

Popular Electronics Tests



Osborne 1 Portable Computer

THERE have been other portable computers, but the Osborne 1 was the first portable computer to include a video screen, two 5¼" floppy disk drives, a detachable keyboard, Z80 CPU, 64K of memory, and both serial and parallel interfaces. A large application software package and the CP/M-80 operating system has been included too, all at a very modest price. As such, the Osborne 1 is a pioneer in much the same manner as, say, the Sinclair ZX80 or the Sharp (Radio Shack) PC1200 handheld computer were front runners.

Description. The computer is mounted in a lightweight case with the keyboard folding in so that the entire package can be carried (by a handle on the "bottom" of the case) and stowed under an airline seat. There is a cavity in the rear of the case that contains the power switch, a circuit breaker, and the power cord. The latter can be wound on a bracket on the cavity cover when not in use. The cover is secured to the case by two Velcro strips.

The complete computer weighs 24 lbs and is 20½" W × 8½" H × 17" D. The suggested price of \$1795 includes a software package that would list for \$1200 if sold separately. The software package consists of WordStar (word processor); SuperCalc (electronic spread sheet);

MailMerge, CBASIC, CP/M-80, and utilities. This package is supplied on five diskettes. The complete CP/M version 2.2 is supplied, including DDT (Dynamic Debugging Technique), ED (the CP/M line editor), and ASM (the CP/M assembler).

The Osborne 1 is opened by unlatching a plastic toggle on either side of the case, with the keyboard folded into an operating position below the front panel. The keyboard is connected to the front panel by a 10" replaceable cable. (A 24" cable is available from a separate source.)

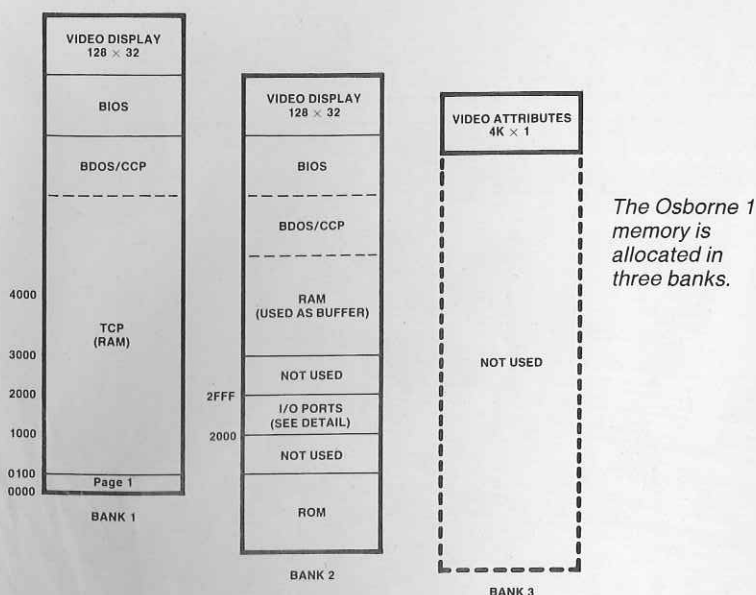
The keyboard has a QWERTY-type-writer format with the addition of four arrow keys used to position the cursor and to scroll the video "window" (more about this later). There is also a 12-key numeric keypad for rapid input of numerical data. All keys have good "feel" to them and no noticeable bounce. Some of the keys we have become used to on a computer keyboard are missing on the Osborne 1. One of these is DEL, which is used for deletion in many applications. Other missing characters are the braces and the tilde. When using WordStar, the program substitutes other keys for these functions. In all, the keyboard is better than those supplied on more expensive terminals and computers.

The first thing that you really notice

about the Osborne 1 is the small (5") video screen located in the middle of the front panel between the disk drives. There are two rotary knobs below the screen to control the brightness (BTR) and contrast (CONTR).

The display takes some getting used to, more because of its unusual format than its size. The computer actually writes information into a display that is 32 lines of 128 characters, but the video screen is only a window showing 24 rows of 52 characters each. This window can be scrolled in either a horizontal or vertical direction by using the arrow keys with the SHIFT key depressed.

