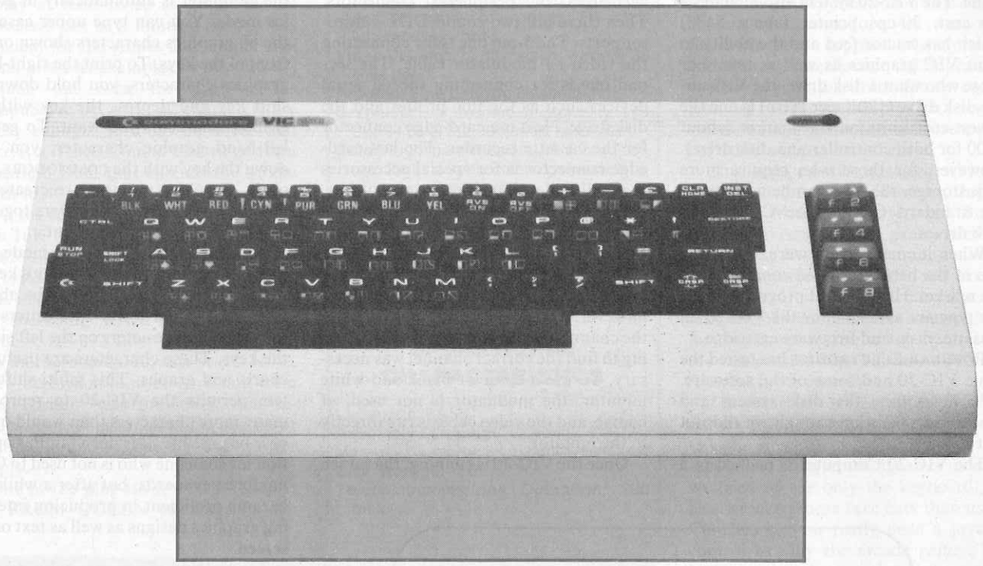
Popular Electronics Tests Commodore VIC-20 Low-Cost Computer System



THE Commodore VIC-20 is that company's entry into the Home Computer Sweepstakes. This puts Commodore in competition with Texas Instruments, Atari, and Radio Shack for the growing market for low-cost home computers. The VIC-20 and Atari 400 are running neck-and-neck, with Radio Shack's TRS-80 Color Computer coming up fast. Texas Instruments' TI 99/4 is fourth,.but running hard with the stamina for a long race.

All of these machines are now in the price range from $200 to $400 for the basic computer unit. The VIC-20 has a manufacturer's suggested price of $300 for the computer unit, power supply, and r-f modulator, although the selling price in many stores is much less. The VIC-20 was introduced at the 1981 computer shows and has developed a large following of users for a variety of reasons: high-resolution graphics (176 by 184 pixels), color capability (8 border colors and 16 screen colors), sound and music generation, a large supply of software and firmware (cartridges), many peripherals, and relatively low cost for a "real" computer. In addition, it is inexpensive to expand because costs of perhiperals have been kept in proportion to the original cost of the computer.

Commodore has provided a range of peripherals for the VIC-20 that enables the owner to configure several different types of personal system. The owner who wishes to contact one of the Public Information Services, such as CompuServe or The Source, only has to plug in the VICMODEM cartridge, connect a telephone handset cord into the modem, and dial the network access number to be connected to the service. Commodore offers a free one-year subscription to CompuServe and one hour's free time on the network.

In addition, Commodore supplies the VICTERM-1 software, which programs the VIC-20 to act as a "smart terminal." Information on the network can be stored on the Commodore Datasette recorder. If a VIC disk is part of the system, information can be transferred from the network to the VIC disk, or from the VIC disk to the network disk system. To encourage VIC users to use the telecomputing capabilities, Commodore has sponsored the Commodore Information Network, a special-interest group on CompuServe. This provides a "hotline," a public information bulletin board, and an area where computer hobbyists can get programming tips and technical assistance.

The VIC-20 owner who wants to use his computer for home computing, or even simple business applications, can expand the machine's limited memory by plugging in a Memory Expansion Cartridge sold by Commodore in 3K, 8K or 16K sizes. Larger memory expansions are made by several other companies in

sizes up to 24K. A 24K memory expansion is the maximum expansion possible since that brings the total RAM to 32K, which is the largest RAM memory this computer can support.

