

## 80x86 Instructions by Opcode

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
00	add	mem8,reg8	SF,ZF,OF,CF,PF,AF	2+	7	3	3
01	add	mem16,reg16	SF,ZF,OF,CF,PF,AF	2+	7	3	3
		mem32,reg32					
02	add	reg8,reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
02	add	reg8,mem8	SF,ZF,OF,CF,PF,AF	2+	6	2	2
03	add	reg16,reg16	SF,ZF,OF,CF,PF,AF	2	2	1	1
		reg32,reg32					
03	add	reg16,mem16	SF,ZF,OF,CF,PF,AF	2+	6	2	2
		reg32,mem32					
04	add	AL,imm8	SF,ZF,OF,CF,PF,AF	2	2	1	1
05	add	AX,imm16	SF,ZF,OF,CF,PF,AF	3	2	1	1
		EAX,imm32		5			
06	push	ES	none	1	2	3	1
07	pop	ES	none	1	7	3	3
08	or	mem8,reg8	SF,ZF,OF,CF,PF,AF	2+	7	3	3
09	or	mem16,reg16	SF,ZF,OF,CF,PF,AF	2+	7	3	3
		mem32,reg32					
0A	or	reg8,reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
0A	or	reg8,mem8	SF,ZF,OF,CF,PF,AF	2+	6	2	2
0B	or	reg16,reg16	SF,ZF,OF,CF,PF,AF	2	2	1	1
		reg32,reg32					
0B	or	reg16,mem16	SF,ZF,OF,CF,PF,AF	2+	6	2	2
		reg32,mem32					
0C	or	AL,imm8	SF,ZF,OF,CF,PF,AF	2	2	1	1
0D	or	AX,imm16	SF,ZF,OF,CF,PF,AF	3	2	1	1
		EAX,imm32		5			
0E	push	CS	none	1	2	3	1
0F 04	shld	reg16,reg16,imm8	SF,ZF,CF,PF	4	3	2	4
		reg32,reg32,imm8	OF,AF ?				
0F 04	shld	mem16,reg16,imm8	SF,ZF,CF,PF	4+	7	4	4
		mem32,reg32,imm8	OF,AF ?				
0F 05	shld	reg16,reg16,CL	SF,ZF,CF,PF	3	3	3	4
		reg32,reg32,CL	OF,AF ?				
0F 05	shld	mem16,reg16,CL	SF,ZF,CF,PF	3+	7	4	5
		mem32,reg32,CL	OF,AF ?				
0F 80	jo	rel32	none	7+,3	3,1	1	6
0F 81	jno	rel32	none	7+,3	3,1	1	6
0F 82	jb	rel32	none	7+,3	3,1	1	6
	jnae						
0F 82	jc	rel32	none	7+,3	3,1	1	6
0F 83	jae	rel32	none	7+,3	3,1	1	6
	jnb						
0F 83	jnc	rel32	none	7+,3	3,1	1	6
0F 84	je	rel32	none	7+,3	3,1	1	6
	jz						
0F 85	jne	rel32	none	7+,3	3,1	1	6
	jnz						
0F 86	jbe	rel32	none	7+,3	3,1	1	6

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
0F 87	jna						
	ja	rel32	none	7+,3	3,1	1	6
	jnb						
0F 88	js	rel32	none	7+,3	3,1	1	6
0F 89	jns	rel32	none	7+,3	3,1	1	6
0F 8A	jp	rel32	none	7+,3	3,1	1	6
0F 8B	jpe						
	jnp	rel32	none	7+,3	3,1	1	6
	jpo						
0F 8C	jl	rel32	none	7+,3	3,1	1	6
0F 8D	jnge						
	jge	rel32	none	7+,3	3,1	1	6
	jnl						
0F 8E	jle	rel32	none	7+,3	3,1	1	6
0F 8F	jng						
	jg	rel32	none	7+,3	3,1	1	6
	jnle						
0F A0	push	FS	none	2	2	3	1
0F A1	pop	FS	none	2	7	3	3
0F A8	push	GS	none	2	2	3	1
0F A9	pop	GS	none	2	7	3	3
0F AC	shrd	reg16,reg16,imm8	SF,ZF,CF,PF	4	3	2	4
0F AC	shrd	reg32,reg32,imm8	OF,AF ?				
		mem16,reg16,imm8	SF,ZF,CF,PF	4+	7	4	4
		mem32,reg32,imm8	OF,AF ?				
