

COMMODORE 500

THE PROFESSIONAL/SCIENTIFIC COMPUTER



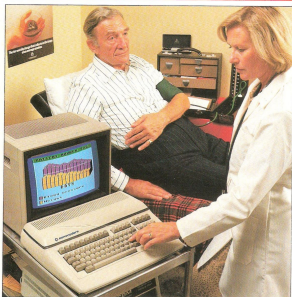
 **commodore**
COMPUTER

COMMODORE 500... AN OUTSTANDING MICROCOMPUTER FOR THE SCIENTIST OR PROFESSIONAL

Never before has such a powerful microcomputer been designed especially for scientific, technical and professional applications. Here are just a few of the features offered on a Commodore 500:

- ☐ 128K Memory (expandable to 896K)
- ☐ 16 colour display
- ☐ high resolution bit mapped screen
- ☐ complete range of interface ports
- ☐ 10 programmable function keys
- ☐ separate calculator pad as part of keyboard
- ☐ optional concurrent processor capability
- ☐ full range of peripherals

There is no scientific/professional microcomputer at any price that gives you as much as the Commodore 500. But the 500 costs much less than you would expect.



THE COMMODORE 500 ... FOR THE PROFESSIONAL

The Commodore 500 is a valuable tool in a variety of professions. Whether you are in design, industry or the health professions, this computer can help you be more efficient, and accurate whilst offering many exciting and previously unforeseen opportunities. There are software packages specifically developed for the tasks you perform. Not only do they take advantage of the advanced technology of the 500 but they incorporate ease of operation and well presented documentation as well. Here are a few specific examples.

The graphics features of the 500 enable the designer to specify shapes and patterns in 3 dimensions, examining and rearranging them quickly and easily to determine the optimum visual effect. Of course the computer's 16 colours are an invaluable feature in exploring the options. Whether you're a textile designer creating a new

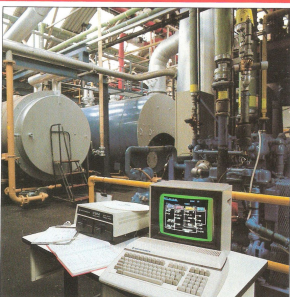
fabric, or an architect designing a building structure, the graphics of the 500 will be an asset.

The dentist can use on-screen visual representations of teeth to view a patient's dental history. Appointment details, dental charges, payroll and accounting can also be accomplished for the dentist on the 500.

Opticians and physicians can benefit from similar software. In addition for the optician there are programs to calculate lens prescriptions and costs. In the doctor's practice repeat prescriptions can be recorded and issued easily and efficiently.

For the engineer the 500 provides powerful arithmetic capabilities to complement the graphics features. For example, beam stresses can be calculated and the beam displayed with loading factors and stress points. Various options of beam design can be evaluated and compared.

Costings for the design including labour and materials can be prepared and included in financial plans. Critical path charts can be generated and used throughout the project. This simple example of beam design shows how powerful and versatile the Commodore 500 series computer is in the professional environment.



... FOR THE SCIENTIST

Because the Commodore 500 offers such a wide range of built-in interfaces, it is the ideal computer for collecting data from scientific instruments. The figures collected can be stored directly using one of Commodore's several mass storage devices, or used in calculations by the computer and then stored. Plotting "on-line" or at a subsequent time is also possible.

The computer can be used to control the environment in which experiments are conducted, for example. If tests require a particular pattern of light and dark and/or a particular humidity level, the 500 can be programmed to control these elements. It can be programmed to use its built in real-time clock and turn lights on and off at preset intervals. It can measure the level of moisture and ventilate or atomize the air as required. Data can be stored to confirm that the experiment was carried out to plan and the results compiled.

The large memory of the 500 can be partitioned and the computer used for multiple tasks. The networking capabilities

Ask your Commodore dealer for a quotation and you will discover that computers costing twice the price are not as powerful or as flexible.

It is not surprising that this technology has come from Commodore, an international company specialising in electronics for over twenty-five years. Commodore design and produce their own microprocessors and components and build their computer systems in modern manufacturing facilities around the world. Their research and development is extensive, helping to keep them as an industry leader.

