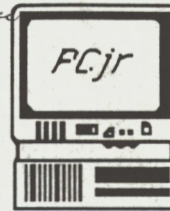


The Junior Report

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p. 8 Software Compatibility



November 1988 Volume 4 Number 10

The National Newsletter for PCjr Owners

Siamese Slots Increase PCjr Cartridge Capabilities

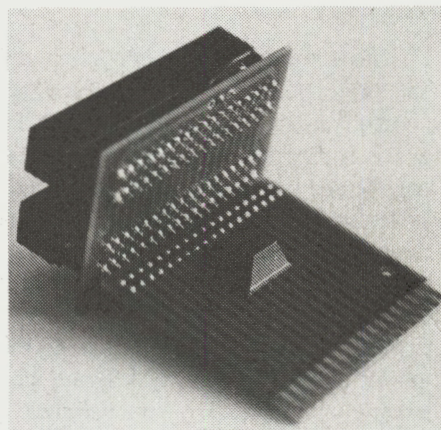
How about a PCjr with four cartridge slots? Here's a first look at the device that can make 2 into 4.

Synectics Software and Systems of San Jose, California has developed another unique device for the PCjr. And who said the PCjr market is dead? This time it is a device called the Siamese Slots that can turn one cartridge slot into two. If a PCjr owner uses two of these, he can have a total of four slots.

They can now be purchased from Paul Rau Consulting (209-745-9284) in California, or Computer ReSet (214-276-8072) in Texas for about \$25. each. Call each vendor for price and availability updates.

The device is rather plain looking compared to the function it can perform, and the picture on the right shows the rear view of it, or the part that is inserted into the jr's existing slot. Though it is of solid construction, you will have to carefully insert it into the existing slot, making sure that the contacts are centered vertically and horizontally. This is because there is no outer cartridge plastic shell to guide it into the right position.

For those of you who may have wondered what's the big deal about the extra slots, you may not realize all of the nice accessories that are available to jr through these openings. There are cartridges such as the PCjr Clock/calendar cartridge which can automatically set your time, the jrVideo cartridge that speeds up many of jr's screen routines, the jr Synchro and keyboard buffer cartridge that allows you to type while the disk drive is spinning and fixes some of PCjr's incompatibility problems, the keylights cartridge that has three lights to let you know when either the Caps Lock, Num Lock, or Scroll lock keys are on, the very popular Quicksilver cartridge that speeds up jr's "booting" routine by eliminating the IBM memory test and thereby the PCjr Beep as well, a PC ID cartridge that makes most software



The Siamese Slots

think that the PCjr is a PC and thereby producing more PCjr compatibility, and several well-known cartridge-based software programs such as Lotus 1-2-3, Managing Your Money, PCjr Colorpaint, and some of the Spinnaker PCjr programs. Move over PCjr BASIC cartridge.

Alas, that ugly word "incompatibility" may rear its ugly head when certain combinations of cartridges are used. We had no problems using the program cartridges such as Lotus 1-2-3 and Managing Your Money with either the jrVideo cartridge or the Quicksilver speedup cartridge. Low-key cartridges such the Clock-calendar and keylights cartridges seem safe with any combination. Though we could not test every combination, the manufacturers warn that some may not work. For \$25. though, The Siamese Slots seem well worth the price, if only to eliminate the nuisance of pulling and replacing cartridges when switching programs on the PCjr.

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By Harrison Day

An Upgraded jr Compatibility Guide and Other Stuff

This is somewhat of a special issue of *The Junior Report* - the editorial staff has worked arduously on an upgraded PCjr software compatibility list which starts on page 8, and takes up a lot of pages due to its length. It is a combination of our original list published in January of 1987, updates provided by readers, a great jr list in the August 1988 issue of *The Metro PCjr Journal*, and a very comprehensive list provided by Timeworks Software via PCjr owner and reader Dr. Ron Hathaway of New Jersey. Our thanks go to everyone who has worked on this list. Remember, however, that this is just a guide and you'll notice that there are many places where YOUR input is needed if you have information that we do not have. Just the magnitude of the list suggests that the PCjr is certainly not dead with the multitude of great programs that run on it. So enjoy yourself as you peruse the list and Bon Appetite.

In order to have more room for this gigantic list, we have eliminated for this month certain features and articles that will return next month (Classified section, an expanded Letters section, PCjr Compatibility Part II, and our expanded Shareware section). Also you may notice that we have had to use smaller type to fit in more articles in this issue. Our apologies to those who do require the standard size type.

Computer ReSet of Garland, Texas (214-276-8072) has informed us that they have acquired several copies of Andrew Tobias's classic personal financial manag-

er *Managing Your Money* in PCjr cartridge form. Richard Byron has priced these at \$60. (the original retail price was \$199.99) and also informs us that an upgrade is available from the publisher MECA for about \$30. Sounds like a pretty good deal to us.

Are you having problems finding a PCjr accessory? Always check one of the vendors in these issues for information. There is a kind of a PCjr underground that exists for PCjr parts and supplies and these folks usually know the when, where, and how much of the jr scene.

There is a bargain that we have spotted this month from Lorir Main Computer in Carrollton, Texas (214-416-5155). It is a PCjr power transformer for \$9.95 plus shipping and handling. This represents an incredible buy and almost demands purchase as a backup in the event that your power transformer goes kaput.

In the September issue of *The Junior Report*, we listed some new vendors of PCjr products that we had discovered in the Editor's Notes. Mr. R.M. Lombardo, a very nice fellow and an avowed Mets Fan, reminds us that when sending a letter or card to Canada to Don MacMillan, you'd better ante up for the additional postage (a letter to Canada costs 30 cents,

postcard - 21 cents). Thanks, Mr. Mets Fan.

We have always stated that EVERYONE should join a local PC or PCjr users group to maximize the potential and enjoyment of your PCjr. There has been a PCjr Users Group in the Charlotte, North Carolina area for three years now and is currently looking for "fresh" members.

The Club meets on the third Thursday of every month and can be contacted through Claire Goodman or Eric Jelstrup at (704) 537-7033. If you own a PCjr in the Charlotte area - you are not alone.

If you have a Systems Peripherals Consultants Remedy-type hard drive for your jr in which you can remove the hard drive itself to store or to replace with another user's hard drive, the PCjr owner can now get a whopping 86 Megabyte hard drive with an access speed of a blazing 19 ms for this system. Accordingly, it's expensive, but for those who need massive storage and lightning speed, this jr product will fill the bill. Systems Peripherals Consultants can be contacted at (619) 693-8611, or write to SPC, Inc., 9747 Businesspark Ave, San Diego, CA 92131. Ask for Bob Richard.



The Junior Report

A Publication of The PCjr Club

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The Best Program For An Expanded PCjr

By Richard Spencer

The following article is reprinted from The OKC Jr Orphans Chronicle, the monthly newsletter of the PCjr users group in Oklahoma City, Oklahoma. The president of this group is John Knox, vice-president is Leanna Mize, secretary is Donna Beck, the newsletter editor is Joe Sturgil, and the librarian is the author of the following article - Richard Spencer. The club meets the 4th Thursday of each month at 6:30 PM at One Bell Central, 800 N. Harvey, Room 426.

Over the years that I have owned my computer, I have encountered several good programs. Of all these programs there is one that stands out for use with the IBM PCjr. The old program was called **JRCONFIG.SYS**. The new version is called **JRCONFIG.DSK** or **JRCONFIG.NRD**. The program was written by Larry Newcomb of Bethesda, Maryland and was put out as shareware. One of the great things about it is that the requested fee is only \$10.00 for this fantastic program. The newest version that I know about is version 2.11.

PROGRAMS FEATURES

There are many features that this program can do on bootup. Here is a list of the features.

1. Turn on the keyboard click sound.
2. Recognize extra floppy disk drives.
3. You can set up a ramdisk as drive C: and you can choose how many directory entries it can hold 16,32,64 or 128 entries. You can also choose how big the ramdisk is to be. The default size is 91K for DOS 2.1 and 79K for DOS 3.1.
4. It will read and install the date and time in the computer if you have a clock. Although it is set up for the JRCAPTAIN, if you know the mem-

ory address of the clock that you have, there is a way to install it.

5. It will fix the communication port problem with the PCjr just like SWAPCOM.
6. You can choose to turn the caps lock to the on condition.
7. It will turn off the internal speaker.
8. It will look for extra ram above 640K (if you have it) to give you a total of 736K of ram.
9. You can set the print screen feature to only print the lines that you choose or the whole screen. At the same time, by choosing which shift key you use, you can cause an automatic page feed if it is wanted.
10. It can be configured to set the screen to either 40 or 80 column in black and white or color.
11. The amount of video ram can be adjusted to a programs needs.
12. A spinning character can be put in the top corner of the screen to let you know when the ramdisk is being activated. The character takes the place of the red light on the floppy drive.
13. It will set the step motor rate in DOS.31 to make the disk drive quieter. This will only take effect after you see the beginning message.
14. The JRSYNCHRO cartridge can be automatically installed.

REMARKS

To get all of the information, you will need to read the documentation that is on the disk. The documentation is well written and explains the options.

For this device driver to run correctly, you **MUST** have at least 256K of memory. After all, an expanded PCjr is what this program is really intended for. I for one use this program every time I turn my computer on. It is one of most useful programs that I have to run on my system.



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.

PCjr HINTS

Hi:

Just thought I'd drop you a line and ramble on for awhile. I have an enhanced jr (via IBM's jr firesale) with 512 KB Microsoft Booster with mouse, a jr color monitor, the internal modem and a Proprinter hanging on it. I'm into cheap and therefore don't have all the spaceage upgrades. My reason for writing is share some tips and opinions for consumption by the novice jr hacker. Here goes:

Best (cheap) add ons:

Pseudo DMA cartridge (PC Enterprises) - keyboard buffer.

Do it yourself upgrades to 640 KB systems - around \$50.

NEC V-20 CPU replacement for the Intel 8088 - around \$15.

5 KB Proprinter buffer (IBM) - around \$20.

X-10 Power House interface (X-10,USA) - lets jr control lights and appliances.

Any modem - Compuserve access is a must.

Keytronic numeric keypad - around \$20.

Best utilities:

FASTOFF.COM (Compuserve) - stops floppy sooner.

SPEED.COM (Compuserve) - speeds floppy access.

CLK26.COM (Compuserve) - puts date

& time at bottom of screen.

COLORSET.COM (PC Mag) - resists software from changing your colors back to black & white.

SETUPJR.COM (Compuserve) - Sets colors, locks caps, sets width to 80 columns.

FASTCO.EXE (PC Mag) - improves DOS copy command, copies as many files into memory as possible before transferring to the destination, great for expanded systems.

IBM4201.COM (IBM) - TSR program which lets you control your Proprinter from the keyboard, changes fonts, print quality and size. Activate with simultaneous Shift, Ctrl, Esc.

MOUSEKEY.COM (PC Mag) - lets you use your mouse in programs that don't normally support it, like Writing Assistant.

Note: All the above were downloaded from the Compuserve IBMJR Forum or came from two PC Magazine utilities diskettes, one you get when you subscribe and the other comes in book they publish, DOS POWER TOOLS. I don't like PC Mag (it's written for super hacks with giant spread sheets and a zillion kb's of memory, but, the diskette is worth a one year subscription.

Best books:

PC Magazine *DOS POWER TOOLS* - includes a diskette

Microsoft Press *RUNNING MS-DOS* by Van Woverton

Microsoft Press *SUPERCHARGING MS-DOS* by Van Woverton

Best magazines:

The Junior Report - no kidding!

PC Resource - but they're getting kind of upity too and hate IBM - my opinion

Boot up speed up hints:

1. Install V-20 CPU

2. Place your files on your boot disk the way BIOS and DOS look for them. My boot disk directory looks like this:

```
CONFIG.SYS
JRSYNRDD.SYS
MEMORY.SYS
MOUSE.SYS
COMMAND.COM
AUTOEXEC.BAT
CLOCK.COM
FASTOFF.COM
SPEED.COM
CLK26.COM
MENU.COM
MOUSE.MNU
COLORSET.COM
SETUPJR.COM
LOGO.TXT
```

3. This hint is from PC Resource magazine. By setting up your AUTOEXEC.BAT file similar to this:

```
ECHO OFF
FOR %%A IN (PROGRAM-A PRO
PROGRAM-B PROGRAM-C) DO
%%A
FOR %%B IN (PROGRAM-D
PROGRAM-E PROGRAM-F) DO
%%B
PROGRAM-G /X
PROGRAM-H MOUSE
PROGRAM-I :Z
```

The A & B can be any character just so what follows the FOR follows the DO. PROGRAM-? is any executable program consisting of one word, no spaces. Others must have their own line. This speeds boot up by making jr read several commands at once rather than one line at a time. I use an A line and a B line because my jr will still only read in 3 or 4 at once, yours might do it

with more, try it. May be redundant but my AUTOEXEC.BAT reads like this:

```
ECHO OFF
FOR %%A IN (JRSYNC>NUL
JRSYNC47>NUL CLOCK/S) DO
%%A
FOR %%B IN (FASTOFF SPEED
CLK26) DO %%B
MENU MOUSE>NUL
COLORSET 31 1
SETUPJR /C,15,1/L/W
TYPE LOGO.TXT
```

Note: ECHO OFF suppresses screen garbage and >NUL following an executable command suppresses screen garbage that ECHO OFF doesn't. Maybe what I call garbage is beauty to you, so don't suppress it.

