems, disguised under the COPY CON command. It's quick and easy to use. It doesn't have some of the editing abilities that wordprocessors have. But for notes, who needs them?

Here's how you can use the DOS pop-up notepad without buying expensive software:

The COPY CON command is an "internal" DOS command, which means you do not have to have the DOS diskette in your drive. You just use it from the A > prompt any time after you have booted DOS. If you are in another program, you can exit to DOS, type the notes you want, save them, and return to your program.

Here's How We Do It

To give a very real example, we keep notes on articles we plan to write for upcoming issues of jr Newsletter in a file called articles. To create this file, we typed at the A > prompt:

COPY CON ARTICLES

After pressing Enter, we type our list. The amount of information you store in this way is not limited to what might fit on a notepad. In fact, you could write and store as much as you have space available for on your disk.

When we have typed in all the text we wanted to save in the file called ARTICLES, we pressed Enter in order to start a new line, then F6 (or Fn 6), then Enter. This saved our file on the disk under the name ARTICLES.

Now, whenever we want to read our file with the list of articles we plan to write, we can bring the list up on our screen by typing at the A > prompt:

TYPE ARTICLES

Of course, you would type the filename you had created when you started.

Although it is not easy to go back and edit your notes created in this way, you can easily add to them. We do this all the time by typing at the A > prompt:

COPY ARTICLES + CON ARTICLES

This command is telling DOS to add a file called ARTICLES to a file called ARTICLES. When you have entered the above command, you simply type whatever you want to add. Then end in the same way as above,

by going to a new line, typing F6 (or Fn 6), then Enter. DOS will now save what you have just typed at the end of the file you created earlier.

This method of saving information may not be as fancy as some of the commercial software, but it's effective — and it's something you already have at your fingertips.

* * * *

Tips for Black Cauldron Players

Here are a few tips to help you with the great adventure game Black Cauldron. These are just bits and pieces, but if you are stuck somewhere in Pridain trying to outwit the Horned King, these clues may help.
—Falling water helps with magic words.
—Fairies love playing music.
—Hollow tree trunks have surprises in them.
—The gargoyle's head turns so you can escape.
—Bring rope, dagger, food and water to the castle.
—Gurgi will help you if you feed him.
—You don't really need wisdom and wealth, do you?

* * * *

BASIC Program to Show Memory

The following lines will display the amount of memory on your system:

```
10 DEF SEG = 0
20 MEM = (256 * PEEK(&H414)) + PEEK(&H413)
```

IBM Will Continue Supporting PCjrs

windows, there are still a few who sell them, and we talked with one person in Dallas, Texas recently who just bought 100 PCjrs from IBM directly. Many jrs have been sold to school systems in the past year during a special marketing campaign. And IBM employees have bought many more, taking advantage of the company's offer to sell up to three PCjrs per employee for under $400 each.

There's Safety in Numbers

So jr owners can take heart, not only from IBM's promise of continued support, but also from the fact that there are hundreds of thousands of other jr owners out there. Just how many, IBM won't say, but a highly respected company that supplies estimated sales figures for the computer industry recently reported 550,000 PCjrs sold to date.

With those kinds of numbers, software producers are not likely to abandon PCjrs soon, either. Since PCjrs can run 90% of the software developed for the PC (provided the PCjr has sufficient memory), software will be available for many years to come. (The same company estimates 2.4 million IBM PCs have been sold.)

We have discovered recently that some individual designers of game software occasionally ignore PCjr compatability, (Amnesia, Grand Slam Bridge, and World Tour Golf, all being sold by Electronic Arts for example), but they are few in number. And we have heard from other game producers that they are making special efforts to assure PCjr compatability. (Strategic Simulations' Gettysburg, one of the finest historic battle simulation games, crashes after a while on PCjrs with 128K, but SSI says it hopes to fix that problem in a new version.)

So PCjr owners need not feel that they have a computer whose days are numbered. In fact, with the continued support of IBM as well as the smaller companies who make memory expansion units, second disk drives, hard drives, and other options to enhance and boost the power of your PCjr, there is no reason why your PCjr can't serve your needs for many years to come.

