

Title :- Program for Graphics Editor

Aim: - To Write a program to demonstrate use of BIOS INT 10H and its services for Video operations in graphics mode.

Related Unit: Unit I/III

Prerequisite: Assembly Language Programming and Interrupts INT 10h and INT 21H, Display adapter Basics.

Theory / Analysis:-

The objective of this experiment is to study the INT 10 and its services. INT 10h supports many services to facilitate video operations. INT 10h supports many of the functions such as setting video mode, setting cursor, scrolling cursor, and displaying characters and pixel

Video Modes:-

The Video mode determines factors such as text mode or graphics mode, screen resolution, and the number of colors.

Attributes:-

The attribute byte in text mode determines the characteristics of each displayed character.

BIOS INT 10h operations

INT 10 Function 00h :Set Video Mode

The purpose of the function is to set the video mode.. Load the function code in AH register and the required mode in AL. The following example sets the video mode for standard color text on any type of the monitor.

1] Set Graphics mode for VGA:

Function 00H in the AH and mode 12H in the AL set Standard VGA color graphics mode.

```
Mov AH,00H      ; Request set Mode
Mov AL,12H      ; 640 * 480 VGA Resolution
INT 10H         ; Call BIOS
```

Setting graphics mode causes the cursor to disappear.

2] Set Text Mode:

```
Mov AH, 00H          ; Request set Mode
Mov AL,03H           ; Text Mode (80 * 25)
INT 10H              ; Call BIOS
```

Graphics Mode

Graphics Mode uses pixels (picture elements of pels) to generate colors patterns. Setting graphics mode causes cursor to disappear.

Following are common graphics modes

Mode	Type	Pages	Resolution	Colors
04h	Color	8	320 × 200	4
05h	Color	8	320 × 200	4
06h	Color	8	640 × 200	2
0Dh	Color	8	320 × 200	16
0Eh	Color	4	640 × 200	16
0Fh	Monochrome	2	640 × 350	1
10h	Color	2	640 × 350	16
11h	Color	1	640 × 480	2
12h	Color	1	640 × 480	16
13h	Color	1	320 × 200	256

INT 10h Function 0Ch : Write Pixel Dot

Function 0Ch is used to display a selected color in graphics mode.. Set these registers

AL = Color of the pixel

BH = Page Number

CX = Column

DX = Row

The minimum value for column or row is 0 and the maximum value depends on the video mode,

INT 16H, Function 10H: Read a Keyboard Character

The operation checks the keyboard buffer for an entered character: If none is present the operation wait for the user to press key: If character is present the operation returns it in AL and it's scan code in AH.

Program Description

Program will display pixel on the CRT screen by using INT 10h. First it will switch to the graphics mode and will display. Then it will move the pixel in different directions according to the user input. Following are scan codes of different keys. These scan codes are compared in the program to find user input and to move the pixel in appropriate direction

Keys	Scan code
Left Arrow	4BH
Right Arrow	4DH
UP Arrow	48H
Down Arrow	50H
Home	47H

End 4FH
Page UP 49H
Page Down 51H
Esc 01H
Enter 1CH
Program will display

Algorithm –

- 1] Start
- 2] Initialize the Graphics Mode
- 3] Put pixel on screen
- 4] Take a input from user
- 5] According to input perform appropriate function (e.g., Left move, Right Move etc).
- 6] Go to step 4 until exit
- 7] Set back to the text mode
- 8] Stop

Output : Pixel will display on the monitor. Images can be formed on monitor by moving pixel in different directions

References :

1. Peter Abel , “ IBM PC Assembly Language and Programming “, Fifth Edition , Mar 2003, PHI Limited
2. B. Govindarajalu, “ IBM PC and Clones”, Tata Mc Graw Hill , Latest Edition
3. Douglas Hall, “ Microprocessors and Interfacing”, Second Edition, TMH