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Has colour graphics, floppy disc and up to 32K of RAM

The Compucolor II

The Compucolor II "complete personal computer" is a new release on the computer scene that's sure to interest serious enthusiasts and beginners alike. It features colour graphics, in-built mini floppy disk drive and a powerful BASIC disk operating system plus loads of software.

by **RON DE JONG**

Few personal computers today include a colour monitor and a floppy disk drive as standard equipment. The Compucolor II does, and they've put it all together into a "complete" and highly affordable system.

First off, there are only two components, a monitor, and a keyboard which is connected to it via a flat ribbon cable. The sample floppy disk provided contains games and other programs which can be called up with a single keystroke. From there on it is a quick step to writing your own games, programs and graphic displays and saving them on blank floppy disks.

The Compucolor is based on an 8080A microprocessor and has a BASIC operating system in 17K of ROM. Maximum user memory available is 32K and there are three models available — the Model 3 supplied with 8K of RAM, the Model 4 with 16K of RAM and the

Model 5 with 32K. If further memory is required, 16K RAM modules are available for the Model 3 and 4. In addition "Extended" and "Deluxe" keyboards can be purchased in place of the standard keyboard.

The monitor houses the microprocessor, floppy disk drive and the colour CRT. Eight bright colours are available on the 30cm CRT screen which can display text in 32 lines of 64 characters, and has a resolution of 128 x 128 in the graphics mode. In addition to the 64 standard ASCII characters there are also 64 special graphics characters and a plethora of colour control, cursor control and special function characters.

The floppy disk drive can be seen to the right of the CRT and is the most convenient feature of the Compucolor II. It uses the standard 125mm disks with Compucolor format and provides 51.2 kilobytes of storage per side, a 7680

characters/sec transfer rate and an access time of 200ms. Compare this to the performance of a cassette which only has a transfer rate of typically 120 characters per second and an access time of around five minutes or more and you'll realise why floppies are so popular!

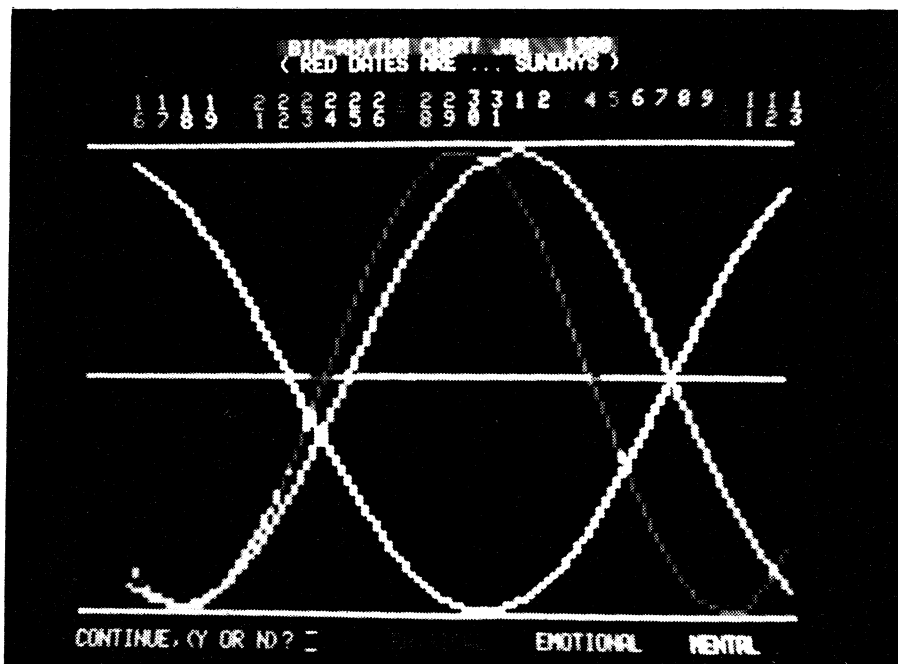
An RS-232C serial interface at the back of the unit is suitable for connection to a printer or modem. It can be accessed from a program and the baud rate can be set from 110 to 9600 baud. A 50-pin bus is also provided for future expansion of peripherals and we understand that an expansion unit is being developed as well as some interesting peripherals like a music synthesiser.

The photograph above shows the complete unit with an Extended keyboard. The standard keyboard has 71 gold cross-bar commercial key switches including CPU reset and AUTO disk loading key. If you're going to do a lot of graphics though I would seriously suggest getting the Extended keyboard. It has 101 keys with a colour cluster and a numeric cluster plus four edit keys. The Deluxe keyboard provides a further 16 keys for simplifying graphic functions.

Some of the graphics capability of the Compucolor is shown in the accompanying photographs. The photograph of the complete unit for instance, has a "spirograph" pattern on the screen which gives some idea of the resolution of the graphics. The program we've written to generate this pattern appears in a separate box. It is a surprisingly simple program because of the powerful PLOT functions available — it is only necessary, for example, to specify the end points of a line and the vector PLOT function draws it.