In addition, there are external expansion units that add additional slots to the memory expansion port and permit the simultaneous use of either additional circuit boards or cartridges. Also there are expansion units for the RS-232 interface, and an IEEE Adapter interface that permits the VIC-20 to be connected to standard Commodore CBM computers and to share peripherals with the larger machine. The VIC-20 system also includes a low-cost, 30-cps printer (about $400) which has tractor feed and the ability to print VIC graphics as well as text. For those who want a disk drive, the VIC single-disk drive (170K per drive) is one the lowest-cost units on the market (about $500 for both controller and disk drive). However, for those who require more disk storage, the VIC can be adapted to use standard Commodore CBM dual-disk drives.

When it comes to software, VIC-20 is one of the better-supplied computers on the market. Hundreds of programs of every type are available for the VIC-20 on cassette, disk, and firmware cartridge.

POPULAR ELECTRONICS has tested the basic VIC-20 and some of the software. (We have seen the disk system and modem in operation though we did not test them.)

The VIC-20 Computer is packed in a styrofoam box that contains the power supply, keyboard computer unit, and r-f modulator. Removing the beige-color keyboard unit, you'll find that it's similar to a typewriter with four extra keys down the right side. At the top of the cabinet is a power indicator light. On the right side of the cabinet is a recessed area containing the power cord socket, an on/off switch, and a "D" socket for plugging in a joystick or other game-control device.

At the rear of the unit, are several types of connections. First, there are three card-edge connectors. The largest (on the left) is to plug in VIC Program cartridges or peripheral connectors. Then there are two round DIN connector ports. The 5-pin one is for connecting the video r-f modulator cable. The second one is for connecting special serial devices such as the line printer and the disk drive. Next is a card-edge connector for the cassette recorder. The last card-edge connector is for special accessories that will be developed from time-to-time.

Setting up the VIC-20 is easy enough. To use it with a TV receiver, the r-f modulator has to be set for either channel 3 or 4. (One of these channels is clear in every area of the United States.) On our unit, however, the switch was not marked with the channel position so some experimenting to find the correct channel was necessary. To use a color or black-and-white monitor, the moduator is not used, of course, and the video cable is run directly to the monitor.

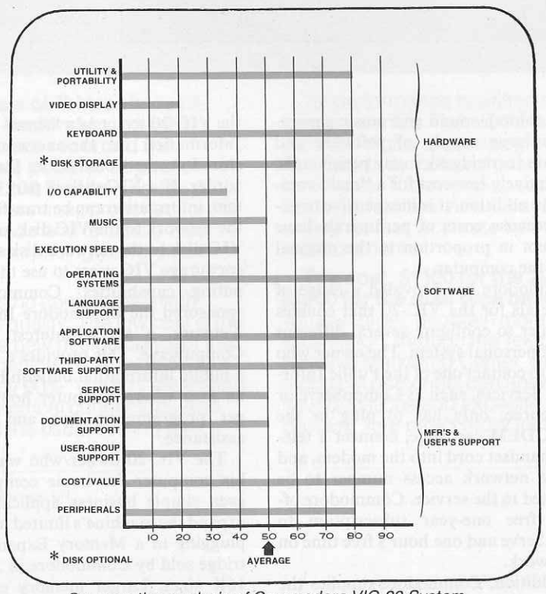
Once the VIC-20 is running, the screen displays the number of bytes of memory that are free for programming. If a cartridge program is to be used, the computer should be switched off at this point and the cartridge plugged in, per directions supplied with the program cartridges. The manual supplied with the computer does not mention this at all.

The VIC-20's keyboard follows the usual Commodore arrangement of using multi-shifts for graphic characters and upper/lower case characters. Looking at the keys, the user finds there are two graphics characters on the front of most of them. When you turn on the VIC-20, the computer is automatically in graphics mode. You can type upper case and the 60 graphics characters shown on the front of the keys. To print the right-hand graphics characters, you hold down the shift key and depress the key with the graphic character you want. To get the left-hand graphic character, you hold down the key with the COMMODORE logo on it. Graphics pictures are created by placing the graphics characters together to create the pattern you want.

To use the VIC-20 in text mode, you press the SHIFT and COMMODORE keys at the same time. You will now be able to type upper- and lower-case letters and the graphics characters on the left side of the keys. These characters are useful for charts and graphs. This multi-shift system permits the VIC-20 to reproduce many more characters than would otherwise be possible. It is not a familar operation for someone who is not used to Commodore keyboards; but after a while, we became proficient in producing interesting graphics designs as well as text on the screen.

The top row of keys has color designations inscribed on their fronts. The colors are red, cyan (light blue), white, black, purple, green, blue, and yellow. With these keys you can change the color of the characters inside or outside a program. Once the color is "set," the display remains in that color until it is changed. The "9" and "0" keys have the letters RVS ON and RVS OFF on the front. They turn on the reverse-color capability so that you can reverse color of the characters and the background. The Commodore color system is very different from that used by other computers with color capabilities, but we found that it was very easy to use and very effective.

