
IBM

INSIDE STORY

IBM's Peanut: A PC in a Junior-size Package

Offering upward compatibility with the PC, jr reveals some surprizes, including a cordless keyboard

By George Mitchell

THE long-awaited IBM home system is here and it sports some interesting surprises.

Although the new system was long-ago dubbed the Peanut, supposedly the internal IBM code name for the project, the name being used is the PC*jr*. And, not so surprisingly, the name pretty much tells the tale—though it is certainly not a precise chip off the old block.

For example, the PC*jr* still uses the IBM PC's Intel 8088 microprocessor operating at 4.77 MHz and the DOS 2.1 in the disk-oriented version, which is a new generation of PC-DOS utilized on the larger machines.

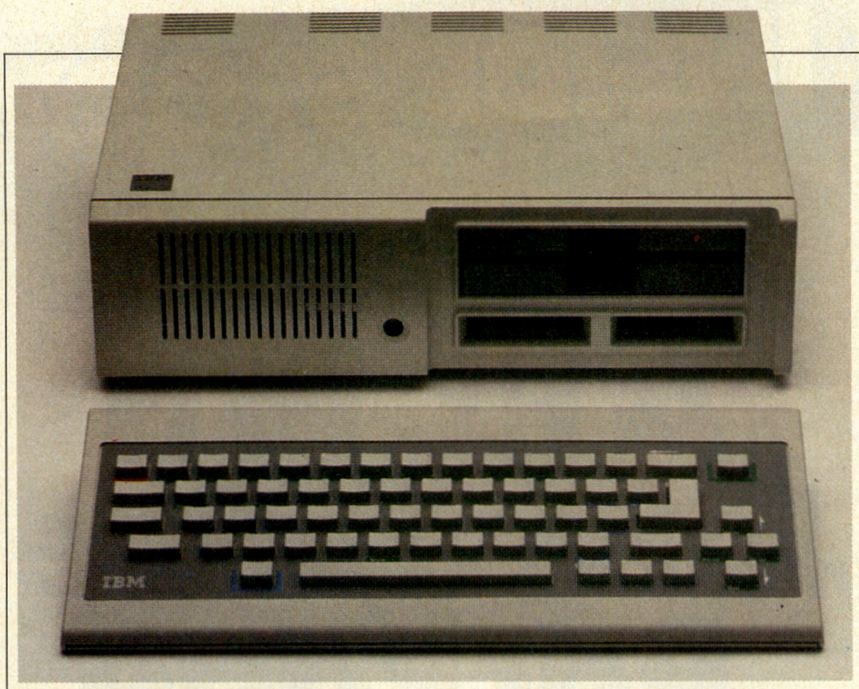
Even with the similarities in processor and operating system, however, there are a number of differences between the IBM PC and PC*jr*. Specifically, the latter is designed to work with a standard home television set, has a cordless keyboard, and uses a desktop transformer for power, much like an Atari 800 does. Other features of the system include:

- 64K bytes of dynamic RAM, expandable to a maximum of 128K. Of this, 16K is dedicated to the video buffer.
- 64K bytes of ROM, containing power-on diagnostics, cassette BASIC interpreter, cassette operating system, I/O drivers, dot patterns for 256 characters in graphics mode, and a diskette bootstrap loader.
- Two ROM cartridge program slots.
- A cassette interface.
- Interfaces for adding joysticks, modem, light pen, and I/O expansion.

In addition, the system console, which measures 13.9″ × 11.4″ × 3.8″ and tips the scale at less than 6 lb without disk drive (9 lb with a single drive), includes individually keyed connectors on the rear panel for attaching a variety of I/O devices.

The "entry" unit, without disk drives but with 64K of memory, cordless keyboard, transformer, and two cartridge slots, is expected to carry a price tag of $669. To attach the unit to your color television set, add another $30 for the connector cable. What you then have is a cassette-based BASIC system that is capable of displaying 40 characters on the screen and up to 16 colors.

