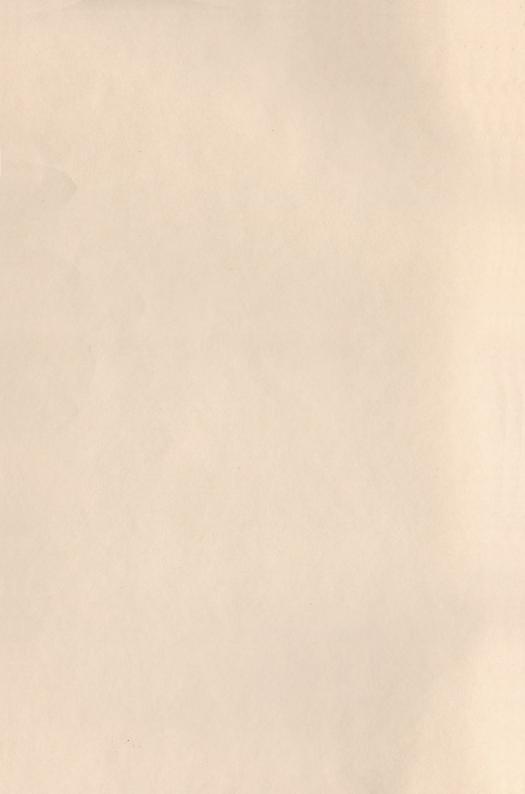# HI-RES III

COLOR COMPUTER III
HI RESOLUTION SCREEN COMMANDER

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HI-RES III Manual Index

Hi-Res III is designed to improve the standard Hi-Resolution graphics text displays offered in the CoCo-3. This is accomplished thru the use of a Hi Resolution 640 by 192 Graphics Display. The program is fully integrated into the existing Basic Rom software. This enables it to be used with standard Basic programs as well as machine language programs. You can also switch back and forth between the Hi-Res format and the Standard 32 by 16 format for complete compatibility in almost all situations. The format of the display when the program is first executed defaults to 80 characters by 24 lines. This can be changed to character sizes varing from 14 to 212 characters line thru the use of control codes. The package also includes other control code functions which allow various screen functions comparable to other video terminals. Some of them include: Reverse Screen, Reverse character, Underline, Double Height, Double width, Quad width, Bold & Italic characters, Erase to end of line, Erase to end of screen, Clear Screen, Home Cursor, Bell tone, and more. All of these features are controled thru the use of control codes sent via the CHR$(n) Basic statement, the Control functions of the Keyboard or thru Machine language routines. The following is a list of Control codes recognized by the program and its function.

Hex Dec Clear Function

Hex	Dec	Clear	Function
1	1	A	Display Black characters on a White background (Default)
2	2	B	Display White characters on Black background.
4	4	D	Select Double Height character mode.
5	5	E	De-Select Double Height character mode.
6	6	F	Switch between Blinking & Non-Blinking Cursor
7	7	G	Sound Bell tone.
8	8	H	Backspace cursor one character position.
9	9	I	Advance cursor one character position.
A	10	J	Move cursor down one line (Scroll if at bottom).
B	11	K	Initiate X,Y cursor position function.
C	12	L	Clear screen.
D	13	M	Move cursor to begin of line & move down 1 line.
E	14	N	Turns character Underline off (default).
F	15	O	Turns character Underline on.
10	16	P	Home cursor to position #0 on the screen (top left).
11	17	Q	Turns Destructive Cursor on.
12	18	R	Turns Destructive Cursor off (default).
13	19	S	Turns Space character Underline On (Default)
14	20	T	Turns Space character Underline Off
15	21	U	Erase from cursor to the end of line.
16	22	V	Erase from cursor to the end of screen.
17	23	W	Turn Reverse character mode off (Default).
18	24	X	Turn Reverse character mode on.
19	25	Y	Turns Erase to EOL after "CR" Off (Default)
1A	26	Z	Turns Erase to EOL after "CR" On
1B	27	;	Change characters, tabs, protect lines or key repeat.
1C	28	<	Change display to Color or Monochrome.
1D	29	=	Switch Screen format to Hi-Res or Standard 32*16.
1E	30	>	Turns double width characters off (default).
1F	31	?	Turns double width characters on.