IBM's announcement apparently means you will be able to bring your PCjr in to an IBM Service and Exchange Center or other authorized repair center for repairs and you won't be told "Sorry, they don't make parts for these clunkers any more." Most of the companies who specialize in providing parts and accessories for PCjrs, including advertisers in jr Newsletter, say they will continue their services as well.

IBM's PCjr hotline will also presumably continue to function as it does now. It's not a source of much technical information, but, as one hotline responder recently put it, "We are a resource as far as general hardware and software information is concerned. We

Questions and Answers

developed by highly skilled programmers who have decided to distribute it in this unusual way, but who still would like to get reimbursed by those who try it and like it. That is why you see appeals for payments in the documentation of shareware programs. You aren't expected to send a payment if you don't find the software useful. We hope you will send a payment if you like the software, because we feel the people who develop high quality shareware deserve to be supported by those of us who use it.

Incidentally, we use PC-Write to write this newsletter, PC-File to keep the database of subscribers and print mailing labels, and PC-Calc to do our finances. We have become registered users of these programs by sending in the requested fees, which we feel are truly bargains considering the high quality of these fine user-supported programs.

Q. I sometimes have problems with my monitor, which gets dim every once in a while. Do I have it hooked up wrong? Is there a problem with the PCjr Color Display that causes intermittent dimness? Maybe I have too many peripherals hooked up and need more power?

A. There could be a problem with your PCjr Color Display, although that is probably not the case if it functions normally most of the time. The Color Display is a high quality monitor and should serve you well for many years. Fluctuations in power usually cause a shrinking of the screen display before they cause dimness, so this probably is not the answer either.

There is one other possibility that all PCjr owners should be aware of. When the jr goes into BASIC, either directly or via a program, the screen intensity drops to about 50% of normal. You can't restore the brightness with your brightness control. This is true of either cassette or cartridge BASIC and apparently was done on purpose by IBM so as to avoid a possible overload on the monitor. You can restore your screen to high intensity by entering the statement: SCREEN 1,0. But we don't recommend operating in BASIC at high intensity for long periods of time, since the technical folks at IBM might very well have a good reason for dimming the screen during BASIC use. We will report on this subject when we have more information from IBM itself.

* * * *

Have a Comment or a Tip?

Share your experience with other PCjr owners by writing to: jr Newsletter, Box 163, Southbury, CT 06488. We'd like to hear from you.

Using Racore Units With Other Units

Although it has been said that you can't add Racore memory to PCjr systems with other memory expansions already installed, there are ways around the problem. Here is one way to use Racore Drive II with an IBM sidecar.

1. Always use the jr mode.

2. Set the switches on the IBM sidecar as follows: #1,2 and 3 OFF; #4 ON.

Also, make sure the Racore memory board is full before you use the sidecar.

The Differences Between PCjrs and PCs

fact that the PCjr doesn't use DMA may also be a point of potential incompatibility with some software written exclusively for the PC (but that's a rare problem).

In my mind, the most important difference between the PCjr and the PC is the location of video memory. Before we go on, however, let's look at how the PCjr and the PC use their memory. To understand this, let's digress one step further and begin by talking about the brain and heart of the IBM PC, XT and PCjr—the 8088 microprocessor.

The 8088 is a 16-bit processor, and through some trickery called segmented addressing, is capable of addressing up to 1,024K bytes, or one megabyte, of memory. But not all of that memory is available for our use. To see exactly how IBM uses that memory, let's pull out a map. *(See box on this page)*

Figure 1 is not a traditional map, but a map of how the 8088's memory capacity is used by IBM computers. Each line in the memory map (00000 through F0000) represents the starting hexadecimal address for a 64K block of memory. Each block of memory has a specific application. Blocks 00000 thru 90000 are used for working memory. That's what we mean when we speak of a computer's memory. These blocks represent the memory available for our programs; they add up to the 640K maximum amount of memory in the PC, XT, and PCjr. Above that, block A0000 is used for IBM's enhanced video options, the Enhanced Graphics Adapter and the Professional Graphics Adapter. Continuing to climb the map, we find block B0000 which, as I mentioned earlier, is used for the video on the PC and XT. Our PCjr does not use that block of memory. Still climbing, block C0000 is used for the hard disk controller on the XT.