Adding additional functions costs more, of course. For example, expect to pay in the neighborhood of $1269 for the "enhanced" system that includes 128K of main memory and a 360-Kb disk drive. Cost will be higher, though, to make it all happen for this option-laden machine. So add $30 for a TV set connector, $175 for a thermal printer, etc., etc. You can add other items such as a joystick, internal modem, carrying case, adapter cable for an IBM color display, and a keyboard cord. Generally speaking, you will have more than



Using infrared communication, the keyboard is said to be able to be used 20 ft away from the base unit.

$1900 invested in the machine if you purchase everything, excluding software, firmware, and color display.

The Keyboard's Cordless. One of the exciting features of the PC*jr* is its keyboard. Measuring approximately 13½" × 6½" × 1" and weighing 25 oz with 4 AA batteries, the keyboard features a typewriter-style 62-key layout, cursor-key control cluster, and a single function key.

Although the keyboard looks standard enough, it communicates with the system through two infrared-emitting diodes. The keystrokes are encoded with pulse-modulation techniques, which are then detected by the base unit.

IBM claims that the keyboard can be used 20 feet away from the base unit and that it has a wide 60-degree arc of operation. Physical obstacles will block the signal of course.

You don't have to rely on the IR link, however. IBM provides, at additional cost, a cable connection. This cable not only provides power to the keyboard but establishes a serial link for the encoded data by disengaging the battery power and IR link. IBM says that this option must be used when more than one unit is used in the immediate area to avoid interference.

Because the PC*jr* keyboard differs greatly from the standard PC keyboard, aside from its much smaller size and slightly-sculpted, Chiclet-like keys, IBM allows emulation via SHIFT CONTROL keys. It's claimed a user can then do everything on the PC*jr* that he does on the larger PC keyboard. To facilitate this, cardboard overlays are offered for the PC*jr* keyboard. These are designed to be written or typed on so that specific application overlays can be created. Basically, this seems to be a cheap solution to what will probably be a very complex problem for serious users. Letters and numbers aren't marked directly on keys, by the way.

Apparently, the reason for the cordless keyboard is that positioning of the control section can be more flexible when used in the home and for playing games. However, some observers think that this foreshadows the IBM office communication system. The keys are supposedly full-travel types with membrane contacts.

Memory and Display Can Be Expanded. The very basic PC*jr* comes with 64K of built-in dynamic memory and the ability to display 40 characters. Expanding both is handled via the memory and display expansion option, which you can expect to pay around $140 for.

This module enables you to have a 625 x 480 resolution, 80 columns, and up to six pages of display memory. Moreover, an additional 64K of 150-nanosecond dynamic RAM is added. The board plugs into a 44-pin connector on the system board. This connector is the only I/O expansion on the system board.

You can probably expect a variety of manufacturers to offer multifunction boards to fit this connector by the first quarter of this year. But be aware that the electrical power to the PC*jr* is minimal. A single 60-VA transformer supplies the power, and extending the memory beyond 128K would severely drain its capabilities. Additionally, little space is available inside the system unit, and stacked boards won't fit.

Interestingly, the PC*jr* doesn't provide you with as much usable memory as you may wish, as you can see in Table I. Notice that only 112K bytes maximum is available, due to the 16K required for the video buffer. And when using the new DOS 2.1 only 82K bytes is available. As a result, many programs that work on a full-sized PC won't fit. However, IBM has modified some (EasyWriter 1.15 and most of the PFS software) to work in the limited memory.

Although there is little space inside the system cabinet, IBM has designed an internal 300-bps auto/answer auto/dial modem. This plugs into a special connector on the system board, and the telephone jack extends from the rear. Since the modem does employ serial signals and uses the interrupt structure of the PC*jr*, the connector may offer add-

APPLE'S MACINTOSH OFFERS MORE FOR LESS

If you're not an IBM fan and like the Apple world, the MacIntosh personal computer is just a month away.