Reading the characters on the small screen is no more difficult than reading characters in a book since they are about the same size. However, for nonportable operation, better reading comfort can be obtained with a video monitor connected to the Osborne 1 front panel. The connector is a card edge designed to mate only with a cable supplied by Osborne for its monitor. However, the EXMON Adapter by Esoteric Engineering, which sells for \$39.95, converts the EXT VIDEO connector into a standard video port. There is also an EXMON-II, which includes an r-f modulator capable of producing a video display on a conventional TV receiver. Using the larger video mon-



itor does not increase the area of the video window; you still only see 24 rows of 52 characters each, but you see them in a larger format.

One of the less desirable features of this computer is the use of minifloppies having only single-density format. This results in 92K bytes of data storage which is not quite enough for extensive word-processing applications, or for accounting programs. However, as of this writing, dealers all over the US will soon be installing dual (double) density drives. This modification extends the data storage capacity to 184K per diskette. In addition, the update doubles the data transfer rate, which results in faster access to information stored on the diskette. The existing disk drives require no physical modifications for conversion to dual density, by the way. The modifications affect only the support circuits, cables, firmware, and software.

The term "dual" density means that the disk system can be operated as either single or double density. The system automatically recognizes the different densities when a diskette is booted. The double density modification will add about \$185 to the cost of the computer, and it can be done in about a half hour at the dealer's service department.

Memory Usage. The memory map of the Osborne 1 is different from other computers because of the unusual use of memory banks. The 64K of dynamic RAM memory is assigned to Bank 1, a normal organization of memory within a CP/M system using memory-mapped video. (See the memory usage chart). The area referred to as Bank 2 is a combination of the system monitor ROM that controls the system before the CP/M op-

erating system is booted, and memory-mapped I/O ports. The remainder of the 64K address space in Bank 2 is a "phantom" of Bank 1. Bank 3 is unused except for the top 4K block, which is used for a video attribute to control the underlining of characters.

People who are familiar with the normal organization of a Z80 computer will find the use of memory-mapped I/O ports strange. In most cases, CP/M computers use I/O support chips that require programming through a port with IN or OUT instructions. The Osborne 1 uses Motorola support chips (an M6850 and an M6821) which provide I/O by addressing an area of memory. (See the memory map chart.) There are advantages to this arrangement when it comes to providing a variety of I/O. The Osborne 1 User Guide explains this and illustrates the I/O memory map.

I/O. One of the most important measures of computer utility is the ability of a system to communicate with the outside world. The Osborne 1 is equipped with both a serial and a parallel I/O port.

One of the "user friendly" things that Osborne has done in its version of CP/M is the implementation of the CP/M I/O BYTE. This enables the user to send data to and from either the serial or the parallel port by assigning them to be the list device (LST:) used with the STAT command in CP/M.

The RS232C serial port has a standard DB25S connector with enough pins connected to implement most printer protocol.

The modem port is an extension of the RS232 port connected to a 9-pin D connector plug. It includes the RCV (Receiver Enable, pin 4) and DSR (Trans-

mitter Enable, pin 5). These are open-collector terminations that may be damaged if improperly terminated.

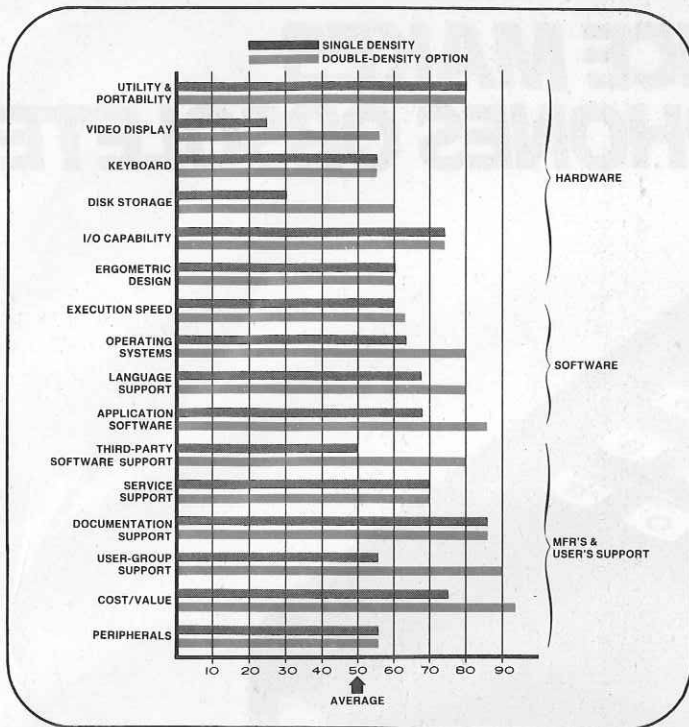
If the modem port is used without an external adapter, be sure that nothing is connected to pin 4 at the computer end of the cable. In view of this, probably the best way to use a modem is to employ the RS232 port. The Osborne Company advises it will be supplying a modem with the correct terminations for its machine.