There are 16 PLOT functions available plus colour selection to help you create almost any pattern you desire. Each function is represented by a single character or sequence of characters and is directly accessible from the keyboard. In BASIC, each function is invoked simply by sending the corresponding character to the screen using the PLOT command — which makes it easy to use and enables patterns to be prototyped directly.

The vector PLOT function just mentioned is particularly useful for point-to-point plotting like graphs and curves (see Biorhythm curves). Two other PLOT functions which are notable are



Display of the Biorhythm program which is available on the sampler floppy disk.

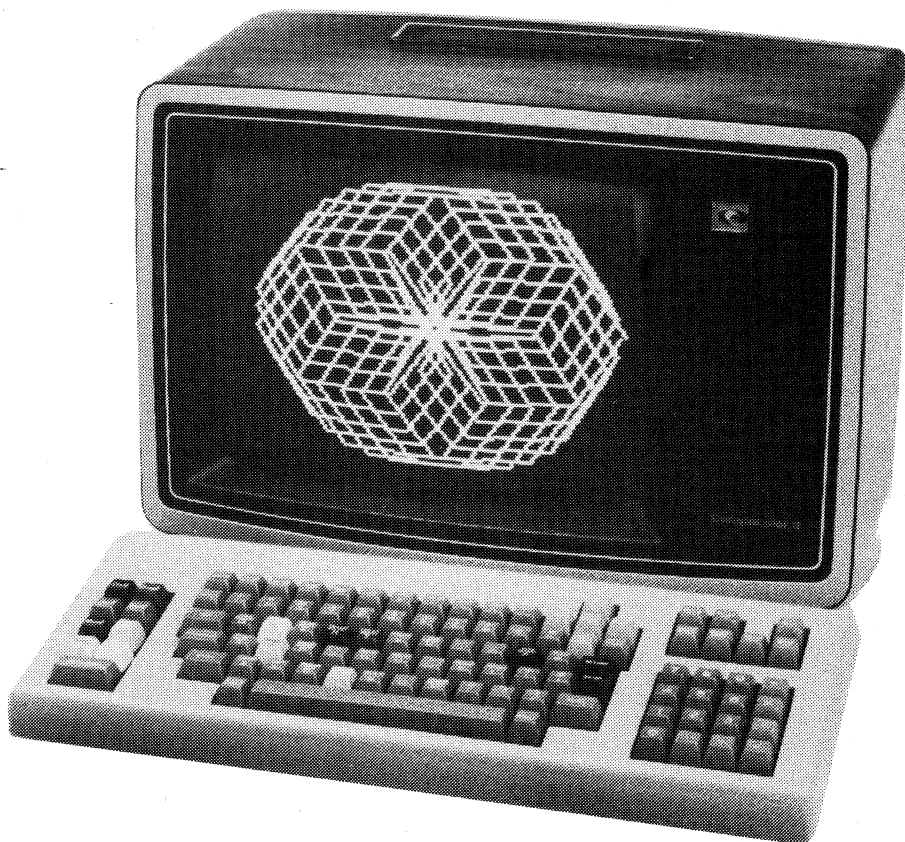
the vertical and horizontal bar graph functions. These can be used for histograms and since these internal routines are much faster than BASIC alone, it is possible to create real-time colour displays such as, for example, a 16 channel audio spectrum analyser.

Colour selection for text or graphics is via the colour keys on the left side of the keyboard. Both the foreground and background colours can be set individually for each character or "plot block" on the screen and characters can be made to blink against their background. Debits and credits, for example, can be colour coded and special comments made to flash. Character size can also be large or small.

The 64 special graphics characters which are also available have a resolution of 384 x 256. The whole set can be seen in an accompanying photograph and they include chess figures and card suits. These character are accessed according to a flag bit and by pressing the shift key and one of the alphabetic keys on the keyboard.

Each of the 128 x 128 graphics locations can be also individually accessed if you wish to create a kaleidoscopic pattern from scratch. The locations are arranged in a 4 x 2 matrix inside blocks which are the size of large characters. Each point within the matrix corresponds to one of the eight colour keys and can be set using the colour plus the cursor control.

The central feature of the Compucolor is of course the BASIC operating system. In most respects it's similar to the standard Microsoft BASIC found on other personal computers. It has 29 statement types (IF, FOR, GOTO etc), three command types (LIST, RUN, CONT), 19 mathematical functions



Shown above is the Compucolor II with an extended keyboard. The "spirograph" pattern on the screen shows the graphics capability of the Compucolor.

(ABS, COS, PEEK etc) and 9 string functions (LEN, MID, CHR\$ etc). In addition 11 disk-file commands are provided (GET, LOAD, FILE "N", SAVE etc).