Keyboard Controls

The Hi-Res Screen Package adds two convenience that pertain to the Keyboard. The first of which, now allows all keys except "Clear" to automatically repeat when held down for more than 1.5 seconds (approximately). The rate at which the key is repeated is adjustable thru the "Escape" functions which are explained later in this manual. It can be programmed to repeat very fast, slow or not at all.

The second change may not be as noticable, but may prove to be very useful depending on your use of the computer. It can also be used to execute some of the Hi-Res Screen function commands. This feature allows the Keyboard to generate all the Control codes between 00 and 31. This is done by activating the "CTRL" key or the reprogrammed "Clear" key to be used as a "Control" key. To do this hold down the "CTRL" or "Clear" key and press any other character key. This character will be converted to a "Control" character. For example, the letter "A", when converted to a control character, or what is known as a CTRL "A", generates a code value of "01". A CTRL "B" would generate an "02" and so on up thru CTRL "Z" which generates a "26" (This accounts for the codes 01 thru 26). The characters ";<=>.?" account for the codes 27 thru 31 and "ə" accounts for 00. For example a CTRL ";" would be an Escape code (CHR$(27)). Thru the use of Control characters you now can control most of the Hi-Res Screen functions directly from the Keyboard. For example, using a CTRL "B" will cause the video to reverse, and a CTRL ";" & "8" will change the characters to 64 per line.

In order to regain the "Clear" key function you hold down the "Clear" key and hit the "L" key. This generates a value of 12 the same as the old "Clear" key did and gives the same results as before. However when you hit the "Clear" key, you will no longer lose a line or screen of information as you would have before.

NOTE: The Ctrl "I" and Ctrl "U" functions will not work from the keyboard under Basic since these codes are used for different functions during keyboard input from Basic.

Control Code Use

Most of the time screen control functions will be used with the Basic statement "PRINT CHR$(n)". When using this method, the values listed under the Decimal column are to be used to implement the function. For example, to clear the screen use the Basic statement PRINT CHR$(12). There are two control functions which are not completed with a single character code. The first one, (11), is used for X,Y cursor positioning and the second one , (27), has several functions depending on the value of the character immediately following it.

The X,Y cursor position function allows the cursor to be positioned to any location on the screen with a minimum of effort. This can be useful for screen mapping & information updating. This is similar to the Basic PRINT @ function. Instead of using a single number for the location, a column position and line number are used. These values must immediatly follow the X,Y control code. A column value of 0 to the current number of characters per line may be used (64 is the default). The line number must then follow with a value from 0 to 23. For example, to position the cursor to the middle of the screen and print the word "HELP", you would use the following statement: PRINT CHR$(11);CHR$(23);CHR$(11);"HELP"

               PRINT CHR$(11);CHR$(23);CHR$(11);"HELP"

This would print the word "HELP" starting at column 23 on line 11. Notice that a ";" must be used between each character so that other characters are not sent in between the column, line #, and print data for the command to work correctly.

"Escape" Character Sequence Commands

The "Escape" code (27, $1B) is used for several different functions depending upon the value of the character following it. There are six functions that are affected using this code:

1) The number of positions used between tab columns for the Basic PRINT statement using commas ","
2) The number of lines on the Hi-Res Screen to be protected
3) The number of characters per line to be displayed on the Hi-Res Screen
4) The rate at which the Keyboard keys are to be repeated when held down
5) Clearing several of the Special functions options with a single command
6) Selecting special character modes (Bold, Italic, Double Width, Quad Width, Underline & Double Height).