Another hint:

Want a bootable copy of Writing Assistant (you'll lose the spelling checker) for quick letters? Here's how:

Make a copy of your Writing Assistant (WA) disk with one of those programs that gets around the copy protection. I use COPYIIR (flip side of COPYIIPC). Then, DEL (erase) all the files on the copy, repeat - the COPY, except the one called INSTRUCT.PFS (contains the copy protection scheme). Note:

INSTRUCT.PFS is hidden like IBM-BIO.COM & IBMDOS.COM and can only be seen with a disk maintenance utility but it's there, trust me. I use PCTOOLS. Next, make the COPY a system disk by inserting your DOS disk and entering the command SYS B:. DOS will ask you to insert your COPY into drive B: (same one on a one floppy system) and strike any key when ready. DOS will then place IBM-BIO.COM, IBMDOS.COM and COMMAND.COM onto the COPY making it bootable. Now, copy your

desired CONFIG.SYS, AUTOEXEC.BAT, any utilities plus WRITE.SWP, PRINTERS.LC, WRITE.EXE, LOGO.EXE and VENDOR-#.DO1 from your original WA disk to the COPY. Bingo, you should have a bootable WA. Note: If you have 256 KB or greater use the WRITE.EXE from the supplemental disk allowing the program to operate in memory eliminating floppy whirs and churns. For big stuff I boot the old way but copy all of WA into a ramdisk which allows the spell checker to scream - silently.

Richard Schneider
Thousands Oaks, CA

Thanks for all of the helpful hints; it looks like your Junior is quite productive, thanks to some basic computing knowledge and some intelligence - yours.

BACKING UP IS HARD TO DO, BUT DO IT

I just learned another reason to backup your floppy disks. Last week my house was burglarized and they took anything that could fit into two pillow cases (they were mine too!). That means jewelry and all the software that was with my PCjr (I'm sure they wanted the Junior but it was too big). Anyway, I lost 75 disks including Lotus, Wordperfect, and many custom programs I had written. Lucky for me I made copies of all my disks and stored them in an upstairs bookcase - the thieves never saw them! The moral - backup your data, it can be lost in ways you never imagined.

Greg Montague
Ballston Spa, NY

From your misfortune we have learned two valuable lessons, always backup, and always keep the copies away from

the rest of your equipment. Thanks for letting us know.

JRHOTSHOT POWER

After a year of deliberating on whether to get a new IBM compatible computer or expanding our PCjr we finally decided to upgrade the Junior. We purchased the JR Hotshot's 512K memory expansion and are extremely happy with it. It hasn't solved all our compatibility problems, but it sure is nice to have so much extra memory. We don't have a lot of programs because we were afraid to purchase them because of the compatibility problems, with only 128K we seemed extremely limited. Our system is simple, 512K Junior Hotshot (640K total), Junior's internal modem, and Tecmar's parallel printer port with clock calendar (no memory expansion). I was amazed at how easy JR Hotshot was to install. I am not a computer wizard and was apprehensive about doing it myself. Surprise - it worked! After patting myself on the back I headed to the store to buy some new software. I purchased 'Early Games' from Springboard, and booted it up. Disappointment followed, the Video was wacko. I called Springboard's tech line and was told that their new 256K version will not run on the PCjr. They told my that they would swap my disk for the 128K version of 'Early Games' and that it should run. I declined and returned the software.

For me the Junior Report is a life-saver. A novice at best, I have used the patch to unprotect IBM's Writing Assistant, and the Turbo Pascal's 4.0 routines from a recent issue. I have never used Debug before until now, I am currently searching through old issues to see what else I can experiment with.

Daryl Matsumura

More PCjr Hints

By Jacqueline Austin

The following primer on PCjr maintenance is reprinted from the September 1988 issue of the Eugene PCjr Club Newsletter. The club can be contacted at 1011 Valley River Way, Suite 220, Eugene, OR 97401

Jacqueline's Hints:

Many of these hints that are listed by Jacqueline you have heard before, but they are still worth reading.

Buy or make lint-free covers for your hardware...and use them. Clean the dust covers every once in awhile. Close the covers on your disk storage boxes when they are not in use. Don't leave your diskettes laying on your desk to collect dust.

Use a surge protector instead of just a power strip.

Start the journal of helpful (and unhelpful) service people and their phone numbers. When you attend your computer club meeting keep your ears open to hear about other people's experiences with local repair shops.

Every few weeks clean the key board with either compressed air or a small vacuum with a soft brush. Also, vacuum the computer area, especially around the air vents on Junior and the display, and wipe off your storage boxes. Vacuum, or clean with compressed air, the inside of your printer, especially if you use continuous form paper. Every few months lubricate guide rods that support your read/write heads in the disk drive. At the same interval, lubricate the guide rod (s) for the print head in your printer. Do NOT over-lubricate!

Disconnect and reconnect line plugs and sockets. If necessary, clean any corrosion with alcohol. Be sure that

none of the Junior connectors on the rear of your CPU are under any strain; you will find great difficulty should you ever have to replace one.

Listen to all the theories about using a cleaning disk and then make up your own mind. Some say clean the heads every six months while others say once a year is more than enough. Another camp says to do it much more often. A few people say they never clean the heads unless you start getting error messages. I am in the group that believes that everyone use the best way to keep the heads clean; lack of

If you must take Junior in for repairs, get a written estimate and a receipt for your computer.

use is what causes them to get dirty. (But remember, I was a parachute rigger in the Coast Guard; not a computer tech.)

Turning Junior on and off is more damaging than leaving it on. An IBM tech rep told me that the first person into the office in the morning throws the switch that powers up all of the Juniors they have in their technical services area. They stay on all day, and the last person out turns the main power switch off. If you can use a screen saver, it is a better way to go than to turn Junior on and off many

times a day.

When disaster does strike, take a break to think about what has happened. Inspect the plugs, connectors and the fuses. Inspect mechanical connections. Run the Junior diagnostic tests; you know, Ctrl, Alt, Insert. Call a friend and talk your problem over with him or her. Another view point may solve your problem.

Remember that it may be possible that your data won't be all lost if you have gotten yourself into the habit of saving often and making backup copies of important data. Many utilities are available to recover lost or damaged files. Call that friend for help.

Never be embarrassed to ask questions. That lady who sits next to you at the computer club meeting may have had the same problem you are having now, and can be of great help. Never underestimate the knowledge of the junior members of the Junior Club! If you must take Junior in for repairs, get a written estimate and a receipt for your computer. If the repair is going to take an excessively long time, ask about a loaner from the repair shop. If you must mail a component back to the manufacturer, get a return authorization number first. Make sure you have over-padded and packed it well, and double check the address to insure you have it correct. If you have enjoyed using your Junior, insure it before you give it to the US Postal Service or UPS to drop in the bin or chunk it into the truck.

We know that much of this is "old hat" to many, but if we can just keep one Junior alive for another week that person just may contribute an article to the newsletter.

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
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1200 Baud External Modem	\$ 99
JR-RS232 Modem Cable	\$ 19
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Siamese Slots-Cartridge Expansion	\$ 25

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Reprint Disk #1 and New Shareware

Once they were lost, and now they are found. Sound familiar? This time we have found lost issues of the early editions of The Junior Report that are not available through the Reprint section. These three early issues - February 1986, September 1986, & January 1987, can now be found on **REPRINT DISK #1**, and can be ordered from the Shareware order form on page 31. Some of the articles included are such classics as The Big Mac Versus the Junior, Bruce Lee Review, The Many Thanks, The Filing Assistant as a Label Maker, King's Quest, Touchdown Football Reviews, A Do-it Yourself Second Drive, Junior's Third Birthday, and Symphonixjr Speech Attachment. Of course the wild and exciting Editor's Notes and Letters sections are included as well. The best part of the Reprint disks is that you can print out all of the articles on your printer, and then use the diskette for something else, like a frisbee.

We don't have much space to talk about new shareware programs this month in this special PCjr Compatibility issue, but we do have three that you will find interesting: **POKER (#140)**: A great poker shareware program that will satisfy the gambling nature in the worst of us. Good graphics and lots of fun.

MEAN 18 COURSE DISK (#141): More great, new courses to test your Mean 18 golfing skills. Don't call yourself a Pro till you have mastered these course in PCjr 16 color glory.

Jr TELE COM ver. 2.1 (#142): Finally a good telecommunications program written specifically for the 128K Junior. Gentlemen, start your modems.

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PCjr Software Compatibility Guide

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	CONFIG SYS
	A+		Y			128K		
	ABILITY		Y	Y		384K	Needs two drives.	
	ABSCENES -COMPUTEACH- ACE		Y			128K		
	ACE OF ACES -ACCOLADE- ADVENTURE CONSTRUCTION SET		Y			256K		
1.00	ADVENTURE IN SERENIA -IBM-		Y	N	N	128K		
1.00	ADVENTURES IN MATH -IBM- ALF		Y	N	Y	128K		
	ALGE-BLASTER -DAVIDSON- ALLEY CAT		Y					
	ALPHABET CIRCUS -DLM- ALPHABET ZOO		Y	N	N	128K		
	ALPINE ENCOUNTER		Y					041
	ALPINE TRAIN RIDE _LEARNING TECH_		NO DATA					041
	ALTER EGO -ACTIVISION- AMERICAN CHALLENGE		Y			128K		
	AMNESIA			Y				
	AMTAX "1987 SHAREWARE" AMULET OF YENDOR		Y	Y		384K	026	
NONE	ANCIENT ART OF WAR ANCIENT ART OF WAR AT SEA		Y	Y	N	256K	054	
1.00	ANIMATION CREATION		Y	N	N	128K		
1.00	APL		N					
1.00	APBA BASEBALL		Y	Y	N	128K	082	
2.00	APBA BASEBALL STAT MANAGER		Y	Y	N	256K+	082	
	APPLE PANIC		N					
1.00	APPLICATION DISPLAY		Y	Y	N	128K+	001	
	ARCHON		Y	N	N	128K		
	ARCTIC ANTICS...SPYIII _EPYX_							049
	ARCTIC FOX (EA)		N					049
	ARITHMETIC COMPU-TEACH		Y			128K		
1.00	ARITHMETIC GAMES SET 1		Y	Y	Y			
1.00	ARITHMETIC GAMES SET 2		Y	Y	Y			
	ART GALLERY 3 -UNISONWORLD- Y		N	N	256K		116	
	ART GALLERY 1,2,3 _UNISONWORLD_		Y	N	N	128K	079	
	ART STUDIO		Y	Y		128K		
	ASTRO-DODGE		N					
	ASTRO-GROVER _HI TECH_		N					031
2.00	ASYNC SUPPORT		N					
	AS EASY AS		Y	Y		256K		
2.15	AUTOCAD		Y	Y		512K	640K, 2 drives recommended	
	AUTOSKETCH -AUTODESK- BACK TO BASIC		Y	Y	N	640K	103	
NONE	BALANCE OF POWER		Y	Y	N	640K	029	/RAM
	BALLYHOO -INFOCOM- BANK STREET MUSICWRITER-MINDSCAPE		Y	Y	N	128K		
	BANK STREET STORYBOOK -MINDSCAPE-		Y	Y	N	128K		
	BANK STREET WRITER		Y	Y	N	128K		
	BANK STREET WRITER PLUS (BRO*)		Y	Y	N	128K		
	BARD'S TALE (EA)		Y			256K		
	BARRON'S COMPUTER SAT		Y	Y		128K		
	BASEBALL -KONAMI-							