0F AD	shrd	reg16,reg16,CL	SF,ZF,CF,PF	3	3	3	4
0F AD	shrd	reg32,reg32,CL	OF,AF ?				
		mem16,reg16,CL	SF,ZF,CF,PF	3+	7	4	5
		mem32,reg32,CL	OF,AF ?				
0F AF	imul	reg16,reg16	OF,CF	3	9-22	13-26	11
reg32,reg32		SF,ZF, PF,AF ?		9-38	13-42	10	
0F AF	imul	reg16,mem16	OF,CF	3+	12-25	13-26	11
		reg32,mem32	SF,ZF, PF,AF ?		12-41	13-42	10
0F B6	movzx	reg16,reg8	none	3	3	3	3
reg32,reg8							
0F B6	movzx	reg16,mem8	none	3+	6	3	3
reg32,mem8							
0F B7	movzx	reg32,reg16	none	3	3	3	3
0F B7	movzx	reg32,mem16	none	3+	6	3	3
0F BE	movsx	reg16,reg8	none	3	3	3	3
reg32,reg8							
0F BE	movsx	reg16,mem8	none	3+	6	3	3
reg32,mem8							
0F BF	movsx	reg32,reg16	none	3	3	3	3
0F BF	movsx	reg32,mem16	none	3+	6	3	3
10	adc	mem8,reg8	SF,ZF,OF,CF,PF,AF	2+	7	3	3
11	adc	mem16,reg16	SF,ZF,OF,CF,PF,AF	2+	7	3	3
mem32,reg32							
12	adc	reg8,reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
12	adc	reg8,mem8	SF,ZF,OF,CF,PF,AF	2+	6	2	2
13	adc	reg16,reg16	SF,ZF,OF,CF,PF,AF	2	2	1	1

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
13	adc	reg32,reg32					
		reg16,mem16	SF,ZF,OF,CF,PF,AF	2+	6	2	2
		reg32,mem32					
14	adc	AL,imm8	SF,ZF,OF,CF,PF,AF	2	2	1	1
15	adc	AX,imm16	SF,ZF,OF,CF,PF,AF	3	2	1	1
16	push	EAX,imm32		5			
		SS	none	1	2	3	1
		SS	none	1	7	3	3
17	pop	SS	none	1	7	3	3
18	sbb	mem8,reg8	SF,ZF,OF,CF,PF,AF	2+	7	3	3
19	sbb	mem16,reg16	SF,ZF,OF,CF,PF,AF	2+	7	3	3
1A	sbb	mem32,reg32					
		reg8,reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
		reg8,mem8	SF,ZF,OF,CF,PF,AF	2+	6	2	2
1B	sbb	reg16,reg16	SF,ZF,OF,CF,PF,AF	2	2	1	1
1B	sbb	reg32,reg32					
		reg16,mem16	SF,ZF,OF,CF,PF,AF	2+	6	2	2
		reg32,mem32					
1C	sbb	AL,imm8	SF,ZF,OF,CF,PF,AF	2	2	1	1
1D	sbb	AX,imm16	SF,ZF,OF,CF,PF,AF	3	2	1	1
1E	push	EAX,imm32		5			
		DS	none	1	2	3	1
		DS	none	1	7	3	3
20	and	mem8,reg8	SF,ZF,OF,CF,PF,AF	2+	7	3	3
21	and	mem16,reg16	SF,ZF,OF,CF,PF,AF	2+	7	3	3
22	and	mem32,reg32					
		reg8,reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
		reg8,mem8	SF,ZF,OF,CF,PF,AF	2+	6	2	2
23	and	reg16,reg16	SF,ZF,OF,CF,PF,AF	2	2	1	1
23	and	reg32,reg32					
		reg16,mem16	SF,ZF,OF,CF,PF,AF	2+	6	2	2
		reg32,mem32					
24	and	AL,imm8	SF,ZF,OF,CF,PF,AF	2	2	1	1
25	and	AX,imm16	SF,ZF,OF,CF,PF,AF	3	2	1	1
27	daa	EAX,imm32		5			
		none	SF,ZF,PF,AF	1	4	2	3
			OF ?				
