6800 Instruction Set

ASCII	Decimal	Binary	Octal	Hex	Mnem	Effected Register	Byte length	Address Mode	Cycles	Description
	0	00000000	000	00	!					
	1	00000001	001	01	NOP		1		2	No Operation
	2	00000010	002	02	!					
	3	00000011	003	03	!					
	4	00000100	004	04	!					
	5	00000101	005	05	!					
	6	00000110	006	06	TAP	AF	1		2	Transfer A to Status Flag Register
	7	00000111	007	07	TPA	A,Flags	1		2	Transfer Status Flag Register to A
	8	00001000	010	08	INX	Index	1		4	Increment the Index Register
	9	00001001	011	09	DEX	X	1		4	Decrement the Index Register
	10	00001010	012	0A	CLV	Flags	1		2	Clear the Overflow Flag
	11	00001011	013	0B	SEV	Flags	1		2	Set the Overflow Flag
	12	00001100	014	0C	CLC	Flags	1		2	Clear the Carry Flag
	13	00001101	015	0D	SEC	Flags	1		2	Set the Carry Flag
	14	00001110	016	0E	CLI	Flags	1		2	Clear the Interrupt Flag
	15	00001111	017	0F	SEI	Flags	1		2	Set the Interrupt Flag
	16	00010000	020	10	SBA	AB	1		2	Subtract B from A
	17	00010001	021	11	CBA	AB	1		2	Compare B to A
	18	00010010	022	12	!					
	19	00010011	023	13	!					
	20	00010100	024	14	!NBA!	AB	1		2	AND Accumulators
	21	00010101	025	15	!					
	22	00010110	026	16	TAB	AB	1		2	Transfer A to B
	23	00010111	027	17	TBA	AB	1		2	Transfer B to A
	24	00011000	030	18	!					
	25	00011001	031	19	DAA	A	1		2	Decimal Adjust A
	26	00011010	032	1A	!					
	27	00011011	033	1B	ABA	AB	1		2	Add B to A
	28	00011100	034	1C	!					
	29	00011101	035	1D	!					
	30	00011110	036	1E	!					
	31	00011111	037	1F	!					
	32	00100000	040	20	BRA		2	RELA	4	Branch Unconditional
	33	00100001	041	21	!					
	34	00100010	042	22	BHI		2	RELA	4	Branch if ACCUM is Higher, C&Z=0
	35	00100011	043	23	BLS		2	RELA	4	Branch if ACCUM is Lower or Same, C&Z=1
	36	00100100	044	24	BCC		2	RELA	4	C=0
	37	00100101	045	25	BCS		2	RELA	4	C=1
	38	00100110	046	26	BNE		2	RELA	4	Z=0
	39	00100111	047	27	BEQ		2	RELA	4	Z=1
	40	00101000	050	28	BVC		2	RELA	4	V=0
	41	00101001	051	29	BVS		2	RELA	4	V=1
	42	00101010	052	2A	BPL		2	RELA	4	N=0
	43	00101011	053	2B	BMI		2	RELA	4	N=1
	44	00101100	054	2C	BGE		2	RELA	4	Branch if 2's comp in A is >=, after SUB or Compare, N=V
	45	00101101	055	2D	BLT		2	RELA	4	Branch if 2's comp in A is <, after SUB or Compare, N<>V
	46	00101110	056	2E	BGT		2	RELA	4	Branch if 2's comp in A is >, after SUB or Compare, Z=0 N=V
	47	00101111	057	2F	BLE		2	RELA	4	Branch if 2's comp in A is <=, after SUB or Compare, Z=1 N<>V
	48	00110000	060	30	TSX	XS	1		4	Transfer Stack Pointer to the Index Register
	49	00110001	061	31	INS	S	1		4	Increment the Stack Pointer
	50	00110010	062	32	PUL	A	1		4	Pull Data from Stack to A
	51	00110011	063	33	PUL	B	1		4	Pull Data from Stack to B
	52	00110100	064	34	DES	S	1		4	Decrement the Stack Pointer
	53	00110101	065	35	TXS	XS	1		4	Transfer Index Register to the Stack Pointer
	54	00110110	066	36	PSH	A	1		4	Push A onto the Stack
	55	00110111	067	37	PSH	B	1		4	Push B onto the Stack
	56	00111000	070	38	!					
	57	00111001	071	39	RTS		1		5	Return from Subroutine
	58	00111010	072	3A	!					

