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**IBM JX: THE LOW END OF IBM**





# THE LOW EN

**In a determined effort to penetrate the home, educational and small business markets, IBM has recently released the IBM JX. Peter Vernon takes a look.**

**W**hat are we to make of the IBM JX computer? Is it an over-priced home and classroom computer for people seduced by the IBM logo, or a daring new thrust into the low-cost business computer market? Will it follow the failed PCjr into oblivion, or become the all-purpose successor to the IBM PC, ably assisted by IBM's marketing clout?

First, some statistics. The IBM JX computer (officially, the IBM 5510) uses the same 8088 processor as the IBM PC and runs at the same speed. It comes with 64k of RAM (expandable to 512k internally), and is the first IBM PC to use 90mm (3.5 inch) micro diskette drives. It is said to be compatible with the PC, and runs Microsoft's Flight Simulator, which is

usually taken as proof of the compatibility claim. You'll need an expansion unit to test this claim for yourself, however, if your favourite programs are not yet available in the 90mm diskette format.

Internally the JX is as sleek as Japanese designers and today's technology can make it. The modular power supply and the diskette drives take up most of the space and are mounted on top of the main board, with a small fan at the rear. Extensive use of semi-custom 'gate array' circuits has helped to keep costs down and should make service easy, but this is not a 'do-it-yourself' machine. It is slick, fast and powerful, although when side-by-side with the PC it seems like a lightweight.

The JX computer comes in a great metal case measuring 400mm wide, 290mm deep and 88mm high. On the front panel, from left to right, is a big red power switch, a small window for the infra-red keyboard receiver, and two diskette drives, with a smooth disk insertion and push-button ejection mechanism. Beneath the diskette drives are two connectors for program cartridges. At the back of the case is a socket for a keyboard cable, connectors for 240V power and the video display, a power outlet for an expansion unit, a cut-out for an optional RS-232C interface, two joystick connectors, a parallel printer port and connectors for audio output, cassette interface and a light pen. What more could you want?

Two keyboards are available for the system, one a 'compact' version with 79 keys and the other an expanded 98 key version. Both can be used with or without a keyboard cable, and in fact the keyboard cable is an optional extra. The two keyboards are very similar, with the numeric keypad the main extra feature of the 98 key version. The programmable function keys have been moved to the top on both versions, and all keys are clearly

colour display provided with the JX (and included in the price) is an RGB type, and I for one would not like to try substituting a display from another manufacturer. There is no monochrome display adapter, which is a problem if you feel that applications such as word processing are better suited to the higher resolution and lower light output of a green screen.

IBM representatives are very proud of

effects and a noise generator. Although such a system could be used with ROM cartridge software and data stored on tape, it is unlikely that many programs will be available on tape. The extra expense of a disk drive is easily justified.

For business use, a hard disk drive (in the expansion unit) would be ideal. Although a hard disk version of the JX is rumoured, there has not as yet been any firm announcement.

# D O F I B M

## Disk drives and the expansion unit

The 90mm compact disk drives of the system provide 360k of storage on each disk under DOS 2.1, rather than the 720k provided by these devices on other systems. Possibly the decision was guided by a desire for disk format compatibility with the PC's 5¼ inch disks. Apparently IBM in Japan has released a version of the JX which uses the larger capacity disks, and this system may be available here before long. The disk drives are a delight to use,

marked and arranged in a standard Selectric format. The backslash key between 'Z' and the left-hand Shift key on the PC keyboard has been moved to the right-hand side, which may cause problems of its own, however, and there is still no Caps Lock indicator. The keyboard has a firm, positive action which makes it very easy to use, even for prolonged periods.

Range of the infra-red keyboard transmitter is approximately three metres and of course the connection is line of sight only. This means that if you like typing with the keyboard in your lap (an atrocious practice that probably leads to horrible back and neck problems) you've got to have the computer on approximately the same level. The optional 63cm coiled keyboard cable can be plugged in at any time, so it is possible to switch from cable to infra-red connection without affecting the operation of a program as long as the batteries in the keyboard are up to scratch.

The 30cm (diagonal measurement)

the quality of the JX colour display. They make a point of mentioning the reduced spacing between the phosphor dots on the screen (it's 0.4mm, instead of the 0.6mm of the PC colour display) and the 16 colour 320 x 200 dot graphics that are possible when you have at least 128k of

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*"Internally the JX is as sleek as Japanese designers and today's technology can make it."*

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memory installed. There is also a four colour, 640 x 200 dot graphics mode, in addition to fully compatible IBM PC colour display modes. Some programs designed for a monochrome screen, however, may give 'unpredictable' results, according to the JX documentation. Text displays can be in a 40 column by 25 line format (set by AUTOEX-EC.BAT) or in 80 column mode, which is mandatory for some programs.