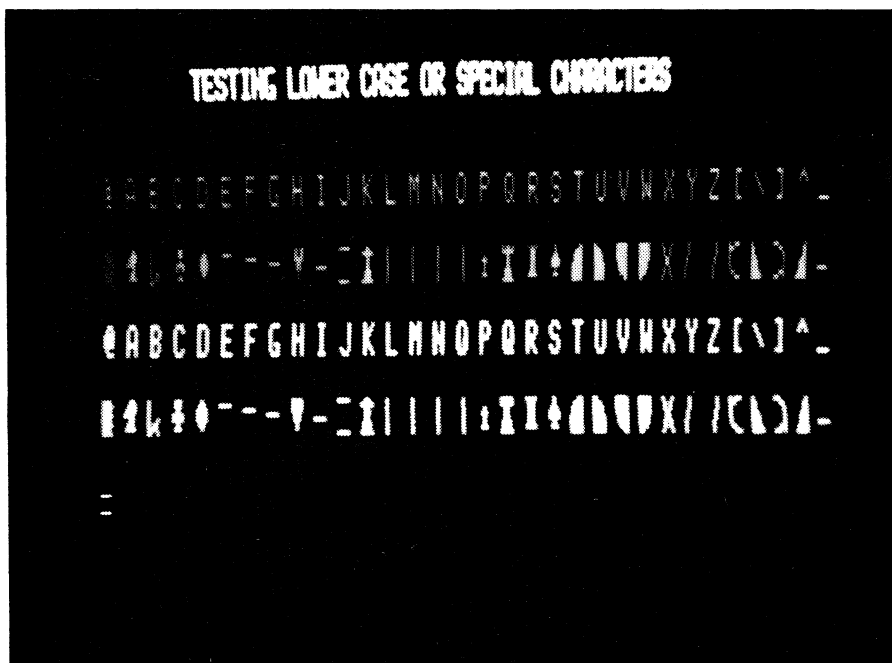
An interesting feature of this BASIC is that many of the keywords such as PRINT and GOTO can be entered simply by pressing the "COMMAND" key

and one of the eight colour keys labelled with the appropriate command. This single keystroke action causes the Compucolor to print the keyword on the screen, which is a real time saver when you're programming. If you are keen the remaining BASIC keywords can also be accessed by pressing the "COMMAND" key and one of the regular keys, but since these keys are not labelled with their corresponding command, it is not as convenient.

Interestingly, each of these keywords is actually stored in the computer as a single "funny" character to conserve memory space and while the Compucolor isn't the only computer to do this, it is the only one we know of that will print the command out as you're typing a line in — impressive!

Some differences in this BASIC include the absence of a LET statement preceding an assignment, for example, LET X=A + B, but since few programmers would even include the LET statement anyway, this is a minor point. It also has a few extensions like the acceptance of variable names longer than two characters. It still only looks at the first two characters but the advantage is that longer variable names are more meaningful, such as CREDIT rather than CR.

Calculations are performed in single precision, that is, 6-digit mantissa with one hidden digit for accuracy. Numbers can be expressed in floating point or scientific notation in which the



Stylised chess figures are included in the character set of the Compucolor II.

COMPUCOLOR II

decimal number is followed with an exponent, eg 3.4567E-29. The exponent must be in the range +/-38.

The file control commands are quite comprehensive. Programs can be loaded and saved quickly and reliably on the floppy disk, eg LOAD "DEMO", SAVE "DEMO", and it is also possible to create data files and save arrays or variables. Updates to accounts or lists are easily made on the floppies — if you are used to pushing the piano key controls on a cassette deck this is a welcome relief.

To further facilitate disk operations the Compucolor has an AUTO key. When this is pressed the file control system searches for a BASIC program called "MENU" on the disk and then loads and runs it. This "MENU" program is usually provided on most disks for the purposes of outlining what is on the disk or any information about it. It's used, for example, on the "Sampler" disk which comes with the Compucolor and all the other software disks but it can also be used when creating your own disks.

From within the file control system itself the "DIRECTORY" command will list all the files on one side of the floppy disk. The directory includes file name, version, size and address. Files can be deleted or copied from one floppy disk to another using the screen-refresh RAM as a temporary buffer.