6800 Instruction Set

ASCII	Decimal	Binary	Octal	Hex	Mnem	Effected Register	Byte length	Address Mode	Cycles	Description
	59	00111011	073	3B	RTI		1		10	Return from Interrupt
	60	00111100	074	3C	!					
	61	00111101	075	3D	!					
	62	00111110	076	3E	WAI		1		9	Wait for Interrupt
	63	00111111	077	3F	SWI		1		12	Software Interrupt
	64	01000000	100	40	NEG	A	1		2	Negate the Accumulator
	65	01000001	101	41	!					
	66	01000010	102	42	!					
	67	01000011	103	43	COM	A	1		2	Complement the Accumulator
	68	01000100	104	44	LSR	A	1		2	Logical Shift Right
	69	01000101	105	45	!					
	70	01000110	106	46	ROR	A	1		2	Rotate Right
	71	01000111	107	47	ASR	A	1		2	Arithmetic Shift Right
	72	01001000	110	48	ASL	A	1		2	Arithmetic Shift Left
	73	01001001	111	49	ROL	A	1		2	Rotate Left
	74	01001010	112	4A	DEC	A	1		2	Decrement the Accumulator
	75	01001011	113	4B	!					
	76	01001100	114	4C	INC	A	1		2	Increment the Accumulator
	77	01001101	115	4D	TST	A	1		2	Test the Accumulator
	78	01001110	116	4E	!					
	79	01001111	117	4F	CLR	A	1		2	Clear the Accumulator
	80	01010000	120	50	NEG	B	1		2	Negate the Accumulator
	81	01010001	121	51	!					
	82	01010010	122	52	!					
	83	01010011	123	53	COM	B	1		2	Complement the Accumulator
	84	01010100	124	54	LSR	B	1		2	Logical Shift Right
	85	01010101	125	55	!					
	86	01010110	126	56	ROR	B	1		2	Rotate Right
	87	01010111	127	57	ASR	B	1		2	Arithmetic Shift Right
	88	01011000	130	58	ASL	B	1		2	Arithmetic Shift Left
	89	01011001	131	59	ROL	B	1		2	Rotate Left
	90	01011010	132	5A	DEC	B	1		2	Decrement the Accumulator
	91	01011011	133	5B	!					
	92	01011100	134	5C	INC	B	1		2	Increment the Accumulator
	93	01011101	135	5D	TST	B	1		2	Test the Accumulator
	94	01011110	136	5E	!					
	95	01011111	137	5F	CLR	B	1		2	Clear the Accumulator
	96	01100000	140	60	NEG	MEM	2	INDEXED	7	Negate the Memory Location
	97	01100001	141	61	!					
	98	01100010	142	62	!					
	99	01100011	143	63	COM	MEM	2	INDEXED	7	Complement the Memory Location
	100	01100100	144	64	LSR	MEM	2	INDEXED	7	Logical Shift Right
	101	01100101	145	65	!					
	102	01100110	146	66	ROR	MEM	2	INDEXED	7	Rotate Right
	103	01100111	147	67	ASR	MEM	2	INDEXED	7	Arithmetic Shift Right
	104	01101000	150	68	ASL	MEM	2	INDEXED	7	Arithmetic Shift Left
	105	01101001	151	69	ROL	MEM	2	INDEXED	7	Rotate Left
	106	01101010	152	6A	DEC	MEM	2	INDEXED	7	Decrement the Memory Location
	107	01101011	153	6B	!					
	108	01101100	154	6C	INC	MEM	2	INDEXED	7	Increment the Memory Location
	109	01101101	155	6D	TST	MEM	2	INDEXED	7	Test the Memory Location
	110	01101110	156	6E	JMP	MEM	2	INDEXED	4	Jump
	111	01101111	157	6F	CLR	MEM	2	INDEXED	7	Clear the Memory Location
	112	01110000	160	70	NEG	MEM	3	EXTENDED	6	Negate the Memory Location
	113	01110001	161	71	!					
	114	01110010	162	72	!					
	115	01110011	163	73	COM	MEM	3	EXTENDED	6	Complement the Memory Location
	116	01110100	164	74	LSR	MEM	3	EXTENDED	6	Logical Shift Right

