



# COMMANDING MOVES

**Commodore have for many years produced a range of 5 $\frac{1}{4}$ in floppy disk drives. All Commodore drives are 'intelligent', containing their own microprocessor and associated RAM. The Commodore disk operating system (DOS) is available in several broadly similar forms that are resident in ROM within the drives.**

The main problem with intelligent disk drives is that they are expensive to manufacture. After the introduction of the Vic-20 home computer, Commodore launched an inexpensive single drive version of its successful PET drives called the Vic-1540. The Commodore 64 incorporates similar facilities to the Vic-20 for accessing the 1540, but minor differences made it necessary to carry out a POKE before using the drive and a further POKE on completion. This tiresome process is no longer necessary, however, as Commodore made changes to the DOS to rectify the defect and re-launched the 1540 as the 1541. This newer version is fully compatible with both the Vic-20 and the 64. For simplicity we will refer to both drives as the 1541, as there is no difference in the way they are used.

The 1541 is controlled via a 6502 microprocessor, two 6522 Versatile Interface Adaptors (VIAs), two Kbytes of RAM and eight Kbytes of ROM, which contains the DOS. The DOS supplied is very powerful and enables

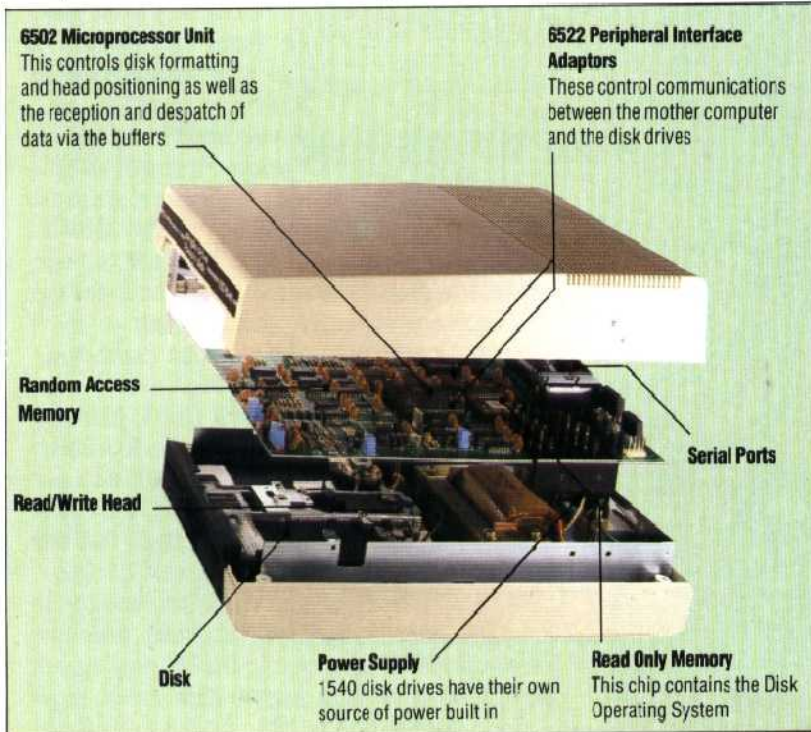
complex routines to be programmed to create and manipulate program (PRG) files, sequential data (SEQ) files and random access files, all with sophisticated error-checking procedures. Computer control is exercised via a serial version of the IEEE488 interface. This interface supports the same commands as its more powerful parallel equivalent — through which the other Commodore peripherals are controlled — and allows serial IEEE488-fitted peripherals to be 'daisy chained' so that, for example, a disk drive can output files to a printer while the computer carries out another task. This is accomplished by the use of commands with associated logical file numbers and device numbers.

Diskettes are formatted into 35 tracks on a single side, each track being arranged in sectors, with 21 in the outermost track down to 17 in the innermost. Each sector contains one 256-byte block of file data plus timing, identification and checksum data. Each diskette stores 683 blocks, of which 664 are available to the user. This gives a maximum capacity of approximately 170 Kbytes, dependent on what type of files are stored. DOS manages the distribution of data on a diskette by maintaining a Block Availability Map (BAM) and Directory. The BAM is stored in track 18, sector 0 and consists of 144 bytes that signify which blocks are in use and which are free for storage. The Directory starts at sector 1, track 18 and is a list of a maximum of 144 files, by file name, that contains specific information relating to file type and how many blocks it consists of. Both the BAM and Directory are updated as data is written to or removed from the diskette.

Despite a high purchase price, the flexibility of the Commodore intelligent disk drive system gives value for money. The scope offered by its reliable mass storage (which can be incorporated in a peripheral management system and does not encroach on computer memory or processor time) justifies the expense. However, it is unfortunate that, because of the serial interface, the 1541 is comparatively slow in operation. Commodore do not even quote a data transfer rate or average access time in the user manual supplied. Although it is in excess of 50 times faster than cassette storage it is likely that the 1541 has the longest access time of all the popular disk systems. If a large storage capacity is required, it is possible to purchase an interface that connects to the serial port and emulates the parallel port fitted to PET computers. This does not speed operations up particularly, but it does enable you to connect the full range of PET peripherals to a Vic-20 or Commodore 64.

### Commodore Disk Drive

Available for both the Vic-20 and the Commodore 64, and a standard feature of the later SX-64 portable computer, Commodore's 1540 disk drive is an intelligent unit that makes no demands on the host computer's CPU or memory. In fact, it has a processor of its own — the same MOS Technology 6502 that powers the computers themselves



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