The keyboard also contains four function keys on the right side of the console. These are not defined when the VIC-20 is turned on. They are assigned functions or tasks when used with the plug-in cartridges; or they can be assigned functions within a program loaded from a disk or tape, or entered from the keyboard. The existence of user programmable function keys in a low-cost computer is unusual and indicative of excellent design in the VIC-20.



Comparative analysis of Commodore VIC-20 System.

The VIC-20 has another useful characteristic: the ability to make sounds and music without adding devices. The VIC has four voices enabling it to "sing" simultaneously in four different notes. Using this capability, you can create interesting audio effects and fairly complex music.

One serious drawback of the VIC-20 is its 22-character display. This may not be more than an annoyance to a person who is learning programming on the VIC, but to an experienced person who is used to a display at least twice as great, the 22 characters can be a limiting factor. It is sufficient for the games and simple programs given as examples in the owner's manual; but even for use on the CompuServe network, 22 characters are hardly enough. It sould be noted that there is a Video Combo Cartridge from Quantium Data that extends the screen width to 40 or 80 characters at a cost of $199; the same cartridge can be obtained with 16K of RAM and a PROM socket for $299.

There are several other expansion units made by independent manufacturers, including RAM and ROM Expandors, RS-232 Interfaces, and expansion motherboards. At this year's NCC, a new expansion motherboard unit from Great Britain was previewed that includes six expansion slots for boards or cartridges, and it has its own power supply.

One of the plug-ins for the VIC-20 is the PROM QUEEN cartridge, which turns the VIC-20 into a software development system. This cartridge programs 2732 and 2716 EPROMs or acts as a 4K-byte EPROM emulator. It takes its input from the keyboard, the modem, or another EPROM, thus permitting direct duplication.

When the unit supplied by Commodore was tested, we found considerable r-f interference displayed on the screen. This could not be cleared up with the fine-tuning control on the TV set, but we discovered that, as we moved the keyboard to different positions in the room, we could reduce the pattern on the screen. When we mentioned this to our contact at Commodore, we were told that we had been supplied an early model and that this interference did not exist in present production units. However, examining units on display at several stores, we found that the interference occurred on at least half of them.

The game cartridges tested with the VIC-20 included VIC Avenger, Jupiter Landing, Midnight Drive, and Blackjack. The Arcade-type games were as good as we have seen on much more expensive computers. There are several special features in the VIC cartridge system, one of which enables the user to adjust the image on the screen by pressing the CSR control key. This allows for differences in various TV sets.

The games are set up to permit use of either a joystick or the keyboard as a controller. However we learned that the Aliens had a big advantage over us when we tried to use only the keyboard. We also wrecked more race cars than usual. Conclusion: you really need a joystick control to play the arcade games. The high score indicates the highest total reached, so you have something to shoot for. We did not test the new Bally/Midway series of games that Commodore has just come out with as they had not been released in time for our tests.

User Comments. The Commodore VIC-20 is more computer for the money than we had expected to see. It offers an excellent low-cost way for a person to start computing, yet there is enough programming capability to maintain interest and to learn programming, graphics, and the fundamentals of music. Users can always take a break by plugging in a cartridge to play a wide variety of games. With video and memory expansion units installed, the VIC can also be used as a word processor. Further, it can provide low-cost access to the world of information networks.

The VIC-20 has real computer capability, as well as being a commendable games player and educational tool.

—Stan Veit

PHYSICAL CHARACTERISTICS

Housing: Metal with separate power supply and r-f modulator.
Keyboard: Full ASCII (64 characters) with numerals and calculation symbols. Four programmable function keys. Full PET-type graphics character set generated directly from keyboard. Auto-repeat on control keys.
I/O: Centronics-type printer and disk-drive parallel port. Joystick, paddle, and lightpen port. Digital-cassette, composite-video, modem, and bus-expansion ports for plug-in programs and expansion of memory. RS-232C interface capability.
Video Display: 22 characters wide by 23 lines deep.
Program Line Length: 88 characters.
Graphics: High-resolution capability. 176 by 184 pixel (32,384) max. resolution.
Color: Eight border colors, 16 screen colors. Eight screen colors generated directly from keyboard.
Music and Sound: Four tone generators covering five octaves. White-noise generator for special effects.

OPERATIONAL CHARACTERISTICS

Language: BASIC
Assembly Language: Optional
Memory Capacity: 5K expandable to 32K
Disk Storage: 170K
Telecommunications Operation: 300 baud

Some of the peripherals that are available to use with the VIC-20.