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	CONFIG SYS
	BARTENDER'S GUIDE		Y			128K		
1.00	BASIC COMPILER		Y	Y	N			
1.00	BASIC PRIMER		Y			128K		
1.05	BASIC PROG. DEVELOP. SYSTEM		Y	Y	N			
	BATTLE AT ANTEINEM		Y			128K		
	BATTLE FOR NORMANDY		Y			128K		
	BATTLEZONE					NO DATA		
	BELOW THE ROOT		Y			128K		
	BENEATH APPLE MANOR		Y			128K		
	BETTER WORKING: EIGHT-IN-ONE (S)		Y	Y	N	640K		
	BETTER WORKING: WORD PROC (S)					NO DATA		
	BETTER WORKING: COMMUNICATOR (S)					NO DATA		
	BETTER WORKING: DESKTOP (S)					NO DATA		
	BEYOND ZORK		Y			256K	106	
	BIG BIRD'S SPECIAL DELIVERY-CBS-		Y			128K		
	BIRDS 'N BEES -INTRACORP INC-					NO DATA		
	BLACK CAULDRON -SIERRA-		Y			128K		
	BLUE BUSH CHESS		Y			256K		
	BOP 'N RUMBLE -MINDSCRAPE-					NO DATA		
	BOP 'N WRESTLE -MINDSCRAPE-		Y	Y	N	256K		
	BORROWED TIME		Y					
	BORDER ZONE -INFOCOM-					NO DATA		
	BOULDER DASH CONSTRUCT KIT -EPYX-					NO DATA		
	BOUNCY BEE LEARNS LETTERS -IBM-		Y			128K	002	
	BOUNCY BEE LEARNS WORDS _IBM_		Y			128K	003	
	BPI ACCOUNTING SOFTWARE _ALL		N					
	BREAKERS (BRO*)		Y			128K		
	BRIDGE _ELECTRONIC ARTS_		N					
	BRIDGEMASTER		Y			128K		
	BRUCE LEE _DATASOFT_		Y			128K		
	BUCK ROGERS		Y	N	N	640K	009	
	BUILD A BOOK _MINDSCAPE_		Y			128K		
1.00	BUMBLE GAMES _IBM_		Y	N	Y			
1.00	BUMBLE PLOT _IBM_		Y	Y	Y	128K		
	BUMBLES GAMES _IBM_		Y					
	BUSHIDO _KARATE_		Y			256K	017	
	BUTTON & BADGE MAKER _INTRACORP_					NO DATA		
4.0	C COMPILER		Y			128K		
	CALIFORNIA GAMES _EPYX_		Y	Y	N	512K	119	/C
	CAPTAIN POWER					NO DATA		
1.05	CASINO GAMES		Y	N	Y	128K		
	CASTLE WOLFENSTEIN		Y			128K		
	CAVE GIRL CLAIR		Y	Y	N	128K		
	CENTIPEDE "JR. VERSION"		Y			128K	Need jr version.	
	CERTIFICATE LIBRARY		Y	N	N	256K	076	
	CERTIFICATE MAKER		Y			128K		
	CHAMPIONSHIP BASEBALL _GAMESTAR_					NO DATA		
NONE	CHAMPIONSHIP BOXING _SIERRA_		Y	N	N	128K		
NONE	CHAMPIONSHIP GOLF _GAMESTAR_		Y	N	N	128K++		
	CHAMPIONSHIP LODGE RUNNER		Y	N	N	128K		
	CHARLIE BROWN'S ABC'S (RH)		Y			128K		
	CHART MASTER		Y	Y		128K		
	CHEM LAB		Y				128K	
	CHESSMASTER 2000 (ST)		Y			384K		

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
NONE	C.YEAGER ADV. FLIGHT SIMULATOR		Y	Y	N	256K	033	
NONE	C.YEAGER ADV. FLIGHT TRAINER		Y	Y	N	256K	033	
	CIVIL WAR _AH_					NO DATA		
	CIRCUS MAXIMUS		Y	Y		128K		
	CLASSMATE		Y			128K		
	CLOWNING AROUND _LEARNING TECH_					NO DATA		
1.00	COBOL COMPILER _IBM_		Y	Y	N	128K+	096	
	COLORFIX					NO DATA		
	COLORME..COLOR KIT _MINDSCAPE_		Y	Y	N	384K	110	/C
	COMBINED ADV. W/NO.'S (PDS)		Y	Y	N	128K		
	COME PLAY WITH POCKETS (WB)		Y			128K		
	COLLEGE BASKETBALL _KONAMI_					NO DATA		
	COMIC CRUSADER		Y			256K		
1.50	CONFETTI					NO DATA		
	COPY II PC _CENTRAL POINT_		Y	Y	N	256K		
	COSMIC CRUSADER		Y	N	N	256K		
	CREATE A CALENDAR _EPYX_					NO DATA		
	CREATURE CREATOR _DESIGNWARE_		Y			128K		
	CROSSFIRE "ROM CARTRIDGE"		Y	N	N	64K		
	CROSSWORD MAGIC _MINDSCAPE_					NO DATA		
	CRUSADE IN EUROPE _MICROPROSE_		Y	N	N			
	DECISION IN THE DESERT		Y					
	DAMBUSTERS _ACCOLADE_		Y	Y	N	128K		
NONE	DARK CASTLE _360 PACIFIC_		Y	Y	N	256K	085	
	DAC-EASY ACCOUNTING SOFTWARE		Y			640K		/RAM
	DATA MANAGER PC _TIMEWORKS_					NO DATA		
	DBMAN _VERSA SOFT_					NO DATA		
	DEADLINE		Y	Y	N	128K		
	DEATHSWORD _EPYX_					NO DATA		
1.00	DECATHLON _IBM_		N					
	DEFCON 5 _COSMI_					NO DATA		
	DEFENDER OF THE CROWN		Y					
	DEJA VU: A NIGHTMARE _MINDSCAPE_					NO DATA		
	DELTA DRAWING (S)		Y			128K		
	DEMON ATTACK _IMAGIC_		Y	N	N	128K	123	/CART
	DEMONS FORGE _BOON_		Y	N	N	128K		
	DESIGNASAURUS _BRITANNICA_		N	Y	N	640K	112	
	DESIGNER'S PENCIL		Y	N	N	128K		
	DESKTOP _TIMEWORKS_					NO DATA		
	DESMET C 2.3		Y	Y	N	128K		
	DESMET C 2.4		Y	Y	N	128K		
	DESTROYER _EPYX_					NO DATA		
	DIG DUG _THUNDER MOUNTAIN_		Y				060	
	DIG DUG _ATARI_		N					
	DINOSAURS _ADVANCED IDEAS_					NO DATA		
	DISK REPAIR					NO DATA		
	DISK WILL					NO DATA		
1.00	DISKETTE LIBRARIAN _IBM_		Y	Y	Y			
	DISPLAYWRITE ASSISTANT _IBM_		Y			384K		
	DISPLAYWRITE BISYNC COMM. _IBM_		N					
	DISPLAYWRITE 1 _IBM_		Y	?	N	128K		
1.10	DISPLAYWRITE 2 _IBM_		Y	Y	N	256K	005	
	DISPLAYWRITE 3 _IBM_					NO DATA		
2.00	DOLLARS AND SENSE		Y	Y	N	384K	102	
3.00	DOLLARS AND SENSE		Y	Y	N	384K	102	

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
NK	DONALD DUCKS PLAYGROUND (S*)		Y	N	N	128K	088	
	DOS COMMAND RETRIEVER		Y	Y	N	128K		
	DOS RX _TIMEWORKS_			NO DATA				
1.00	DOW JONES REPORTER		Y	Y	Y	128K		
	DR HALO II		Y	Y	N	640K		
	DR SHRINK		Y			256K		
	DRAGON WORLD		Y			128K		
	DS TUTOR _DESIGN SOFTWARE_		Y			256K		
	EARL WEAVER BASEBALL _EA_		Y	Y	N	384K	117	
	EARLY ELEMENTARY I _COMPU-TATIONS_		Y			128K		
	EARLY ELEMENTARY II _COMPU-TATIONS_		N					
	EARLY GAMES		Y			128K		
	EASY AS ABC _SPRINGBOARD_		Y			128K		
1.15	EASY WRITER		Y	Y	N			
	EIGHT _IN_ ONE		Y	Y	N	512K		
	ELECTRONIC COMMUNICATOR _MELODY_			NO DATA				
1.0*	ELECTRIC DESK JR. _ALPHA_		Y	Y	N	128K	06	
1.1	ELECTRIC DESK _ALPHA_		Y	Y	N	384K	067	
	ELITE _FIREBIRD_			NO DATA				
3101	EMULATION		N					
ALL	ENCHANTER _INFOCOM_		Y	Y	N	128K	108	
NONE	ERNIE'S BIG SPLASH _HI TECH_		Y	Y	N	256K	089	
	ERNIE'S MAGIC SHAPES		N				031	
	ERNIE'S MAGIC BLOCKS		N				031	
	EUREKA		Y			384K		
	EVELYN WOOD DYNAMIC READER		Y			128K		
	EXECUTIVE CURSOR CONTROL _KRAFT_			NO DATA				
	EXECUTIVE WRITER, FILER, WRITER, ETC.		Y			128K		
	EXECUTIVE SUITE		Y	Y	N	128K		
	EXPRESS CALC		Y			256K		
	F-15 STRIKE EAGLE _MICROPROSE_		Y	N	N	128K	014	
	FACEMAKER _SPINMAKER_		Y	N	N	128K	041	/CART
1.00	FACT TRACK		N					
1.0	FALCON F-16 _SPECTRUM_		N				105	
	FAMILY FEUD		Y	Y		256K		/C
	FANTASY _UNISONWORLD_		Y	Y	N	256K	116	
1.0	FILE COMMAND _IBM_		Y	Y	N	128K		
	FILE FACILITY		Y	Y	N	128K		
	FINANCIAL CALCULATOR _MECA_			NO DATA				
	FIRST CHOICE _SOFTSYNC_			NO DATA				
NONE	FIRST EXPEDITION _INTERSTEL_		Y	Y	N	320K	086	
	FIRST PUBLISHER _SOFTSYNC_			NO DATA				
	FIRST: THE LEGEND CONT _MINDSCAPE_			NO DATA				
1.00	FIXED DISK ORGANIZER		Y	Y	N	128K		
	FLASH		Y			128K		
1.00	FLASHCALC		Y	Y	N	128K		
2.10	FLIGHT SIMULATOR _MICROSOFT_		Y	N	N	128K		
3.0	FLIGHT SIMULATOR _MICROSOFT_		Y	Y		256K		
	FONTASY		Y	Y		128K		
	FONTS AND BORDERS _UNISONWORLD_		Y	N	N	256K	070	
1.00	FORTRAN COMPILER		Y	Y	N	256K		
	FONTRIX		Y			256K		
	FORBIDDEN CASTLE		Y			128K		
	FORBIDDEN QUEST		Y					
	FRACTION FEVER _SPINMAKER_		Y	N	N	128K	120	/CART

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
	FRIENDLY COMPUTER _MECC_							
	FROGGER		N					
2.00	FUNNELS & BUCKETS _SHAREWARE_		Y	Y	N	128K		
1.1	FUN WITH LETTERS & WORDS _WESCOTT_		Y	Y	N	640K		
	GAMBLER		Y			128K		
NONE	GAUNTLET _MINDSCAPE_		Y	Y	N	256K	099	/C
1.02	GATO _SPECTRUM_		Y	Y	N	128K		
	GBA CHAMPIONSHIP BASKETBALL (GS)		Y			256K		
	GEM DESKTOP							
	GEM DRAW							
3.0	GENERIC CADD		Y	Y	N	512K	055	
	GERTRUDE'S PUZZLES _IBM_		Y	Y	N	128K	054	
	GERTRUDE'S SECRETS _IBM_		Y	Y	N	128K	054	
	GET SET FOR WRITING TO READ _IBM_		Y	Y	N	128K	002	
	GET ORGANIZED		Y			256K		
	GETTING READY TO READ AND ADD (SC)		Y			128K		
	GFL CHAMPIONSHIP FOOTBALL (GS)		N					
	GHOST & GOBLINS _CAPCOM_		Y	Y	N	256K	032	
	GHOST BUSTERS _ACTIVISION_		Y	N	N	128K	050	
	GOLDEN COMMON LISP		Y	Y	N	256K+	006	
NONE	GOLF'S BEST		Y	Y	N	128K		
	GOREN'S BRIDGE MADE EASY		N					
	GRANDSLAM BASEBALL		Y			128K		
	GRAND SLAM BRIDGE (EA)		N				068	
1.10	GRAPHICS DEV. TOOLKIT _IBM_		Y	Y	N	128K+		
	GRAPHICS EXPANDER _SPRINGBOARD_		Y	Y	N	256K	078	
	GRAPHICS SCRAPBOOK 1,2,3 _EPYX_		Y				074	
	GRAPHICS LIBRARY DISK 1,2 (BRO*)		Y	N	N		075	
	GUILD OF THIEVES _FIREBIRD_							
	GUNSHIP _MICROPROSE_		Y	Y	N	384K		/C
	HACK		Y			512K		
	HACKER		Y			128K		
	HACKER II		Y			128K		
	HAPPY BIRTHDAY, POCKETS (WB)		Y			128K		
NONE	HARDBALL _ACCOLADE_		Y	Y	N	384K	113	/C
	HARD-HAT MACK		Y	N	N	128K		
	HARVARD PRESENTATION GRAPHICS		Y	Y		512K		
	HAT TRICK _CAPCOM_							
	HELLCAT ACE		Y			256K		
NONE%	HITCHHIKERS GUIDE..GALAXY (I*)		Y	Y	N	128K		
	HOBBIT		Y			128K		
	HOLY GRAIL _HAYDEN_		Y			128K		
	HOLLYWOOD HIJINX _INFOCOM_		Y	Y	N	128K		
1.00	HOME BUDGET JR		Y	Y	Y			
1.00	HOMEWORD		Y	N	N	128K		
	HOMEWORD PLUS _SIERRA_							
	HOMEWORK HELPER WRITING		Y				023	
	HOMEWK HELPER MATH WORD PROB (S)		Y	Y	N	128K		
	HOPPER		Y			128K		
	HULK		Y					
1.00	IBM ACCOUNTING SOLUTIONS		Y	Y	N	128K		
1.00	IBM ASSISTANT HOME SOLUTIONS		Y	Y	N	128K		
2.00	IBM ASSISTANT SERIES		Y	Y	N	256K		
	IBM BIOLOGY SERIES		Y	Y	N	128K		
	IBM C COMPILER		N					
1.00	IBM DRAWING ASSISTANT		Y	Y	N	256K		

