DOS and BIOS Interrupts

- DOS and BIOS interrupts are used to perform some very useful functions, such as displaying data to the monitor, reading data from keyboard, etc.
- They are used by identifying the interrupt option type, which is the value stored in register AH and providing, whatever extra information that the specific option requires.

BIOS Interrupt 10H

- Option 0H – Sets video mode.
- Registers used:
  - AH = 0H
  - AL = Video Mode.
    - 3H - CGA Color text of 80X25
    - 7H - Monochrome text of 80X25
- Ex:
  - MOV AH,0
  - MOV AL,7
  - INT 10H

BIOS Interrupt 10H

- **Option 2H – Sets the cursor to a specific location.**
- **Registers used:**
  - **AH = 2H**
  - **BH = 0H selects Page 0.**
  - **DH = Row position.**
  - **DL = Column position.**

BIOS Interrupt 10H

- Ex:
  - MOV AH,2
  - MOV BH,0
  - MOV DH,12
  - MOV DL,39
  - INT 10H

BIOS Interrupt 10H

- Option 6H – Scroll window up. This interrupt is also used to clear the screen when you set AL = 0.
- Registers used:
  - AH = 6H
  - AL = number of lines to scroll.
  - BH = display attribute.
  - CH = y coordinate of top left.
  - CL = x coordinate of top left.
  - DH = y coordinate of lower right.
  - DL = x coordinate of lower right.

BIOS Interrupt 10H

- **Clear Screen Example:**
  - **MOV AH,6**
  - **MOV AL,0**
  - **MOV BH,7**
  - **MOV CH,0**
  - **MOV CL,0**
  - **MOV DH,24**
  - **MOV DL,79**
  - **INT 10H**
- **The code above may be shortened by using AX, BX and DX registers to move word size data instead of byte size data.**

BIOS Interrupt 10H

- Option 7H – Scroll window down. This interrupt is also used to clear the screen when you set AL = 0.
- Registers used:
  - AH = 7H
  - AL = number of lines to scroll.
  - BH = display attribute.
  - CH = y coordinate of top left.
  - CL = x coordinate of top left.
  - DH = y coordinate of lower right.
  - DL = x coordinate of lower right.

BIOS Interrupt 10H

- **Option 8H – Read a character and its attribute at the cursor position.**
- **Registers used:**
  - **AH = 8H and returned attribute value.**
  - **AL = Returned ASCII value.**
  - **BH = display page.**

BIOS Interrupt 10H

- **Option 9H – Write a character and its attribute at the cursor position.**
- **Registers used:**
  - **AH = 9H.**
  - **AL = ASCII value.**
  - **BH = display page.**
  - **BL = attribute.**
  - **CX = number of characters to write.**

Attribute Definition

Blinking	Background			Intensity	Foreground		
D7	D6	D5	D4	D3	D2	D1	D0

- Monochrome display attributes
  - Blinking
    - D7 = 0 - Non-blinking
    - D7 = 1 - Blinking
  - Intensity
    - D3=0 - Normal intensity
    - D3=1 - Highlighted intensity
  - Background and foreground
    - D6 D5 D4 and D2 D1 D0
      - White = 0 0 0
      - Black = 1 1 1

Attribute Definition

Blinking	Background			Intensity	Foreground		
	R	G	B		R	G	B
D7	D6	D5	D4	D3	D2	D1	D0

- Color display attributes
  - Blinking
    - D7 = 0 - Non-blinking
    - D7 = 1 - Blinking
  - Intensity
    - D3=0 - Normal intensity
    - D3=1 - Highlighted intensity
  - Background and foreground
    - D6 D5 D4 and D2 D1 D0
      - RGB values defined by the table to the right.

I	R	G	B	Color
0	0	0	0	Black
0	0	0	1	Blue
0	0	1	0	Green
0	0	1	1	Cyan
0	1	0	0	Red
0	1	0	1	Magenta
0	1	1	0	Brown
0	1	1	1	White
1	0	0	0	Gray
1	0	0	1	Light blue
1	0	1	0	Light green
1	0	1	1	Light cyan
1	1	0	0	Light red
1	1	0	1	Light magenta
1	1	1	0	Yellow
1	1	1	1	High intensity white

DOS Interrupt 21H

- **Option 1 – Inputs a single character from keyboard and echoes it to the monitor.**
- **Registers used:**
  - **AH = 1**
  - **AL = the character inputted from keyboard.**
- **Ex:**
  - **MOV AH,1**
  - **INT 21H**

DOS Interrupt 21H

- Option 2 – Outputs a single character to the monitor.
- Registers used:
  - AH = 2
  - DL = the character to be displayed.
- Ex:
  - MOV AH,2
  - MOV DL,’A’
  - INT 21H

DOS Interrupt 21H

- **Option 9 – Outputs a string of data, terminated by a $ to the monitor.**
- **Registers used:**
  - **AH = 9**
  - **DX = the offset address of the data to be displayed.**
- **Ex:**
  - **MOV AH,09**
  - **MOV DX,OFFSET MESS1**
  - **INT 21H**

DOS Interrupt 21H

- **Option 0AH – Inputs a string of data from the keyboard.**
- **Registers used:**
  - **AH = 9**
  - **DX = the offset address of the location where string will be stored.**
- **DOS requires that a buffer be defined in the data segment. It should be defined as follows:**
  - **1st byte contains the size of the buffer.**
  - **2nd byte is used by DOS to store the number of bytes stored.**

DOS Interrupt 21H

- Ex:
  - .DATA
  - BUFFER1 DB 15,?,15 DUP (FF)
  - .
  - .
  - MOV AH,0AH
  - MOV DX,OFFSET BUFFER1
  - INT 21H
- Assume “Go Tigers!” was entered on the keyboard.
  - BUFFER1 = 10,10,’Go

DOS Interrupt 21H

- **Option 4CH – Terminates a process, by returning control to a parent process or to DOS.**
- **Registers used:**
  - **AH = 4CH**
  - **AL = binary return code.**
- **Ex:**
  - **MOV AH,4CH**
  - **INT 21H**