28	sub	mem8,reg8	SF,ZF,OF,CF,PF,AF	2+	7	3	3
29	sub	mem16,reg16	SF,ZF,OF,CF,PF,AF	2+	7	3	3
2A	sub	mem32,reg32					
		reg8,reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
		reg8,mem8	SF,ZF,OF,CF,PF,AF	2+	6	2	2
2B	sub	reg16,reg16	SF,ZF,OF,CF,PF,AF	2	2	1	1
2B	sub	reg32,reg32					
		reg16,mem16	SF,ZF,OF,CF,PF,AF	2+	6	2	2
		reg32,mem32					
2C	sub	AL,imm8	SF,ZF,OF,CF,PF,AF	2	2	1	1
2D	sub	AX,imm16	SF,ZF,OF,CF,PF,AF	3	2	1	1
2F	das	EAX,imm32		5			
		none	SF,ZF,PF,AF	1	4	2	3
			OF ?				
30	xor	mem8,reg8	SF,ZF,OF,CF,PF,AF	2+	7	3	3

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
31	xor	mem16,reg16 mem32,reg32	SF,ZF,OF,CF,PF,AF	2+	7	3	3
32	xor	reg8,reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
32	xor	reg8,mem8	SF,ZF,OF,CF,PF,AF	2+	6	2	2
33	xor	reg16,reg16 reg32,reg32	SF,ZF,OF,CF,PF,AF	2	2	1	1
33	xor	reg16,mem16 reg32,mem32	SF,ZF,OF,CF,PF,AF	2+	6	2	2
34	xor	AL,imm8	SF,ZF,OF,CF,PF,AF	2	2	1	1
35	xor	AX,imm16 EAX,imm32	SF,ZF,OF,CF,PF,AF	5	2	1	1
37	aaa	none	AF,CF SF,ZF,OF,PF ?	1	4	3	3
38	cmp	reg8,reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
38	cmp	mem8,reg8	SF,ZF,OF,CF,PF,AF	2+	5	2	2
39	cmp	mem16,reg16 mem32,reg32	SF,ZF,OF,CF,PF,AF	2+	5	2	2
3A	cmp	reg8,mem8	SF,ZF,OF,CF,PF,AF	2+	6	2	2
3B	cmp	reg16,reg16 reg32,reg32	SF,ZF,OF,CF,PF,AF	2	2	1	1
3B	cmp	reg16,mem16 reg32,mem32	SF,ZF,OF,CF,PF,AF	2+	6	2	2
3C	cmp	AL,imm8	SF,ZF,OF,CF,PF,AF	2	2	1	1
3D	cmp	AX,imm16 EAX,imm32	SF,ZF,OF,CF,PF,AF	5	2	1	1
3F	aas	none	AF,CF SF,ZF,OF,PF ?	1	4	3	3
40	inc	AX EAX	SF,ZF,OF,PF,AF	1	2	1	1
41	inc	CX ECX	SF,ZF,OF,PF,AF	1	2	1	1
42	inc	DX EDX	SF,ZF,OF,PF,AF	1	2	1	1
43	inc	BX EBX	SF,ZF,OF,PF,AF	1	2	1	1
44	inc	SP ESP	SF,ZF,OF,PF,AF	1	2	1	1
45	inc	BP EBP	SF,ZF,OF,PF,AF	1	2	1	1
47	inc	SI ESI	SF,ZF,OF,PF,AF	1	2	1	1
48	dec	AX EAX	SF,ZF,OF,PF,AF	1	2	1	1
48	inc	DI EDI	SF,ZF,OF,PF,AF	1	2	1	1
49	dec	CX ECX	SF,ZF,OF,PF,AF	1	2	1	1
4A	dec	DX EDX	SF,ZF,OF,PF,AF	1	2	1	1
4B	dec	BX EBX	SF,ZF,OF,PF,AF	1	2	1	1

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
4C	dec	SP ESP	SF,ZF,OF,PF,AF	1	2	1	1
4D	dec	BP EBP	SF,ZF,OF,PF,AF	1	2	1	1
4E	dec	SI ESI	SF,ZF,OF,PF,AF	1	2	1	1
4F	dec	DI EDI	SF,ZF,OF,PF,AF	1	2	1	1
50	push	AX EAX	none	1	2	1	1
51	push	CX ECX	none	1	2	1	1
52	push	DX EDX	none	1	2	1	1
53	push	BX EBX	none	1	2	1	1
54	push	SP ESP	none	1	2	1	1
55	push	BP EBP	none	1	2	1	1
56	push	SI ESI	none	1	2	1	1
57	push	DI EDI	none	1	2	1	1
58	pop	AX EAX	none	1	4	1	1
59	pop	CX ECX	none	1	4	1	1
5A	pop	DX EDX	none	1	4	1	1
5B	pop	BX EBX	none	1	4	1	1
5C	pop	SP ESP	none	1	4	1	1
5D	pop	BP EBP	none	1	4	1	1
5E	pop	SI ESI	none	1	4	1	1
5F	pop	DI EDI	none	1	4	1	1
60	pusha pushad	none	none	1	18	11	5
61	popa popad	none	none	1	24	9	5
68	push	imm16 imm32	none	3 5	2	1	1