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
	IBM EARTH SCIENCE SERIES		Y	Y	N	128K		
1.00	IBM EXECUTIVE SOLUTIONS		Y	Y	N	128K		
1.00	IBM FILING ASSISTANT		Y	Y	N	128K		
2.00	IBM FILING ASSISTANT		Y	Y	N	256K		
1.00	IBM GRAPHING ASSISTANT		Y	Y	N	128K		
2.00	IBM GRAPHING ASSISTANT		Y	Y	N	256K		
2.00	IBM MACRO ASSEMBLER		Y	Y	N	128K		
	IBM PCJR. COLOR PAINT		Y	Y	N	128K	004	
3.20	IBM PC DOS		Y	Y	N	132K		
	IBM PC MATH CONCEPTS		Y	Y	N	128K		
	IBM PC MATH PRACTICE		Y	Y	N	128K		
	IBM PC PARTS OF SPEECH		Y	Y	N	128K		
	IBM PC READING FOR INFORMATION		Y	Y	N	128K		
	IBM PC READING FOR MEANING		Y	Y	N	128K		
	IBM PC SPELLING SERIES		Y	Y	N	128K		
	IBM PC TOUCH TYPING FOR BEGINNERS		Y	Y	N	128K		
	IBM PC VOCABULARY SERIES		Y	Y	N	128K		
1.00	IBM PLANNING ASSISTANT		Y	Y	N	128K		
	IBM PHYSICS DISCOVERY SERIES		Y	Y	N	128K		
1.00	IBM REPORTING ASSISTANT		Y	Y	N	128K		
	IBM REPORTS + TRAINING EDITION		Y	Y	N	256K		
2.00	IBM REPORTING ASSISTANT		Y	Y	N	256K		
	IBM SCIENTIFIC REASONING SERIES		Y	Y	N	128K		
1.00	IBM WRITING ASSISTANT		Y	Y	N	128K		
	IBM-GROUND WATER		Y	Y	Y	128K		
	IBM-HYDROLOGIC CYCLE		Y	Y	Y	128K		
	IBM-MOISTURE IN THE ATMOSPHERE		Y	Y	Y	128K		
	IBM-SURFACE WATER		Y	Y	Y	128K		
2.00	IBM WRITING ASSISTANT		Y	Y	N	256K		
	ICON (MACROCOM)		Y	Y	N	128K		
	IKARI WARRIORS		N					
	INCA _HAYDEN_		Y					
	INDOOR SPORTS _MINDSCAPE_		NO DATA					
2.00	IN SEARCH OF MOST AMAZING THING		Y	Y	Y	128K		
	INFILTRATOR _MINDSCAPE_		Y	Y	N	384K		/C
	INFILTRATOR II _MINDSCAPE_		NO DATA					
	INSIDE TRADER _COSMI_		NO DATA					
	INTO THE EAGLES NEST _MINDSCAPE_		Y	Y	N	384K		/C
	INSIGHT KNOWLEDGE SYSTEM		Y	Y	N	128K	007	
	INSTANT PAGES (ST)		NO DATA					
	IT FIGURES		Y			128K		
	JAVELIN		Y			512K	RACORE WITH DMA	
	J-BIRD		N					
	JK LASSER'S YOUR MONEY MANAGER		Y			128K		
	JENNY OF THE PRAIRIE		Y	Y	N	128K		
	JEOPARDY		Y			256K		/C
1.3	JET _SUBLOGIC_		Y	N	N	128K		
2.0	JET _SUBLOGIC_		Y	Y	N	256K	061	
	JIM FIXX'S RUNNING PROGRAM		Y			128K		
	JINGLE DISK		Y	N	N	256K		
	JR.SYNCHRO		Y					
	JRTELE _FREWARE_		Y	N	N	128K		
	JUMPMAN _IBM_		Y	N	N	128K		
	JUGGLES' BUTTERFLY _IBM_		Y	N	Y	128K		
	KAMPFGRUPPE		N					

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
	KAREL THE ROBOT		Y	N	N	128K		
	KARATEKA _BRODERBUND_		Y	Y	N	256K	048	
	KEDIT		Y	Y	N	256K		
	KEYBOARD CADET		Y	Y		128K		
	KEYWORKS		Y			128K		
	KIDS ON KEYS (S)		Y			128K		
	KID'S STUFF		Y			128K		
	KIDWRITER (S)		Y			128K		
	KID PRO QUP _SOFTSYNC_		Y	N	N	128K	077	
	KINDERCOMP (S)		Y	N	N	128K	121	/CART
	KING OF CHICAGO _MINDSCAPE_		NO DATA					
	KINGS QUEST I		Y	N	N	256K	064	
	KINGS QUEST II		Y	N	N	256K	015	
	KINGS QUEST III		Y			256K	028	
	KINGS QUEST IV		NO DATA					
	KNOCK OUT BOXING		N					
1.07	KNOWLEDGEMAN		Y	Y		256K	013	
	KUNG FU		Y	Y	N	128K		
	LAST WILL AND TESTAMENT		NO DATA					
2.12	LATTICE C		Y	Y	N	128K		
2.14	LATTICE C		Y	Y	N	128K		
1.00#	LEARNING DOS _IBM_		Y			128K	073	
	LEARNING DOS 2.0		N					
	LEARNING TO PROGRAM IN BASIC		N					
	LEARN TO USE DOS _INDIVIDUAL_		NO DATA					
	LEARN TO USE PC _INDIVIDUAL_		NO DATA					
	LEATHER GODDESSES		Y			128K		
	LETTERS FOR YOU _POLARWARE_		NO DATA					
	LEISURE SUIT LARRY...LIZARDS		Y	Y	N	256K		
	LETTRIX		Y			256K		
	LIGHTNING		Y			256K+		
	LINKWORD FRENCH, GERMAN, SPANISH		Y			128K		
	LODE RUNNER (BRO*)		Y	N	N	128K	030	
3.0	LODE RUNNER (BRO*)		Y	Y	N	128K	030	
1.00	LOGO		Y	Y	N	128K		
	LORDS OF CONQUEST		Y	Y	N	256K		/C
4.0	LOTTO LOGIC _MACTON		Y	Y(3)	N	256K+	115	/E
	LOTUS 123 CARTRIDGE		Y	Y	N	128K		
	LOTUS 123 DISK		Y	Y	N	256K	008	
2.X	LOTUS 123 DISK		Y	Y	N	256K	058	
	LOVEJOY'S SAT		Y			128K		
	LUCID 3D _PC SUPPORT GROUP_		Y	Y		512K		
	LUNAR EXPLORER		Y			128K		
	LURKING HORROR _INFOCOM_		Y	Y	N	128K		
	LUSCHER PROFILE		Y			128K		
1.00	MACRO ASSEMBLER		Y	Y	N	128K		
4.0	IBM MACRO ASSEMBLER		Y			128K		
	MAGIC SPELLS		Y	Y	Y	128K		
	MAKE A MATCH _SPRINGBOARD_		Y			128K		
1.00	MAILING LIST MANAGER		Y	Y	N	128K	097	
	MARBLE MADNESS (EA)		N				069	
1.00	MANAGEMENT SYSTEM		Y	Y	N	192K+		
	MANAGING THE MARKET		Y	Y		256K		
4.00	MANAGING YOUR MONEY _MECA_		Y	Y	N	256K	034	
	MASK PARADE _SPRINGBOARD_		Y			128K		
	MASTER NINJA: SHADOW WARROR (PS)		Y	Y	N	384K		/C

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
	MASTERING THE ACT	_MINDSCAPE_		NO DATA				
	MASTERING THE GRE	_MINDSCAPE_		NO DATA				
	MASTERING THE SAT	_MINDSCAPE_		NO DATA				
	MASTERTYPE	_MINDSCAPE_		Y				
	MASTERTYPE'S FILER	_MINDSCAPE_		NO DATA				
	MATH & ME	_DAVIDSON_		NO DATA				
	MATH BLASTER		Y		N	128K		
	MATH BLASTER PLUS	_DAVIDSON_		N				
	MATH COMPUTATION SKILLS	_IBM_	Y	Y	N	128K	051	
	MATH MAGIC	_MINDPLAY_		Y		128K		
1.0	MATH RABBIT	_LEARNING CO._	Y	Y	N	128K	107	
	MATHSHOP			NO DATA				
	MATRIX MADNESS (PDS)		Y	Y	N	128K		
	MAVIS BEACON TEACHES TYPING (ST)		Y	Y	N	256K	125	
NONE	MEAN 18	_ACCOLADE	Y	Y	N	256K	056	
	MEMORY MASTER (SA)		Y			128K		
	MEMORY: CONCENTRATION (SC)		Y			128K		
	MEMORY: SIMON SAYS (SC)		Y			128K		
	MEMORY: TEDDY AND IGGY (SC)		Y			128K		
	MEMORY: WHAT'S IN A FRAME (SC)		Y			128K		
	MICKY'S SPACE ADVENTURE (S*)			NO DATA				
	%MICRO COOKBOOK	_PINPOINT PUB_	Y	Y	N	256K	126	
NONE	MICROLEAGUE BASEBALL		Y	N	N	128K	059	
	MICROSOFT ADVENTURE		Y					
	MICROSOFT QUICK-C		Y			640K	043	
	MICROSOFT WORD		Y	Y	N	256K		
	MICROSURGEON	_IMAGIC_	Y	N	N	128K	122	/CART
	NONE MIGHT & MAGIC	_NWI_	Y	N	N	256K	090	
	MILLIONAIRE II	_BRITANNICA_		NO DATA				
	%MINDSHADOW	_ACTIVISON_		NO DATA				
	MINE SHAFT "ROM CARTRIDGE"	_IBM_	Y	N	N	64K		
	MISSING LETTERS	_IBM_	Y	Y	N	128K		
	MIXED UP MOTHER GOOSE (S*)		Y	Y	N	256K	063	
	MOEBIUS	_ORIGIN SYSTEMS_		NO DATA				
	MONKEY BUSINESS	_LEARNING TECH_		NO DATA				
1.00	MONOCHROME MAZES			N				
1.00	MONSTER MATH		Y	N	Y	128K		
	MONTEZUMA'S REVENGE		Y	Y	N	128K		
	MOON BUGS		Y			256K	018	/C
	MOONMIST	_INFOCOM_	Y	Y	N	128K		
	MOPTOWN PARADE (LC)		Y			128K		
	MOTHER GOOSE (S*)		Y	Y	N	256K	063	
	MOUSER	_IBM_	Y	N	N	64K		/CART
2.03	MOUSEPERFECT	_MOUSEPERFECT INC._	Y	Y	N	640K	084	
	MS. PAC MAN (THUNDER MT.)			N			081	
3.31	MULTIMATE		Y			256K		
1.10	MULTIPLAN		Y	Y	N	128K		
2.00	MULTIPLAN		Y	Y	N	256K		
3.00	MULTIPLAN		Y	Y	N	384K		
1.00	MULTIPLICATION TABLES			N				
1.00	MULTIPLICAT/DIVISION	_VISION_		NO DATA				
	MUSIC CONSTRUCTION SET		Y	N	N	128K		
	MUSIC MAESTRO	_SPRINGBOARD_	Y			128K		
	MUSIC STUDIO	_ACTIVISION_	Y	Y	N	128K		
	MY LETTERS, NUMBERS, AND WORDS(SA)		Y			128K		
	NET WORTH	_MINDSCAPE_		NO DATA				

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
	NEWSMASTER		Y					
	NEWSROOM		Y			256K		
	NFL CHALLENGE		Y			384K	016	
	NIGHT MISSION PINBALL		Y	N	N	128K		
	NINJA _MASTERONICS_		Y	Y	N	256K		/C
	NORTON COMMANDER _PETER NORTON_		NO DATA					
	NORTON UTILITIES _PETER NORTON_		Y					
	NOTABLE PHANTOM, THE _DESIGNWARE_		Y			128K		
	NUMBERS COUNT _POLARWARE_		NO DATA					
	NUMBERWORKS		Y			128K		
	NUTSHELL		Y			256K		
	OIL'S WELL		Y			128K		
	OMNICRON CONSPIRACY _EPYX_		NO DATA					
	ONCE UPON A TIME _COMPUTEACH_		NO DATA					
	ONE ON ONE "BASKETBALL"		Y	N	N	128K		
	OPERATION MARKET_GARDEN		Y					
	OPPOSITES ATTRACT _POLARWARE_		NO DATA					
	ORBITER _SPECTRUM_		Y			256K + 360K RAMDRIVE		
	OR CAD		Y			512K	NEEDS MOUSE	
	PAC MAN _THUNDER MT._		Y	N	N	128K	080	
NONE	PAL'S AROUND TOWN _HI TECH_		Y	Y	N	256K	091	
	PANEL 5.2 "SCRN HNDLR LAT C"		Y	Y	N	128K		
	%PAPER MODELS:..CHRISTMAS KIT(AC)		NO DATA					
	PARADOX		Y			640K		
	PARATROOPER		N					
	PARTNER PC _TIMEWORKS_		NO DATA					
2.00	PASCAL COMPILER		Y	Y	N	256K		
1.00	PASCAL COMPILER		N					
	PAUL WHITEHEAD TEACHES CHESS		Y			256K		
	PBO "PRINT BUFFER ONLINE"		Y	Y	N	128K		
	PCTERM		NO DATA					
	PCWATCH (PDS)		N	Y	N		046	
4.0	PC-FILE III		Y	Y	N	384K	044	
1.0	PC-FILE PLUS		Y	Y	N	512K	045	
	PC-MAN		Y	N	N	128K	009	
	PC-WRITE		Y	Y	N	128K		
2.70	PC-WRITE		Y	Y	N	384K	020	
	PC ARCADE		N					
	PC PALETTE		Y	Y	N	128K		
	PC PAINT PLUS _ZSOFT_		Y	Y	N	128K	094	
	PC PAINTBRUSH		Y					
	PC POOL CHALLENGE _IBM_		Y	N	N	128K		
	PC/TAXCUT _BEST PROGRAMS_		NO DATA					
	PC TOOLS DELUX _CENTRAL POINT_		Y	Y	N	256K		
	PC QUINTET _TIMEWORKS_		NO DATA					
	PE 2		NO DATA					
1.00	PEACHTEXT		Y	Y	N			
	PEACHTREE ACCT'ING SOFTWARE "ALL"		N					
	PEANUTS MAZE MARATHON (RH)		Y			128K		
	PEANUTS PICTURE PUZZLERS (RH)		Y			128K		
	PERFECT SCORE _MINDSCAPE_		Y			128K		
1.00	PERSONAL COMMUNICATIONS MGR		Y	Y	N	128K		
1.00	PERSONAL EDITOR		Y	Y	N	128K		
	PERSONAL LAWYER "WILLS"		Y			128K		
1.05	PFS:FILE		Y	Y	N	128K		
1.05	PFS:REPORT		Y	Y	N	128K		

