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8051 Instruction Set Manual


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Opcodes

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The following table lists the 8051 instructions by HEX code.

Hex Code	Bytes	Mnemonic	Operands
00	1	NOP	
01	2	AJMP	addr11
02	3	LJMP	addr16
03	1	RR	A
04	1	INC	A
05	2	INC	direct
06	1	INC	@R0
07	1	INC	@R1
08	1	INC	R0
09	1	INC	R1
0A	1	INC	R2
0B	1	INC	R3
0C	1	INC	R4
0D	1	INC	R5
0E	1	INC	R6
0F	1	INC	R7
10	3	JBC	bit, offset
11	2	ACALL	addr11
12	3	LCALL	addr16
13	1	RRC	A
14	1	DEC	A
15	2	DEC	direct
16	1	DEC	@R0
17	1	DEC	@R1
18	1	DEC	R0
19	1	DEC	R1
1A	1	DEC	R2
1B	1	DEC	R3
1C	1	DEC	R4
1D	1	DEC	R5
1E	1	DEC	R6
1F	1	DEC	R7
20	3	JB	bit, offset
21	2	AJMP	addr11
22	1	RET	
23	1	RL	A
24	2	ADD	A, #immed
25	2	ADD	A, direct
26	1	ADD	A, @R0
27	1	ADD	A, @R1
28	1	ADD	A, R0
29	1	ADD	A, R1
2A	1	ADD	A, R2
2B	1	ADD	A, R3
2C	1	ADD	A, R4
2D	1	ADD	A, R5
2E	1	ADD	A, R6
2F	1	ADD	A, R7
30	3	JNB	bit, offset

Hex Code	Bytes	Mnemonic	Operands
80	2	SJMP	offset
81	2	AJMP	addr11
82	2	ANL	C, bit
83	1	MOVC	A, @A+PC
84	1	DIV	AB
85	3	MOV	direct, direct
86	2	MOV	direct, @R0
87	2	MOV	direct, @R1
88	2	MOV	direct, R0
89	2	MOV	direct, R1
8A	2	MOV	direct, R2
8B	2	MOV	direct, R3
8C	2	MOV	direct, R4
8D	2	MOV	direct, R5
8E	2	MOV	direct, R6
8F	2	MOV	direct, R7
90	3	MOV	DPTR, #immed
91	2	ACALL	addr11
92	2	MOV	bit, C
93	1	MOVC	A, @A+DPTR
94	2	SUBB	A, #immed
95	2	SUBB	A, direct
96	1	SUBB	A, @R0
97	1	SUBB	A, @R1
98	1	SUBB	A, R0
99	1	SUBB	A, R1
9A	1	SUBB	A, R2
9B	1	SUBB	A, R3
9C	1	SUBB	A, R4
9D	1	SUBB	A, R5
9E	1	SUBB	A, R6
9F	1	SUBB	A, R7
A0	2	ORL	C, /bit
A1	2	AJMP	addr11
A2	2	MOV	C, bit
A3	1	INC	DPTR
A4	1	MUL	AB
A5		reserved	
A6	2	MOV	@R0, direct
A7	2	MOV	@R1, direct
A8	2	MOV	R0, direct
A9	2	MOV	R1, direct
AA	2	MOV	R2, direct
AB	2	MOV	R3, direct
AC	2	MOV	R4, direct
AD	2	MOV	R5, direct
AE	2	MOV	R6, direct
AF	2	MOV	R7, direct
B0	2	ANL	C, /bit

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31	2	ACALL	addr11
32	1	RETI	
33	1	RLC	A
34	2	ADDC	A, #immed
35	2	ADDC	A, direct
36	1	ADDC	A, @R0
37	1	ADDC	A, @R1
38	1	ADDC	A, R0
39	1	ADDC	A, R1
3A	1	ADDC	A, R2
3B	1	ADDC	A, R3
3C	1	ADDC	A, R4
3D	1	ADDC	A, R5
3E	1	ADDC	A, R6
3F	1	ADDC	A, R7
40	2	JC	offset
41	2	AJMP	addr11
42	2	ORL	direct, A
43	3	ORL	direct, #immed
44	2	ORL	A, #immed
45	2	ORL	A, direct
46	1	ORL	A, @R0
47	1	ORL	A, @R1
48	1	ORL	A, R0
49	1	ORL	A, R1
4A	1	ORL	A, R2
4B	1	ORL	A, R3
4C	1	ORL	A, R4
4D	1	ORL	A, R5
4E	1	ORL	A, R6
4F	1	ORL	A, R7
50	2	JNC	offset
51	2	ACALL	addr11
52	2	ANL	direct, A
53	3	ANL	direct, #immed
54	2	ANL	A, #immed
55	2	ANL	A, direct
56	1	ANL	A, @R0
57	1	ANL	A, @R1
58	1	ANL	A, R0
59	1	ANL	A, R1
5A	1	ANL	A, R2
5B	1	ANL	A, R3
5C	1	ANL	A, R4
5D	1	ANL	A, R5
5E	1	ANL	A, R6
5F	1	ANL	A, R7
60	2	JZ	offset
61	2	AJMP	addr11
62	2	XRL	direct, A
63	3	XRL	direct, #immed
64	2	XRL	A, #immed
65	2	XRL	A, direct
66	1	XRL	A, @R0
67	1	XRL	A, @R1
68	1	XRL	A, R0
69	1	XRL	A, R1
6A	1	XRL	A, R2
6B	1	XRL	A, R3
6C	1	XRL	A, R4
6D	1	XRL	A, R5
6E	1	XRL	A, R6
6F	1	XRL	A, R7
70	2	JNZ	offset
71	2	ACALL	addr11