According to sources close to the company, Apple's latest entry is expected to be unveiled at the annual stock holders' meeting in early January.

The machine, which features Lisa-like functions such as the mouse cursor controller, uses a 68000 processor, has dual 5¼" standard disk drives rather than the unreliable Twiggy drives, includes a 7"(diagonal measurement) monochrome integrated CRT, and provides composite video output for use with a color monitor or television.

The full-size typewriter keyboard, although not cordless, may be easier to use than any other machine offered in its price class. (You can probably expect to pay less than $3000 for the MacIntosh when it finally appears on the market.)

As enticing as MacIntosh sounds, it, too, may have some shortcomings. Specifically, it may be lacking in software. To date, not enough has been developed for Lisa, so why should MacIntosh have great early software support? It seems that most programming shops are tuned in to creating products for the 8088 CPU rather than the 68000.

However, it is believed that MacIntosh may have a heads-up chance at getting software by offering more than just an Apple operating system. You might expect to see Digital Research's CP/M-68K and VisiCorp's Visi-On on the machine. In addition, it appears that Microsoft is preparing to offer its popular Multitool series on the machine.

on makers a solution as to where to plug things in.

Cartridges Add Programs. Following an Atari- and TI-like concept, the PC*jr* also comes equipped with two 28-pin ROM cartridge slots.

The cartridges include a number of games, educational software, and, apparently, an IBM logo. You can look for: Monster Math, Animation Creation, Bumble Games, Juggles' Butterfly, Turtle Power, Personal Communications Manager, and Casino Games, to name a few. Cartridge BASIC is also available as an option for $75.

There are expected to be about 50 cartridges available by the time you read this, and an equal number of disk-based software packages.

DOS 2.1, a Better O/S. Once you tire of using the PC*jr* as a cassette-based system (1500-baud transfer is used on the cassette) or cartridge system, you will more than likely upgrade to a disk-based system.

You can choose to use one single drive in concert with cartridge BASIC and the cassette O/S to maximize system operation and minimize cost. (IBM does not presently offer an outboard second drive, though the system is said to be able to support it with the proper controller electronics to go with it.) You can upgrade the entire system by adding serial and parallel adapters, a thermal printer, and a host of other options.

Once you've added everything, you have a fairly complete system, though only a one-drive system. And DOS 2.1 completes the picture. The $65 O/S comes with a user's guide and a DOS reference manual.

Like previous versions, DOS 2.1 operates on all prior PC models, but earlier versions of DOS don't work on the PC*jr*. The new version works with either single- or double-density disk drives, can support a hard disk (an option that may come for the PC*jr*).

One aspect of DOS 2.1 to be considered is that it has higher memory requirements than previous versions (about 12K bytes more than 1.1). In addition, it supports graphics screen dump to the printer, global file name searches, and supports multiple-disk I/O memory buffers to speed disk performance.

You can also have job stream command sequences, and support current date and time in directory entries. Further background operations such as file print are included, and you can divert parallel printer output to serial.

The basic commands of DOS 2.1 are similar to previous versions, with some added functions and commands to ease its use, as shown in Table II.

Generally speaking, the use of DOS 2.1 and the cordless keyboard may be the real hallmarks of the system. The rest is almost pedestrian.

Setting Up. Setting up the PC*jr* is fairly simple. You can use the keyboard cable or operate in a cordless mode. You can then connect the system console to either your color TV, a standard composite video monitor, or, through a $20 adapter cable, the IBM color display via a plug on the rear of the system console. If you plan anything serious, you should probably consider getting the higher-class display. The popular BMC color monitor will work nicely, I believe. Be aware, however, that, if you plan to have sound effects, you do need the television receiver since the system uses the speaker in the TV set. If you want the better display *and* sound, you'd have to kludge up a speaker on the system console.