6800 Instruction Set

ASCII	Decimal	Binary	Octal	Hex	Mnem	Effected Register	Byte length	Address Mode	Cycles	Description
	117	01110101	165	75	!					
	118	01110110	166	76	ROR	MEM	3	EXTENDED	6	Rotate Right
	119	01110111	167	77	ASR	MEM	3	EXTENDED	6	Arithmetic Shift Right
	120	01111000	170	78	ASL	MEM	3	EXTENDED	6	Arithmetic Shift Left
	121	01111001	171	79	ROL	MEM	3	EXTENDED	6	Rotate Left
	122	01111010	172	7A	DEC	MEM	3	EXTENDED	6	Decrement the Memory Location
	123	01111011	173	7B	!					
	124	01111100	174	7C	INC	MEM	3	EXTENDED	6	Increment the Memory Location
	125	01111101	175	7D	TST	MEM	3	EXTENDED	6	Test the Memory Location
	126	01111110	176	7E	JMP	MEM	3	EXTENDED	3	Jump
	127	01111111	177	7F	CLR	MEM	3	EXTENDED	6	Clear the Memory Location
NULL	128	10000000	200	80	SUB	A	2	IMMEDIATE	2	Subtract Memory contents from Accumulator
SOH	129	10000001	201	81	CMP	A	2	IMMEDIATE	2	Compare the contents of Memory to Accumulator
STX	130	10000010	202	82	SBC	A	2	IMMEDIATE	2	Subtract Mem and Carry Flag from Accumulator
ETX	131	10000011	203	83	!					
EOT	132	10000100	204	84	AND	A	2	IMMEDIATE	2	AND the Accumulator
ENQ	133	10000101	205	85	BIT	A	2	IMMEDIATE	2	Bit Test the Accumulator
ACK	134	10000110	206	86	LDA	A	2	IMMEDIATE	2	Load Accumulator from Memory
BEL	135	10000111	207	87	!STA!	A		IMMEDIATE		Store an Accumulator in Memory
BS	136	10001000	210	88	EOR	A	2	IMMEDIATE	2	EXLCLUSIVE OR the Accumulator
HT	137	10001001	211	89	ADC	A	2	IMMEDIATE	2	Add contents of Mem +Carry Flag to Accumulator
LF	138	10001010	212	8A	ORA	A	2	IMMEDIATE	2	OR the Accumulator
VT	139	10001011	213	8B	ADD	A	2	IMMEDIATE	2	Add Memory contents to the Accumulator
FF	140	10001100	214	8C	CPX	X	3	IMMEDIATE	3	Compare the contents of Mem to the Index Reg
CR	141	10001101	215	8D	BSR		2	RELA	8	
SO	142	10001110	216	8E	LDS	S	3	IMMEDIATE	3	Load the Stack Pointer
SI	143	10001111	217	8F	!STS!			IMMEDIATE		Store the Stack Pointer
DLE	144	10010000	220	90	SUB	A	2	DIRECT	3	Subtract Memory contents from Accumulator
DC1	145	10010001	221	91	CMP	A	2	DIRECT	3	Compare the contents of Memory to Accumulator