The next two blocks (D0000 and E0000) are of particular interest to PCjr users, because they are addresses into which we plug our ROM cartridges. This area is unused by the rest of the IBM family. Finally, we come to the top of memory, block F0000, where all of the built-in ROM resides. That includes ROM BASIC (remember, Cartridge BASIC would be in either block D0000 or E0000); the built-in diagnostics; the ROM BIOS; and the ever-popular Keyboard Adventure! This top part of memory holds a lot of interesting things, but they will have to wait to be explained in a future article.

We've seen that block B0000 is not used by the PCjr. Well, if our video isn't stored there, where *is* it stored? As you might guess, the PCjr allocates a part of our normal RAM memory for video. The highest part of RAM

IBM MEMORY MAP	
F0000	IBM ROM BIOS, ROM BASIC, etc.
E0000	ROM Cartridge
D0000	Programs
C0000	Hard Drive
B0000	PC Monochrome
B8000	PC Color Graphics
A0000	PC Enhanced Graphics
90000	
80000	
70000	
60000	
50000	
40000	
30000	
20000	
10000	PCjr
00000	(128K)
Working memory	

on a standard PCjr is reserved for the video. In text mode, 16K of our memory is allocated to video; in graphics mode, 32K is allocated out of RAM.

There are several RAMifications (!) of this arrangement:

First, some of our program memory is used up for video. Therefore, some programs that can run on a 128K PC don't have enough room to run on a standard PCjr.

Second, when IBM originally released the PCjr, they must have felt no one would want to expand it beyond 128K. So they placed the video RAM at the top of the 10000 block of memory. That caused a separation between the first 128K of RAM and the rest of the working memory (20000-90000), and that meant our programs wouldn't know where to find additional memory, even if we did find a way to install it. Well, as we all know, ways

Golf & Sailing Games, DOS / Multi-tasking And Early Learning Games Now Available

A challenging golf game combined with a chance to sail the Bermuda Triangle are both offered on a new disk in our software collection this month.

"Teed Off" is a graphics golf game which has three courses to choose from (Novice, Professional and Sadistic). Club selection, direction and swing are all controlled by the player, who also has to watch out for water, trees, hills on the green and other hazards.

The swing is controlled by the length of the backswing and the point of impact, which determines whether you have hooked, sliced or hit the ball straight. Ranges of the clubs can be modified by the player.

The game is colorful and well designed by author Keven Hendricks, who also supplies some hints on how to master the techniques involved in keeping your score respectable.

Even non-sailers can be hooked by Sailing the Bermuda Triangle, a game that tests your ability to maneuver through storms, gravitational vortexes, and alien crystals while trying to pick up stranded swimmers along the course. Your sailboat is equipped with radar, rudder, sails which you must trim or extend, and an engine for times when there is a lull in the prevailing South wind.

It takes considerable skill to sail all three legs of the triangle, picking up the swimmers and rafters along the way, without being overwhelmed by the mysterious forces that await you in the Bermuda Triangle.

Both Teed-Off and Sailing the Bermuda Triangle are on disk #47 in the jr Newsletter Software Store, page 13.

Games for Young Children

The Early Learning disk (Disk #48) contains a series of games designed to teach basic skills to children ages 5-8. Utilizing the color and sound capabilities of your PCjr, the games include a sing-along alphabet, letter matching game, alphabet tutorial, numbers counting game, a maze, a pattern matching game and a game that teaches how to tell time.

Multi-tasking Dosamatic

This nifty program combines a Macintosh-like user interface that uses a "point and press" system to perform a variety of DOS tasks. In other words, you don't have to type the DOS command, you just put the cursor bar over the appropriate command and press enter to execute it.

Dosamatic's Directory and File Selection Panels show you the same information as the DOS DIR command,

except that all the files in the current directory are available for your viewing. An information panel along the top of your screen gives you the same information as the DOS CD, CHKDSK, VOL, and VER commands all at once. Using the insert and delete keys you can perform MKDIR, RMDIR and ERASE functions.

Dosamatic has a few powerful keys, which allow you to move between its windows and it has pull-down menus so you don't have to know complex DOS commands by heart.

One of the most useful features is Dosamatic's ability to run from one to seven other programs simultaneously, switching between them whenever you want.

Dosamatic is Disk #49.

Basic Screen Modes 5 and 6

Basic Statement, SCREEN, Modes 5 or 6 are supported in Cartridge Basic only and require a minimum of 128K of memory.