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Tab Column spacing

The number of spaces between tab columns will automatically default to 16 when Hi-Res is executed. This is the same value that Basic normally uses for the Screen and Printer. You can change this value to any number from one to 16 by using the "Escape" character followed immediatly with a value from 1 to 16. To set the tabs 8 columns apart you could use the Basic command "PRINT CHR$(27);CHR$(8)" or do it directly from the Keyboard using the "Clear" (Control) key by entering the sequence "Clear ;" and "Clear H". The letters A thru O, when used with the "Clear" (Control) key, generate the decimal values 1 thru 16.

Protecting Screen lines

The Hi-Res Screen can have from 1 to 23 of its 24 lines protected so that normal writing will not destroy or overwrite the protected portion of the Screen. This can be handy for keeping program menus on the screen or working with mixed text and Graphics in HSCREEN 3 mode (640*192 2-colors). If the cursor is in a part of the Screen being protected, it still allows you to write in that part of the screen until the cursor moves below the lines being protected. If you would like to move the cursor immediatly out of the protected part of the screen, you can use the Basic "CLS" command or CHR$(16) to move the cursor to the Home position on the 1st unprotected line.

To protect a part of the display, you simply follow the "Escape" (27, $1B) code with a number from 1 to 24 for the number of lines to be protected plus a value of 16. If a value of 24 thru 31 is used all lines will become unprotected. If you would like to protect the first 8 lines of the screen and have the cursor move to the 1st unprotected line you would use the Basic statement:

PRINT CHR$(27);CHR$(8+16);CHR$(16)

If the CHR$(16) following the protect function is not used, and the cursor is still in the protected area, it will still allow information to be printed or displayed until it is moved out of the area. Once protected, you cannot put any information in that area thru the normal Hi-Res functions or Print Commands, until the area is unprotected. This can be used in a variety of ways limited only by your imagination.

Changing Characters per line

The Hi-Res Screen package allows the user to set the number of characters displayed per line on the Hi-Res Graphic Screen. This can be varied from 58 to 212 characters per line in defined steps. The Hi-Res screen defaults to a 64 characters across by 24 lines down at program startup time, but can be changed to one of 9 different formats. The following characters correspond to the number of display characters per line selected when used following the "Escape" code:

1 = 212	2 = 160
3 = 128	4 = 106
5 = 90	6 = 80
7 = 70	8 = 64
9 = 58	

All Screen widths above 128 characters per line are difficult to read in all upper case, but are not to bad in mixed upper/lower case. They can be very useful for seeing print formats on the display before printing a document.

```
PRINT CHR$(27);"8"<enter>  Set width to 64 chars/line
PRINT CHR$(27),"3"<enter>  Set width to 128 chars/line
```

You can also set the number of characters per line directly from the Keyboard using the "Ctrl" or "Clear" (Control) key. To set the display to 106 characters per line enter "CTRL ;" and "4". Note that the cursor size is proportional to the size of the character width selected so you will have some idea of what size characters are selected.

Changing Auto Key Repeat

The Hi-Res package also includes an Auto-Key repeat feature for enhanced Keyboard operation. To make it even more flexible, the user can program whether or not to allow the keys to automatically repeat, and if so, how fast or how often. The value following the "Escape" (27, $1B) can be from 0 to 127, plus a value of 128. If a value of 0 is used, then automatic repeat will be disabled entirely. If a value between 1 and 127 follows, that value will be used to determine how fast the keys will repeat (The smaller the number the faster the key will repeat). The default value is 15 which causes a repeat at a reasonable rate. Each individual will have to set this to meet their own requirement. The delay from the first time a key is pressed until it begins to repeat is approximately 1.5 seconds, and it is not adjustable. To disable the automatic repeat, the basic command would be: PRINT CHR$(27);CHR$(0+128)

To set the repeat at its fastest rate you would use "CHR$(1+128)" following "Escape" code and for the slowest rate you would use "CHR$(127+128)" following the "Escape" code.