Any IEEE 448 device can be connected to the Osborne 1 by using the proper adapter and cable. Osborne uses the IEEE 488 port for both IEEE 488 devices and the Centronics parallel printer interface. Therefore, they use a card edge connector instead of a standard IEEE cable connector for this port. The Osborne 1 technical manual describes details for constructing both an IEEE 488 card-edge/cable adapter or IEEE 488 card-edge/Centronics 36-pin connector cable adapter. Both of these cables can be obtained commercially. In fact, several manufacturers sell Osborne-to-Epson, Osborne-to-IDS, and Osborne-to-Centronics cables.

The EXT VIDEO connector is also a card edge type rather than a familiar video connector used in other computers or

| | |
|---------------------|-------------|
| 2FFF | NOT USED |
| 2C03 Part B Control | VIDEO |
| 2C02 Part B Data | |
| 2C01 Part A Control | |
| 2C00 Part A Data | |
| NOT USED | |
| 2A01 Buffer | SERIAL PORT |
| 2A00 Status/Control | |
| NOT USED | |
| 2903 Part B Control | IEEE BUS |
| 2902 Part B Data | |
| 2901 Part A Control | |
| 2900 Part A Data | |
| NOT USED | |
| 2280 Row 7 | KEYBOARD |
| 2240 Row 6 | |
| 2220 Row 5 | |
| 2210 Row 4 | |
| 2208 Row 3 | |
| 2204 Row 2 | |
| 2202 Row 1 | |
| 2201 Row 0 | |
| NOT USED | |
| 2103 Data | DISK |
| 2102 Sector | |
| 2101 Track | |
| 2100 Status | |
| NOT USED | |
| 2000 | |

Detail of Osborne 1 memory-mapped input/output.



Comparative analysis of Osborne 1 characteristics.

OPERATIONAL CHARACTERISTICS

Operating System: CP/M-80

Languages: Microsoft BASIC-80, CBASIC2

Assembly Language: CP/M Assembler with DDT

Internal Memory Capacity: 64K in 3 switched banks; uses 60K CP/M

Disk Storage: 2 drives; single-density standard with 102K bytes; 92K bytes formatted for CP/M; double-density optional with 184K bytes.

Benchmark: Generates primes to 1000 in 24 seconds.

CP/M Characteristics:

Format Time: 34.6 s

Sysgen Time: 33.6 s

PIP & Verify System Disk: 2 min, 40 s

CBASIC2 Compile Time (Benchmark): 36.5 s

Telecommunications Operation:

Baud Rate: RS-232C 300 baud or 1200 baud software selectable. 600 baud or 2400 baud jumper selectable.

Escape Codes: Same as Televideo.

PHYSICAL CHARACTERISTICS

Housing: Single fiberglass case with keyboard in removable cover.

Components: 5" CRT, two 5¼" disk drives, keyboard, controls and connectors.

Controls:

BRT: Monitors brightness.

CONTR: Monitors contrast.

RESET: Starts computer operation from scratch.

Connectors:

MODEM: Type D.

RS232C: Standard DP-25p.

IEEE 488: Card-edge 26-pin, can be adapted for standard IEEE or Centronics parallel printer can be adapted for IEEE connector.

KEYBOARD: Detachable cable.

EXT. VIDEO: Covered with shunt for internal monitor operation. Requires adapter for use with ordinary video monitor.

BATT: Use with battery pack and requires modification of panel to add ac/dc switch.

Keyboard: Standard QWERTY type with cursor arrow control keys, CTRL key, ESC key, RETURN key, and numerical keypad.