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
	PFS FIRST CHOICE		Y			256K	ACCORDING TO METRO	
	PROFESSIONAL WRITE		Y	Y		256K		
	PROFESSIONAL FILE		Y	Y		256K		
NONE	PIECE OF CAKE MATH _SPRINGBOARD_		Y	N	Y	128K		
	PINBALL CONSTRUCTION SET		Y	N	N	128K		
NONE	PINBALL WIZARD _ACCOLADE_		Y	Y	N	384K	114	/C
NONE	PIRATES _MICROPROSE_		N					
	PITFALL II _ACTIVISION_		Y	N	N	128K	118	/CART
	PITS AND STONE		N					
	PITSTOP II _EPYX_		Y	N	N	128K		
	PITSTOP 2		Y		N	384K	027	/C
	PLANNING ASSISTANT		Y			128K		
NONE	PLUNDERED HEARTS _INFOCOM_		Y	Y	N	64K	087	
	POCKET APL FROM STSC		Y					
	POCKETS AND HER NEW SNEAKERS (WB)		Y			128K		
	POCKETS GOES ON A PICNIC (WB)		Y			128K		
	POCKETS GOES ON VACATION (WB)		Y			128K		
	POCKETS GOES TO THE CARNIVAL (WB)		Y			128K		
	POCKETS LEADS THE PARADE (WB)		Y			128K		
	POLICE QUEST		Y	Y		384K		/C
	PORTAL		Y			256K		
	POSTCARDS _ACTIVISION_		Y	Y	N	256K		
	POSEY YACHT RACE SIMULATOR		Y			256K		
	PRESIDENT'S CHOICE (S)		Y	N	N	128K		
	PRESIDENT ELECT '88 _S.S.I._		NO DATA					
	PRIMARY EDITOR		Y	Y	N	128K	052	
	PRIMARY EDITOR PLUS		NO DATA					
	PRIME TIME _FIRST ROW_		NO DATA					
	PRINTER'S ANGEL _(BCI)		Y				074	
	PRINTER'S DEVIL _(BCI)		Y	N	N		074	
	PRINTER'S PALS _(BCI)		Y				074	
	PRINTER'S PATRIOT _(BCI)		Y				074	
	PRINT MAGIC _EPYX_		NO DATA					
	PRINT MASTER _UNISONWORLD_		Y	Y	N	128K		
	PRINT MASTER PLUS _UNISONWORLD_		Y	Y	N	256K		
	PRINT SHOP		Y	Y	N	256K	022	
	PRINT SHOP COMPANION _(BRO*)		Y	Y	N	128K	075	
	PRINT SHOP HOLIDAY EDITION		Y	N	N	128K	071	
1.00	PRIVATE TUTOR		NO DATA					
2.00	PRIVATE TUTOR		Y	Y	N	128K		
	PROCHALLENGE BASEBALL _JBE LTD_		NO DATA					
1.00	PROFESSIONAL EDITOR		Y	Y	N			
	PROFESSIONAL DEBUG		NO DATA					
	PROKEY		Y			128K		
	PROMETHEAN PROPHECY		Y			256K		
	PUZZLE MASTER _SPRINGBOARD_		Y			128K		
1.0	PROCOMM+		Y	Y	N	256K		
2.42	PROCOMM		Y	Y	N	640K	035	
	PSIS TRADE COMPANY _ACCOLADE		Y	N	N	128K		
3.0	Q & A _SYMANTEC_		NO DATA (SHOULD WORK)					
	Q & A WRITE _SYMANTEC_		NO DATA (SHOULD WORK)					
	QBERT		NO DATA					
3.1	QMODEM		Y	Y	N	640K	036	
	QUATRO		Y			640K		

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
	QUEST_PENGUIN_		Y					
2.00	QUICKBASIC		N					
3.00	QUICKBASIC		Y	Y		384K	042	
4.00	QUICKBASIC "MAY REQUIRE 2 DRIVES"		Y	Y		640K		
	QUICK CHECK _INTRACORP_		NO DATA					
	QUICKEN		Y	Y		192K		
	RACTER _MINDSCAPE_		N					
	RAMBO		Y			256K		
	ROAD WARRIOR _EPYX_		Y	Y	N	256K		
151C	RBBS-PC _CPUG_		Y	Y	N	320K	104	/RAM
	READER RABBIT _WORD FACTORY		Y	Y	N	128K		
1.0	READER RABBIT _LEARNING CO.		Y	N	N	128K	107	
1.23	READIWRITER		Y	Y	N		037	
	REBEL CHARGE AT ANTIETEM		Y			640K		
	REFLEX		Y	Y	N	640K		
	RENDEVOUS WITH RAMA		Y			128K		
	RHYMES AND RIDDLES		Y			128K		
	RISK JR		Y			128K		
2.00	RIGHTWRITER		Y	Y	N	256K		
	RINGS OF ZILFIN _S.S.I._		Y			256K		
	RIVER RAID _ACTIVISION_		Y	N	N	128K	118	/CART
	ROADWAR EUROPA _S.S.I._		NO DATA					
NONE	ROBOTRON 2084		Y	N	N	256K	047	
	ROBO MATH _MIND PLAY_		NO DATA					
	ROCKFORD (EA)		N DATA					
	ROCK 'N ROLL TRIVIA_THUNDER MT_		Y	Y	N	132K		
	ROCKY'S BOOTS _IBM_		Y	N	N	128K		
	ROGUE _EPYX_		Y			128K		
	ROOTS		Y			128K		
	RUN FOR THE MONEY		Y			128K		
	SARGON III (S)		Y	Y		128K		
	SAT		Y	Y	Y	384K	025	
	SAT COMPLETE (S)		NO DATA					
	SCHULTZ' TREASURES		Y					
	SCRABBLE _ELECTRONIC ARTS_		NO DATA					
	SCRABBLE _LEISURE GENIUS_		NO DATA					
	SCREENWRITER II _SIERRA_		NO DATA					
1.00	SCRIPT/PC		Y	Y	N	256K		
1.10	SCRIPT/PC		Y	Y	N	256K		
	SCRIPT/PC II		Y	Y	N	384K	021	
NONE	SCUBA VENTURE "ROM CARTRIDGE"		Y	N	N	64K		
	S.D.I. _MINDSCAPE_		NO DATA					
	SEARCH AND DESTROY		NO DATA					
	SERPENTINE		N					
	SEVEN CITIES OF GOLD		Y			128K		
	SHADOWGATE _MINDSCAPE_		NO DATA					
	SHAMUS _IBM_		Y	N	N	128K		
	SHANGHAI		Y			256K		
	SHAPE & COLOR RODEO (DLM)		Y			128K		
NK	SHOGUN		Y	Y	N	256K		
	SINBAD & THE THRONE _MINDSCAPE_		NO DATA					
	SIDEARMS _CAPCOM_		NO DATA					
	SIDEKICK _BORLAND_		Y			128K		
	SILENT SERVICE		Y	N	N	128K		
	SKY RUNNER _CASCADE_		Y	Y	N	256K	047	/C
	SKY RUNNER (S)		NO DATA					

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	CONFIG SYS
	SMART COM		Y	Y	N	128K		
	SMART GUIDE DOS _INDIVIDUAL_		NO DATA					
	SMART MONEY _SIERRA_		Y			128K		
	SMARTCOMM II _HAYES_		Y					
	SNAKE		Y			128K		
	SNOOPER TROOPERS		Y			128K		
	SNOOPY'S READING MACHINE		Y			128K		
	SOPWITH		Y					
	SOKO BAN _SPECTRUM_		NO DATA					
	SOLARISM _INTERSEL_		Y			256K		
	SOLITAIRE ROYALE _SPECTRUM_		NO DATA					
	SOLVING MATH WORD PROBLEMS _IBM_		Y	Y	N	128K		
	SONG WRITER		Y			128K		
	SORCERER		Y			128K		
	SPACE GAMES		Y			128K		
	SPACE QUEST "CHAPTER I" _SIERRA_		Y	Y	N	256K	/E	
	SPACE QUEST "CHAPTER 2" _SIERRA_		Y	Y	N	256K	/E	
	SPACE STRIKE		N					
	SPELL IT		Y			128K		
	SPELL BREAKER		Y			128K		
	SPELLCOPTER		Y	N	N			
3.3	%SPELLSTAR _MICROPRO_		Y	Y	N	128K		
	SPIDERBOT _EPYX_		NO DATA					
	SPIDERMAN		Y			128K		
	SPITFIRE ACE		Y			128K		
	SPY HUNTER		N					
	SPY VS. SPY III _EPYX_		NO DATA					
	SPYDER		N					
	STARS AT BAT		N					
	STAR EMPIRE _FIRST ROW_		NO DATA					
	STAR FLEET I		Y	Y	N	128K*	010	
	STAR FLEET II _INTERSTEL_		NO DATA					
	STARCROSS		Y	Y	N	128K		
	STARFLIGHT _ELECTRONIC ARTS_		Y	Y		384K	124	
	STARGATE		N					
	STARGLIDER		NO DATA					
	STARTREK:KOBAYASHI ALTER'VE (S&)		Y					
	STATIONFALL _INFOCOM_		Y	Y	N	128K		
	STEPPING STONES LVII _COMPUTEACH_		NO DATA					
	STEPPING STONES LVIII _COMPUTEACH_		NO DATA					
	STICKERS _SPRINGBOARD_		Y			128K		
	STICKYBEAR READING (WRFS)		N					
	STICKYBEAR MATH (WRFS)		N					
	STICKYBEAR MATH II (WRFS)		N					
NONE	STICKYBEAR NUMBERS (WRFS)		Y	N	N	128K		
	STORY MACHINE _SPINNAKER_		N					
	STORM _MASTERONICS_		Y	N	N	128K		
1.05	STRATEGY GAMES _IBM_		Y	N	Y	128K		
	STREET SPORTS BASEBALL _EPYX_		NO DATA					
	STREET SPORTS BASKETBALL _EPTX_		Y	Y	N	640K	/E	
	SUB BATTLE _EPYX_		Y			320K		
	SUBMARINE COMMANDER		Y			128K		
	SUBMISSION		Y			256K+		
	SUCCESS WITH MATH _MINDSCAPE_		NO DATA					
	SUCCESS WITH ALGEBRA _MINDSCAPE_		Y			128K		