The 2-lb, 13-oz desktop stepdown transformer is plugged into a connector at the rear and supplies power to the entire system.

Once you have everything plugged in and turned on, you're greeted with the IBM logo and 16 color bars. While this screen is being displayed, the system is self-checking, and a single beep and change to BASIC 1.1 signifies that everything is operating correctly.

You can choose to run Keyboard Adventure, which is built into the system ROM. This is entered by tapping the escape key during the system start-up sequence. This program uses a cartoon character to take you through the use of the keyboard.

Early Conclusions. The PC*jr*, finally emerging out of the swell of rumors under the guise of "Peanut," is a classy home personal computer. Sure there's a list of wish-it-hads that could be made; but, price aside, it's an impressive package—for the home, that is, not for heavy small-business use. After all, it would be unfair to compare, say, a student's home electric typewriter with a heavy-duty office typewriter.

Nonetheless, the keypads, though operating smoothly, are not a touch-typist's delight owing to their size and shape. The same could be said for keys of some very fine electric typewriters, too. Further, people who aren't proficient typists might find the absence of markings directly on the keys disconcerting. Instead, they're marked on the keyboard's base. Apparently, the anticipated use of a variety of keyboard overlays led IBM to make this decision (each key can be programmed for special applications). Furthermore, it would have been nice to have a numeric keypad.

Color video quality of a model demonstrated was excellent, with 16 individual colors in medium-resolution and four colors in high-resolution.

When we get our hands on a *jr* for a reasonable period of time, we'll get more details on it for you. Meanwhile, I'd liken this machine to Cadillac's "Cimarron" small automobile. It will compete at the top of the nonbusiness personal computer area. Other less prestigious machines will get you there also, of course. ◇

TABLE I—MEMORY USAGE

	Memory Used	Total System Memory Approx. Remaining User Memory	
		64K	128K
Video buffer	16K	48K	112K
Cassette BASIC (ROM)	4K	44K	108K
DOS	24K	24K	88K
Cartridge BASIC (w/o DOS)	6K	42K	106K
Cartridge BASIC (with DOS)	30K	18K	82K

TABLE II—DOS COMMANDS

Function	DOS Command or Utility
Configuration File (CONFIG. SYS)	BREAK=ON/OFF BUFFERS= DEVICE= FILES=
Substitute diskette drive assignments	ASSIGN
Batch file support	.BAT
Check for Ctrl/Break Interrupt	BREAK
Check diskette or fixed disk	CHKDSK
Clear screen	CLS
Compare files	COMP
Copy files	COPY
Set date	DATE
Set time	TIME
Delete files	DEL, ERASE
List directory	DIR
Compare diskettes	DISKCOMP
Copy diskette	DISKCOPY
Format diskette or fixed disk	FORMAT
Graphics screen dump	GRAPHICS
Set display or printer options	MODE
Remark within batch file, then wait	PAUSE
Print files in "Background"	PRINT
Change DOS prompt	PROMPT
Recover file	RECOVER
Remark from batch file	REM
Rename a file	RENAME, REN
Transfer DOS to another diskette or fixed disk	SYS
Set time of day	TIME
Display file contents	TYPE
Display DOS version	VER
Write-verify data to diskette	VERIFY
Display disk(ette) label	VOL
Line editor	EDLIN
Load, alter, display/execute files	DEBUG
Link-edit a compiled program	LINK
Change directory	CHDIR
Substitute screen & keyboard	CTTY
Convert .EXE files to .COM format	EXE2BIN
Search for string in file	FIND
Create a sub-directory	MKDIR
Pause after displaying screenful	MORE
Specify directory paths	PATH
Remove directory	RMDIR
Set environment	SET
Sort data	SORT
Display directory paths	TREE
Initialize a fixed disk	FDISK
Backup fixed disk files to diskette	BACKUP
Restore files from diskette to fixed disk	RESTORE