Monitor: 5" diagonal B&W CRT display 24 lines of 52 characters. The CRT is "window" on the actual display, which is 32 rows of 128 columns stored in the video memory. The window can be moved by pressing CTRL and one of the directional arrow keys. (Using a larger monitor does not increase the number of rows and columns in the window. It only makes them larger.)

Disk Drives: Two 5¼" minifloppies (single-sided, single-density).

Rear Compartment: Contains power cord, on/off switch, circuit breaker reset button.

Options:

Double Density Modification: Increases data storage capacity from 92K to 184K bytes (after formatting). \$185.

Portable Power Modification: For portable use, offers power from a battery pack or a plug-in dc source. Consists of installation of ac/dc switch on computer rear panel and use of battery pack and recharger/inverter unit.

Centronics Parallel Printer: Cables can be constructed according to diagrams in technical manual or purchased elsewhere to connect the Centronics type of parallel interface to the Osborne.

External Video Monitor: The Osborne 12" External Monitor can be connected by removing the EXT VIDEO shunt and plugging in the video cable. For any other video monitor, an adapter must be used. This can be made according to the video circuit diagrams in the technical manual or purchase from another source.

Telecommunications: The Osborne Modem is the only such unit that should be connected into the MODEM port. A standard modem can be connected to the RS-232C port.

Size: 8½" H × 20½" W × 17" D.

Weight: 24 lb.

Price: \$1795 for single-density model includes CP/M and application software package.

video monitors. The card edge is covered with a video shunt that has two uses. First, it transfers the video signals from the bottom of the card to the top where they are connected to the built-in 5" CRT. Second, since the 12-volt dc is brought out to the card edge, it provides short-circuit protection.

External Power. The BATT connector provides input for the external power system of the Osborne. The battery-pack option consists of a 12-volt battery with a charger, shoulder carrying case, and adapter cable. The computer has a new power panel installed with an AC/DC switch, 12-volt power plug, and a power inverter module with a plug-in harness. This modification can be made by an Osborne dealer.

The external battery power system can serve as battery backup when required, providing full power for as long as 60 minutes. The primary application is to permit operation from the 12-volt dc system at remote locations, or mobile installations in cars, boats and planes.

RFI Test. A sample unit was tested for radio-frequency interference with television and broadcast radio reception. Interference was noticed on vhf television channels when the Osborne 1 was operated in the same room. No interference was noticed on uhf television channels. There was interference on the AM broadcast band during disk access, but no interference with FM unless the stations were tuned off-channel.

User Comments. All of the software delivered with the Osborne 1 appears to work as well as the same programs work on other computers. However, due to the small amount of data storage permitted by the single density format, there is not enough room left on the disk for extensive user application data. To achieve maximum data storage space, data diskettes were formatted with no CP/M system. These data diskettes were placed in drive B and used to store data files for WordStar and Supercalc. This appears to be the only practical method of using the single-density version of the Osborne 1 for practical applications. This situation will be helped by installing the double-density option.

Osborne never advertised this machine as a general-purpose computer for accounting applications. The distributors of software, such as Lifeboat Associates, now support the Osborne format, but they do have to qualify this support because the larger packages will simply not fit on the single-density format. There are now software houses writing specifically for the Osborne and their products may offer greater variety than users have had previously.

With any start-up operation there is a lag between the time the machines are delivered and the time spare parts are available to dealers' repair departments. This period is over as far as the Osborne 1 is concerned. Through the efforts of the Osborne Company and its dealers, service departments now have technical information and spare parts to repair, modify and service Osborne 1 computers.

The dealers rate the company as one of the better supporting manufacturers. The users are now much happier and they have formed user groups within existing computer clubs and as independent organizations. They intend to establish a software library for Osborne format software.

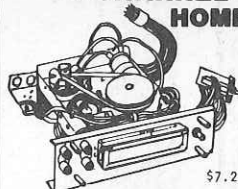
The Osborne 1 is a mature, serious computer for any stand-alone application or for portable use; and it is one of the best bargains offered in the computer industry.

The documentation and service seem to have caught up to the marketing effort and the company is making every effort to support its dealers and users. Osborne has announced that the Computerland stores and at least 50 additional dealers will be added to the network in 1982. This will make the product easier to buy and the increased sales will probably lead to more software development. It would seem that the double-density modification is necessary for all but the most limited applications.—Stan Veit

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