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64 K SCREEN EXPANDER

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LOADING INFORMATION:

To load the program from cassette, insert the tape and press PLAY. Type 'CLOADM' and press ENTER. To load from disk, put the disk in drive 0 and type 'LOADM"EXPANDER' and press ENTER. After loading, type 'EXEC' and you will see the 51 X 24 screen with a BUFF background. If you desire the GREEN background, typing SCREEN,0 will give you one.

64K SCREEN EXPANDER II"

Computerware's 64K Screen Expander II"

This program will give the 64K Color Computer user the ability to use a 51 or 64 column by 24 line screen to improve the readability of any display that has lines longer than 32 characters. It will also allow the mixing of text and hi-resolution graphics on the same screen easily. A character set editor is included with the screen expander to allow you to create your own characters. 64K Screen Expander II" does not stop there! Also included as standard features are automatically repeating keys, type ahead, both the standard PRINT @ and a much more powerful PRINT @ using standard X,Y coordinates. To make programming easier, Expander II" also includes ON ERROR and AUTO line numbering while entering a program. A 64K Color Computer with Extended Basic is required to use the screen expander and character editor.

Once the program has loaded and executed, you will see a short copyright notice at the top of the screen. From now on, you are in the hi-res screen mode. The program is protected against RESET, and almost any other event, so you don't need to worry about it. One of the more noticeable differences between normal BASIC and the now modified BASIC is the use of the 'PRINT @' command. To utilize the larger screen easily, another syntax is available. It is 'PRINT @(X,Y)'. X must be set to a number between 0 and 23, for the row number and Y is a number between 0 and 50 (or 63 for the 64 column mode) for the column number. The program defaults to this mode when it is executed. To change back to the original mode, just POKE &HF802,0. Also changed in the new format is the tab size. The tab field width is set to 10 columns. This gives 5 TAB fields in the 51 character mode and 6 in the 64 character mode.

A less noticeable but very nice feature is that now your keyboard has auto repeat and type ahead. To use auto repeat, simply hold down any key longer than normal and it will begin repeating. To see type ahead in action, give the computer a command that causes it to display for a moment. While it is displaying, go ahead and type something else - when the display is finished, you will see that what you typed was accepted as input.

Another enhanced feature is the 'PMODE' command. The only difference is that it will allow you to specify page 0 as the start page. Page 0 is defined as the high resolution text screen area. When PMODE 4,0 is used, it is still required to have 4 graphics pages reserved. If you don't need these four pages, you can get around having them by using the following

```
PCLEAR the number of pages you want  
EXEC &HF812
```

To use PMODES other than 4, POKE &HB6,pmode:POKE &HB9,bytes per line. Bytes per line is 32 for PMODES 1, 3, and 4 while it is 16 for PMODES 0 and 2.

As previously mentioned, two new commands have been added to make BASIC programming easier. The

AUTO [line number],[increment]

command causes BASIC to now supply the line numbers for you while in the BASIC program input mode. As shown, the starting line number and increment value are optional, and if not supplied, BASIC will begin at line number 100 with an increment value of 10. If the AUTO command is given a range that conflicts with existing lines in a program, it will display an asterisk '*' on any line that already exists. You may either type over that existing line, or exit the AUTO input mode by pressing the BREAK key.

ON ERROR can be very helpful when writing a program that others will use. You can use it to try and correct from a problem situation, or to insure that all files get closed prior to an abort. Unlike other implementations of ON ERROR, Screen Expander II's™ allows any valid BASIC statement or command as action following the ON ERROR command. Since both the error number and line number that the error occurred within are available to the program, you can write a subroutine that takes different actions according to the error. Below is a list of most of the errors available in CoCo BASIC. See the section on variables within Screen Expander II™ for the locations of the error number and line number. They can easily be accessed with the PEEK function.

BASIC Error Numbers and Descriptions

#	Description	#	Description
0	NF NEXT without FOR	2	SN Syntax Error
4	RG RETURN without GOSUB	6	OD Out of Data
8	FC Illegal Function Call	10	OV Overflow
12	OM Out of Memory	14	UL Undefined Line
16	BS Bad Subscript	18	DD Redimensioned Array
20	/0 Division by Zero	22	ID Illegal Direct Statement
24	TM Type Mismatch	26	OS Out of String Space
28	LS String too long	30	ST String too Complex
32	CN Can not Continue	34	FD Bad File Data
36	AO Already Open	38	DN Device Number Error
40	IO I/O Error	42	FM File Mode Error
44	NO File not Open	46	IE Input past EOF
48	DS Direct Statement in File	50	UF Undefined Function
52	NE File does NOT Exist	54	BR Bad Record Number
56	DF Disk Full	58	OB Out of Buffer Space
60	WP Disk Write Protected	62	FN Bad File Name
64	FS Bad File Structure	66	AE File Already Exists
68	FO Field Overflow	70	SE Set to Non Fielded String
72	VF Verification Error	74	ER Write Past EOF

64K SCREEN EXPANDER II™

The following is a list of variable and subroutine locations available with Screen Expander II™ and their functions. There are several changes from those in the original Screen Expander™, so if you were previously using the original version, take note!