69	imul	reg16,reg16,imm16 reg32,reg32,imm32	OF,CF SF,ZF, PF,AF ?	4 6	9-22 9-38	13-26 13-42	10 10
69	imul	reg16,mem16,imm16 reg32,mem32,imm32	OF,CF SF,ZF, PF,AF ?	4+ 6+	12-25 12-41	13-26 13-42	10 10
6A	push	imm8	none	2	2	1	1

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
6B	imul	reg16,imm8	OF,CF	3	9-14	13-18	10
		reg32,imm8	SF,ZF, PF,AF ?				
6B	imul	reg16,reg16,imm8	OF,CF	3	9-14	13-18	10
		reg32,reg32,imm8	SF,ZF, PF,AF ?				
6B	imul	reg16,mem16,imm8	OF,CF	3+	9-17	13-18	10
		reg32,mem32,imm8	SF,ZF, PF,AF ?				
70	jo	rel8	none	7+,3	3,1	1	2
71	jno	rel8	none	7+,3	3,1	1	2
72	jb	rel8	none	7+,3	3,1	1	2
	jnae						
72	jc	rel8	none	7+,3	3,1	1	2
73	jae	rel8	none	7+,3	3,1	1	2
	jnb						
73	jnc	rel8	none	7+,3	3,1	1	2
74	je	rel8	none	7+,3	3,1	1	2
	jz						
75	jne	rel8	none	7+,3	3,1	1	2
	jnz						
76	jbe	rel8	none	7+,3	3,1	1	2
	jna						
77	ja	rel8	none	7+,3	3,1	1	2
	jnbe						
78	js	rel8	none	7+,3	3,1	1	2
79	jns	rel8	none	7+,3	3,1	1	2
7A	jp	rel8	none	7+,3	3,1	1	2
	jpe						
7B	jnp	rel8	none	7+,3	3,1	1	2
	jpo						
7C	jl	rel8	none	7+,3	3,1	1	2
	jnge						
7D	jge	rel8	none	7+,3	3,1	1	2
	jnl						
7E	jle	rel8	none	7+,3	3,1	1	2
	jng						
7F	jg	rel8	none	7+,3	3,1	1	2
	jnle						
80	adc	reg8,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
80	adc	mem8,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
80	add	reg8,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
80	add	mem8,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
80	and	reg8,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
80	and	mem8,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
80	cmp	reg8,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
80	cmp	mem8,imm8	SF,ZF,OF,CF,PF,AF	3+	5	2	2
80	or	reg8,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
80	or	mem8,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
80	sbb	reg8,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
80	sbb	mem8,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
80	sub	reg8,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
80	sub	mem8,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
80	xor	reg8,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
80	xor	mem8,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
81	adc	reg16,imm16	SF,ZF,OF,CF,PF,AF	4	2	1	1
		reg32,imm32		6			
81	adc	mem16,imm16	SF,ZF,OF,CF,PF,AF	4+	7	3	3
		mem32,imm32		6+			
81	add	reg16,imm16	SF,ZF,OF,CF,PF,AF	4	2	1	1
		reg32,imm32		6			
81	add	mem16,imm16	SF,ZF,OF,CF,PF,AF	4+	7	3	3
		mem32,imm32		6+			
81	and	reg16,imm16	SF,ZF,OF,CF,PF,AF	4	2	1	1
		reg32,imm32		6			
81	and	mem16,imm16	SF,ZF,OF,CF,PF,AF	4+	7	3	3
		mem32,imm32		6+			
81	cmp	reg16,imm16	SF,ZF,OF,CF,PF,AF	4	2	1	1