DC2	146	10010010	222	92	SBC	A	2	DIRECT	3	Subtract Mem and Carry Flag from Accumulator
DC3	147	10010011	223	93	!					
DC4	148	10010100	224	94	AND	A	2	DIRECT	3	AND the Accumulator
NAK	149	10010101	225	95	BIT	A	2	DIRECT	3	Bit Test the Accumulator
SYN	150	10010110	226	96	LDA	A	2	DIRECT	3	Load Accumulator from Memory
ETB	151	10010111	227	97	STA	A	2	DIRECT	4	Store Accumulator in Memory
CAN	152	10011000	230	98	EOR	A	2	DIRECT	3	EXLCLUSIVE OR the Accumulator
EM	153	10011001	231	99	ADC	A	2	DIRECT	3	Add contents of Mem +Carry Flag to Accumulator
SUB	154	10011010	232	9A	ORA	A	2	DIRECT	3	OR the Accumulator
ESC	155	10011011	233	9B	ADD	A	2	DIRECT	3	Add Memory contents to the Accumulator
FS	156	10011100	234	9C	CPX	X	2	DIRECT	4	Compare the contents of Mem to the Index Reg
GS	157	10011101	235	9D	!HCF!					Halt and Catch Fire
RS	158	10011110	236	9E	LDS	S	2	DIRECT	4	Load the Stack Pointer
US	159	10011111	237	9F	STS	S	2	DIRECT	5	Store the Stack Pointer
Space	160	10100000	240	A0	SUB	A	2	INDEXED	5	Subtract Memory contents from Accumulator
!	161	10100001	241	A1	CMP	A	2	INDEXED	5	Compare the contents of Memory to Accumulator
"	162	10100010	242	A2	SBC	A	2	INDEXED	5	Subtract Mem and Carry Flag from Accumulator
#	163	10100011	243	A3	!					
$	164	10100100	244	A4	AND	A	2	INDEXED	5	AND the Accumulator
%	165	10100101	245	A5	BIT	A	2	INDEXED	5	Bit Test the Accumulator
&	166	10100110	246	A6	LDA	A	2	INDEXED	5	Load Accumulator from Memory
.'	167	10100111	247	A7	STA	A	2	INDEXED	6	Store Accumulator in Memory
(	168	10101000	250	A8	EOR	A	2	INDEXED	5	EXLCLUSIVE OR the Accumulator
)	169	10101001	251	A9	ADC	A	2	INDEXED	5	Add contents of Mem +Carry Flag to Accumulator
*	170	10101010	252	AA	ORA	A	2	INDEXED	5	OR the Accumulator
+	171	10101011	253	AB	ADD	A	2	INDEXED	5	Add Memory contents to the Accumulator
,	172	10101100	254	AC	CPX	X	2	INDEXED	6	Compare the contents of Mem to the Index Reg
-	173	10101101	255	AD	JSR		2	INDEXED	8	Jump to Subroutine
.	174	10101110	256	AE	LDS	S	2	INDEXED	6	Load the Stack Pointer