B1	2	ACALL	addr11
B2	2	CPL	bit
B3	1	CPL	C
B4	3	CJNE	A, #immed, offset
B5	3	CJNE	A, direct, offset
B6	3	CJNE	@R0, #immed, offset
B7	3	CJNE	@R1, #immed, offset
B8	3	CJNE	R0, #immed, offset
B9	3	CJNE	R1, #immed, offset
BA	3	CJNE	R2, #immed, offset
BB	3	CJNE	R3, #immed, offset
BC	3	CJNE	R4, #immed, offset
BD	3	CJNE	R5, #immed, offset
BE	3	CJNE	R6, #immed, offset
BF	3	CJNE	R7, #immed, offset
C0	2	PUSH	direct
C1	2	AJMP	addr11
C2	2	CLR	bit
C3	1	CLR	C
C4	1	SWAP	A
C5	2	XCH	A, direct
C6	1	XCH	A, @R0
C7	1	XCH	A, @R1
C8	1	XCH	A, R0
C9	1	XCH	A, R1
CA	1	XCH	A, R2
CB	1	XCH	A, R3
CC	1	XCH	A, R4
CD	1	XCH	A, R5
CE	1	XCH	A, R6
CF	1	XCH	A, R7
D0	2	POP	direct
D1	2	ACALL	addr11
D2	2	SETB	bit
D3	1	SETB	C
D4	1	DA	A
D5	3	DJNZ	direct, offset
D6	1	XCHD	A, @R0
D7	1	XCHD	A, @R1
D8	2	DJNZ	R0, offset
D9	2	DJNZ	R1, offset
DA	2	DJNZ	R2, offset
DB	2	DJNZ	R3, offset
DC	2	DJNZ	R4, offset
DD	2	DJNZ	R5, offset
DE	2	DJNZ	R6, offset
DF	2	DJNZ	R7, offset
E0	1	MOVX	A, @DPTR
E1	2	AJMP	addr11
E2	1	MOVX	A, @R0
E3	1	MOVX	A, @R1
E4	1	CLR	A
E5	2	MOV	A, direct
E6	1	MOV	A, @R0
E7	1	MOV	A, @R1
E8	1	MOV	A, R0
E9	1	MOV	A, R1
EA	1	MOV	A, R2
EB	1	MOV	A, R3
EC	1	MOV	A, R4
ED	1	MOV	A, R5
EE	1	MOV	A, R6
EF	1	MOV	A, R7
FO	1	MOVX	@DPTR, A
F1	2	ACALL	addr11

72	2	ORL	C, bit
73	1	JMP	@A+DPTR
74	2	MOV	A, #immed
75	3	MOV	direct, #immed
76	2	MOV	@R0, #immed
77	2	MOV	@R1, #immed
78	2	MOV	R0, #immed
79	2	MOV	R1, #immed
7A	2	MOV	R2, #immed
7B	2	MOV	R3, #immed
7C	2	MOV	R4, #immed
7D	2	MOV	R5, #immed
7E	2	MOV	R6, #immed
7F	2	MOV	R7, #immed

F2	1	MOVX	@R0, A
F3	1	MOVX	@R1, A
F4	1	CPL	A
F5	2	MOV	direct, A
F6	1	MOV	@R0, A
F7	1	MOV	@R1, A
F8	1	MOV	R0, A
F9	1	MOV	R1, A
FA	1	MOV	R2, A
FB	1	MOV	R3, A
FC	1	MOV	R4, A
FD	1	MOV	R5, A
FE	1	MOV	R6, A
FF	1	MOV	R7, A

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