		reg32,imm32		6			
81	cmp	mem16,imm16	SF,ZF,OF,CF,PF,AF	4+	5	2	2
		mem32,imm32		6+			
81	or	reg16,imm16	SF,ZF,OF,CF,PF,AF	4	2	1	1
		reg32,imm32		6			
81	or	mem16,imm16	SF,ZF,OF,CF,PF,AF	4+	7	3	3
		mem32,imm32		6+			
81	sbb	reg16,imm16	SF,ZF,OF,CF,PF,AF	4	2	1	1
		reg32,imm32		6			
81	sbb	mem16,imm16	SF,ZF,OF,CF,PF,AF	4+	7	3	3
		mem32,imm32		6+			
81	sub	reg16,imm16	SF,ZF,OF,CF,PF,AF	4	2	1	1
		reg32,imm32		6			
81	sub	mem16,imm16	SF,ZF,OF,CF,PF,AF	4+	7	3	3
		mem32,imm32		6+			
81	xor	reg16,imm16	SF,ZF,OF,CF,PF,AF	4	2	1	1
		reg32,imm32		6			
81	xor	mem16,imm16	SF,ZF,OF,CF,PF,AF	4+	7	3	3
		mem32,imm32		6+			
83	adc	reg16,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
		reg32,imm8					
83	adc	mem16,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
		mem32,imm8					
83	add	reg16,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
		reg32,imm8					
83	add	mem16,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
		mem32,imm8					
83	and	reg16,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
		reg32,imm8					
83	and	mem16,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
		mem32,imm8					
83	cmp	reg16,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
		reg32,imm8					
83	cmp	mem16,imm8	SF,ZF,OF,CF,PF,AF	3+	5	2	2
		mem32,imm8					
83	or	reg16,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
		reg32,imm8					

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
83	or	mem16,imm8 mem32,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
83	sbb	reg16,imm8 reg32,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
83	sbb	mem16,imm8 mem32,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
83	sub	reg16,imm8 reg32,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
83	sub	mem16,imm8 mem32,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
83	xor	reg16,imm8 reg32,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
83	xor	mem16,imm8 mem32,imm8	SF,ZF,OF,CF,PF,AF	3+	7	3	3
84	test	reg8,reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
84	test	mem8,reg8	SF,ZF,OF,CF,PF,AF	2+	5	2	2
85	test	reg16,reg16 reg32,reg32	SF,ZF,OF,CF,PF,AF	2	2	1	1
85	test	mem16,reg16 mem32,reg32	SF,ZF,OF,CF,PF,AF	2+	5	2	2
86	xchg	reg8,reg8	none	2	3	3	3
86	xchg	reg8,mem8	none	2+	5	5	3
87	xchg	reg16,reg16	none	2	3	3	3
87	xchg	reg16,mem16	none	2+	5	5	3
88	mov	mem8,reg8	none	2+	2	1	1
89	mov	mem16,reg16 mem32,reg32	none	2+	2	1	1
8A	mov	reg8,reg8	none	2	2	1	1
8A	mov	reg8,mem8	none	2+	4	1	1
8B	mov	reg16,reg16 reg32,reg32	none	2	2	1	1
8B	mov	reg16,mem16 reg32,mem32	none	2+	4	1	1
8C	mov	reg16,sreg	none	2	2	3	1
8C	mov	mem16,sreg	none	2+	2	3	1
8D	lea	reg32,mem32	none	2+	2	1	1
8E	mov	sreg, reg16	none	2	2	3	1