VER.	PROGRAM NAME	-VENDOR-	JR RUN	DOS REQ	BAS CART	MEM REQ	COMMENT	C SYS
	SUMMER GAMES _EPYX_		Y			?		
	SUMMER GAMES II _EPYX_		Y			?		
1.1	SUPERBIKE CHALLENGE _BRODERBUND_		Y	Y	N	256K	033	
	SUPER BOULDER DASH _(EA)		Y	N	N	128K	072	
NONE	%SUPER SUNDAY _AH_		Y	N	N	128K		
2.10	SUPERCALC 3		Y	Y		256K		
	SUPERCALC 4		Y	Y	N	640K		
	SUPERKEY _BORLAND		Y	Y	N	256K		
NONE	SUPERSTAR ICE HOCKEY _MINDSCAPE_		Y	Y	N	256K	062	/C
	SUPERSTAR SOCCER _MINDSCAPE_		NO DATA					
	SUPER SUNDAY _AH_		NO DATA					
	SUPERWRITER		Y			128K		
	SWIFTCALC PC _TIMEWORKS_		Y			128K		
	SYLVIA PORTER'S INC TX_TIMEWORKS		NO DATA					
	SYLVIA PORTER'S PER INV MOR V2		NO DATA					
1.10	SYMPHONY		Y			512K	NEED PATCH	
5.18	TAPICS _OMNI INFO RES._(*)	Y	Y	N	384K		095	
	TAPPER		Y	Y	N	128K		
	%TASS TIME..TONETOWN_ACTIVISION_		NO DATA					
	TAX SHOP 1040_TAX SHOP_ "1370"		NO DATA					
	TEACHER'S QUIZ DESIGNER		Y	Y	Y	128K		
1.03	TELLSTAR _SPECTRUM HOLBYTE_		Y	Y	N	128K		
	TEMPLE OF APSHAI		Y		Y			
	TERM PAPER WRITER		Y			256K		
	TEST DRIVE _ACCOLADE_		Y	Y	N	384K		/C
3.10	TEXTRA		Y	Y		256K		
	THEXDER _SIERRA_		Y	Y	N	256K		/C
NONE	THE FORD SIMULATOR (FMC)		Y/N	Y	N	384K	098	/C
	THE GAME SHOW _ADVANCED IDEAS_		NO DATA					
	THE HUNT FOR RED OCTOBER (EA)		NO DATA					
	THE LUSCHER PROFILE _MINDSCAPE_		NO DATA					
	THE MOVIE MONSTER GAME _EPTX_		NO DATA					
	THE NEWSROOM PRO _SPRINGBOARD_		Y	Y	N	640K	032	
	THE THREE STOGEOGES _CINEMAWARE_		NO DATA					
	THESE UNITED STATES (PDS)		Y	Y	N	128K		
2.00	THINKTANK		Y	Y	N	384K		
	THINKING SKILLS _VISION_		NO DATA					
	TICKET TO PARIS		Y			128K		
	TICKET TO SPAIN _BLUE LION_		Y	Y	N	128K		
	TIGERS IN THE SNOW		Y			128K		
1.05	TIME MANAGER		Y	Y	N	128K		
	TLC LISP		Y	Y	N	256K		
	TOMAHAWK _DATASOFT_		NO DATA					
	TOOLS FOR TOTS _VISION_		NO DATA					
NONE	TOP GUN _THUNDER MOUNTAIN_		Y	Y	N	128K		
	TOPVIEW		N					
	TOUCHDOWN FOOTBALL		Y	Y		128K		
	TOURNAMENT BRIDGE		Y			128K		
	TOYSHOP		Y	Y		640K		
	TRACER SANCTION		Y					
	TRANSYLVANIA		Y			128K		
	TREASURE ISLAND _WINDHAM_		Y					
	TRI-ACTION GAMES _MASTERTRONIC_		NO DATA					
	TRINITY _INFOCOM_		Y	Y	N	128K		

	TRIO_SOFTSYNC_				NO DATA		
	TRIVIA FEVER				Y	128K	
	TRIVIA PURSUIT				NO DATA		
	TROJAN_CAPCOM_				NO DATA		
	TURBO BASIC				Y	384K	057
1.0	TURBO C	Y	Y	N		512K	038
	TURBO CHESS				Y		
2.00	TURBO PASCAL	Y	Y	N		128K	
5.01	TURBOTAX_CHIPSOFT_"1987 TAX"	Y	Y	N		512K	083
1.00	TURTLE POWER	Y	N	N		128K	
1.00	TV & CINEMA 101 TRIVIA (PDS)	Y	N	N		128K	
	TWIN	Y	Y	N		348K	
	TWIST AND SHOUT				Y	128K	
	TYPE!				Y	128K	
	TYPING TUTOR	Y	N	Y			011
	TYPING MADE EASY				Y	128K	
	TYPING TUTOR 111	Y	Y	N		128K	033
	TYPING TUTOR 1V	Y	Y	N		128K	033
	UCSD P_SYSTEM "ALL PRODUCTS"				N		
	ULTIMA III_ORIGIN SYSTEMS_				Y	256K	
	ULTIMA IV_ORIGIN SYSTEMS_				Y	256K	
	ULYSSES				Y		
	UNINVITED_MINDSCAPE_				NO DATA		
	UP AND ADD'EM				Y	128K	
	URIDIUM_MINDSCAPE_				NO DATA		
NONE	%VEGAS VIDEO POKER_APPL.PLUS_	Y	Y	N		384K	128
1.20	VISICALC	Y	Y	N		128K	
	VOLKSWRITER 3				Y	256K	
	VOLKSWRITER PLUS				Y	256K	
	VOODOO ISLAND				Y	128K	
	VP EXPERT_PAPERBACK SOFTWARE_	Y	Y	N		384K	
	VP PLANNER				Y	128K	
1.04	WEBSTER'S NEW WORLD WRITER	Y	Y	N		384K	101
	WEBSTER'S NEW WORLD SPELLER				Y	256K	
	WEBSTER'S NEW WORLD THESAURUS				Y	256K	SET TO -WV=N
	WHAT.TEACH. AT HARVARD (ST)				NO DATA		
	WHEEL OF FORTUNE "OF TV FAME"	Y	Y			256K	/C
	WHEEL OF FORTUNE "SHAREDATA"	Y	Y	N		128K	103
	WHERE IN THE U.S.A...SANDIEGO?				Y	128K	056
	WHERE IN THE WORLD...SANDIEGO?				Y	128K	056
	WILDERNESS				Y	128K	
	WILL WRITER				Y	128K	
	WINDOWS_MICROSOFT_				N		
	WINES ON DISK				Y	128K	
	WINTER GAMES_EPYX_				Y	128K	
	WINNIE THE POOH (s*)	Y	N	N		128K	065
	WISHBRINGER				Y	128K	
	WIZARD OF WALL STREET				Y	128K	
	WIZARD OF WORDS_ADVANCED IDEAS_				NO DATA		
	WIZARD OF OZ_WINDHAM_				Y		
	WIZARDRY	Y	N	N		128K	
	WIZARD'S CROWN_S.S.I._				Y		
	WIZBALL_MINDSCAPE_				NO DATA		
2.00	WORD_MICROSOFT_				Y	256K	
	WORD ATTACK				Y	128K	
	WORD PERFECT	Y	Y	N		256K	019
	WORD PERFECT JR.	Y	Y	N		128K	

(Continued on page 24)

REPRINT DISK #1

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 Setting Preferences on Jr BASIC and the PCjr
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 BASIC & Ramdisks Microsoft Letter
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 Learning to Draw on the PCjr II
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 QuickBASIC 4.0 on PCjr Mickey and Donald
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 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
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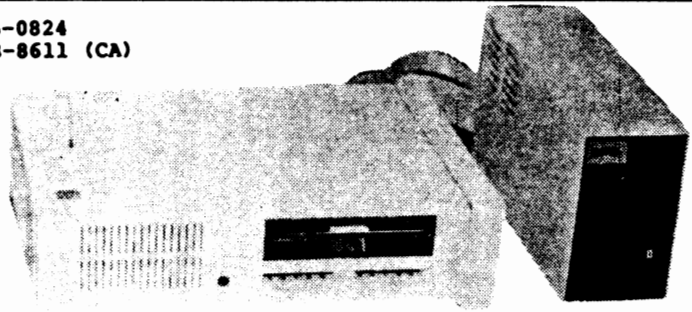
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nov 88

(Continued from page 21)

	WORD WRITER PC _TIMEWORKS_	NO DATA				
1.0	WORDPERFECT EXECUTIVE	Y	Y	N	640K	040
1.1	WORDPERFECT LIBRARY	Y	Y	N	640K	
1.00	WORDPROOF	Y	Y	N	128K	
3.30	WORDSTAR	Y	Y	N	128K	
4.0	WORDSTAR	Y			256K	
	WORLDGAMES _EPYX_	NO DATA				
	WORLD TOUR GOLF	N				
	WORLD CLASS LEADER BOARD	NO DATA				
	WORLD CLASS CHESS _MELODY HALL_	NO DATA				
	WORLD'S GREATEST BASEBALL	Y			128K	
	WRITING TO READ	Y	N	T	128K	012
	X-RATED GRAPHICS _MEGASOFT_	Y	N	N		074
3.00	X*CHANGE "CABLE NEWS SERVICE"	N				024
3.00	X*PRESS "CABLE NEWS SERVICE"	N				024
	XYWRITE	Y			256K	NO JR KEYBOARD
	YOUR PERSONAL NETWORTH _MINDSCAPE	NO DATA				
	ZAP THE CODEFINDER _FIRST ROW_	NO DATA				
	ZAXXON	Y	N	N	128K	
ALL	ZORK I _INFOCOM_	Y	Y	N	128K	108
	ALL ZORK II _INFOCOM_	Y	Y	N	128K	108
ALL	ZORK III _INFOCOM_	Y	Y	N	128K	108
NONE	ZYLL _IBM_	Y	N	N	128K	
	10TH FRAME _ACCESS_	Y	Y	N	256K	
	\$10,000 PYRAMID (TV GAME SHOW)	N				100
	1987 TAX PROGRAM	NO DATA				
	221 B BAKER STREET _DATASOFT_	Y			256K	
	3-D HELICOPTER SIMULATOR (S*)	Y			384K	/C

VENDOR ABBREVIATIONS WHERE USED:

(*) =SHAREWARE	(S*) =SIERRA
(BRO*)=BRODERBUND	(S&) =SIMON & SCHUSTER
(EA) =ELECTRONIC ARTS	(ST) =SOFTWARE TOOLWORKS
(FMC) =FORD MOTOR COMPANY	(S) =SPINNAKER
(gs) =GAMESTAR	(SA) =STONE & ASSOCIATES
(nbc) =NEW WORLD COMPUTING	(SC) =SUNBURST COMMUNICATIONS, INC
(pds) =PERSONALLY DEVELOPED SOFTWARE	(LC) =THE LEARNING COMPANY
(RH) =RANDOM HOUSE SOFTWARE	(WB) =WORLD BOOK, INC
	(WRFS)=WEEKLY READER FAMILY SOFTWARE

COMMENT SECTION

001 "APPLICATION DISPLAY MANAGEMENT SYSTEM". NEEDS 128K MANAGER PART AND 192K FOR DESIGNER PART (MIN. CONFIGURATIONS)

002 THIS PROGRAM USES THE IBM PCJR SPEECH ATTACHMENT.

003 THIS PROGRAM USES THE IBM PCJR SPEECH ATTACHMENT.

004 THIS PROGRAM REQUIRES A MOUSE. HOWEVER THERE IS A JOYSTICK DRIVER PROGRAM AVAILABLE

005 REQUIRES A SECOND DISK DRIVE.

006 256+ INDICATED, USER REPORTS NEEDS 512K TO RUN PROPERLY.

007 RUNS FASTER WITH MORE MEMORY (256K+)

008 NEEDS GRAPHICS DRIVERS, AVAILABILITY UNKNOWN?

009 PCJR JOYSTICKS DO NOT WORK.

010 RUNS FASTER WITH MORE MEMORY (256K+)

011 SPEED TIMING IS INCORRECT?

012 REQUIRES SPEECH ATTACHMENT, AND OTHER ACCESSORIES, CHECK PROGRAM REQUIREMENTS.

013 RUN & DIR FUNCTIONS DIDN'T WORK, 256K+ MAY BE REQUIRED. SECOND DISK DRIVE PREFERRED, NOT REQUIRED.

014 OLDER VERSIONS WILL NOT WORK, NEWER VERSIONS USE 16 COLOR MODE. THERE ARE VERSIONS THAT RUN IN CGA FOUR COLOR MODE.

015 YOU MUST CHECK THAT YOU HAVE THE PCjr VERSION.

016 A 640K SETUP WITH A 256K RAMDISK TO STORE TEAM DATA.

017 THERE ARE 27 DIFFERENT KEY BOARD COMBINATIONS REQUIRED FOR THIS GAME.

(Continued on next page)

(Continued from previous page)