To utilize the technology of the 500 a wide range of software, both specialised and general purpose, has been designed. High resolution plotting, graphics presentation, environmental monitoring and general

business applications (such as word processing and financial planning) highlight just a few areas where the 500 is useful. Interfacing to laboratory equipment and to other computers, communications packages for local networks and via 'phone lines extend the abilities even further. Whether it's Prestel or process control, engineering or animation, you can't beat a Commodore 500 for price and performance backed up by an international company with an experienced dealer network.



of this computer mean that scientific data can be transmitted to other stations for consolidation or perhaps to instigate an action at the other location. The scientific uses of the Commodore 500 are nearly limitless.

... IN TECHNICAL APPLICATIONS

The Commodore 500 computer is a valuable tool for controlling manufacturing and other processes. Its variety of interfaces, colour and sound capabilities for warnings and other controls, and large memory, make it ideal for this type of application. Again, multi-tasking is a useful option easily built-in to the software.

Whether it's monitoring steam generation, light, heat or water in a glasshouse, or production on an automated assembly line, the Commodore 500 can do the job.



... AND ALL TYPES OF BUSINESS

As well as performing a multitude of technical and specialist tasks, the Commodore 500 computer can perform all the traditional business tasks such as word processing, financial planning, information handling, accounting, etc. This enables your organisation to standardize on one Commodore model, if you wish, for both office and specialist use.

Business letters, technical documentation, proposals and reports can be generated with ease and accuracy using a Commodore 500 word processing system. Updating, correcting, rearranging and expanding text can all be accomplished without time-consuming retyping.

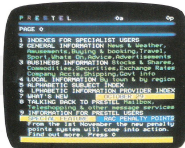
Facts stored using an information handling program, whether scientific data or client/patient records can be easily retrieved and updated. Reports, graphs and charts can be generated automatically using all or selected parts of the information.

Prestel information can be accessed using a Commodore 500 (more details inside).

This computer can be linked to other computers and data bases through networking or using a modem to communicate over the telephone lines.

Whatever your professional, scientific, technical or business application, the Commodore 500 series is the ideal computer.

FEATURES OF THE 500



Prestel

Prestel (a service provided by British Telecom) gives you access over the telephone lines to over 500,000 "pages" of information stored on computers. The information on Prestel varies from weather forecasts to stock exchange reports, from train time-tables to a joke-of-the-week.

Unlike Oracle or Ceefax, Prestel is interactive, that is you can send as well as receive information. For example, armchair shopping is possible by ordering goods on a Prestel reply page. You simply type in the item codes and delivery information which is then transmitted to the distributor.

Messages to other specific Prestel users can be sent via the Mail Box. Type in your message and the code for the addressee and Prestel will record the information. The recipient will be alerted when he signs on at the message awaits. He can then request his "mail."

PRESTEL AND THE 500

To gain access to Prestel either a purpose-built device or a computer with an adaptor and appropriate software may be used. Of course, the advantages of the computer is that it has its own ability to process information. Moreover, the computer can "collect" pages of Prestel information and store them in its memory or on disk for later reference and use. This keeps connection time, and therefore telephone charges, to a minimum.

Software has been written to enable you to use your Commodore 500 series computer with Prestel easily and conveniently. Press a few keys and the page is captured. Re-display the information at any time for an in-depth



look or comparison. Even software programs can be saved from Prestel thus expanding your personal library of programs.

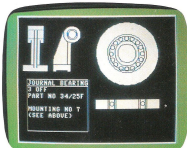
The Prestel adaptor and software for the 500 series machines can be used in communications for file transfer to another 500. This means that letters, financial information, programs, etc. can be exchanged between locations using the telephone network. Using this method of transfer is faster than telex or acoustic coupler.

PRESTEL AND COMMODORE

Transmitting software is just one of the many services offered by Commodore via Prestel. The company will be transmitting up to 10,000 pages of information. In addition to program listings, there will be news about new products, notices of meetings of the Independent Commodore Product Users Group (ICPUG), lists of dealers by location and technical tips for both hardware and software. You will even have the opportunity to request literature or ask questions using Prestel's interactive features.

