

Electronics Australia reviews the **Data General One** laptop computer

The first battery-powered portable computer with a standard size LCD screen has been released in Australia. It is the Data General One which comes with 3-1/2 inch disk drives and up to 512K of RAM.

by LEO SIMPSON

April 1985 saw the most extravagant product launch the computer industry has ever seen with the release of the Data General One. Billed as a laptop portable which can go literally anywhere, the Data General One was launched first at Sydney's Kingsford Smith Airport, where the assembled crowd from the industry and press saw a narrated tableau complete with actress miming the part of a jetsetting business person

plus loud music, liquid nitrogen "smoke" and other pizzazz.

After that, the assembly was whisked aboard an Ansett Boeing 767 for a flight to the New South Wales coast as far as Port Macquarie, ostensibly to demonstrate the inflight behaviour of the new computer.

The extravagant nature of the marketing effort tended to overshadow the significance of the product itself

which is the first portable computer with a really large liquid crystal display (LCD) screen. As well, the DG/One comes with one or two inbuilt 720K 3.5in disk drives, up to 512K of user memory, two serial ports and an expansion bus.

The DG/One is also fully compatible with the IBM PC and will run most of the software available for this industry-standard machine.

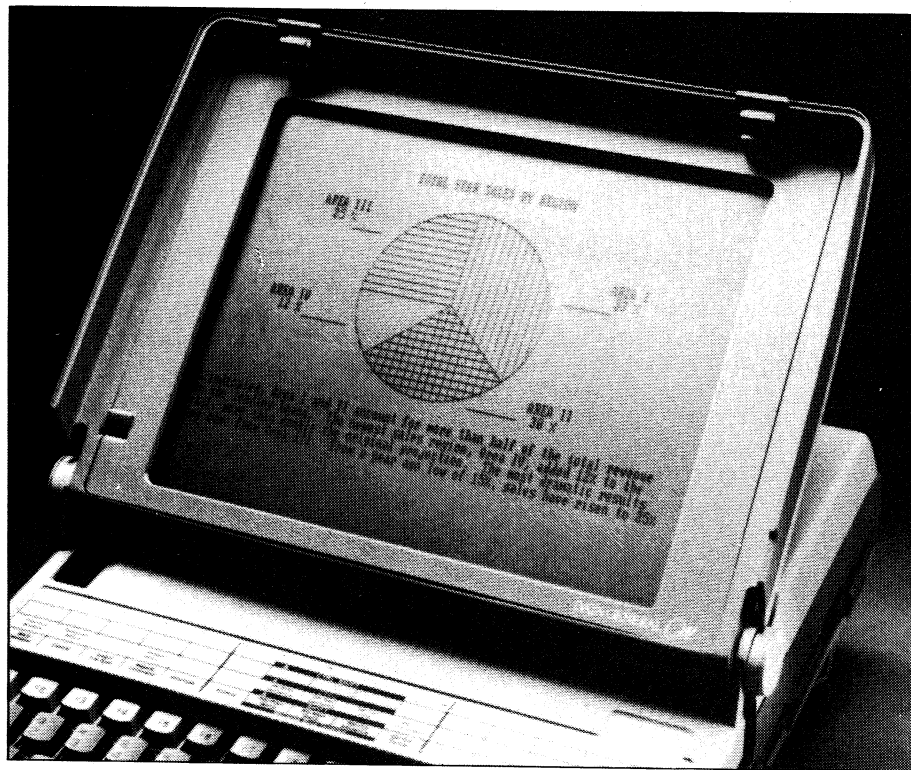
Assessing a complex product such as this is difficult in an atmosphere of "hype" but even so it does appear as though the DG/One is a real breakthrough. Not much larger or heavier than a Microbee, this battery-powered machine has just about all the capabilities of the IBM PC and it has its own inbuilt screen.

When closed up, the Data General One is the size and form of a very compact portable typewriter. Undoing a clip on each side of the case lets the lid tilt up to reveal a large LCD screen with an area roughly equal to that of a typical 30cm video monitor and capable of displaying 25 lines of 80 characters each, or 256×640 pixels, for software that uses bit-mapped graphics. Weight of the unit, including the internal batteries, is just 4.5kg.

The standard QWERTY keyboard has a total of 79 keys: 47 alphanumeric, 10 function and four cursor position plus the usual special keys associated with the IBM PC such as PrtSc (print screen), Ctrl (control), Alt, Num Lock, Scroll Lock and Esc (escape).

Unlike the IBM PC, the DG/One has large Shift and Return keys where a typist would normally expect to find them. A numeric keyboard is superimposed over a group of keys on the righthand side of the keyboard and is brought into play by pressing the aforementioned Num Lock key.

Disks are loaded into the side of the unit and the rear of the unit slides down to double as a keyboard tilt and reveal the serial and expansion ports. An external 5-1/4 inch disk drive may be attached to the unit, allowing it to run most of the software available for the



Above: The LCD screen and tilt control of the Data General One.

IBM PC and transfer non-copy-protected software to the 3-1/2 inch format.

Innovative circuit

Three aspects of the DG/One represent breakthroughs in computer design. The first is the large LCD screen. The size of this is stretching the present technology to the limit both in manufacturing the display itself and in the circuitry required to drive it.

Such a large screen, with 163,840 individual picture elements (pixels) cannot be refreshed often enough to produce a dark enough image. The solution was to break the display into five sections which are effectively driven in parallel, using multiplex circuitry. This solution presents a problem in itself as it makes it difficult to obtain smooth scrolling down the five "screens". Complicated video driver circuitry is needed.