Clearing Special functions

There is a special function code used to reset most of th special functions in the HI-Res package. The functions which ar reset to the default condtions are:Reverse Display (2), Underlin (15), Reverse character mode (24), All special character modes (bold italic, etc.), Destructive Cursor (18) and Protected lines (27). Al of these functions can be reset by the single command: PRIN CHR$(27);"0"

This can be useful for clearing display options used during program that has been interrupted while some of these functions wer in use, or at the end of a program using them.

Special Character Modes

There are six special character enhancement modes that can t selected. They are Bold, Italic, Underline, Double Width, Doubl Height, Quad Width and Plain characters (all special modes off). Th desired mode is selected and de-selected by the same control sequence The first time the sequence is received it selects the specifie feature to be enabled, the next time it is received, it is disablec The character code that follows the Escape code (27,$1B) is a singl letter code that selects or de-selects the function. The characte codes are fairly simple to remember: B=bold, I=italic, U=Underline D=double width, Q=Quad width, H=double heigth and P=plain.

Any individual feature may be selected at any time, and more tha one feature may be enabled at the same time. For instance you ca have Italics and Double _WIDE_ enabled by usin CHR$(27);"I";CHR$(27);"D". You can disable all special features wit the single sequence CHR$(27);"P" for plain characters. You can als select special character features directly from the keyboard using th "CTRL" or "Clear" keys. To select Quad width just enter "Ctrl ;" an then press the letter "Q". Note the characters must be in upper cas to be recognized corectly. Some of the special character modes can b selected by other control sequences. The "P" function will also clea any modes selected by them.

Special Character codes

P = Plain	I = Italics
U = Underline	B = Bold
D = Double Wide	Q = Quad width
H = Double Height	

Changing Screen Formats

This function allows the user to switch screen formats back and forth between the Normal 32*16 screen and the Hi-Res screen. When in the Standard 32 by 16 screen all Hi-Res control functions will be ignored except the "CHR$(28)" which is used to return you back into the Hi-Res Screen format. This function toggles or flips back and forth between formats each time it is entered. It can also be used directly from the Keyboard by using the "Clear" (Control) key. The sequence would be "Clear Shift =" pressing all three down in that sequence.

Changing Hi-Res Screen Background Color

This command allows the user to change the Hi-Res Video Screen from Monochrome to Color, or Color to Monochrome. This is mainly for convenience when using a Color T.V. or Monitor, to make the Hi-Res character screen easier to read. Th function flips the Screen Display mode each time it is used. To change modes, the Basic command would be PRINT CHR$(28) <enter>, or from the Keyboard you could enter "Clear Shift <".

Many of Hi-Res III's control functions consist of a single control code and can easily be used in a Basic program. Three of the single code functions control how the characters will be displayed on the screen until they are turned off. Some of them are the same as the Special character modes available. They are Underline ($0F) 15 decimal, Reverse characters ($18) 24 decimal, and Double wide characters ($1F) 31 decimal. Once these functions are enabled, each character displayed will be affected by the active functions. Any combination of the three or all three may be enabled at the same time. They may also be reset at any time. The Reverse character effect can also be obtained by adding a value of 128 to any normal ASCII printable code. For example, to highlight a single character just add 128 to the letter using the format:

PRINT CHR$(ASC("Z")+128)

The Destructive cursor function allows you to tell the program whether or not to erase the character at the current cursor location. This is normally on by default. Some screen editing programs require it to be off to function correctly, while others require it to be on, so characters are erased during backspace operations. For these reasons we allow it to be changed.

The Reverse screen function also allows for special effects with Graphic displays, or just personal preference for the screen display.

Additional Functions

Three functions have been added to allow more flexability in using Hi-Res III. The first allows you to switch between a blinking and non-blinking cursor (6). The second function allows you to select whether or not to Underline space characters on the screen ($13,$14) 19 & 20 decimal (spaces are underlined by default). The third function allows you to select whether or not to erase the screen to the end of line following a carriage return or "Enter" character ($19,$1A) 25 & 26 decimal (erase to end of line is off by default). All three of the additional functions consist of a single control code and remain in effect until turned off or switched by their counterpart code. As with most of the other functions in Hi-Res III you can enable these functions directly from the keyboard by using the "Ctrl" or "Clear" control key to activate the function. For example to change the cursor to blinking or non-blinking, simply hold down the "Clear" key and press "F". The blinking or non-blinking state will immediatly swith to it's opposite state.