Prestel, Commodore and a 500 series computer are invaluable assets to any businessman, professional person, educator or computer hobbyist.

Memory The 500 series is available with either 128K or 256K of RAM as standard. This is expandable to 896K. The RAM is configured in 64K banks. One entire bank can be used for BASIC programs with the remainder being used for data storage. There is no such restriction on machine code programs. Bank switching is handled automatically by the CPU.



Display The 500 series computer can be connected to a television or a monitor. Sixteen colours are available for displaying letters, number or any of the 62 PET graphics symbols on the keyboard. The standard screen configuration is 40 column by 25 lines with a border colour which is specified independent of the background. The display is bit mapped with a definition of 320 by 200 pixels for high resolution. Both vertical and horizontal smooth scrolling (pixel by pixel) can be accomplished in both normal and hi-res mode.

Commodore's amazing Sprite graphics are available on the 500. These user-defined moveable objects provide three dimensional graphics effects since they can move in front of or behind other screen objects or even other sprites. Independent magnification of objects and pixel by pixel movement in any direction enhance the ability to produce superb realistic informative eye-catching graphics displays.

Programming An extended Commodore BASIC instruction set is supplied as standard on the 500 series computers. Additional commands include KEY to assign operations to function keys, BANK to select a specific 64K block, BLOAD/BSAVE which load or save a specific bank. The PETSPEED compiler is available for this BASIC as well as other soft-loaded languages which will include UCSD Pascal, FORTH, Prolog, LOGO and others.

The 6509 instruction set for assembly language programming is a slight modification of the 6502 instructions. Two changed commands enable the addressing of the RAM beyond the first bank. The instructions are LDA (label), Y and STA (label), Y.

THE COMMODORE 500 SERIES COMPUTERS ARE MORE POWERFUL THAN ANY OTHER COLOUR MICROCOMPUTERS

And those aren't just words. The details below affirm the statement. We invite you to study them and see for yourself but let us point out a few of the highlights.

- ☐ 128K OR 256K RAM AS STANDARD
- ☐ EXPANDABLE TO 896K
- ☐ DUAL PROCESSOR (8088 OR Z80) OPTION
- ☐ SECOND PROCESSOR RUNS CONCURRENTLY
- ☐ FULLY IMPLEMENTED IEEE-488 INTERFACE
- ☐ BUILT-IN RS232C INTERFACE

THE COMMODORE

The Commodore 500 series has a professional QWERTY keyboard that has been designed for easy, comfortable, accurate use. The keyboard profile is slightly curved and each individual key top is shaped to fit your fingertips. The action of the keys is positive and responsive.

Four critical operation keys are the keyboard so that they will not be CLR/HOME, OFF/RVS. NO

The keys which control the monitor are above the keyboard. One key is p

The cursor control keys allow you to easily move the cursor to any position on the screen. Note that there is a separate key for each direction of movement.

The insert/delete key speeds up the editing of information entered from the keyboard. Pressing this key will remove mistyped characters, whilst holding down the SHIFT key and pressing INST/DEL will "open up" the display so that you have room to insert characters.

A £ sign is included on the keyboard. The sign can be printed on your Commodore printer.

Ten function keys are provided for "shorthand" entry of up to twenty special commands within a program. The programmer defines them with BASIC or machine code routines. They can assume tasks as varied as instituting data sorting or selecting program options.

This key sets or releases tabulation positions when used with the SHIFT key. Pressing this key alone will move the cursor to previously set tab positions.

The 64 character PET graphics set is available directly from the keyboard.

The value of the geometric symbol π is available from the keyboard for use in calculations directly or within programs.

The area in front of the keys is wide enough to provide a convenient and comfortable rest for your hands.