8E	mov	sreg,mem16	none	2+	2	3 <sup>[4]</sup>	2 <sup>[4]</sup>
8F	pop	mem16 mem32	none	2+	5	6	3
91	xchg	AX, CX EAX, ECX	none	1	3	3	2
92	xchg	AX, DX EAX, EDX	none	1	3	3	2
93	xchg	AX, BX EAX, EBX	none	1	3	3	2
94	xchg	AX, SP EAX, ESP	none	1	3	3	2
95	xchg	AX, BP EAX, EBP	none	1	3	3	2
96	xchg	AX, SI	none	1	3	3	2




Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
97	xchg	EAX, ESI	none	1	3	3	2
		AX, DI					
98	cbw	EAX, EDI	none	1	3	3	3
		none					
98	cwde	none	none	1	3	3	3
99	cdq	none	none	1	2	3	2
99	cwd	none	none	1	2	3	2
9A	call	far direct	none	7	17+	18	4
9C	pushf	none	none	1	4	4	3
	pushfd						
9D	popf	none	none	1	5	9	4
	popfd						
A0	mov	AL, direct	none	5	4	1	1
A1	mov	AX, direct	none	5	4	1	1
A2	mov	EAX, direct	none	5	2	1	1
		direct ,AL					
A3	mov	direct, AX	none	5	2	1	1
A4	movsb	direct, EAX	none	1	7	7	4
		none					
A5	movsw	none	none	1	7	7	4
A6	cmpsb	movsd	none	1	10	8	5
		none					
A7	cmpsw	none	none	1	10	8	5
A8	test	cmpsd	SF,ZF,OF,CF,PF,AF	2	2	1	1
		AL,imm8					
A9	test	AX,imm16	SF,ZF,OF,CF,PF,AF	3	2	1	1
		EAX,imm32					
AA	stosb	none	none	1	4	5	3
AB	stosw	none	none	1	4	5	3
	stosd						
AC	lods b	none	none	1	5	5	2
AD	lodsw	none	none	1	5	5	2
AE	scas b	lods d	none	1	7	6	4
AE	scasw	none	none	1	7	6	4
B0	mov	scasd	none	2	2	1	1
B1	mov	AL, imm8	none	2	2	1	1
B2	mov	CL, imm8	none	2	2	1	1
B3	mov	DL, imm8	none	2	2	1	1
B4	mov	BL, imm8	none	2	2	1	1
B5	mov	AH, imm8	none	2	2	1	1
B6	mov	CH, imm8	none	2	2	1	1
B7	mov	DH, imm8	none	2	2	1	1
B8	mov	BH, imm8	none	2	2	1	1
B9	mov	AX, imm16	none	3	2	1	1
		EAX, imm32					
BA	mov	CX, imm16	none	3	2	1	1
		ECX, imm32					
BB	mov	DX, imm16	none	3	2	1	1
		EDX, imm32					

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
BC	mov	EBX, imm32	none	5	2	1	1
		SP, imm16		3			
BD	mov	ESP, imm32	none	5	2	1	1
		BP, imm16		3			
BE	mov	EPB, imm32	none	5	2	1	1
		SI, imm16		3			
BF	mov	ESI, imm32	none	5	2	1	1
		DI, imm16		3			
C0	rol	reg8, imm8	SF,ZF,OF,CF,PF	3	3	2	1
			AF ?				
C0	rol	mem8, imm8	SF,ZF,OF,CF,PF	3+	7	4	3
			AF ?				
C0	shl/sal	reg8, imm8	SF,ZF,OF,CF,PF	3	3	2	1
	shr		AF ?				
	sar						
C0	shl/sal	mem8, imm8	SF,ZF,OF,CF,PF	3+	7	4	3
	shr		AF ?				
	sar						
C1	rol	reg16,imm8	SF,ZF,OF,CF,PF	3	3	2	1
	ror	reg32,imm8	AF ?				
C1	rol	mem16,imm8	SF,ZF,OF,CF,PF	3+	7	4	3
	ror	mem32,imm8	AF ?				
C1	shl/sal	reg16,imm8	SF,ZF,OF,CF,PF	3	3	2	1
	shr	reg32,imm8	AF ?				
	sar						
C1	shl/sal	mem16,imm8	SF,ZF,OF,CF,PF	3+	7	4	3
	shr	mem32,imm8	AF ?				
	sar						
C2	ret (near)	imm16	none	3	10+	5	3
C3	ret (near)	none	none	1	10+	5	2
C6	mov	mem8, imm8	none	3+	2	1	1
C7	mov	mem16,imm16	none	4+	2	1	1
		mem32,imm32	6+				
CA	ret (far)	imm16	none	3	18+	14	4
CB	ret (far)	none	none	1	18+	13	4
D0	rol	reg8	SF,ZF,OF,CF,PF	2	3	3	1
	ror		AF ?				