Without disk drives the JX is an expensive starter system, with Basic in ROM, a cassette interface, three channel sound

with the sturdy packaging of the disk complemented by simple 'push-click' loading and an ejector button. (Memo to IBM — are all 90mm diskette drives as noisy as these, and why do they take so long to start up?)

While the disks are convenient and easy to use and store, the acceptance of the JX would be hampered if existing programs and data on floppy diskettes could not be transferred to the system. IBM has provided an expansion unit to solve the difficulty. The expansion unit supplied with the review system contained a 5¼

inch disk drive, power supply and a cooling fan, with space to mount an expansion board with four 64-pin connectors for auxiliary boards. The disk controller installed in the system unit can support up to three disk drives, with a piggy-back connector for the third drive accessible from the expansion unit. The expansion unit itself sits on top of the system unit and is held by two screws which on an unexpanded system hold the top cover in place. In this configuration the top of the system unit is removed and replaced on the top of the expansion unit.

With many programs now designed to load only from the manufacturer's encrypted distribution disk, the JX operating system provides a command which makes the 5¼ inch disk drive in the expansion unit act as drive A. However this program must itself be called from DOS, so the system cannot be booted from the 5¼ inch drive. Transferring copy protected programs from 5¼ inch format to the micro disks would be a job for the dedicated enthusiast only, but with over a hundred programs available in the 90mm format already and more appearing each month, shortage of software should not be a problem. If you need to share diskette files between an IBM PC and the JX however, you need the expansion unit.

## Internal expansion

The three expansion slots inside the system unit are all physically different and are reserved for special purposes. One slot takes only the 64k memory expansion board, while another can take either a 128k, 256k or 384k memory board, with the RS-232C interface in the third slot. A real-time clock is provided on the 256k

buy the system. With 64k on the motherboard and a 64k board installed in its special slot, each further expansion means buying a new memory board. To go from 128k to 256k, for example, you would plug in a 128k memory board, but to go from 256k to 512k, you need to remove the 128k board and plug in a 384k board, which may be an expensive proposition.

The relationship between expanded memory and the system software is complicated by the number of options available. Firstly, you need the expanded memory to allow the use of enhanced

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graphics modes, including the 16 colour 320 x 200 mode and the four colour 640 x 200 mode, but you can also vary the location of the video memory area and the number of graphics 'pages' available. If desired, the extra memory can be used as a RAM disk, depending on which device drivers are loaded.

The cartridge slots of the JX are compatible with those of the PCjr, which means that some software is already available in this format. An advantage of the cartridges is that they do not require RAM for the application program, so programs which would not otherwise fit in memory can be run from the cartridge.

## Software and documentation

Disk drive versions of the IBM JX run PC-DOS 2.1, with extensions for the RAM disk and memory drivers. Two versions of Basic are provided, one in ROM and

Quest' and a tutorial program on the groundwater cycle (which is an excellent demonstration of JX graphics).

Writing Assistant is an easy-to-use word processor with a spell check feature, extensive Help facilities and a wide range of formatting and colour options. Graphing Assistant lets you enter and edit data, select a type of graph (line, bar, pie chart etc), enter titles and legends, adjust scaling and print or display graphs in colour. It is a complete system with applications in business, industry and education. Both programs interface with other members

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of the 'Assistant' family, including IBM's Filing Assistant.

## Conclusion and prices

Three versions of the JX have been released. Each provides the colour display, parallel printer port, cassette, audio, lightpen and joystick interfaces. The basic 64k model without disk drives is priced at \$2116, with a 128k one drive system at \$2861. With 256k of memory and two disk drives the JX is \$3365. The expansion unit with a 5¼ inch disk drive costs \$596, or \$286 for the expansion unit with no drive but space for the four slot expansion board (which costs an extra \$167). An RS-232C board will set you back \$166.

Overall I think the JX is an excellent computer, although a little over-priced for home or school use. The fact that only a colour display is available, with a resolution inferior to that of a high quality green screen monitor may cause concern, if like me you have an aversion to staring at coloured letters for a long time. I can't see disk drive capacity as a problem (or the IBM PC suffer from the same problem, since the disk drive capacity is the same for both systems). Software and support are readily available, and no doubt other manufacturers will be producing add-on boards and alternative expansion schemes. If you are thinking of running a business based on the JX however, I'd wait until the hard disk unit becomes available.

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and 384k boards. There is also a networking 'cluster' controller board, which sits in the slot reserved for the high capacity memory boards, so clustered JX computers are limited to 128k of memory.

The way in which memory is expanded means that you should consider how much memory you require before you

one on disk, both with enhancements to the graphics and sound effects statements to take advantage of these features of the JX.

Other software provided with the review system (on 90mm disks) included IBM's Writing Assistant and Graphing Assistant, the adventure game 'King's