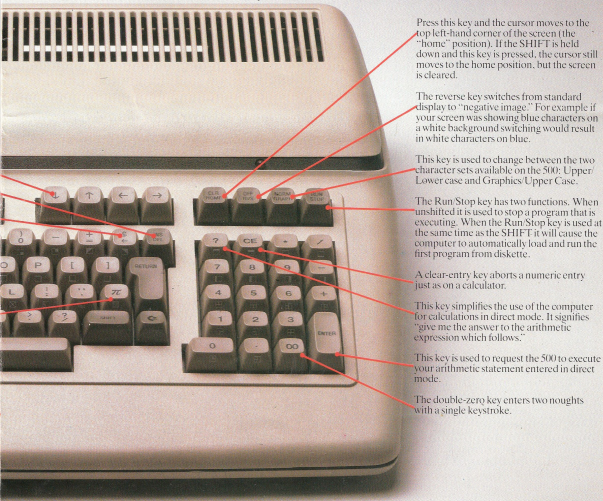
- ☐ FULLY PROGRAMMABLE EIGHT BIT PARALLEL PORT
- ☐ PRESTEL LINK
- ☐ NETWORKING CAPABILITY
- ☐ BUILT-IN CLOCK
- ☐ DEDICATED VIDEO CHIP
- ☐ HIGH RESOLUTION (320 X 200 PIXEL) DISPLAY
- ☐ SPRITE GRAPHICS
- ☐ SIXTEEN COLOURS - 255 COLOUR COMBINATIONS
- ☐ COMPATIBLE WITH PET SOFTWARE

- ☐ MULTIPLE SOFT LOAD LANGUAGE CAPABILITY
- ☐ ACCEPTS PLUG-IN ROM CARTRIDGES
- ☐ SCULPTURED KEYBOARD
- ☐ ISOLATED COMPLETE CALCULATOR PAD
- ☐ TEN PROGRAMMABLE FUNCTION KEYS
- ☐ SOUND SYNTHESIZER
- ☐ INTERFACES TO TV OR MONITOR
- ☐ ON-BOARD PROGRAMMABLE ANALOG PORT

E 500 KEYBOARD

located above the remainder of the keyboard. They are pressed inadvertently. They are used for RUN/GRAPH and RUN/STOP. Movement of the cursor are also provided for each direction.

A calculator pad provides full numeric entry facilities. When entering arithmetic statements you will not have to move between the pad and main keyboard since arithmetic operations, enter, clear entry, decimal point and ? keys are provided on the calculator pad.



Press this key and the cursor moves to the top left-hand corner of the screen (the "home" position). If the SHIFT is held down and this key is pressed, the cursor still moves to the home position, but the screen is cleared.

The reverse key switches from standard display to "negative image." For example if your screen was showing blue characters on a white background switching would result in white characters on blue.

This key is used to change between the two character sets available on the 500: Upper/Lower case and Graphics/Upper Case.

The Run/Stop key has two functions. When unshifted it is used to stop a program that is executing. When the Run/Stop key is used at the same time as the SHIFT it will cause the computer to automatically load and run the first program from diskette.

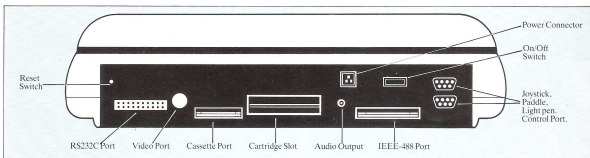
A clear-entry key aborts a numeric entry just as on a calculator.

This key simplifies the use of the computer for calculations in direct mode. It signifies "give me the answer to the arithmetic expression which follows."

This key is used to request the 500 to execute your arithmetic statement entered in direct mode.

The double-zero key enters two noughts with a single keystroke.

EXPANSION CAPABILITIES



Second processor option The 500 series computers use a 6509 microprocessor. This chip has been designed so that it can run concurrently with a second processor (the Z80 or 8088) if you wish. The 6509 will handle the I/O, screen and keyboard responses, etc. while the second processor does the operational computing. The combination results in high-speed processing. In addition, the second processor allows for other operating systems such as CP/M® and MS-DOS®. These in turn mean other soft loaded languages such as FORTRAN and COBOL are available thus expanding even further the range of software for this computer.