D0	rol	mem8	SF,ZF,OF,CF,PF	2+	7	4	3
	ror		AF ?				
D0	shl/sal	reg8	SF,ZF,OF,CF,PF	2	3	3	1
	shr		AF ?				
	sar						
D0	shl/sal	mem8	SF,ZF,OF,CF,PF	2+	7	4	3
	shr		AF ?				
	sar						
D1	rol	reg16	SF,ZF,OF,CF,PF	2	3	3	1
	ror	reg32	AF ?				
D1	rol	reg16	SF,ZF,OF,CF,PF	2+	7	4	3
	ror	reg32	AF ?				
D1	shl/sal	reg16	SF,ZF,OF,CF,PF	2	3	3	1

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
D1	shr	reg32	AF ?	2+	7	4	3
	sar						
	shl/sal	reg16	SF,ZF,OF,CF,PF				
	shr	reg32	AF ?				
D2	sar			2	3	2	1
	rol	reg8, CL	SF,ZF,OF,CF,PF				
D2	ror	AF ?		2+	7	4	4
	rol	mem8, CL	SF,ZF,OF,CF,PF				
D2	ror		AF ?	2	3	2	1
	shl/sal	reg8, CL	SF,ZF,OF,CF,PF				
D2	shr		AF ?	2+	7	4	4
	sar						
	shl/sal	mem8, CL	SF,ZF,OF,CF,PF				
D3	shr		AF ?	2	3	2	1
	sar						
D3	rol	reg16,CL	SF,ZF,OF,CF,PF	2	3	2	1
	ror	reg32,CL	AF ?				
D3	rol	mem16,CL	SF,ZF,OF,CF,PF	2+	7	4	4
	ror	mem32,CL	AF ?				
D3	shl/sal	reg16,CL	SF,ZF,OF,CF,PF	2	3	2	1
	shr	reg32,CL	AF ?				
	sar						
D3	shl/sal	mem16,CL	SF,ZF,OF,CF,PF	2+	7	4	4
	shr	mem32,CL	AF ?				
	sar						
D4 0A	aam	none	SF,ZF,PF OF,AF,CF ?	2	17	15	18
D5 0A	aad	none	SF,ZF,PF OF,AF,CF ?	2	19	14	10
D7	xlat	none	none	1	5	4	4
E0	loopne	none	none	11+	6,9	7,8	2
E1	loopnz			11+	6,9	7,8	2
	loope	none	none				
E2	loopz			11+	6,7	5,6	2
	loop	none	none				
E3	jecxz	rel8	none			6,5	2
E8	call	rel32	none	5	7+	3	1
E9	jmp	rel32	none	5	7+	3	1
EB	jmp	rel8	none	2	7+	3	1
F2	repnz	none	none	1			
	repne	(string instruction prefix)					
F2 A6	repne	none	none	2	5+9n	7+7n	9+4n
	cmps	sb					
F2 A7	repne	none	none	2	5+9n	7+7n	9+4n
	cmps	sw					
	repne						
F2 AE	cmps	d					
	repne	none	none	2	5+8n	7+5n	9+4n
F2 AF	scas	sb					
	repne	none	none	2	5+8n	7+5n	9+4n

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
F3	scasw						
	repne						
	scasd						
F3	rep	none	none	1			
	repz repe	(string instruction prefix)					
F3 A4	rep movsb	none	none	2	7+4n	12+3n	13+4n
F3 A5	rep movsw	none	none	2	7+4n	12+3n	13+4n
	rep movsd						
	rep stosb	none	none	2	5+5n	7+4n	9n
F3 A6	repe cmpsb	none	none	2	5+9n	7+7n	9+4n
F3 A7	rep stosw	none	none	2	5+5n	7+4n	9n
	rep stosd						
F3 A7	repe cmpsw	none	none	2	5+9n	7+7n	9+4n
	repe cmpsd						
	repe scasb	none	none	2	5+8n	7+5n	9+4n
F3 AF	repe scasw	none	none	2	5+8n	7+5n	9+4n
	repe scasd						
F5	cmc	none	CF	1	2	2	2
