HI-RES II
Hi-Resolution Screen Utility

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Hi-Resolution Screen Utility

The Hi Resolution Screen Package is designed to improve the standard 32*16 Text mode display of the color computer. This is accomplished thru the use of a Hi Resolution 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 51 characters by 24 lines. This can be changed to 85, 64, 42, 36, 32 or 28 characters per 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 character, Double Size 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 code characters 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 the function that it performs.

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	Use alternate character set starting with 64 chars/line
5	5	E	Use alternate character set starting with 85 chars/line
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 chars/line, tabs, protect lines or key repeat.
1C	28	<	Change the background color to Buff or Green.
1D	29	=	Switch Screen format to Hi-Res or Standard 32*16.
1E	30	>	Turns double size characters off (default).
1F	31	?	Turns double size characters on.

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Keyboard Controls

The Hi-Res Screen Package adds two conviences 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 reprogramming the "Clear" key to be used as a "Control" key. To do this hold down the "Clear" key and press any other character key. This 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 "@" accounts for 00. 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 32 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.

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 usefull 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 (51 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 five 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

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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 PMODE 4. 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 28 to 255 characters per line in defined steps. The Hi-Res screen defaults to a 51 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 = 255		2 = 128	
3 = 85		4 = 64	
5 = 51		6 = 42	
7 = 36		8 = 32	
9 = 28			

All Screen widths above 85 characters per line are unreadable, but can be very useful for seeing print formats on the display before printing a document.

```
PRINT CHR$(27);"8"<enter>    Set width to 32 chars/line
PRINT CHR$(27),"3"<enter>    Set width to 85 chars/line
```

You can also set the number of characters per line directly from the Keyboard using the "Clear" (Control) key. To set the display to 64 characters per line enter "Clear ;" and "4" followed by the "Break" key to insure that Basic does not think that the number "4" is a line number. Note that the cursor size is proportional to the size of the character width 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.

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Clearing Special functions

There is a special function code used to reset most of the special functions in the HI-Res package. The functions which are reset to the default condtions are:Reverse Display (2), Underline (15), Reverse character mode (24), Double Size characters (31), Destructive Cursor (18) and Protected lines (27). All of these functions can be reset by the single command: PRING CHR$(27);"0"
This can be useful for clearing display options used during a program that has been interrupted while some of these functions were in use, or at the end of a program using them.

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 Background from Green to Buff, or Buff to Green. This is mainly for convience when using a Color T.V., to make the Hi-Res character screen easier to read. This function flips the Background color each time it is used. To change the color, the Basic command would be PRINT CHR$(28) <enter>, or from the Keyboard you could enter "Clear Shift <".

Alternate Character Set Options

The Hi-Res Screen package contains two character sets for displaying the text on the screen. The main (larger) character set is used for all line lengths from 28 to 51 characters per line. Initally the program is set up to use the smaller character set starting at 64 characters per line. You can alternatly use the larger character set for 64 chars/line by using the CHR$(4) function. If you would like to switch back to the smaller character set at 64 chars/line, use the CHR$(5) function. In some cases you may prefer to use one or the other for better reading ability or clearity.

The majority of the control functions supported, consist of a single control code and can easily be used in a Basic program. Three of the functions control how the characters will be displayed on the screen until they are turned off. They are Underline ($0F) 15 decimal, Reverse characters ($18) 24 decimal, and Double size 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. When this function is used on a screen with protected lines, only the unprotected part of the display will be reversed so as not to effect a menu or Graphics Display.

Additional Functions

Three functions have been added to allow more flexability in using Hi-Res II. 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 II you can enable these functions directly from the keyboard by using the "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 opposit state.

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EFFECTS ON BASIC SCREEN COMMANDS

    This package was designed to be as compatible and convienient 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. 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 68 in the 51 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 4.   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"<enter>

    When in this mode, all PRINT @ screen formating should be almost
identical to the original format.

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GRAPHICS & DISPLAY RAM OPTIONS

Since the Hi Resolution Screen package uses almost a full 8K of RAM (2K for the program and 6K for the display), we thought it would be nice to have some options as to what part of memory is used for the display or program area. The first option is the standard configuration. In this mode, the screen display RAM uses the same 6K reserved by Extended Basic for Graphics display. This allows Text and Graphics to be Mixed on the same screen in PMODE 4. This can be very usefull especially with the use of PRINT @ and X,Y cursor control. This must be done in PMODE 4 to work correctly.

The Second configuration reserves 6K of RAM immediatly under the Program at the top of free memory. This allows for the use of separate Text and Graphic Displays. This moves it out of the way of other machine language programs that may use the lower RAM areas.

The Third & Fourth configurations are for users having 64K of RAM available in the system, and not being used for other programs. In the Third & Fourth modes, the program automatically copies the Basic Roms to Ram. It also sets up a RESET vector to re-initalize for 64K mode when the Reset Button is used. It uses RAM from $F800 thru $FEFF reguardless of the system configuration. This is compatible with Disk Systems and Tape alike. There should be no noticable difference in System performance. The "HRES64DN" version is similar to the Mixed Text & Graphics non 64K version, and the "HRES64UP" version has separate Text & Graphics pages which uses the 6K of RAM from E000 thru F7FF for the Graphics display page.