6800 Instruction Set

ASCII	Decimal	Binary	Octal	Hex	Mnem	Effected Register	Byte length	Address Mode	Cycles	Description
./	175	10101111	257	AF	STS	S	2	INDEXED	7	Store the Stack Pointer
0	176	10110000	260	B0	SUB	A	3	EXTENDED	4	Subtract Memory contents from Accumulator
1	177	10110001	261	B1	CMP	A	3	EXTENDED	4	Compare the contents of Memory to Accumulator
2	178	10110010	262	B2	SBC	A	3	EXTENDED	4	Subtract Mem and Carry Flag from Accumulator
3	179	10110011	263	B3	!					
4	180	10110100	264	B4	AND	A	3	EXTENDED	4	AND the Accumulator
5	181	10110101	265	B5	BIT	A	3	EXTENDED	4	Bit Test the Accumulator
6	182	10110110	266	B6	LDA	A	3	EXTENDED	4	Load Accumulator from Memory
7	183	10110111	267	B7	STA	A	3	EXTENDED	5	Store Accumulator in Memory
8	184	10111000	270	B8	EOR	A	3	EXTENDED	4	EXLCLUSIVE OR the Accumulator
9	185	10111001	271	B9	ADC	A	3	EXTENDED	4	Add contents of Mem +Carry Flag to Accumulator
:	186	10111010	272	BA	ORA	A	3	EXTENDED	4	OR the Accumulator
;	187	10111011	273	BB	ADD	A	3	EXTENDED	4	Add Memory contents to the Accumulator
<	188	10111100	274	BC	CPX	X	3	EXTENDED	5	Compare the contents of Mem to the Index Reg
=	189	10111101	275	BD	JSR		3	EXTENDED	9	Jump to Subroutine
>	190	10111110	276	BE	LDS	S	3	EXTENDED	5	Load the Stack Pointer
?	191	10111111	277	BF	STS	S	3	EXTENDED	6	Store the Stack Pointer
@	192	11000000	300	C0	SUB	B	2	IMMEDIATE	2	Subtract Memory contents from Accumulator
A	193	11000001	301	C1	CMP	B	2	IMMEDIATE	2	Compare the contents of Memory to Accumulator
B	194	11000010	302	C2	SBC	B	2	IMMEDIATE	2	Subtract Mem and Carry Flag from Accumulator
C	195	11000011	303	C3	!					
D	196	11000100	304	C4	AND	B	2	IMMEDIATE	2	AND the Accumulator
E	197	11000101	305	C5	BIT	B	2	IMMEDIATE	2	Bit Test the Accumulator
F	198	11000110	306	C6	LDA	B	2	IMMEDIATE	2	Load Accumulator from Memory
G	199	11000111	307	C7	!STA!	B		IMMEDIATE		Store an Accumulator in Memory
H	200	11001000	310	C8	EOR	B	2	IMMEDIATE	2	EXLCLUSIVE OR the Accumulator
I	201	11001001	311	C9	ADC	B	2	IMMEDIATE	2	Add contents of Mem +Carry Flag to Accumulator
J	202	11001010	312	CA	ORA	B	2	IMMEDIATE	2	OR the Accumulator
K	203	11001011	313	CB	ADD	B	2	IMMEDIATE	2	Add Memory contents to the Accumulator
L	204	11001100	314	CC	!					
M	205	11001101	315	CD	!					
N	206	11001110	316	CE	LDX	X	3	IMMEDIATE	3	Load the Index Register
O	207	11001111	317	CF	!STX!			IMMEDIATE		Store the Index Register
P	208	11010000	320	D0	SUB	B	2	DIRECT	3	Subtract Memory contents from Accumulator
Q	209	11010001	321	D1	CMP	B	2	DIRECT	3	Compare the contents of Memory to Accumulator
R	210	11010010	322	D2	SBC	B	2	DIRECT	3	Subtract Mem and Carry Flag from Accumulator
S	211	11010011	323	D3	!					
T	212	11010100	324	D4	AND	B	2	DIRECT	3	AND the Accumulator
U	213	11010101	325	D5	BIT	B	2	DIRECT	3	Bit Test the Accumulator
V	214	11010110	326	D6	LDA	B	2	DIRECT	3	Load Accumulator from Memory
W	215	11010111	327	D7	STA	B	2	DIRECT	4	Store Accumulator in Memory
X	216	11011000	330	D8	EOR	B	2	DIRECT	3	EXLCLUSIVE OR the Accumulator
Y	217	11011001	331	D9	ADC	B	2	DIRECT	3	Add contents of Mem +Carry Flag to Accumulator
Z	218	11011010	332	DA	ORA	B	2	DIRECT	3	OR the Accumulator
[	219	11011011	333	DB	ADD	B	2	DIRECT	3	Add Memory contents to the Accumulator
\	220	11011100	334	DC	!					
]	221	11011101	335	DD	!HCF!					Halt and Catch Fire
^	222	11011110	336	DE	LDX	X	2	DIRECT	4	Load the Index Register
_	223	11011111	337	DF	STX	X	2	DIRECT	5	Store the Index Register
`	224	11100000	340	E0	SUB	B	2	INDEXED	5	Subtract Memory contents from Accumulator
a	225	11100001	341	E1	CMP	B	2	INDEXED	5	Compare the contents of Memory to Accumulator
b	226	11100010	342	E2	SBC	B	2	INDEXED	5	Subtract Mem and Carry Flag from Accumulator
c	227	11100011	343	E3	!					
d	228	11100100	344	E4	AND	B	2	INDEXED	5	AND the Accumulator
e	229	11100101	345	E5	BIT	B	2	INDEXED	5	Bit Test the Accumulator
f	230	11100110	346	E6	LDA	B	2	INDEXED	5	Load Accumulator from Memory
g	231	11100111	347	E7	STA	B	2	INDEXED	6	Store Accumulator in Memory
h	232	11101000	350	E8	EOR	B	2	INDEXED	5	EXLCLUSIVE OR the Accumulator