Interfaces The interface options on the 500 series are numerous thus making it easy to connect this computer to many peripherals and instruments. In addition to the IEEE-488 and RS232C connections, a user port (8-bit parallel), cassette port, cartridge slot and controller port are provided. The computer has a video/audio output port as well as the monitor link. There is also an internal DMA bus and the second processor connector.

Communications The 500 series has a built-in capacity for connecting to local area networking. This will allow for shared peripherals such as hard disks and letter-quality printers. Remote data capture with central processing is also available through this system.

The computer can also communicate over the telephone lines using a modem. This will give access to Prestel as mentioned on the left-hand page. In addition communicating with office or laboratory computers from home or other remote sites is easy to

COMMODORE DISK UNITS

(all with built-in IEEE-488 interfaces)

TYPE	NO. OF DRIVES	STORAGE CAPACITY
5¼ inch diskette	1	164.5K
5¼ inch diskette	2	329K
5¼ inch diskette	2	1018K
5¼ inch diskette	2	2050K
5¼ inch Winchester	1	5000K
5¼ inch Winchester	1	7500K

COMMODORE PRINTERS

(all with built-in IEEE-488 interfaces)

TYPE	SPEED	PAPER: MAX WIDTH	TYPE
Dot-Matrix	60 CPS Bi-directional	9½ inch	Continuous form
Dot-Matrix	150 CPS Bi-directional	14½ inch	Continuous form Single sheets
'Daisy Wheel'	40 CPS Bi-directional	14½ inch	Continuous form Single sheets

Full specification available on request.
Subject to change.

achieve. Large databases can also be linked (with appropriate software) to your 500.

Electronic mail is possible with either the telephone link or local area networking. The choice will of course, depend on the distance you wish to transmit. Within the building sending is done over the network but using the phone your message could be delivered anywhere in the world.

Peripherals A full colour monitor, for use with the 500 Series computer, is available from Commodore. A full range of other Commodore systems peripherals may all be connected directly to the 500 including both single and dual disk drives. The Commodore hard disks and printers (both graphics and letter quality) may also be used. Plotters, lightpens, etc are available as well. The range of interface ports means that the right hardware for your application is easily available and at the right price.

Sound A special SID (sound interface device) chip in the 500 series enables you to produce hifi-quality music or sound effects from your computer. Three separate voices of nine octaves each can be played separately, in unison or in harmony. By specifying the tonal quality, most traditional instruments can be simulated.

Applications An extensive variety of applications software is available for the 500 series. In addition to scientific calculations, signal conversion, and instrumentation links, many graphics applications are available. Financial planning, word processing, spreadsheet and other traditional micro-computer software programs have also been tailored for this system.

The Commodore 500 is only one of a full range of microcomputers from Commodore. Ask your dealer to tell you about the Commodore 64 Personal computer and the 700 series Business systems,



COMMODORE 64



700 SERIES

DATA

Microprocessor	MOS 6509 standard on all machines. Second processor option on all models.		Language	Built in BASIC interpreter	
Numeric Data Format	Floating point Mantissa 9 digit	Exponent 2 digit -39 to E+38	Variables	Real, Integer, String	
System Memory Area	28K ROM	3K RAM	Array Variables	Real, Integer, String (single and multi-dimensional)	
User Area	Either 64K RAM for BASIC programs 64K - 192K RAM for data and variable storage or 128K - 256K RAM for machine code programs		System Commands	LOAD, SAVE, RUN, DLOAD, DSAVE, BLOAD, BSAVE, STOP, END, CONT, PEEK, POKE, SYS, WAIT, USR, BANK	
Keyboard	Qwerty layout - 94 keys Separate numeric pad 10 function keys		Editing & Formatting Commands	LIST, REM, TAB, SPC, POS, CLR/HOME, INST, DEL, CTRL, CRSR Controls, DELETE	
Display	40 column, 25 row, 16 colour on standard TV or Monitor, 320 x 200 pixel high resolution graphics, 255 screen/border colour combinations.		Array & String Commands	DIM, LEN, STR\$, VAL, CHR\$, ASC, LEFT\$, RIGHT\$, MID\$, INSTRING	
Sound	3 voices, 9 octaves each, 4 waveforms: sawtooth, triangle, variable pulse, noise. Programmable ADSR (attack, decay, sustain, release) generator. Programmable filter selectable for each voice: low pass, band pass, high pass or notch outputs. Variable resonance. Master volume control.		Input/Output Commands	INPUT, GET, PRINT, DATA, READ, RESTORE, RESTORE-IN	
Input/Output	RS232C IEEE 488 8 bit parallel	Cassette port Second processor	Program Flow	GOTO, IF... THEN, IF... THEN... ELSE, FOR... TO... NEXT, GOSUB, RETURN, ON-GOTO, ON-GOSUB, DISPOSE, TRAP, RESUME, ERRS, EL, ER	
		Memory bus Analog port	File Commands	OPEN, CLOSE, DOPEN, DCLOSE, RECORD#, GET#, INPUT#, PRINT#, PRINT#... USING	
			Algebraic Operators	+, -, *, /, ^, < >, <=, >=	
			Logical Operators	AND, OR, NOT	
			General Specification	Physical dimension - 460mm (W) x 375mm (D) x 105mm (H) Power source - 240V AC mains adaptor	

