ΠΙΝΑΚΑΣ ΕΝΤΟΛΩΝ ΤΗΣ ΓΛΩΣΣΑΣ ΤΟΥ 8051

Instructions that Affect Flag Settings[(1)]

Instruction	Flag			Instruction	Flag		
	C	OV	AC		C	OV	AC
ADD	X	X	X	CLR C	0		
ADDC	X	X	X	CPL C	X		
SUBB	X	X	X	ANL C,bit	X		
MUL	0	X		ANL C,/bit	X		
DIV	0	X		ORL C,bit	X		
DA	X			ORL C,bit	X		
RRC	X			MOV C,bit	X		
RLC	X			CJNE	X		
SETB C	1						

[(1)]Note that operations on SFR byte address 208 or bit addresses 209-215 (i.e. the PSW or bits in the PSW) will also affect flag settings.

X=Flag is affected

Note on instruction set and addressing modes

Rn - Register R7-R0 of the currently selected Register Bank.

direct - 8-bit internal data location's address. This could be an Internal Data RAM location (0-127) or a SFR [i.e. I/O port, control register, status register, etc. (128-255)].

@Ri - 8-bit internal data RAM location (0-127) addressed indirectly through register R1 or R0.

#data - 8-bit constant included in instruction.

#data 16 - 16-bit constant included in instruction

addr 16 - 16-bit destination address. Used by LCALL & LJMP. A branch can be anywhere within the 64K-byte Program Memory address space.

addr 11 - 11-bit destination address. Used by ACALL & AJMP. The branch will be within the same 2K-byte page of program memory as the first byte of the following instruction.

rel - Signed (two's complement) 8-bit offset byte. Used by SJMP and all conditional jumps. Range is -128 to +127 bytes relative to first byte of the following instruction.

bit - Direct Addressed bit in Internal Data RAM or Special Function Register.

Clocks per machine cycle:
8051 :12
DS89C4x0 :1

f_{osc}=11.0592 MHz

8051 T_{mc}=1.085 μs
DS89C4x0 T_{mc}=0.09 μs

Mnemonic		Description	Byte	8051	DS 89C4x0
ARITHMETIC OPERATIONS					
ADD	A,Rn	Add register to Accumulator	1	1	1
ADD	A,direct	Add direct byte to Accumulator	2	1	2
ADD	A,@Ri	Add indirect RAM to Accumulator	1	1	2
ADD	A,#data	Add immediate data to Accumulator	2	1	2
ADDC	A,Rn	Add register to Accumulator with Carry	2	1	1
ADDC	A,direct	Add direct byte to Accumulator with Carry	2	1	2
ADDC	A,@Ri	Add indirect RAM to Accumulator with Carry	1	1	2
ADDC	A,#data	Add immediate data to Accumulator with Carry	2	1	2
SUBB	A,Rn	Subtract register from Accumulator with borrow	1	1	1
SUBB	A,direct	Subtract direct byte from Accumulator with borrow	2	1	2
SUBB	A,@Ri	Subtract indirect RAM from Accumulator with borrow	1	1	2
SUBB	A,#data	Subtract immediate data from Accumulator with borrow	2	1	2
INC	A	Increment Accumulator	1	1	1
INC	Rn	Increment register	1	1	1
INC	direct	Increment direct byte	2	1	2
INC	@Ri	Increment direct RAM	1	1	2
DEC	A	Decrement Accumulator	1	1	1
DEC	Rn	Decrement register	1	1	1
DEC	direct	Decrement direct byte	2	1	2
DEC	@Ri	Decrement indirect RAM	1	1	2
INC	DPTR	Increment Data Pointer	1	2	1
MUL	AB	Multiply A&B	1	4	9
DIV	AB	Divide A by B	1	4	10
DA	A	Decimal adjust Accumulator	1	1	2

Mnemonic		Description	Byte	8051	DS 89C4x0
LOGICAL OPERATIONS					
ANL	A,Rn	AND register to Accumulator	1	1	1
ANL	A,direct	AND direct byte to Accumulator	2	1	2
ANL	A,@Ri	AND indirect RAM to Accumulator	1	1	2
ANL	A,#data	AND immediate data to Accumulator	2	1	2
ANL	direct,A	AND Accumulator to direct byte	2	1	2
ANL	direct,#data	AND immediate data to direct byte	3	2	3
ORL	A,Rn	OR register to Accumulator	1	1	1
ORL	A,direct	OR direct byte to Accumulator	2	1	2
ORL	A,@Ri	OR indirect RAM to Accumulator	1	1	2
ORL	A,#data	OR immediate data to Accumulator	2	1	2
ORL	direct,A	OR Accumulator to direct byte	2	1	2
ORL	direct,#data	OR immediate data to direct byte	3	2	3
XRL	A,Rn	Exclusive-OR register to Accumulator	1	1	1
XRL	A,direct	Exclusive-OR direct byte to Accumulator	2	1	2
XRL	A,@Ri	Exclusive-OR indirect RAM to Accumulator	1	1	2
XRL	A,#data	Exclusive-OR immediate data to Accumulator	2	1	2
XRL	direct,A `	Exclusive-OR Accumulator to direct byte	2	1	2
XRL	direct,#data	Exclusive-OR immediate data to direct byte	3	2	3
CLR	A	Clear Accumulator	1	1	1
CPL	A	Complement Accumulator	1	1	1
RL	A	Rotate Accumulator Left	1	1	1
RLC	A	Rotate Accumulator Left through the Carry	1	1	1
RR	A	Rotate Accumulator Right	1	1	1
RRC	A	Rotate Accumulator Right through the Carry	1	1	1
SWAP	A	Swap nibbles within the Accumulator	1	1	1

