

INSTRUCTION SET



↓

33

FFFC NMI

BVC BVC

Condition	Complement
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BGE	BLT
BEO	BNE

BHI BLS

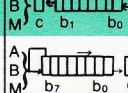
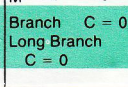
BLO BHS

HOW TO USE THE TABLES

table which is lower than or equal to the decimal number to be converted. The corresponding hexadecimal character is the most significant character. Subtract the decimal value found from the decimal number to be converted. With the difference, repeat the process to find subsequent hexadecimal characters.



0011 = U 1011 = DPR
0100 = S
0101 = PC

INSTRUCTION/ FORMS		6809 ADDRESSING MODES																	DESCRIPTION	5	3	2	1	0		
		INHERENT			DIRECT			EXTENDED			IMMEDIATE			INDEXED ¹			RELATIVE									
		OP	~	#	OP	~	#	OP	~	#	OP	~	#	OP	~	#	OP	~							#	
ABX		3A	3	1																B + X → X (UNSIGNED)	•	•	•	•	•	
ADC	ADCA ADCB				99 D9	4 4	2 2	B9 F9	5 5	3 3	89 C9	2 2	2 2	A9 E9	4+ 4+	2+ 2+				A + M + C → A B + M + C → B	↑	↑	↑	↑	↑	
ADD	ADDA ADDB ADDD				9B DB D3	4 4 6	2 2 2	BB FB F3	5 5 7	3 3 3	8B CB C3	2 2 4	2 2 3	AB EB E3	4+ 4+ 6+	2+ 2+ 2+				A + M → A B + M → B D + M: M + 1 → D	↑	↑	↑	↑	↑	
AND	ANDA ANDB ANDCC				94 D4	4 4	2 2	B4 F4	5 5	3 3	84 C4 1C	2 2 3	2 2 2	A4 E4	4+ 4+	2+ 2+				A ∧ M → A B ∧ M → B CC ∧ IMM → CC	•	•	•	0	1	
ASL	ASLA ASLB ASL	48 58	2 2	1 1																	8	↑	↑	↑	↑	
ASR	ASRA ASR ASR	47 57	2 2	1 1																	8	↑	↑	↑	↑	
BCC	BCC LBCC																24 10 24	3 5(6)	2 4	Branch C = 0 Long Branch C = 0	•	•	•	•	•	
BCS	BCS LBCS																25 10 25	3 5(6)	2 4	Branch C = 1 Long Branch C = 1	•	•	•	•	•	
BEQ	BEQ LBEQ																27 10 27	3 5(6)	2 4	Branch Z = 0 Long Branch Z = 0	•	•	•	•	•	
BGE	BGE LBGE																2C 10 2C	3 5(6)	2 4	Branch ≥ Zero Long Branch ≥ Zero	•	•	•	•	•	
BGT	BGT LBGT																2E 10 2E	3 5(6)	2 4	Branch > Zero Long Branch > Zero	•	•	•	•	•	
BHI	BHI LBHI																22 10 22	3 5(6)	2 4	Branch Higher Long Branch Higher	•	•	•	•	•	
BHS	BHS LBHS																24 10 24	3 5(6)	2 4	Branch Higher or Same Long Branch Higher or Same	•	•	•	•	•	
BIT	BITA BITB				95 D5	4 4	2 2	B5 F5	5 5	3 3	85 C5	2 2	2 2	A5 E5	4+ 4+	2+ 2+				Bit Test A (M ∧ A) Bit Test B (M ∧ B)	•	↑	↑	0	•	
BLE	BLE LBLE																2F 10 2F	3 5(6)	2 4	Branch ≤ Zero Long Branch ≤ Zero	•	•	•	•	•	
INSTRUCTION/ FORMS		INHERENT			DIRECT			EXTENDED			IMMEDIATE			INDEXED ¹			RELATIVE			DESCRIPTION		5	3	2	1	0
BLO	BLO LBLO																25 10 25	3 5(6)	2 4	Branch Lower Long Branch Lower	•	•	•	•	•	
BLS	BLS LBLS																23 10 23	3 5(6)	2 4	Branch Lower or Same Long Branch Lower or Same	•	•	•	•	•	
BLT	BLT LBLT																2D 10 2D	3 5(6)	2 4	Branch < Zero Long Branch < Zero	•	•	•	•	•	
