

TABLE 11 — JUMP AND BRANCH INSTRUCTIONS

Operations	Mnemonic	Direct		Relative		Index		Extnd		Inherent		Branch Test	Cond. Code Reg.					
		OP	#	OP	#	OP	#	OP	#	OP	#		5	4	3	2	1	0
													H	I	N	Z	V	C
Branch Always	BRA			20	3 2							None	●	●	●	●	●	●
Branch Never	BRN			21	3 2							None	●	●	●	●	●	●
Branch If Carry Clear	BCC			24	3 2							C = 0	●	●	●	●	●	●
Branch If Carry Set	BCS			25	3 2							C = 1	●	●	●	●	●	●
Branch If = Zero	BEQ			27	3 2							Z = 1	●	●	●	●	●	●
Branch If ≥ Zero	BGE			2C	3 2							$N \oplus V = 0$	●	●	●	●	●	●
Branch If > Zero	BGT			2E	3 2							$Z + (N \oplus V) = 0$	●	●	●	●	●	●
Branch If Higher	BHI			22	3 2							C + Z = 0	●	●	●	●	●	●
Branch If Higher or Same	BHS			24	3 2							C = 0	●	●	●	●	●	●
Branch If ≤ Zero	BLE			2F	3 2							$Z + (N \oplus V) = 1$	●	●	●	●	●	●
Branch If Carry Set	BLO			25	3 2							C = 1	●	●	●	●	●	●
Branch If Lower Or Same	BLS			23	3 2							C + Z = 1	●	●	●	●	●	●
Branch If < Zero	BLT			2D	3 2							$N \oplus V = 1$	●	●	●	●	●	●
Branch If Minus	BMI			28	3 2							N = 1	●	●	●	●	●	●
Branch If Not Equal Zero	BNE			26	3 2							Z = 0	●	●	●	●	●	●
Branch If Overflow Clear	BVC			28	3 2							V = 0	●	●	●	●	●	●
Branch If Overflow Set	BVS			29	3 2							V = 1	●	●	●	●	●	●
Branch If Plus	BPL			2A	3 2							N = 0	●	●	●	●	●	●
Branch To Subroutine	BSR			8D	6 2								●	●	●	●	●	●
Jump	JMP					6E	3 2	7E	3 3			} See Special Operations - Figure 21	●	●	●	●	●	●
Jump To Subroutine	JSR	9D	5 2			AD	6 2	BD	6 3				●	●	●	●	●	●
No Operation	NOP									01	2 1		●	●	●	●	●	●
Return From Interrupt	RTI									3B	10 1		↑	↑	↑	↑	↑	↑
Return From Subroutine	RTS									39	5 1		●	●	●	●	●	●
Software Interrupt	SWI									3F	12 1		●	S	●	●	●	●
Wait For Interrupt	WAI									3E	9 1		●	●	●	●	●	●

TABLE 12 — CONDITION CODE REGISTER MANIPULATION INSTRUCTIONS

Operations	Mnemonic	Inherent			Boolean Operation	Cond. Code Reg.					
		OP	~	#		5	4	3	2	1	0
						H	I	N	Z	V	C
Clear Carry	CLC	0C	2	1	$0 \rightarrow C$	●	●	●	●	●	R
Clear Interrupt Mask	CLI	0E	2	1	$0 \rightarrow I$	●	R	●	●	●	●
Clear Overflow	CLV	0A	2	1	$0 \rightarrow V$	●	●	●	●	R	●
Set Carry	SEC	0D	2	1	$1 \rightarrow C$	●	●	●	●	●	S
Set Interrupt Mask	SEI	0F	2	1	$1 \rightarrow I$	●	S	●	●	●	●
Set Overflow	SEV	0B	2	1	$1 \rightarrow V$	●	●	●	●	S	●
Accumulator A \leftarrow CCR	TAP	06	2	1	$A \leftarrow CCR$	↑	↑	↑	↑	↑	↑
CCR \leftarrow Accumulator A	TPA	07	2	1	$CCR \leftarrow A$	●	●	●	●	●	●

LEGEND

- OP Operation Code (Hexadecimal)
 Number of MPU Cycles
 MSP Contents of memory location pointed to by Stack Pointer
 # Number of Program Bytes
 + Arithmetic Plus
 - Arithmetic Minus
 ● Boolean AND
 X Arithmetic Multiply
 + Boolean Inclusive OR
 ⊕ Boolean Exclusive OR
 M Complement of M
 → Transfer Into
 0 Bit : Zero
 00 Byte : Zero

CONDITION CODE SYMBOLS

- H Half-carry from bit 3
 I Interrupt mask
 N Negative (sign bit)
 Z Zero (byte)
 V Overflow, 2's complement
 C Carry/Borrow from MSB
 R Reset Always
 S Set Always
 ↑ Affected
 ● Not Affected