Mnemonic		Description	Byte	8051	DS 89C4x0
DATA TRANSFER					
MOV	A, Rn	Move register to Accumulator	1	1	1
MOV	A,direct	Move direct byte to Accumulator	2	1	2
MOV	A,@Ri	Move indirect RAM to Accumulator	1	1	2
MOV	A,#data	Move immediate data to Accumulator	2	1	2
MOV	Rn, A	Move Accumulator to register	1	1	1
MOV	Rn,direct	Move direct byte to register	2	2	2
MOV	Rn,#data	Move immediate data to register	2	1	2
MOV	direct, A	Move Accumulator to direct byte	2	1	2
MOV	direct,Rn	Move register to direct byte	2	2	2
MOV	direct,direct	Move direct byte to direct	3	2	3
MOV	direct,@Ri	Move indirect RAM to direct byte	2	2	2
MOV	direct,#data	Move immediate data to direct byte	3	2	3
MOV	@Ri, A	Move Accumulator to indirect RAM	1	1	1
MOV	@Ri,direct	Move direct byte to indirect RAM	2	2	2
MOV	@Ri,#data	Move immediate data to indirect RAM	2	1	2
MOV	DPTR,#data	Load Data Pointer with a 16-bit constant	3	2	3
MOVC	A,@A+DPTR	Move Code byte relative to DPTR to Accumulator	1	2	3
MOVC	A,@A+PC	Move Code byte relative to PC to Accumulator	1	2	3
MOVX	A,@Ri	Move External RAM (8-bit address) to Accumulator	1	2	3
MOVX	A,@DPTR	Move External RAM (16-bit address) to Accumulator	1	2	3
MOVX	@Ri, A	Move Accumulator to External RAM (8-bit address)	1	2	3
MOVX	@DPTR,A	Move Accumulator to External RAM (16-bit address)	1	2	3
PUSH	direct	Push direct byte onto stack	2	2	2
POP	direct	Pop direct byte from stack	2	2	2
XCH	A, Rn	Exchange register with Accumulator	1	1	2
XCH	A, direct	Exchange direct byte with Accumulator	2	1	3
XCH	A, @Ri	Exchange indirect RAM with Accumulator	1	1	3
XCHD	A, @Ri	Exchange low-order Digit indirect RAM with Accumulator	1	1	3

Mnemonic		Description	Byte	8051	DS 89C4x0
BOOLEAN VARIABLE MANIPULATION					
CLR	C	Clear Carry	1	1	1
CLR	bit	Clear direct bit	2	1	2
SETB	C	Set Carry	1	1	1
SETB	bit	Set direct bit	2	1	2
CPL	C	Complement Carry	1	1	1
CPL	bit	Complement direct bit	2	1	2
ANL	C, bit	AND direct bit to Carry	2	2	2
ANL	C, /bit	AND complement of direct bit to Carry	2	2	2
ORL	C, bit	OR direct bit to Carry	2	2	2
ORL	C, /bit	OR complement of direct bit to CARRY	2	2	2
MOV	C, bit	Move direct bit to Carry	2	1	2
MOV	bit,C	Move Carry to direct bit	2	2	2
JC	rel	Jump if Carry is set	2	2	3
JNC	rel	Jump if Carry is Not set	2	2	3
JB	bit, rel	Jump if direct Bit is set	3	2	4
JNB	bit,rel	Jump if direct Bit is Not set	3	2	4
JBC	bit,rel	Jump if direct Bit is set & Clear bit	3	2	4

Mnemonic		Description	Byte	8051	DS 89C4x0
PROGRAM BRANCHING					
ACALL	addr11	Absolute Subroutine Call	2	2	2
LCALL	addr16	Long Subroutine Call	3	2	3
RET		Return from Subroutine	1	2	3
RETI		Return from Interrupt	1	2	3
AJMP	addr11	Absolute Jump	2	2	2
LJMP	addr16	Long Jump	3	2	3
SJMP	rel	Short Jump (relative address)	2	2	3
JMP	@A+DPTR	Jump indirect relative to the DPTR	1	2	3
JZ	rel	Jump if Accumulator is Zero	2	2	3
JNZ	rel	Jump if Accumulator is Not Zero	2	2	3

Mnemonic		Description	Byte	8051	DS 89C4x0
CJNE	A,direct,rel	Compare direct byte to Accumulator and Jump if Not Equal	3	2	5
CJNE	A,#data,rel	Compare immediate to Accumulator and Jump if Not Equal	3	2	4
CJNE	Rn,#data,rel	Compare immediate to register and Jump if Not Equal	3	2	4
CJNE	@Ri,#data,rel	Compare immediate to indirect and Jump if Not Equal	3	2	5
DJNZ	Rn, rel	Decrement register and Jump if Not Zero	2	2	4
DJNZ	direct,rel	Decrement direct byte and Jump if Not Zero	3	2	5
NOP		No Operation	1	1	1