

| Instructions                                 | Opcode                              | Instructions                 | Opcode                         |
|--|-------------------------------------|------------------------------|--------------------------------|
| MOV reg, reg<br>MOV reg, mem<br>MOV mem, reg | 100010dw oorrmmmm<br>disp           | RCL reg, 1<br>RCL mem, 1     | 1101000w oo010mmm<br>disp      |
| MOV reg, imm                                 | 1011wrrr data                       | RCR reg, 1<br>RCR mem, 1     | 1101000w oo011mmm<br>disp      |
| MOV mem, imm                                 | 1100011w oo000mmm<br>disp data      | ROL reg, 1<br>ROL mem, 1     | 1101000w oo000mmm<br>disp      |
| MOVSX reg, reg<br>MOVSX reg, mem             | 00001111 1011111w<br>oorrrmmmm disp | ROR reg, 1<br>ROR mem, 1     | 1101000w oo001mmm<br>disp      |
| MOVZX reg, reg<br>MOVZX reg, mem             | 00001111 1011011w<br>oorrrmmmm disp | RCL reg, CL<br>RCL mem, CL   | 1101001w oo010mmm<br>disp      |
| MUL reg<br>MUL mem                           | 1111011w oo100mmm<br>disp           | RCR reg, CL<br>RCR mem, CL   | 1101001w oo011mmm<br>disp      |
| NEG reg<br>NEG mem                           | 1111011w oo011mmm<br>disp           | ROL reg, CL<br>ROL mem, CL   | 1101001w oo000mmm<br>disp      |
| NOT reg<br>NOT mem                           | 1111011w oo010mmm<br>disp           | ROR reg, CL<br>ROR mem, CL   | 1101001w oo001mmm<br>disp      |
| OR reg, reg<br>OR reg, mem<br>OR mem, reg    | 000010dw oorrmmmm<br>disp           | RCL reg, imm<br>RCL mem, imm | 1100000w oo010mmm<br>disp data |
| OR reg, imm<br>OR mem, imm                   | 1000000w oo001mmm<br>disp           | RCR reg, imm<br>RCR mem, imm | 1100000w oo011mmm<br>disp data |
| POP reg                                      | 01011rrr                            | ROL reg, imm<br>ROL mem, imm | 1100000w oo000mmm<br>disp data |
| POP mem                                      | 10001111 oo000mmm<br>disp           | ROR reg, imm<br>ROR mem, imm | 1100000w oo001mmm<br>disp data |
| PUSH reg                                     | 01010rrr                            | Jcond Label<br>(8bit disp)   | 0111cccc disp                  |
| PUSH mem                                     | 11111111 oo110mmm<br>disp           | Jcond Label<br>(16bit disp)  | 00001111 1000cccc disp         |
| PUSH imm                                     | 01101000 data                       | LOOP Label                   | 11100010 disp                  |
| INC reg<br>INC mem                           | 1111111w oo000mmm<br>disp           | DEC reg<br>DEC mem           | 1111111w oo001mmm<br>disp      |

| MOD = 11 |     |     | Direct Effective Address |                |                          |                           |
|----------|-----|-----|--------------------------|----------------|--------------------------|---------------------------|
| R/M      | W=0 | W=1 | R/M                      | MOD = 00       | MOD = 01                 | MOD = 10                  |
| 000      | AL  | AX  | 000                      | [BX]+[SI]      | [BX]+[SI]+D <sub>8</sub> | [BX]+[SI]+D <sub>16</sub> |
| 001      | CL  | CX  | 001                      | [BX]+[DI]      | [BX]+[DI]+D <sub>8</sub> | [BX]+[DI]+D <sub>16</sub> |
| 010      | DL  | DX  | 010                      | [BP]+[SI]      | [BP]+[SI]+D <sub>8</sub> | [BP]+[SI]+D <sub>16</sub> |
| 011      | BL  | BX  | 011                      | [BP]+[DI]      | [BP]+[DI]+D <sub>8</sub> | [BP]+[DI]+D <sub>16</sub> |
| 100      | AH  | SP  | 100                      | [SI]           | [SI]+D <sub>8</sub>      | [SI]+D <sub>16</sub>      |
| 101      | CH  | BP  | 101                      | [DI]           | [DI]+D <sub>8</sub>      | [DI]+D <sub>16</sub>      |
| 110      | DH  | SI  | 110                      | Direct Address | [BP]+D <sub>8</sub>      | [BP]+D <sub>16</sub>      |
| 111      | BH  | DI  | 111                      | [BX]           | [BX]+D <sub>8</sub>      | [BX]+D <sub>16</sub>      |

| Condition |          |                       |                               |
|-----------|----------|-----------------------|-------------------------------|
| Codes     | Mnemonic | Flag                  | Description                   |
| 0000      | JO       | $O = 1$               | Jump if overflow              |
| 0001      | JNO      | $O = 0$               | Jump if no overflow           |
| 0010      | JB/NAE   | $C = 1$               | Jump if below                 |
| 0011      | JAЕ/JNB  | $C = 0$               | Jump if above or equal        |
| 0100      | JE/JZ    | $Z = 1$               | Jump if equal/zero            |
| 0101      | JNE/JNZ  | $Z = 0$               | Jump if not equal/zero        |
| 0110      | JBE/JNA  | $C = 1 + Z = 1$       | Jump if below or equal        |
| 0111      | JA/JNBE  | $C = 0 \bullet Z = 0$ | Jump if above                 |
| 1000      | JS       | $S = 1$               | Jump if sign                  |
| 1001      | JNS      | $S = 0$               | Jump if no sign               |
| 1010      | JP/JPE   | $P = 1$               | Jump if parity                |
| 1011      | JNP/JPO  | $P = 0$               | Jump if no parity             |
| 1100      | JL/JNGE  | $S \bullet O$         | Jump if less than             |
| 1101      | JGE/JNL  | $S = 0$               | Jump if greater than or equal |
| 1110      | JLE/JNG  | $Z = 1 + S \bullet O$ | Jump if less than or equal    |
| 1111      | JG/JNLE  | $Z = 0 + S = O$       | Jump if greater than          |

Best of Luck