EFFECTS ON BASIC SCREEN COMMANDS

This package was designed to be as compatible and convenient to use as possible, so normal operations with Basic programs would be affected as little as possible. Since some Basic programs use commands that affect the screen display, we have tried to make them as compatible as possible with the new screen format. Unfortunatly, this may not be 100% compatible but should be close enough so the programs will still run without any major problems. If problems do arise, you can always switch back to the standard screen format for those functions, and then back to the Hi-Res format with a simple function command.

One of the most common screen commands is "CLS", the clear screen command. With the Hi Resolution program installed and running, this command only clears the screen in normal video (black characters on a white background) or reverse video. If no value follows the command, or if a value of 0 is used, a normal clear screen will occur. If any value is used following the command, the screen is cleared with reverse video.

The second most used screen command is the PRINT ∂ function. Under normal system operation this value may not exceed a value of 511, or an error will occur. You only have 32 character positions available per line by 16 lines, thus 0 to 511 is the range. In the 80 and 40 character screens in Basic the Print ∂ function is not even allowed to be used, but Hi-Res III will allow you to do so easily. When using the Hi Resolution screen program any value is allowed and will be adjusted according to the number of characters displayed per line. For example, if you printed at column 177 in the 80 character mode, it would display on line 2, column 17. If you did the same thing in 64 character mode, it would display on line 2, column 49. If you would like to have compatibility with the old screen format, just reprogram the number of characters per line to 32. This is accomplished by the statement:

PRINT CHR$(27);"8";CHR$(31)<enter>

When in this mode, all PRINT ∂ screen formating should be almost identical to the original format except that 24 lines are available instead of 16 lines.

GRAPHICS & DISPLAY RAM OPTIONS

Since the Hi Resolution Screen package uses almost a full 4K of RAM plus 16K for the graphics screen (in 2nd 64K bank), we thought it would be nice to have an options as to what part of memory is used for the program area. The first option is the standard configuration. In this mode, the program is stored in the 2nd 64K bank of memory and swapped in and out as needed. This version uses none of Basics memory space, however there is a little extra noise on the screen when printing due to the switching of the program in and out. If you find this to be distracting you can use the ".LOW" version of HI-RES III. This version uses almost a full 4K of basics memory space, but since it doesn't have to be switched in and out all the time, there is very little noise on the screen. Either version will allow you to Mix Text and Graphics on the same screen. This can be very useful especially with the use of PRINT 3 and X,Y cursor control. This must be done in HSCREEN 3 mode to work correctly.

Character and Screen Colors

The normal default colors for Hi-Res III are Black characters on a Buff background and is switchable to Buff characters on a Black Background. You can change the screen colors to whatever you like using the Palette command in basic. Only Palette registers 0 and 1 are used by the program. You can change the Palette values at any time however the Border color will not match the background color. By sending a "CTRL B" and then a "CTRL A", Hi-Res III will save the colors and also select the border color to match the Background.

LOADING & EXECUTING THE PROGRAM

Before installing Hi-Res III in the system, decide which version of the program you wish to use. You then use the "LOADM" command followed by the name of the version you wish to use. When the program is loaded, it will automatically execute and display a copyright notice and then you will see the "OK" prompt displayed. The following are the file names assigned to the versions of the programs:

HIRESIII. The Standard Configuration where the program is stored in the 2nd 64k bank of ram, it uses none of Basics memory.

HIRESIII. The Second Configuration that uses almost 4K of Basics memory. It automatically relocates to the top of Ram.

LOADING EXAMPLES:

LOADM"HIRESIII"<enter>
LOADM"HIRESIII.LOW"<enter>