6800 Instruction Set

ASCII	Decimal	Binary	Octal	Hex	Mnem	Effected Register	Byte length	Address Mode	Cycles	Description
i	233	11101001	351	E9	ADC	B	2	INDEXED	5	Add contents of Mem +Carry Flag to Accumulator
j	234	11101010	352	EA	ORA	B	2	INDEXED	5	OR the Accumulator
k	235	11101011	353	EB	ADD	B	2	INDEXED	5	Add Memory contents to the Accumulator
l	236	11101100	354	EC	!					
m	237	11101101	355	ED	!					
n	238	11101110	356	EE	LDX	X	2	INDEXED	6	Load the Index Register
o	239	11101111	357	EF	STX	X	2	INDEXED	7	Store the Index Register
p	240	11110000	360	F0	SUB	B	3	EXTENDED	4	Subtract Memory contents from Accumulator
q	241	11110001	361	F1	CMP	B	3	EXTENDED	4	Compare the contents of Memory to Accumulator
r	242	11110010	362	F2	SBC	B	3	EXTENDED	4	Subtract Mem and Carry Flag from Accumulator
s	243	11110011	363	F3	!					
t	244	11110100	364	F4	AND	B	3	EXTENDED	4	AND the Accumulator
u	245	11110101	365	F5	BIT	B	3	EXTENDED	4	Bit Test the Accumulator
v	246	11110110	366	F6	LDA	B	3	EXTENDED	4	Load Accumulator from Memory
w	247	11110111	367	F7	STA	B	3	EXTENDED	5	Store Accumulator in Memory
x	248	11111000	370	F8	EOR	B	3	EXTENDED	4	EXLCLUSIVE OR the Accumulator
y	249	11111001	371	F9	ADC	B	3	EXTENDED	4	Add contents of Mem +Carry Flag to Accumulator
z	250	11111010	372	FA	ORA	B	3	EXTENDED	4	OR the Accumulator
{	251	11111011	373	FB	ADD	B	3	EXTENDED	4	Add Memory contents to the Accumulator
|	252	11111100	374	FC	!					
}	253	11111101	375	FD	!					
~	254	11111110	376	FE	LDX	X	3	EXTENDED	5	Load the Index Register
DEL	255	11111111	377	FF	STX	X	3	EXTENDED	6	Store the Index Register

ASCII Abreviations for Control Characters

NUL	Null, all zeros
SOH	Start of Heading
STX	Start of Text
ETX	End of Text
EOT	End of Transmission
ENQ	Enquiry
ACK	Acknowledge
BEL	Bell
BS	Backspace
HT	Horizontal Tabulation
LF	Line Feed
VT	Vertical Tabulation
FF	Form Feed
CR	Carriage Return
SO	Shift Out
SI	Shift In
DLE	Data Link Escape
DC1	Device Control 1
DC2	Device Control 2
DC3	Device Control 3
DC4	Device Control 4
NAK	Negative Acknowledge
SYN	Synchronous Idle
ETB	End of Transmission Block
CAN	Cancel
EM	End of Medium
SUB	Substitute
ESC	Escape
FS	File Separator
GS	Group Separator
RS	Record Separator
US	Unit Separator
DEL	Delete