F6	div reg8	reg8	SF,ZF,OF,PF,AF ?	2	14	16	17
F6	div mem8	mem8	SF,ZF,OF,PF,AF ?	2+	17	16	17
F6	idiv reg8	reg8	SF,ZF,OF,PF,AF ?	2	19	19	22
F6	idiv mem8	mem8	SF,ZF,OF,PF,AF ?	2+	22	20	22
F6	imul reg8	reg8	OF,CF SF,ZF, PF,AF ?	2	9-14	13-18	11
	imul mem8	mem8	OF,CF SF,ZF, PF,AF ?	2+	12-17	13-18	11
	mul reg8	reg8	OF,CF SF,ZF, PF,AF ?	2	9-14	13-18	11
F6	mul mem8	mem8	OF,CF SF,ZF, PF,AF ?	2+	12-17	13-18	11
	neg reg8	reg8	SF,ZF,OF,CF,PF,AF	2	2	1	1
F6	neg mem8	mem8	SF,ZF,OF,CF,PF,AF	2+	2	1	1
F6	not reg8	reg8	none	2	2	1	1
F6	not mem8	mem8	none	2+	6	3	3
F6	test reg8,imm8	reg8,imm8	SF,ZF,OF,CF,PF,AF	3	2	1	1
F6	test mem8,imm8	mem8,imm8	SF,ZF,OF,CF,PF,AF	3+	5	2	2
F7	div reg16	reg16	SF,ZF,OF,PF,AF ?	2	22	24	25
		reg32			38	40	41
	div mem16	mem16	SF,ZF,OF,PF,AF ?	2+	25	24	25
F7		mem32			41	40	41
	idiv reg16	reg16	SF,ZF,OF,PF,AF ?	2	27	27	30

Opcode	Mnemonic	Operand(s)	Flags affected	Number of bytes	Timing 386	Timing 486	Timing Pentium
		reg32			43	43	48
F7	idiv	mem16	SF,ZF,OF,PF,AF ?	2+	30	28	30
		mem32			46	44	48
F7	imul	reg16	OF,CF	2	9-22	13-26	11
		reg32	SF,ZF, PF,AF ?		9-38	13-42	10
F7	imul	mem16	OF,CF	2+	12-25	13-26	11
		mem32	SF,ZF, PF,AF ?		12-41	13-42	10
F7	imul	mem16	OF,CF	4	9-22	13-26	11
		mem32	SF,ZF, PF,AF ?	6	9-38	13-42	10
F7	mul	reg16	OF,CF	2	9-22	13-26	11
		reg32	SF,ZF, PF,AF ?		9-38	13-42	10
F7	mul	mem16	OF,CF	2+	12-25	13-26	11
		mem32	SF,ZF, PF,AF ?		12-41	13-42	10
F7	neg	reg16	SF,ZF,OF,CF,PF,AF	2	2	1	1
		reg32					
F7	neg	mem16	SF,ZF,OF,CF,PF,AF	2+	2	1	1
		mem32					
F7	not	reg16	none	2	2	1	1
		reg32					
F7	not	mem16	none	2+	6	3	3
		mem32					
F7	test	reg16,imm16	SF,ZF,OF,CF,PF,AF	4	2	1	1
		reg32,imm32		6			
F7	test	mem16,imm16	SF,ZF,OF,CF,PF,AF	4+	5	2	2
		mem32,imm32		6+			
F8	clc	none	CF	1	2	2	2
F9	stc	none	CF	1	2	2	2
FC	cld	none	DF	1	2	2	2
FD	std	none	DF	1	2	2	2
FE	dec	reg8		2	2	1	1
FE	dec	mem8	SF,ZF,OF,PF,AF	2+	6	3	3
FE	inc	reg8	SF,ZF,OF,PF,AF	2	2	1	1
FE	inc	mem8	SF,ZF,OF,PF,AF	2+	6	3	3
FF	call	reg32 (near indirect)	none	2	7+	5	2
FF	call	mem32 (near indirect)	none	2+	10+	5	2
FF	call	far indirect	none	6	22+	17	5
FF	dec	mem16	SF,ZF,OF,PF,AF	2+	6	3	3
		mem32					
FF	inc	mem16	SF,ZF,OF,PF,AF	2+	6	3	3
		mem32					
FF	jmp	reg32	none	2	10+	5	2
FF	jmp	mem32	none	2+	10+	5	2
FF	push	mem16	none	2+	5	4	2
		mem32					

 timing varies