

16.317: Microprocessor Systems Design I

Spring 2012

Lecture 3: Key Questions

January 27, 2012

1. Explain the difference between how data can be interpreted as a signed or unsigned integer. Show the difference by interpreting the 8-bit value $1001\ 1111_2$ as both a signed and unsigned value.
2. Explain how data can be formatted as binary-coded decimal (BCD).
3. Explain how 8-bit values can be used to represent characters using ASCII encoding.

4. Explain how the segment registers can be used to identify the active segments of memory, and what the significance of each segment register is.

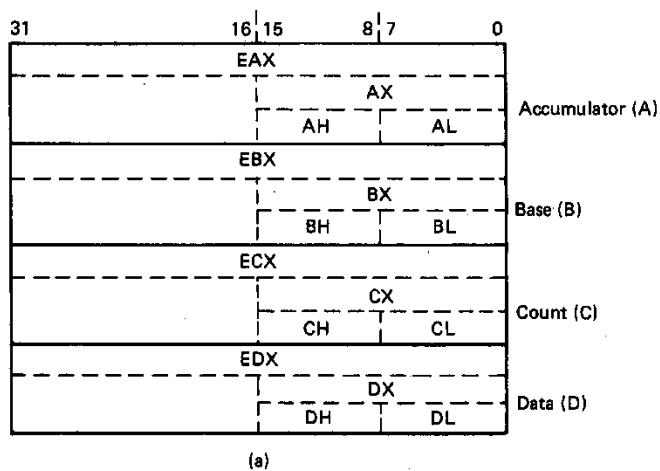
5. Describe the 8 general-purpose registers in the 80386DX:

a. Data registers

b. Pointer registers

c. Index registers

6. Describe the different real mode flags used from the flags register.



Register	Operations
EAX, AX, AH, AL	ASCII adjust for addition/subtraction Convert byte to word/word to double word/ double word to quad word Decimal adjust for addition/subtraction Unsigned multiply/divide Signed divide Input/output operations Load/store flags Load/compare/store string operations Table-lookup translations
EBX, BX, BH, BL	Table-lookup translations
ECX, CX, CH, CL	Loop operations Repeat string operations Variable shift/rotate operations
EDX, DX, DH, DL	Indirect input/output operations Input/output string operations Unsigned word/double word multiply Signed word/double word divide Unsigned word/double word divide

(b)

Fig. 2.14: General-purpose data registers and their special functions

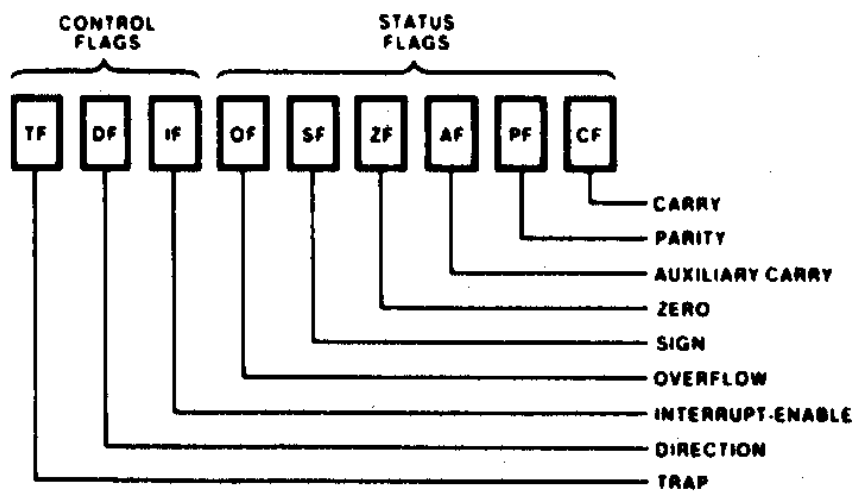


Fig. 2.16: Status and control flags