018 INITIAL LOGO SCREEN GARBLED, PROGRAM RUNS OKAY AFTER THAT.
019 USING THIS PROGRAM WILL REQUIRED RAMDISK MANIPULATION, ETC.
020 TO USE SPELL CHECKER YOU NEED 320K RAM. FILE MANAGEMENT AND USE TOGETHER WITH RAMDISK PLAN-
NING REQUIRED. 640K NEEDED HERE.
021 PROGRAM AUTHOR RECOMMENDS 384K FOR EASE OF USE AND A SECOND DISK DRIVE.
022 PROGRAM WILL WORK WITH 128K, HOWEVER BOOTING PROBLEMS MAY OCCUR.
023 USE COPYRIGHT 1987 OR LATER DATED PROGRAM TO WORK WITHOUT PROBLEMS.
024 SERIAL PORT PROBLEMS.
025 "HARCOURT, BRACE, JOVANAVICH EDITION".
026 REQUIRES 80 COLUMN MODE, INSTALL DOS PATCHES! DOES REQUIRE 384K AND TWO DISK DRIVES PREFERRED
(VDISK/640K JR)
027 REPORTED PROBLEMS WITH JOYSTICK OPERATION.
028 REPORTED PROBLEMS WITH PROGRAM CLOCK OPERATION.
029 REQUIRES MULTI-DISK SET UP. TO SET UP DISKS AND CONFIGURATION FILE, HANGS IN TWO PLAYER MODE KEY-
BOARD MODE.
030 MAKE SURE BOX IS MARKED FOR PCJR USE!
031 HANGS DRIVE OPERATIONS.
032 WHOA! THIS PROGRAM HAS THE PITS OF A PROTECTION SCHEME. IT TAKES ALMOST FIVE MINUTES TO LOAD,
AND CHECKS PROTECTION BETWEEN GAMES. IT RUNS IN THE CGA EMULATION MODE.
033 THE UNPROTECTED COPY RUNS ON THE PCJR.
NOTE: NAME HAS CHANGED TO C. YEAGER ADVANCED FLIGHT TRAINER. BUFFERS=24 AND FILES=8 IS RECOM-
MENDED THAT THESE VALUES BE PLACED IN THE CONFIG.FILE. IF YOU USE THE /C AND THESE VALUES PRO-
GRAM HANGS.
034 AN EARLY VERSION CAME IN CARTRIDGE FORM FOR PCJR.
035 HOST MODE REQUIRES A BYPASS TO WORK.
036 QMODEMJR IS A STRIPPED DOWN VERSION OF QMODEM FOR PCJR.
037 REQUIRES A 2ND DISKETTE DRIVE OR A 320KB RAMDISK.
038 BORLAND PROVIDED TAXES FOR TURBO BASIC AND TURBO C ON PCJR.
039 EXE INCLUDES FOR JR KEYBOARD. 40 COLUMN AND JR SPEED.
040 NEEDS MULTIPLE DRIVES, OR A 720KB DRIVE.
041 EARLIER VERSIONS (?) DO NOT RUN, THIS STATEMENT IS QUESTIONABLE.
042 DB 3.0 CAN RUN ON THE PCJR WITHOUT A KEYBOARD ENHANCER SUBJECT TO CERTAIN RESTRICTIONS. SEE
PCJR FORUM FOR DETAILS.
043 ALL KEYBOARD OPERATIONS DO NOT OPERATE PROPERLY. REQUIRES KEYBOARD PATCH FROM MICROSOFT.
044 RUN PROGRAM OFF A RAMDISK OR 2ND DRIVE, 256K FOR PROGRAM.
045 REQUIRES 2ND DRIVE.
046 SOME FUNCTIONS WILL RUN. ERROR IN PCJR BIOS CAUSES GLITCH.
047 JOYSTICKS DO NOT SEEM TO FUNCTION PROPERLY.
048 MAKE SURE BOX SAYS PCJR VERSION.
049 COPY PROTECTION SCHEME PREVENTS GETTING PAST MENU SCREEN.
050 MAKE SURE BOX SAYS PCJR VERSION.
051 IBM PRIVATE TUTOR COURSE. IBM PRIVATE TUTOR SOFTWARE REQUIRED ALSO.
052 USES THE IBM PCJR SPEECH ADAPTER.
053 IBM PRIVATE TUTOR COURSE. IBM PRIVATE TUTOR SOFTWARE REQUIRED ALSO.
054 PLUG ONE JOYSTICK IN ONLY.
055 ONE DISK DRIVE OKAY, TWO IDEAL.
056 DOS PATCHES MUST BE INSTALLED. INTO AUTOEXE TYPE LOAD /L.
057 GET PATCHES FROM BORLAND, CALL FIRST BEFORE GETTING SOFTWARE.
058 LOTUS INCLUDED PCJR GRAPHICS DRIVERS WITH VERSIONS 2.X 384K+ IS RECOMMENDED.
059 MICROLEAGUE BASEBALL PROGRAM IS ALSO SUPPORTED BY ADDITIONAL/OPTIONAL PROGRAM FILE DISKS
WITH TEAMS, ETC AT ADDITIONAL COST.
060 UNABLE TO "CALIBRATE" JOYSTICK PERIOD. DISK DRIVE DOES NOT STOP TURNING AND USING KEYBOARD CUR-
SOR CONTROLS, NO NULL MOVEMENT POSITION.
061 THERE ARE PROBLEMS WITH THIS SOFTWARE, NO JOYSTICK CONTROL, UNABLE TO GET 320 * 200 16 MODE,
ETC. WILL UPDATE THIS COMMENT WHEN MORE INFORMATION IS AVAILABLE.
062 USE OF /C IN THE CONFIG.SYS FILE, TAKES CARE OF THE PROBLEM OF THE JOYSTICKS NOT TO CALIBRATION,
AND SCREEN FLICKER. ALSO PATCH AVAILABLE.
063 JOYSTICK RECOMMENDED BUT NOT REQUIRED.
064 NOTE THAT KING'S QUEST 1 NOW ONLY COMES IN A 256K VERSION. EARLIER KING'S QUEST 1 USED 128K DI-
RECT BOOT COPY.
065 JOYSTICK NOT REQUIRED NOR SUPPORTED.
066 CARTRIDGE BASED-MAY BE 1 OR 2 CARTRIDGES DEPENDING ON VERSION-FOR PCJR ONLY.

067 SECOND DISKETTE DESIRABLE, MORE MEMORY IMPROVES PERFORMANCE. INCLUDES THESAURUS, SPELLING CHECKER.

068 COPY PROTECTED VERSION DOES NOT RUN.

069 WILL NOT RUN ON JR. SELF-BOOTING DISK. WILL NOT RUN IN PC MODE W/RACORE EXPANSION.

070 REQUIRES PRINT MASTER OR PRINT MASTER PLUS. CONTAINS FILE TO UPGRADE PRINT MASTER TO NEW PRINT MASTER PLUS.

071 ADDITIONAL FONTS, BORDERS AND GRAPHICS FOR USE WITH PRINT SHOP.

072 (2) GAMES ON 1 DISK. BOULDER DASH & SUPER B.D

073 NEEDS PRIVATE TUTOR 2.00 TO RUN.

074 GRAPHICS DISK FOR USE WITH PRINT SHOP & PRINT MASTER. ENHANCES THESE PROGRAMS BY GIVING MORE GRAPHICS, FONTS ETC. TO WORK WITH.

075 GRAPHICS DISK FOR USE WITH PRINT SHOP, ENHANCES THESE PROGRAMS BY GIVING MORE GRAPHICS, FONTS ETC. TO WORK WITH.

076 ADDITIONAL CERTIFICATES TO USE THE CERTIFICATES MAKER PROGRAM.

077 WORD PROCESSOR TYPE PROGRAM FOR CHILDREN.

078 ENHANCEMENT PROGRAM FOR USE WITH NEWSROOM, PRINT SHOP. & PRINT MASTER PROGRAMS. JOYSTICK HELPFUL FOR MOVING AROUND PICTURES.

079 ADDITIONAL PICTURE DISKS FOR USE WITH PRINT MASTER OR PRINT MASTER PLUS PROGRAM.

080 SAME AS ARCADE BUT RUNS SUPER SLOW ON JR. GOOD FOR KIDS. (?).

081 SAME AS ARCADE. ON JR. THE BOTTOM OF SCREEN OVERLAPS THE TOPS THE SCREEN.

082 YOU HAVE TO MAKE A SPECIAL COPY OF DOS. THE MANUAL WALKS YOU THROUGH IT.

083 V5.00 HAS BAD PRINTING DATA. VENDOR HAS UPGRADED TO V5.01 AND CORRECTED PROBLEM. ALL REGISTERED USERS ARE BEING SENT UPGRADES. "PUTTING THE DATA DISK ON A RAM DISK AND DOING AN "ASSIGN A=C". SEE PCJR SOFTWARE FORUM (3/23/87 - DATE) FOR A FIX TO THE 5.00 PROBLEM.

084 RAN WITH WORDPERFECT 4.2 AND LOGITECH C7 MOUSE.

085 ARCADE GAME-GOOD GRAPHICS.

086 COMBINES ARCADE ELEMENTS AND STRATEGY - 4 COLORS.

087 GOOD TEXT ADVENTURE-MAJOR CHARACTER IS FEMALE.

088 (EXCELLENT GAME FOR 7-12 YEAR OLD'S, GREAT GRAPHICS!)

089 (FOR YOUNGER KIDS -4 COLOR)

090 (GOOD ROLE-PLAYING ADVENTURE)

191 (4 COLOR ONLY)

092 REQUIRES 2 DRIVES

093 JOYSTICK CONTROLS ONE BIKE, KEYBOARD DOES NOT WORK FOR SECOND BIKE/PLAYER

094 MOUSE SYSTEM SUPPLIES THEIR OWN MEMORY DRIVER FOR PCJR IN 16 COLORS. COMES WITH INSTL PROGRAM - CONFIGURES DISK & MEM TO /E CONFIGURATION. RAM DISK WITH SYSTEM FILES HELPFUL.

095 NEEDS 2 DRIVES AND MODEM

096 2 DRIVES AND MORE MEMORY BETTER. OTHERWISE NEED TO USE A RAMDISK.

097 PROBLEM: SORTING LIST FOR PRINTING REQUIRES MANY DISK CHANGES. IT NEEDS 2 DRIVES BUT A RAMDISK OR HARDDISK ON V 1.00 IS NO GOOD UNLESS YOU CAN DESIGNATE THEM AS A "B". V 1.00 DOES NOT RECOGNIZE "C" AS A DRIVE.

098 A CAR DRIVING PROGRAM SIMULATION, AND "SALES" TOOL FOR THE FORD MOTOR COMPANY. THE ACTION PART OF THE PROGRAM LOCKS UP THE KEYBOARD - YOU MUST BANG AWAY ON THE SPACE BAR WHILE IT LOADS A PROGRAM SEGMENT. TRIED RAM DISK, SEVERAL SEGMENTS WILL NOT COPY TO RAMDISK. (AUTHOR'S COMMENTS) GAME RUNS, BUT YOU MUST BE PATIENT FOR DISK LOADS (NO DMA YOU KNOW) AND USES "ALT" FOR BRAKES AND "CAPS LOCK" FOR GAS INSTEAD OF THE SPACE BAR. ("YOUR ACTUAL RESULTS MAY VARY") (ANOTHER USERS COMMENTS)

099 JOYSTICKS OPTIONAL, ONE OR TWO PLAYER GAME (ARCADE GRAPHICS GAME VERSION), 16 COLOR FORMAT.

100 TRIED ON A 640K/RACORE W/DMA AND A REG PC JUNIOR. KEYBOARD LOCKUP.

101 REQUIREMENTS STATE DOS 2.0+, 2 FLOPPY DRIVES AND 256K (MIN REQMTS) ITS BEEN RUN ON A 736K SYSTEM WITH 20MEG HD.

102 REQUIREMENTS STATE DOS 2.1+, 2 FLOPPY DRIVES AND 384K (MIN REQMTS) ITS BEEN RUN ON A 736K SYSTEM WITH 20MEG HD.

103 A 60K RAMDISK IS SUGGESTED TO STORE EDIT FUNCTIONS

104 SUPPORTS PCJR INTERNAL MODEM AS WELL AS HAYES COMPATIBLE MODEMS. LARGE RAMDISK TO HOLD ALL TEXTFILES STRONGLY SUGGESTED. RUNS WITH MOST HARDDISK EXTENSIONS, DOS 2.1 OR LATER.

105 FALCON STARTS FINE, BUT AT TAKE_OFF (SOON THERE AFTER) THE SCREEN TURNS TO GARBAGE AND KEYBOARD LOCKS.

(Continued on page 32)

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PCjr's Video System: Part III

By John Wilson

This is the third and last article in a series about the video display system of IBM's PCjr. In the first article we covered the video display system hardware which Junior uses, and we examined the text modes in the second article. **In this article we will explore the graphic modes.** These are the modes in which Junior really shines. IBM gave Junior graphic capabilities that far exceeded the other members of the personal computer family, and in 1984 and 1985 programs such as King's Quest astounded the home computer world.

In this article we'll first see how the graphic modes are different from the text modes. Then we'll look at each of the different graphic modes and finally we'll examine the video display buffer and memory-mapping.

You will recall from the last article that in the text modes the smallest unit on the screen is a character box. A maximum of 25 rows with 80 character boxes per row can be displayed. In the graphic modes the smallest unit on the screen is a pixel. Junior can display up to 128,000 pixels (200 rows with 640 pixels in each row).

The text modes can only display characters from the extended ASCII character set, but you can control the color of the character, the color of the background and you can cause the character to blink. In the graphic modes you only control the color of the pixel, but by turning on a string of pixels you can create lines, arcs and patterns and anything else that you can imagine. As might be expected, this ability to completely control the display has a price of increased complexity, and most of us, even if we do our own programming, are dependent upon programs to unleash Junior's graphic abilities.

More memory is required for the graphic modes. You will recall that a maximum of 4 Kbytes of memory is required for text modes. The graphics modes require 16 Kbytes and two graphic modes need 32 Kbytes of memory.

The terms "foreground" and "background" do not have the same meaning in the graphic modes as they do in the text modes. In the text modes, each character box had a background color and the character in the box was in the foreground color. In the graphic modes, you just turn on a single pixel, or dot, and a single dot doesn't have a background or a foreground. Therefore, in the graphic modes the "background" color is the color that all of the pixels are initially set to and the "foreground" color is the color that individual pixels are set to. Usually the border is also set to the background color.

There is no real cursor in the graphic modes. In the text modes there is a hardware controlled, blinking cursor that indicates the active position on the screen. In the graphic modes there is still an active position on the screen, but there is nothing to show where it is unless the programmer makes something to serve as a cursor. The graphic modes do not support blinking, so if a blinking cursor is desired the programmer must make one that blinks by changing color on a regular interval.

Surprisingly, there can be text in the graphic modes. IBM has included a set of the first 128 ASCII characters in read-only-memory (ROM) of all of the PCs and has provided means through the Basic Input/Output Services (BIOS) to use these characters. Junior, a step ahead of the other PCs, also has the upper 128 ASCII

characters in ROM. These characters are used by BASIC to display any text needed while in the graphic modes, but some other programs have their own set of text characters so that they can have a wider variety of text styles. Just as in the text modes, the high resolution graphic modes have 80 characters per line and the medium graphic modes have 40 characters per line. The low resolution graphic mode has 20 characters per line, for which there is no counterpart in the text modes.