If you have not issued the Basic Statement CLEAR,,,32768 prior to issuing SCREEN, Mode 5 or 6, an Illegal Function Call will result. See Basic Personal Computer - PCjr Manual, for the CLEAR statement and for the SCREEN statement.

jr Newsletter Software Store

This software is the best public domain and user-supported software for the PCjr we've been able to find. All the programs in this collection have been tested on our PCjrs and are highly recommended. Some of these programs are equal to or better than commercial programs costing hundreds of dollars.
The programs in this collection are available for $9 per disk or $7 per disk, if you order four or more.

PC-WRITE. This extremely popular word processing program is both powerful and easy to use. A review in PC World said "PC-Write may well be more versatile than WordStar — it's certainly more straightforward." Version 2.5 runs well on 128K. Version 2.7 has more features, comes on two diskettes and requires 256K to run without the spelling checker, which requires 384K. (Order Disk #1 for 128K V2.5. Order Disks #2A and 2B for V2.7)

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

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

EASYRITE AND LABLFILE. EasyRite makes your jr perform like a typewriter, without learning complicated commands. On screen prompts are easy to follow. Lablfile is also easy to use for printing labels and storing information. Runs well on 128K with Epson/Gemini coded printers. (Disk #7)

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

PC-OUTLINE. Review in PC Magazine called this program "really fine" and it outperformed many commercial programs. Word processing functions are merged, allowing greater control. Many customizing features. Nine windows. Many useful features. 128K, plus DOS 2.0 or higher. (Disk #17)

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

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

PC-DESKTEAM. Enables you to have an alarm clock, calendar, typewriter, calculator, and phone book accessible from your keyboard. Can be a resident program while you are using other software if you have the memory. 128K will run it alone. Need more to run it with other software. (Disk #22)

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

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

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

MINICALC. A small, easy to use, spreadsheet program. 11 columns by 22 rows. On-line help function and manual on disk. In addition to performing calculations, will generate bar graphs. 64K (Disk #27)

FAMILY HISTORY. Designed to help you trace your ancestry and create a family tree. 128K (Disk #33)

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

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

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

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

UTILITIES

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

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

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

DOS 2.1FIX. Patches to fix the bugs in DOS 2.1 cures most problems encountered when running large programs, such as Symphony. (Disk #40)

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

GAMES

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

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

PINBALL RALLY. A colorful collection of amazingly realistic pinball games. Using the Shift keys as flippers, the games get more and more complex until you get to Twilight Zone, which is the hardest because some parts are invisible. Runs on 128K. (Disk #10)

CAVEQUEST. A fantasy role-playing game where the major objective is to lose yourself in another land, in another time. Sound effects and color make this an entertaining game on jr. 128K ok. (Disk #11)

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

TRIVIAL TOWERS. A computerized version of Trivial Pursuit, with three levels of difficulty and the option of creating and saving your own questions. Runs on 128K with one drive, but two drives are better. (Two Disks — #13A and 13B)

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

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

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

BOARD GAMES. Play Monopoly against the computer. Backgammon, Yahtzee and Four — a game your jr is especially clever at. 128K (Disk #31)

GAMES, GAMES, GAMES. A wild assortment of games to test your wits and skills. Includes Slither, Xwing, Torpedo, ABM2 and Overeact. where you are in charge of a nuclear plant. 128K (Disk #34)

PC-CHESS. A full color many-featured chess program, with four levels of play. You can play against the computer or another human, save games to disk, set up the board yourself and switch sides if you want. It has two clocks for elapsed time for each player, allows castling, en passant and pawn promotion with vaility checking, plus other features. 128K (Disk #44)

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

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

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

EARLY LEARNING. A collection of colorful educational games for children ages 6-8. Sing-along alphabet, letter matching, alphabet tutorial, number/counting game, maze, pattern matching and time telling. 128K (Disk #48)

EDUCATIONAL SOFTWARE

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

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

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

PLAY AND LEARN. Educational games for kids five and up. Word match games, find-a-word puzzles, word scrambles, etc. made for PCjrs by school teachers. 128K (Disk #32)

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

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

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

* * * * * * * * * * * * * * * * *

jr Software Order Form

Please circle the disks you want:

1 2A 2B 3 4 5 6 7 8 9 10 11
12 13A 13B 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

1-3 @ $9/disk   4 or more @ $7/disk

_____ disks @ $9.00 each = $_____

_____ disks @ $7.00 each = $_____

Add 7.5% sales tax in CT _____

Total _____

Name _____

Address _____

City _____ State _____ Zip _____

Prices are U.S. funds.
Make check payable to jr Newsletter. Send to:
jr Newsletter • Box 163 • Southbury, CT 06488

* * * * * * * * * * * * * * * * *

PCjr Differences Have Little Impact On Compatability

were found to install additional RAM and to get around the gap in our working memory. Getting around that gap is the primary purpose of the CONFIG.SYS files used with IBM's expanded memory sidecar.

The third problem associated with the location of the PCjr's video RAM is that it is physically located at an address different from the one expected by PC software. (This is, by far, the biggest source of incompatibility between the PCjr and the PC.) In other words, if a program goes to an addresss in block B0000 on our PCjr, it would find no one home. It would be like trying to send a letter to an address that doesn't exist. Fortunately, the post office can be instructed to forward such mail to an alternate address. In the case of the PCjr, that post office is called a Video Gate Array (VGA). The VGA traps any instructions aimed at the B8000 memory area (where the PC Color/Graphics card would be; the Color card is at B8000H and the Monochrome card is at B0000H) and redirects them to the area of memory that we are actually using. This all works fine, and software that plays by the rules will have no problem running on our Pcjrs. The problems come when programs attempt to circumvent the system. Using the letter example, suppose you are in a hurry to have it delivered, so you deliver it personally. Surprise! Not only is no one home, there isn't even a house in the area. Well, some software programs, typically arcade-style games that rely on speed, behave this way. Those programs make direct calls to the addresses they need, thereby bypassing our VGA postman. Finding themselves somewhere in the netherworld, they crash. Almost all the arcade-style games produced before the release of the PCjr will not run on our machine. Fortunately, after the release of the PCjr, many software developers recognized the problem and wrote versions of software that would also run on the PCjr.

An advantage of the PCjr's use of working RAM for the video memory is that it allows us to allocate 32K of video RAM rather than the 16K available on the PC. This gives the PCjr a better color graphics capability than the standard PC.

Another of PCjr's advantages is that it uses the TI SN76469N chip for generating sound. This allows the PCjr to play music in three-part harmony. The PCjr also can be made to synthesize human speech!

Don't panic after reading all of this! In spite of its differences, the PCjr is extremely compatible with its big brothers. After I expanded my PCjr to 640K, I found

minimal compatibility problems. As previously mentioned, incompatibilities came from older arcade-style games (the newer ones are better anyway) and from large-scale business-oriented software that insists on using lots of memory and two disk drives. If you add a second drive, you'll reduce these problems too.

I've touched on a few of the most important functional differences between the PCjr and its bigger brothers. There are other differences (the keyboard, for instance). If you're interested in doing more reading on your own, I can suggest three books by Peter Norton: *Discovering the IBM PCjr Home Computer*, *Exploring the IBM PCjr Home Computer*, and *Programmer's Guide to the IBM PC*.

* * * *

IBM Pledges Support

like to have people call here first for information or service problems." First time PCjr owners may find this hotline especially useful. 1-800-222-PCJR.

IBM also has a number to call for the authorized service center nearest where you live. 1-800-428-2569.

For those of you who have become quite fond of your PCjrs, as most of us have, remember the Mark Twain quotation that IBM used in an advertising campaign shortly after its March, 1985 announcement, "Rumors of my death are greatly exaggerated."

Moving?
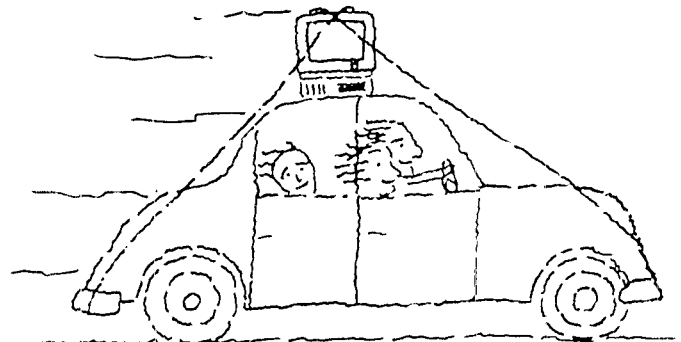
Please send your new address to us at least one month before you move. The Post Office will not forward your newsletters.