\$F800 HIRES SWITCH

This location in memory is used as a switch to select which screen will be used to display text. If it contains a 0, the standard display will be used. If it contains 255, then the hi-res screen will be used.

\$F801 DISPLAY MODE

When in the hi-res mode, this switch selects inverted or normal characters. If it contains a 0, the characters will be displayed as light on a black background. If it is 255, you will get black characters on a light background. When the program is loaded the normal characters are displayed.

\$F802 PRINT @ MODE

When in the 51 x 24 mode, this switch selects the PRINT @ syntax and the tab field width. If it contains a 0, the standard syntax will be used with two tab fields of 16 characters. If it contains 255, the PRINT @(X,Y) syntax will be used with tab fields of ten characters.

\$F803 - F804 CHARACTER SET POINTER for 51 X 24 DISPLAY

These memory locations contain a pointer to the starting address of the block of memory that contains the 51 X 24 character set. This area of memory contains dot information for ASCII characters \$20 to \$7F. They are organized linearly in memory using the 5 most significant bits in each byte.

\$F805 - F806 CHARACTER SET POINTER for 64 X 24 DISPLAY

These memory locations contain the starting address of the block of memory that contains the 64 X 24 character set. This area of memory contains dot information for ASCII characters \$20 to \$7F. They are organized linearly in memory using the 4 most significant bits in each byte.

\$F607 51 X 24 or 64 X 24 DISPLAY SWITCH

This location acts as a toggle switch between either a 51 x 24 display or the 64 x 24 display. A value of 255 is the default and gives a 51 x 24 display. To get the 64 x 24 display, POKE a value of 0 into this location. A PRINT or CLS command after the POKE will initialize all the new registers correctly.

\$F808 TYPE AHEAD SWITCH

This location acts as a toggle switch to enable or disable the type ahead feature. A value of 255 is the default and enables type ahead. If you want to disable this feature, POKE a value of 0 into this location.

\$F809 Action on PAUSE or BREAK while in TYPE AHEAD MODE

Normally, the BREAK and PAUSE (shift-0) keys are NOT saved in the type-ahead buffer. They are acted upon immediately. By poking &HF809,0 you can cause the BREAK and PAUSE functions wait until anything typed before them is used. NOTE: this will make it impossible to break a program loop with the BREAK key.

\$F80A CLEAR TO EOL SWITCH (64 COL MODE ONLY)

While in the 64 character mode, you have the choice of not clearing to end of line (when overwriting a graphics page) or clearing to EOL. The default (value 255) is to not clear. To enable this feature, use a value of 0.

\$F80B ERROR NUMBER SAVE LOCATION

This location contains the value of the error when ON ERROR is being used and an error occurs. For example: ERR=PEEK(&HF80B)

\$F80C - \$F80D ERROR LINE NUMBER SAVE LOCATION

These two locations contain the value of the bad line number when ON ERROR is being used and an error occurs. For example: ERLIN=255*PEEK(&HF80C)+PEEK(&HF80D)

\$F80E - \$F80F COPY TEXT TO GRAPHIC

This is BRANch to a subroutine that will copy the hi-resolution text screen to the current graphics page and the next three pages. (PMODE 4 uses 4 graphics pages.)

\$F810 - \$F811 COPY GRAPHIC TO TEXT

This is a BRANch to a subroutine that will copy the current graphic pages to the high resolution text screen.

\$F812 - \$F813 SETUP PAGE 0 AS PMODE 4

This is a BRANch to a subroutine that will simulate PMODE 4,0 without checking the number of pages reserved for graphics.

THE CHARACTER SET EDITOR

On the back side of the cassette (or the front side of the disk) is a BASIC program named "CHRGEN". It is a character set editor which will allow you to redefine any of the 96 printable characters. It is loaded using 'CLOAD' from cassette or 'LOAD"CHRGEN' from disk. Before you RUN the program, POKE &HF807 to the mode (51 or 64 columns) that you want to edit. The top half of the screen will display the current character set. To change a character, Type the hex number that corresponds with the ASCII code for that specific character. This number is the number to the far right of the character followed by the number or letter below it. For example, the ASCII code for the letter K is 4B.

Once you enter the code for the character, the 5 x 8 array of dots that make up the character will be displayed in expanded form (4 x 8 for 64 column characters). You can use either the right joystick or the keyboard to change the dot pattern. The following is a list of commands available:

To change from joystick to keyboard mode press 'J'

	Joystick ON	OFF
To move the cursor	Right joystick	Arrow keys
To change the dot	Joystick button	Spacebar
To erase the character	CLEAR key	CLEAR key
To store the character	ENTER key	ENTER key

You will notice that one of the dots is blinking. This is the cursor. By pressing the button or the spacebar (depending on what mode you are in), the dot under the cursor will be reversed. The cursor can be moved to another dot with the joystick or the arrow keys. Pressing the CLEAR key will erase all the dots. When the character looks the way you want it to, just press the ENTER key and it will be saved that way. Once you have changed the character set, you can save it to tape or disk by typing S. You will need to select T for tape save or D for disk save and then enter the filename. Now, anytime you want to use your custom character set, just CLOADM the file from cassette or LOADM the file from disk after running the screen expander.

We hope you will find the 64K Screen Expander makes your Color Computer more useful as a programming tool and just plain more fun to use.