Table 1 shows all of the graphic modes that Junior can display. The mode numbers are those used by Junior's Basic Input/Output System (BIOS) to set the video mode. The missing mode number in Table 1, Mode 7, is for a Text mode on IBM's monochrome display adapter which Junior is not able to use. Often mode 8 is called the low resolution mode, modes 4, 5 and 9 are called medium resolution modes, and modes 6 and 10 are referred to as the high resolution modes. These terms were accurate in 1984 but when compared to the 640 by 480 resolution of modern graphic adapters they seem quaint.

You will recall from previous articles that the video adapter in Junior is basically an enhanced version of the IBM Color Graphics Adapter (CGA) which was used in many PCs, XT's and AT's. The CGA had only three graphic modes, modes 4, 5 and 6. Junior has three additional graphic modes, modes 8, 9 and

Table 1 IBM PCjr GRAPHIC MODES

	Resolution	Colors	Memory Required	Bits per Pixel	Cartridge BASIC Mode Equivalent
4	320 x 200	4	16 Kb	2	SCREEN 1,1 and SCREEN 4,1
5	320 x 200	4 shades	16 Kb	2	SCREEN 1,0
6	640 x 200	2	16 Kb	1	SCREEN 2,1
8	160 x 200	16	16 Kb	4	SCREEN 3,1
9	320 x 200	16	32 Kb	4	SCREEN 5,1
10	640 x 200	4	32 Kb	2	SCREEN 6,1

10. Mode 8 is a low resolution mode, but it is capable of displaying 16 colors. Mode 9 is a medium resolution mode similar to mode 4, but capable of displaying 16 colors, and mode 10 is a high resolution mode which can display up to four colors. Unfortunately, modes 8, 9 and 10 are still specific to the IBM PCjr. No other IBM computer ever used these modes and as a result very few programs were ever written to take advantage of them. IBM's Enhanced Color Adapter (EGA) has a 16 color, medium resolution mode similar to Junior's mode 9, but IBM assigned mode number 13 to the EGA mode and the two modes are not compatible.

Mode 4 is the work-horse of Junior's video modes. It doesn't require extra memory to be set aside for video display and the four colors allow for reasonably versatile displays. This mode uses two bits to control the color of each pixel, and since two bits can be arranged in only four ways (They can be arranged as: 00, 01, 10, or 11.), four is the maximum number of colors available. The mode provides 320 pixels across the screen in 200 rows. Thus 64,000 pixels must be controlled, and since the mode uses two bits per pixel, 128,000 bits of memory are required. Remember there are eight bits per byte, so 128,000 bits are the equivalent of 16,000 bytes. Actually, as we will see later, 16 Kbytes (16,384 bytes) are used by this mode and also by modes 5, 6 and 8.

IBM has pre-selected two groups of four color combinations to be used in mode 4 and they called these each of these groups a "palette". The reasoning used was that just as an artist selects a few colors at a time and places them on a palette, the computer would select a few colors from the 16 available and place them on a "palette" in memory. IBM only allowed for only two different palettes. They are shown in Table 2.

Palette number one is the default palette, that is, it is the palette that is used

unless you specifically choose palette number zero. Color number zero is the background color, and it is possible to change the color of the background from black to any of the other 15 colors. However, originally, the colors of the other numbers were fixed. You could choose between palette zero and palette one, and you could have a background of any color, but if you wanted blue lines or yellow lines you were out of luck. You also couldn't show green lines and cyan lines at the same time or red and white lines at the same time. This is still true for the CGA but Junior improves on the palettes through an ability to re-map color assignments. Junior's video gate array (VGA), which we described in the first article, has 16 registers, called the palette array registers, which control the numbers used to assign colors and, therefore, Junior can use any of the 16 colors, in any combination, while in mode 4. Thus you can assign color 1 to blue, color 2 to yellow and color 3 to green regardless of which palette number you are using.

To take advantage of this re-mapping ability you must use a program that recognizes Junior's ability and not many programs do. Cartridge BASIC does through the PALETTE statement. In cartridge BASIC you must first use the SCREEN 4 statement. Both SCREEN 4 and SCREEN 1 place Junior into BIOS mode 4, but SCREEN 4 must be used in order to re-map the palette. The format of the the PALETTE statement is:

PALETTE attribute, color

Attribute is the palette color number and color is the number of the color that you really want. Thus

```
SCREEN 4
PALETTE 1,14
LINE (160,0)-(160,199),1
```

will draw a yellow line down the center of your screen. The PALETTE statement is not available in IBM BASICA or cassette BASIC. Screen Mode 1 was included in Cartridge BASIC for compatibility with BASICA. Turbo Pascal has a SetPalette procedure which doesn't really do the job on Junior, but it's easy to write a procedure that is equivalent to BASIC's PALETTE statement. See the sidebar article for details on how to do this.

Mode 5 is very similar to Mode 4. It is intended to work on composite monitors, and the signal that comes out of the composite video jack transforms the four colors to four shades of grey. On a RGB display mode 5 is identical to mode 4.

The last graphic mode that Junior shares with the CGA is Mode 6. This mode has 128,000 pixels (640 by 200), which is twice as many pixels as modes 4 and 5 have. In order to keep within the 16 Kbyte limit of the CGA this mode has only one bit per pixel. One bit can be in only two forms, either 0 or 1, so this mode can only use two colors. Color number 0 is the background color, and by default this color is black, but it can be changed to any of the other 15 colors.

Color number 1 is the foreground color and cannot be changed in the CGA, but Junior's ability to remap the color number assignments works in this mode just as it does in mode 4 (Except, of course, there are only two color numbers to work with.).

Now we will cover the graphic modes that are unique to the IBM PCjr. Mode 8 is a low resolution mode with 160 pixels across the screen and 200 pixels down, for a total of 32,000 pixels. The mode allots four bits for each pixel, so a total of 128,000 bits, or 16,000 bytes, are required, which fits within the 16 Kbyte memory space normally set-up for the video display. Four bits can be arranged in 16 different ways, so this mode can use all 16 colors that Junior is capable of displaying. The color numbers can be re-mapped, but there is seldom any point in doing this since all 16 colors can be used anyway.

Mode 9 is a medium resolution mode (320 by 200) in which four bits are used for each pixel. Therefore, this mode can

Table 2 Graphic Mode 4 Palettes

Palette Number	Color for Number			
	0	1	2	3
0	Black	Green	Red	Brown
1	Black	Cyan	Magenta	White

display all of the possible 16 colors at one time, just as mode 8 does, but at a resolution that is much more useful. The disadvantage to this mode is that extra video memory must be set aside since 32,000 bytes are needed (64,000 pixels at 4 bits per pixel). There are several ways to set aside the extra video memory. Usually PCjr memory expansion units have memory management programs that can set aside the extra video memory needed for this mode (Racore's program, for example, is named JRVIDEO.COM.). In cartridge BASIC the statement `CLEAR ,,32768` sets aside the memory and this statement must be used before using `SCREEN 5` to set up this mode. Note that although 32,000 bytes is all the memory that is needed, 32 kbytes (32768 bytes) are set aside because of the way memory is addressed.

The last of the Junior-specific modes is mode 10. It is a high resolution mode (640 by 200) that uses two bits per pixel and thus is capable of displaying as many as four colors at once. Like mode 9, this mode requires 32 kbytes of video memory. The color management in this mode is just like it is in mode 4. There are two basic palettes, with black background and cyan, magenta and white foreground colors the default palette, but color number re-mapping can change them to any four of the 16 colors.

The graphic modes use a memory mapped video display buffer just as the text modes do, but it is much more complicated. You will recall from previous articles in this series that in a memory mapped video display buffer a section of memory is used to store what is to be displayed and the location of that section of memory determines where on the screen it is to be displayed. Memory mapping in the text modes is straight-forward. Two adjacent bytes of memory are used to describe each character, one byte holds the ASCII character code and one byte holds the character's attributes, and the offset of these two bytes within the display buffer determine the row and column location of the character on the

screen. The graphic mode memory mapping is not so neat, and it is set up differently for each mode.

Mode 6, in which there is only one memory bit for each pixel, is the easiest to describe. The first byte (eight bits) controls the first eight pixels starting in the upper left corner. If a bit has a value of one, then the pixel is "turned on" to the foreground color. If the bit has a value of zero, then the pixel is "left off" to the background color. Since there are 640 pixels in each row in mode 6, the first 80 bytes in the display buffer control the top row of pixels (which is row number zero). Now you would think that the eightyfirst byte would control the first eight pixels in row number one, but that is not the case. The second row of pixels (which is row number one) is controlled by memory starting at offset 8193 from the start of the video display buffer (Since the offset numbering starts with zero, the byte at offset 8193 is actually number 8192.). The eightyfirst byte (which is byte number 80) controls the first pixels in row two. And byte number 8272 (8192 + 80) controls the first eight pixels in row three.

You can see that for mode 6 the first 8,000 bytes of the video display buffer control the pixels on the even numbered rows (0, 2, 4 ... 198) and that the second 8k bytes control the pixels in the odd numbered rows (1, 3, 5 ... 199). You have probably noticed that, just as in the text modes, some bytes at the end of each block, or bank, of memory is not used. These two banks of memory begin at the effective memory address of B8000, which is the same video memory address used in the CGA. Actually the location of the video display buffer in Junior is no where near address B8000, but to maintain compatibility with the CGA Junior uses some hardware tricks to make it always appear that the video display buffer is at B8000.

Memory mapping for modes 4, 5 and 8 follow the same pattern as in mode 6. Pixels in even numbered rows are controlled by the first 8,000 bytes in the video display buffer, and pixels in the odd numbered rows are controlled by the second 8 Kbytes. Eighty bytes control

each row. In modes 4 and 5 two bits control each pixel and there are 320 pixels in a row. In mode 8, the low resolution mode, four bits control each pixel and there are 160 pixels in each row.

The main reason that the video memory buffer is arranged into two banks which control pixels on alternate rows is so that the memory-map format will match the actual order in which the display screen uses the data. The raster scan, the fast moving beam of electrons, scans horizontally across the screen in a fixed pattern. It does this scanning in two halves, first the even numbered rows, and then then the odd numbered rows, just like the memory-map. Programming is made more complicated by the banked memory-map, but when the hexadecimal number system is used in assembly language, it isn't as complicated as it might appear (So I have been told.).

The two enhanced modes, modes 9 and 10, have a 32 Kbyte video display buffer that is divided into four 8 Kbyte blocks instead of just two, and every fourth row of pixels is controlled by a single memory block. The first memory block controls the pixels in rows 0, 4, 8 ... 196, the second memory block controls rows 1, 5, 9 ... 197, the third block controls rows 2, 6, 10 ... 198 and the fourth memory block controls rows 3, 7, 11 ... 199. Each row needs 160 bytes. Mode 9 uses four bits per pixel and there are 320 pixels in a row, while mode 10 needs two bits per pixel for a row of 640 pixels. The byte-to-pixel arrangement in mode 9 is straight-forward and very similar to that in modes 4, 5, 6 and 8. The first byte in each row controls the two leftmost pixels, and this pattern holds up all across the row. The 160th byte in a row controls the last two pixels.

Mode 10 is completely different though. Two bits control each pixel, and you would expect that the first pixel in a row would be controlled by the two left-most bits in the first byte (which is the way modes 4 and 5 work), but that is not how its done. The very first pixel in a row is controlled by the

(Continued on page 32)

PCjr Compatibility guide..

(Continued from page 26)

- 106 DOS PATCHES MUST BE INSTALLED TO PREVENT KEYBOARD LOCKUP.
107 AVAILABLE ON 3.5" OR 5.25" MEDIA, COPY PROTECTED BUT HARDFILE INSTALLABLE VERSION AVAILABLE FOR ADDITIONAL \$10.
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- 115 REQUIRES DOS 3.0 OR LATER, 256K MIN. STATED, THINK MORE NEEDED ON JR. USED ON 640K. 2 DRIVES HELPFUL. PROGRAM HAS SEVERAL SYSTEMS FOR PICKING LOTTERY NUMBERS FOR ALL STATES HAVING ONE.
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123 JOYSTICK RECOMMENDED, ARCADE SPACE GAME.
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125 REQUIRES TWO DRIVES, (USE A RAM DISK?).
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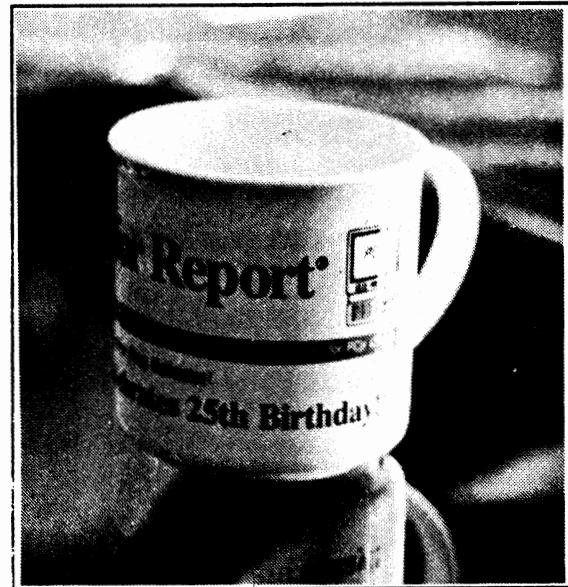
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