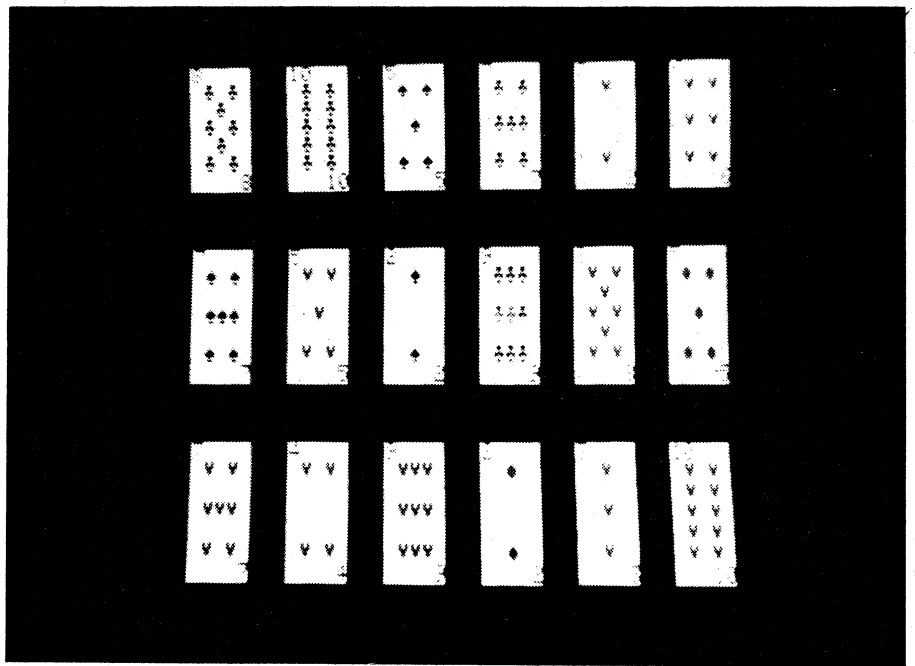
If necessary an additional disk drive can be purchased.

Blank mini floppy disks with the proper formatting are quite cheap at a quoted price of \$9.95 for two. If you're after software for the Compucolor there is certainly a lot of it available on Compucolor "Sofdisk" floppies. The supplied "Sampler" disk is just an appetiser — there are also "Sofdisks" with Hangman, Startrek, Chess, Othello, Text Editor, 8080 assembler and each disk has at least 3 or 4 other games or programs on it.

More software will shortly become available such as games, a screen editor, monitor, finance, engineering and statistical packages — making the Compucolor an even more useful computer.

To keep users aware of the latest developments Compucolor also publish a monthly newsletter called "Colorcue". It includes information on software and hardware developments, user groups and a fair bit of user input. It may be available from some Compucolor retailers but a subscription is also available for US\$24 a year.

There are a few features we have not discussed in detail, like the on-board "real-time" clock, or the sockets provided for an additional 8k of ROM but clearly the Compucolor II is a winner and it has to be ranked as one of



Full card suites are included in the graphics repertoire of the Compucolor II.

the big four personal computers.

Quoted price for the Model 3 is \$2065, the Model 4 is \$2410 and the Model 5 is \$2755 retail. The Expanded keyboard costs an extra \$202, the Deluxe keyboard \$322 and the 16k

RAM module \$539. Further enquiries should be made to the distributors, Anderson Digital Equipment, PO Box 322, Mt Waverley, Victoria 3149 or their dealers. In NSW, The Logic Shop, 91 Regent St, Sydney. (Ph 699 4910). ☉

The "spirograph" pattern shown in our photograph on page 75 is just one of the numerous patterns which can be generated using the program listed below. What it basically does is to trace out the path of a point rotating about a centre which itself is also rotating or in other words one circle rolling around the circumference of another. Three parameters are required: the ratio of the diameters of the two circles; the ratio of their angular velocities and the number of steps to be taken.

The number of patterns which can be created is almost endless, but just to get you started some interesting patterns can be generated with the following parameters — (1,25,150), (1,100,150), (1,200,132), (1,200,134), (.2,10,100), (.5,2,100).

```

1 REM THIS "SPIROGRAPH" PROGRAM PLOTS
2 REM THE LOCUS OF A ROTATING POINT
3 REM CENTRED ON THE CIRCUMFERENCE OF
4 REM ANOTHER ROTATING POINT
5 REM AUTHOR RON DE JONG 11/1/80
6 REM WRITTEN FOR THE COMPUCOLOR II
7 PLOT 12
10 INPUT "R-"; RRATIO: REM RATIO OF OUTER TO INNER RADIUS
11 INPUT "W-"; WRATIO: REM RATIO OF ANGULAR VELOCITIES
12 INPUT "S-"; ST: REM NUMBER OF STEPS TAKEN IN LOCUS
20 R1=62/(RRATIO+1)
30 R2=R1*RRATIO
40 K1=2*3.141593/ST
50 K2=K1*WRATIO
60 PLOT 12,2,127,63,242
70 FOR N=1 TO ST
80 P1=K1*N
90 P2=K2*N
100 X=R1*COS(P1)+R2*COS(P2)
110 Y=R1*SIN(P1)+R2*SIN(P2)
120 PLOT INT(X+63),INT(Y+63)
130 NEXT N
140 PLOT 255,8
150 GOTO 10

```