To solve this, the DG/One uses two CMOS 4000-gate arrays. One array controls the LCD screen's contents and contrast while the other controls the microprocessor as it accesses the video memory. The latter array effectively provides the key functions of the Motorola 6845 video controller chip (as used in the IBM PC).

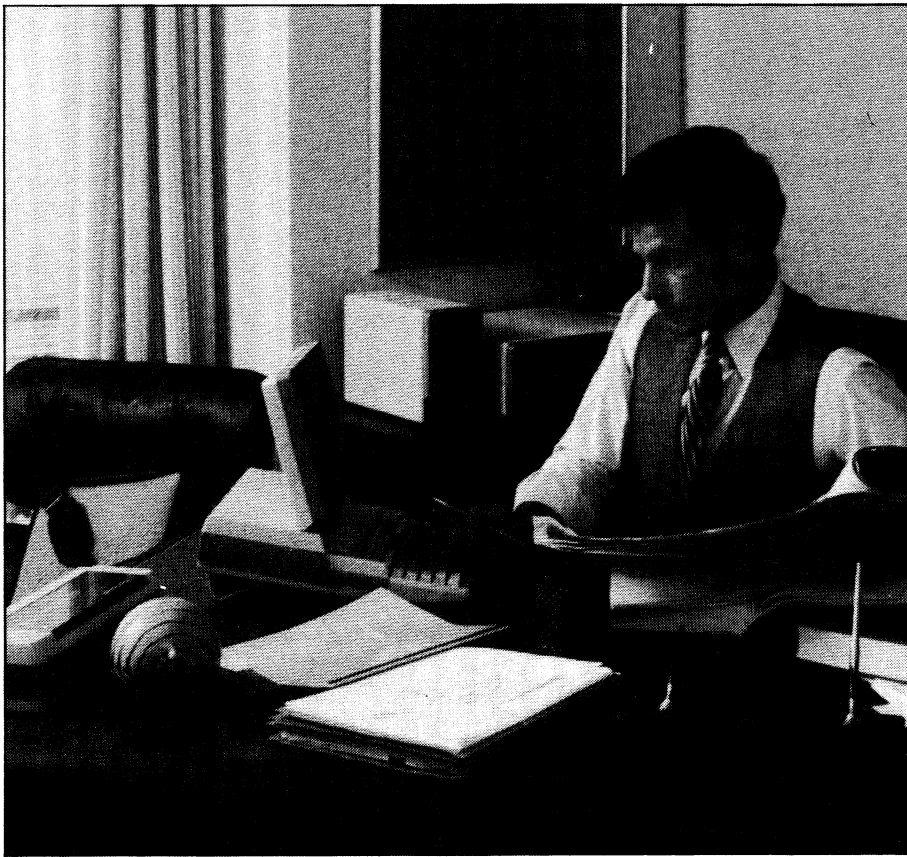
All the other key circuit elements are also CMOS devices, to minimise internal heat and current drain. The processor is an 80C88, a CMOS version of the 8088 used in the IBM PC. It runs at 4MHz, versus 4.77MHz in the IBM.

The circuit boards were also kept as small as possible by using a large proportion of surface-mount components. For example, the 128K memory board is about the size of a playing card and has 18 chips on it; nine per side.

What's it like to use?

Within the constraints of a restricted operating session during an airline flight, the DG/One appears to perform very well. During the flight a large batch of machines were available to try for all and sundry and they were running a large variety of software. The programs included Wordstar Professional, Lotus 123, dBase III, Open Access, Multiplan, Supercalc 3, Crosstalk and Flight Simulator. All appeared to run identically to the IBM, and at much the same speed. But your intrepid editor found that there are difficulties.

The first is the LCD screen. It is difficult to get the screen at an optimum angle which gives good display visibility without reflecting the ambient lighting unduly. Clearly, such screens have a long



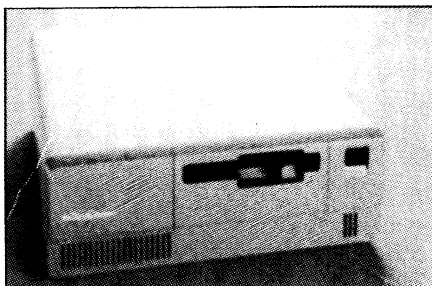
The Data General One gives you at-the-office features in the go-anywhere size of 348 × 297 × 71mm.

way to go before they match the convenience and legibility of a conventional CRT display or the much more expensive electroluminescent display.

The character set of the display is good and has a 2:1 aspect which matches that on a typical 25-line by 80-column CRT display. Characters M and N are hard to distinguish though and if the cursor is buried within a paragraph of text it is impossible to find. In this circumstance, the only way to locate the cursor is to move it to the end of a particular block of text.

On the other hand, scrolling the display did not present any problems. In

Below: Data General One's expansion chassis.



fact there was less "after-image" than with typical high resolution monochrome CRT displays using long persistence phosphors.

There is one particular problem entailed with operating the DG/One within the confines of a standard airline seat. Even when the seat in front of you is fully upright, there is not enough room to position the DG/One comfortably far enough away on your lap; the result is that your elbows are jammed into your seat's back as you use the keyboard. Just whether the airlines will allow use of computers like the DG/One has yet to be determined too. On the same flight were two technicians who were measuring the incidence of any radiated signals from the machines. At the time of writing, the results of these tests were not known.

Clearly though, the Data General One is a significant development which will become the benchmark by which all future laptop portable computers are likely to be judged. Price of the machine with one disk drive and 128K of RAM is just over \$4000.

For further information, contact Data General Australia Pty Ltd, 30 Ellingworth Parade, Box Hill, 3128 or interstate branches.