

APPENDIX C

ESCAPE SEQUENCES

I. CONSOLE OUTPUT (CO) WITH CONTROL CODE INTERPRETATION

One character is passed in register C, where the control codes (below) are interpreted. The contents of all registers, with the exception of the accumulator and the flags, remain unchanged. Exceptions are ESC, 17H, and ESC, 1CH. A number of control functions must be preceded by an escape character (1BH).

CONTROL CODES WITHOUT ESCAPE

HEX (H)

CODE

07 Bell (BEL)

The bell sounds for approximately 1/2 second.

08 Backspace (BS)

The cursor is moved one position to the left. From the beginning of the line, the cursor moves to the end of the preceding line. From the upper left hand corner, the cursor is set to the last line, last column.

0A Line feed (LF)

The cursor is moved down one line. When it reaches the last line, the contents of the screen scroll up one line and the top line scrolls out. The column position of the cursor remains unchanged. Code 0AH can also be used for Down Cursor. (With Down Cursor, the contents of the screen do not scroll.)

0C Clear Screen (FF)

The screen controller is initialized and the screen driver routine reset. Cursor moves to the left upper corner of the screen; cursor is activated and inverse representation deactivated.

0D Carriage Return (CR)

Cursor moves to the start of the next line. A code 0AH directly after the 0DH is ignored.

12 Inverse Off

All subsequent characters are displayed in standard representation.

1C Inverse On

All subsequent characters are displayed in inverse representation.

II. CONTROL CODES WITH ESCAPE(1BH)

1BH, 0CH, XX INITIALIZE SCREEN DRIVER ROUTINE

A third parameter must be included in this code sequence. Individual bits are described below.

- BIT 0=1 Scroll after writing last screen position (scroll mode).
- BIT 0=0 Cursor at home position after writing to last screen position (page mode).
- BIT 2=0 Control Key returns code 7FH.
- BIT 2=1 Control Key is processed internally and returns, when pressed together with another key, the character -40H (e.g., C returns 03H).
- BIT 3=0 Without function.
- BIT 3=1 Control Key returns code 84H in conjunction with Console Input (CI).
- BIT 6=1 Same color is available for back- and foreground color.
- BIT 6=0 Inhibited use of same color for background and foreground color.
- BIT 7=0 The call clears the screen.
- BIT 7=1 The call does not clear the screen.

When the display unit is switched on, the screen driver routine is initialized to 05H.

HEX (H)

CODE

1B,09

Accesses alternate keyboard table

The user key code table (accessing top address in DE register) is replaced with *default* key code table.

1B,10,xx

Outputs blanks

xx blanks are output, moving the cursor to the right.

1B,1D,xx,yy

Outputs character(s)

xx character(s) with the code yy are output.

1B,11

Cursor home

(1B,48)

The cursor is positioned to the upper left corner of the screen.

1B,12

Cursor off

The cursor is deactivated, but the position is tallied internally.

1B,13

Cursor on

The cursor is activated.

1B,16

Sets cursor (line, column)

This ESCAPE sequence requires two further parameters to be passed in register C. Note that the columns are numbered beginning with 0, and the lines beginning with 1. The cursor is set to the highest possible line and column when a value is passed which lies outside the legal bounds.

1B,17

Returns cursor position

The current position of the cursor is returned in register DE. The value is returned when GO is called with 17H in register C. The line is returned in D and the column in E.

HEX (H)
CODE
1B,18

Writes character at current cursor position

The character in register E is written at the current cursor position. The character is passed when CO is called with 18H in register C. The character in register E is not evaluated as a control character: it is possible to represent characters otherwise read as control characters. The cursor remains stationary after reaching the last screen position (no scroll).

1B,19
(1B,4B)

Erases rest of line

1B,1A
(1B,43)

Cursor moves right

1B,1C

Reads character from current position

The character at the current cursor position is returned in register E. The same rules apply as for 1BH,18H. Note that the cursor is moved one position to the right each time.

All of the following code sequences are equivalent to DEC VT-52, fulfilling most requirements placed on screen-oriented software. Note that the four directional cursor movement codes do not enable the cursor to exit the line or column.

1B,41

Cursor up

The cursor moves up one line, same column.

1B,42
(0A)

Cursor down

The cursor moves down one line, same column.

1B,43
(1B,1A)

Cursor right

The cursor moves one column to right.

1B,44
(08)

Cursor left

The cursor moves one column to left.

1B,45
(0C)

Erases screen (ES)

The screen is erased and the cursor returns to home position.

The following ERASE functions do not change the position of the cursor:

HEX (H)

CODE

1B,46

Erases line (EL)

The line in which the cursor is positioned is erased, regardless of cursor position.

1B,4A

Erases rest of screen (EOS)

The screen is erased beginning at the current position of the cursor.

1B,4B

(1B,19)

Erases rest of line (EOL)

The line containing the cursor is erased from the current cursor position to the end.

1B,48

(1B,11)

Cursor Home

1B,59

Positions cursor with line and column offset

(The following two codes position the cursor. An offset of 20H is added to the line and column to circumvent difficulties with lines/columns 8 and 9. Also note that the line and column counts begin with 0, unlike the count in 1BH,16H. All other conditions are identical to those for 1BH,16H.

1B,31

Graphic mode on

This code sequence enables all 64 (semi) graphic characters to be represented. ASCII characters (from 20H to 5FH) are represented as block graphic characters. All other ASCII characters except in conjunction with 1BH,32H are ignored.

1B,32

Graphic mode off

All characters are displayed in standard representation.

1B,49,xx

Inserts characters up to xx

A blank is inserted at the current current cursor position and characters up to column xx are shifted right one position. The last character is deleted. When parameter xx is not logical, the function is not executed.

HEX (H)
CODE

1B,47,xx *Deletes characters up to column xx*
The character at the current cursor position is deleted and the remainder of the line, up to column xx, is shifted to the left. The last character is replaced by a blank. The same parameter conditions apply as for the preceding code sequence.

1B,53,ss *Selects screen width*
Screen width is changed and all display contents (character and attribute) are cleared. Cursor returns to the home position.

ss = 30H: 40 character mode
ss = 32H: 80 character mode

1B,54,ff,bb *Screen erases with appointed color*
Screen is erased with the color attribute ff,bb.

ff = foreground color code (30H-37H)
bb = background color code (30H-37H)

If the screen has been initialized (by 1BH,0CH) to allow the same color for ff and bb, no character appears when the same color is called for ff and bb. Otherwise, the same color for ff and bb is ignored. See 1BH,0CH,xx.

1B,55,ff,bb *Color attribute set*
Color attribute is set for the following display sequences. Color codes and conditions are the same as for 1BH,54H.

1B,56,vv *Screen attribute set*
The character attribute is set for the following display sequences:

vv = 30H: Normal
 31H: Blink
 32H: Inverse
 33H: Blink and inverse

III. CONSOLE INPUT (CI)

This routine waits until a key has been depressed, then returns the key code (7-bit ASCII characters and 8-bit control and graphic patterns) in the accumulator. The contents of all other registers remain unchanged.

The "cursor left" function returns code 08H (backspace).

The "CTRL KEY" or "RESERVED FUNCTION KEY" returns the code if the screen driver is initialized (see 1B,0C).

IV. INTERROGATE CONSOLE STATUS (CSTS)

This routine is used to ascertain whether or not a key has been pressed. The respective value is returned in Register A.

A = 00 and Z = 1: no key pressed
A = FF and Z = 0: key pressed