IBM Sidecar Upgrade

for loose pieces of solder. This loose solder can be a killer for it can cause intermittent shorts which are near impossible to locate once the sockets have been soldered in. Use the soldering iron or an X-acto knife to remove the excess solder.

15. Solder in the 16 low profile solder tail sockets.

16. With the component side of the board facing you there is a set of three plated though holes to the right of the big chip (SN74S409N DRAM Controller) with a white rectangle drawn around them. This is a jumper which determines whether 64K or 256K DRAMs are used. Currently there is a foil on the component side which connects the left and center holes together. Completely cut the foil which connects the two holes with an X-acto knife. Then solder a wire between the center hole and the right hole. The diagram here should give a better idea where the jumper is located.

17. Install the 16 256K DRAM chips into their sockets. Be sure each chip is oriented properly (the notch indicating pin 1 should point upward).

18. Set all four DIP switches on the rear board to their on position (OPEN).

19. Reinstall the PCB back into the sidecar case. Note that in one of our upgrades we found that the pins of the DIP switch were shorted with the strip of gold "fingers" located in the sidecar case. The purpose of the gold fingers is to ensure contact between the PCB and the sidecar case. It may be advisable to place a small piece of electrical tape over the 8 pins of the DIP switch on the foil side of the board.

20. Reinstall the sidecar onto the PCjr.

21. Reconnect the power cable.

22. Turn on the PCjr and verify that power-on diagnostics find 640K of memory with no errors.

23. It is then advisable to run the special diagnostics (CTL ALT INS) for several hours. If the special diagnostics do not find any errors then the memory should be usable

O-O O ← Jumper

SN74S409N
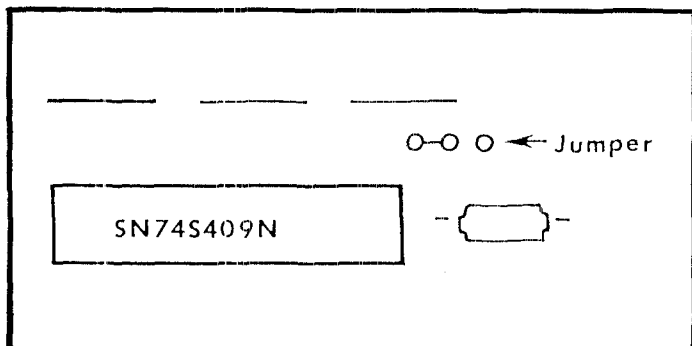
Amazingly Simple Solution To Telecommunicating Problem

The following tip was picked up from Compuserve's PCjr Forum the other day. A message left by Lawrence Gardner said he couldn't get his PCjr with its 1200 baud modem to work properly when trying to log on to Compuserve. Many suggestions were offered, most of them having to do with setting up his modem or his communications software.

Then, this message appeared:

"You will never guess how I got the 1200B modem to work !! I gave your instructions a try but still could not log on....I moved the keyboard closer to the computer and placed a box on top of the computer so no extraneous light could get in. Voila,!!!! My problems were on the infra red links!"

PCjr owners who are operating without a keyboard cable might try this solution whenever a strange problem appears. It may be the simplest solution to aggravating problems we've heard yet.

* * * *

Be Careful Switching From One DOS to Another

Although MS DOS and PC DOS are very similar and your computer can run either, if you plan on upgrading your system by installing a hard disk and want to use DOS 3.0 or higher, you should stick with one or the other.

The hidden files, IBMBIO.COM and IBMDOS.COM on PC DOS, are different for MS DOS, which can cause "non-system disk or disk error" messages. Once one system is installed on your hard disk, that's the one you should stick with.
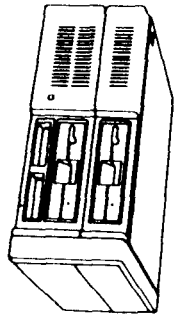
jr Newsletter
P.O. Box 163
Southbury, CT 06488