LOADING & EXECUTING THE PROGRAM

Before installing the Hi Resolution Screen package in the system, decide which version of the program you wish to use. You then use the "CLOADM" command followed by the name of the version you wish to use. Place the tape in the recorder and depress the "PLAY" button. The tape should move and the program will begin loading. When the program is loaded, you will see the "OK" prompt displayed. If an I/O Error occured try adjusting the volume & tone controls, load the program again or try the other side of the tape. The programs are stored on both sides of the tape. On the back side of the tape the programs are stored in reverse order for convenience. The following are the file names assigned to the versions of the programs:

HRES32DN   The Standard Configuration allows Mixed Text & Graphics displays, and uses only 2K of RAM + the 6K Basic Graphics page.

HRES32UP   The Second Configuration Hi-Res Screen & Program are stored at the Top of RAM, and uses 8K of RAM.

HRES64DN   The Third Configuration has Mixed Text & Graphics and stores the program at the top of 64K RAM, using 2K + the 6K Basic Graphics page. (64K Required)

HRES64UP   The Fourth Configuration has the Screen & Program at the top of 64K RAM and has separate Text & Graphics pages, useing 8K of memory and not taking any memory away from Basic. (64K Required)

LOADING EXAMPLES:

CLOADM"HRES32DN"<enter>
CLOADM"HRES64UP"<enter>
OK
EXEC<enter>

```
10 ' DEMONSTRATION PROGRAM FOR HI-RES II SCREEN
20 '
30 ' NEXT LINE CLEARS PROTECTED LINES & SETS NON DESTRUCTIVE CURSOR
40 '
50 PRINTCHR$(27);CHR$(16+24);CHR$(18);
60 GOSUB 590 : 'SET LINE LENGTH = 32 CPL
70 ' HOME CURSOR & CLEAR SCREEN
80 PRINTCHR$(12);
90 ' DOUBLE SIZE (31) & UNDERLINE ON (15)
100 PRINT@4,CHR$(31);CHR$(15);"HI-RES II SCREEN UTILITY"
110 GOSUB 560 : ' SET LINE LENGTH = 51 CPS
120 ' UNDERLINE ON (15) & DOUBLE SIZE OFF (30)
130 ' USE 8,9 TO ADJUST CURSOR AFTER LENGTH CHANGE ON SAME LINE
140 PRINTCHR$(15);CHR$(30);" Featuring:";CHR$(31)CHR$(14);;;GOSUB 590
150 GOSUB 590:PRINTSTRING$(2,CHR$(8));"Double Height";CHR$(15);CHR$(30);
160 GOSUB 560:PRINTSTRING$(17,CHR$(9));"Characters";CHR$(14)
170 PRINT
180 ' LINE LENGTH = 42, UNDERLINE ON, THEN OFF
190 GOSUB 570:PRINT"        On Screen ";CHR$(15);"UNDERLINING";CHR$(14)
200 PRINT"    Protect from 1 to 23 Screen lines"
210 PRINT"    Full set of Cursor Control Functions"
220 PRINT"    True Upper & Lower case character set"
230 ' LINE LENGTH = 51, DOUBLE SIZE ON (31), HIGHLIGHTING ON (24)
240 ' HIGHLIGTHING OFF (23), DOUBLE SIZE OFF (30)
250 GOSUB 590:PRINTCHR$(31);"  ";CHR$(24);" Reverse Video Highlighting ";CHR$(23);CHR$(30)
260 PRINT
270 GOSUB 560:PRINT" Adjustable line lengths from 28 to 255 characters
280 M$="Characters per line"
290 FOR L=9TO3 STEP -1
300 ' PRINT MESSAGE IN DESENDING SIZES 28 THRU 85 CHARACTERS PER LINE
310 ON L-2 GOSUB 540,550,560,570,580,590,600
320 ' CALCULATE SPACES TO CENTER LINE
330 LL=INT(256/L)
340 ML=LEN(M$)+LEN(STR$(LL))
350 PRINTSTRING$((LL-ML)/2,32);LL;M$
360 NEXT
370 ' SET LINE LENGTH BACK TO 51
380 GOSUB 560
390 PRINT:PRINT" Full Control Code Keyboard & Automatic Key Repeat"
400 PRINT" Mixed Text and Graphics in PMODE 4 and Much More."
410 PRINT:'PRINTSTRING$(51,42);
420 PRINT" All functions are easily programmable thru BASIC"
430 PRINT" Fully";CHR$(15);" BASIC COMPATIBLE";CHR$(14);" including CLS & PRINT @";
440 ' DELAY & THEN REVERSE SCREEN
450 FOR I=1TO 5:SOUND 9,1:NEXT:FOR I=1TO 2500:NEXT
460 ' DELAY & THEN REVERSE SCREEN BACK TO NORMAL
470 PRINTCHR$(2);;FOR I=1TO 3000:NEXT
480 PRINTCHR$(1);
490 ' DELAY AGAIN AND THEN REPEAT ALL OVER
500 FOR I=1TO5000:NEXT:RUN
510 ' ROUTINES TO CHANGE LINE LENGTHS
520 PRINTCHR$(27);S$;
530 RETURN
540 S$="3":GOTO 520 : ' LENGTH = 85
550 S$="4":GOTO 520 : ' LENGTH = 64
560 S$="5":GOTO 520 : ' LENGTH = 51
570 S$="6":GOTO 520 : ' LENGTH = 42
580 S$="7":GOTO 520 : ' LENGHT = 36
590 S$="8":GOTO 520 : ' LENGHT = 32
600 S$="9":GOTO 520 : ' LENGTH = 28
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