BMI	BMI LBMI																2B 10 2B	3 5(6)	2 4	Branch Minus Long Branch Minus	•	•	•	•	•	
BNE	BNE LBNE																26 10 26	3 5(6)	2 4	Branch Z ≠ 0 Long Branch Z ≠ 0	•	•	•	•	•	
BPL	BPL LBPL																2A 10 2A	3 5(6)	2 4	Branch Plus Long Branch Plus	•	•	•	•	•	
BRA	BRA LBRA																20 16	3 5	2 3	Branch Always Long Branch Always	•	•	•	•	•	
BRN	BRN LBRN																21 10 21	3 5	2 4	Branch Never Long Branch Never	•	•	•	•	•	
BSR	BSR LBSR																8D 17	7 9	2 3	Branch to Subroutine Long Branch to Subroutine	•	•	•	•	•	
BVC	BVC LBVC																28 10 28	3 5(6)	2 4	Branch V = 0 Long Branch V = 0	•	•	•	•	•	
BVS	BVS LBVS																29 10 29	3 5(6)	2 4	Branch V = 1 Long Branch V = 1	•	•	•	•	•	
CLR	CLRA CLRB CLR	4F 5F	2 2	1 1	0F	6	2	7F	7	3				6F	6+	2+				0 → A 0 → B 0 → M	•	0	1	0	0	
CMP	CMPA CMPB CMPD CMPPS CMPU CMPX CMPY				91 D1 10 93 11 9C 11 93 9C 10	4 4 7 7 7 9C 7 7 6 7	2 2 3 3 3 2 3 2 3	B1 F1 10 B3 11 BC 11 B3 BC 10	5 5 8 8 8 C 8 C 8	3 3 4 4 4 3 3 3 4	81 C1 10 83 11 8C 11 83 8C 10	2 2 5 5 5 4 5 4 5	2 2 4 4 4 3 4 3 4	A1 E1 10 A3 11 AC 11 A3 AC 10	4+ 4+ 7+ 7+ 7+ 6+ 7+ 6+ 7+	2+ 2+ 3+ 3+ 3+ 2+ 3+ 2+ 3+			Compare M from A Compare M from B Compare M: M + 1 from D Compare M: M + 1 from S Compare M: M + 1 from U Compare M: M + 1 from X Compare M: M + 1 from Y	8 8 ↑ ↑ ↑ ↑ ↑ ↑ ↑	↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑		
INSTRUCTION/ FORMS		INHERENT			DIRECT			EXTENDED			IMMEDIATE			INDEXED ¹			RELATIVE			DESCRIPTION		5	3	2	1	0
COM	COMA COMB COM	43 53	2 2	1 1	03	6	2	73	7	3				63	6+	2+				A → A B → B M → M	•	↑	↑	0	1	
CWAI		3C	20	2																CC ∧ IMM → CC; Wait for Interrupt	•	•	•	•	↑	
DAA		19	2	1																Decimal Adjust A	•	↑	↑	0	↑	
DEC	DECA DECB DEC	4A 5A	2 2	1 1	0A	6	2	7A	7	3				6A	6+	2+				A - 1 → A B - 1 → B M - 1 → M	•	↑	↑	↑	↑	
EOR	EORA EORB				98 D8	4 4	2 2	B8 F8	5 5	3 3	88 C8	2 2	2 2	A8 E8	4+ 4+	2+ 2+				A ∨ M → A B ∨ M → B	•	↑	↑	0	•	
EXG	R1, R2	1E	7	2																R1 ↔ R2 ²	•	•	•	•	•	
INC	INCA INCB INC	4C 5C	2 2	1 1	0C	6	2	7C	7	3				6C	6+	2+				A + 1 → A B + 1 → B M + 1 → M	•	↑	↑	↑	↑	
JMP					0E	3	2	7E	4	3				6E	3+	2+				EA ³ → PC	•	•	•	•	•	
JSR					9D	7	2	BD	8	3				AD	7+	2+				Jump to Subroutine	•	•	•	•	•	
LD	LDA LDB LDD LDS				96 D6 DC 10	4 4 5 6	2 2 3 3	B6 F6 FC FE	5 5 6 7	3 3 3 4	86 C6 CC CE	2 2 3 4	2 2 3 4	A6 E6 EC 10	4+ 4+ 5+ 6+	2+ 2+ 2+ 3+				M → A M → B M: M + 1 → D M: M + 1 → S	•	↑	↑	0	•	
	LDU LDX LDY				DE 9E 10 9E	5 5 6 6	2 2 3 3	FE BE 10 BE	6 6 7 7	3 3 4 4	CE 8E 10 8E	3 3 4 4	3 3 4 4	EE AE 10 AE	5+ 5+ 6+ 6+	2+ 2+ 3+ 3+				M: M + 1 → U M: M + 1 → X M: M + 1 → Y	•	↑	↑	0	•	
LEA	LEAS LEAU LEAX LEAY													32 33 30 31	4+ 4+ 4+ 4+	2+ 2+ 2+ 2+				EA ³ → S EA ³ → U EA ³ → X EA ³ → Y	•	•	•	•	•	
LSL	LSLA LSLB LSL	48 58	2 2	1 1	08	6	2	78	7	3				68	6+	2+										