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INTRODUCING

Commodore 510

This new computer combines features of the Commodore 720 and the Commodore 64. Its special capabilities make it ideal for small businesses, for scientific applications for education and for entertainment. The features of the Commodore 510 include:

- video output to a TV or monitor
 - 40 x 25 colour text
 - 320 x 200 pixel high-resolution graphics
 - 16 colours available simultaneously
- audio output - 3 voices of 9 octaves each
- 28K ROM and 64 to 256K RAM
- Full QWERTY keyboard
 - 4 cursor control keys
 - separate and complete calculator key pad
 - 10 programmable function keys
- IEEE 488 port
- RS232C port
- user port
- cassette port
- second processor capability

Computing power

The Commodore 510 includes the latest generation microprocessor and I/O chips. This means that:

- a) existing Commodore IEEE peripherals (including cassettes) can be operated
- b) specialized printers and communications devices which require RS232 can be used
- c) scientific applications can be interfaced through an eight-bit serial port
- d) a second processor board can be inserted (for inclusion of other operating systems such as CP/M)
- e) ROM based software can be added through a cartridge slot

In addition, the exceptional addressing capabilities of the microprocessor allow memory expansion to more than 750K bytes.

continued overleaf

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Graphics

The Commodore 510 has a new video chip, the 6567, which enables you to create three-dimensional graphics. The system allows a complex background to be defined with detailed moving characters in the foreground. Positioning the characters, called MOB's for "moveable object block", simply requires specifying an x-y register. Up to 256 MOB's can be displayed on the screen simultaneously with up to eight on any one horizontal line. The MOB's can be expanded horizontally or vertically to have a multi-colour background or multi-colour characters. Priorities may be established so that one MOB appears to move over another. Collision detection is automatic.

Sound

A separate chip, called a SID (sound interface device), controls the sound on the Commodore 510. The chip gives the computer three "voices", each with a nine octave range, selection of wave shapes, amplitude and ring modulation and oscillator synchronization. By specifying these criteria, you create an "envelope" which defines the nature of the sound produced. A programmable filter is also a feature of the Commodore 510. This is independently selectable for each voice with low pass, high pass and band pass notch outputs and variable resonance. All of these features enable you to create hi-fi quality sound which can, if you wish, be fed to hi-fi speakers.

Technical Specifications

- Chip set: 6509, 6525, 6526, 6551, 6581, 6567
28K ROM
128K RAM
- Functions: 40 x 25 character display on standard
TV monitor (screen not provided)
full Commodore 64 sound and graphics
10 function keys, programmable from BASIC
and machine language
four separate cursor keys
separate full calculator pad
slot for second processor board
16K BASIC and 8K Kernal
4K character generator
runs at 1 MHz
- Expandability: IEEE-488 port
RS232C port
8 bit serial port
multiple soft language capabilities
ROM cartridge slot
can address in excess of 750K byte

Preliminary
Subject to change without notice
Available Oct '82