

Table A-4. Indexed Addressing Mode Summary

Postbyte Code (xb)	Operand Syntax	Comments
rr0mmnn	r n,r -n,r	5-bit constant offset n = -16 to +15 r can specify X, Y, SP, or PC
111r0zsz	n,r -n,r	Constant offset (9- or 16-bit signed) z = 0 = 9-bit with sign in LSB of postbyte (s) z = 1 = 16-bit if z = s = 1, 16-bit offset indexed-indirect (see below) r can specify X, Y, SP, or PC
rr1pmmnn	n,-r n,+r n,-r n,+r	Auto predecrement, preincrement, postdecrement, or postincrement; p = pre-(0) or post-(1), n = -8 to -1, +1 to +8 r can specify X, Y, or SP (PC not a valid choice)
111r1aa	A,r B,r D,r	Accumulator offset (unsigned 8-bit or 16-bit) aa - 00 = A 01 = B 10 = D (16-bit) 11 = see accumulator D offset indexed-indirect r can specify X, Y, SP, or PC
111r011	[n,r]	16-bit offset indexed-indirect r can specify X, Y, SP, or PC
111r111	[D,r]	Accumulator D offset indexed-indirect r can specify X, Y, SP, or PC

Table A-3. Indexed Addressing Mode Postbyte Encoding (xb)

00	10	0X	5b const	10	1+Y	5b const	pre-inc
01	11	1X	5b const	11	2+Y	5b const	pre-inc
02	12	2X	5b const	12	3+Y	5b const	pre-inc
03	13	3X	5b const	13	4+Y	5b const	pre-inc
04	14	4X	5b const	14	5+Y	5b const	pre-inc
05	15	5X	5b const	15	6+Y	5b const	pre-inc
06	16	6X	5b const	16	7+Y	5b const	pre-inc
07	17	7X	5b const	17	8+Y	5b const	pre-inc
08	18	8X	5b const	18	9+Y	5b const	pre-inc
09	19	9X	5b const	19	7-X	5b const	pre-dec
0A	1A	10X	5b const	1A	6-X	5b const	pre-dec
0B	1B	11X	5b const	1B	5-X	5b const	pre-dec
0C	1C	12X	5b const	1C	4-X	5b const	pre-dec
0D	1D	13X	5b const	1D	3-X	5b const	pre-dec
0E	1E	14X	5b const	1E	2-X	5b const	pre-dec
0F	1F	15X	5b const	1F	1-X	5b const	pre-dec
80	70	1+Y	5b const	70	1+Y	5b const	pre-dec
81	71	2+Y	5b const	71	2+Y	5b const	pre-dec
82	72	3+Y	5b const	72	3+Y	5b const	pre-dec
83	73	4+Y	5b const	73	4+Y	5b const	pre-dec
84	74	5+Y	5b const	74	5+Y	5b const	pre-dec
85	75	6+Y	5b const	75	6+Y	5b const	pre-dec
86	76	7+Y	5b const	76	7+Y	5b const	pre-dec
87	77	8+Y	5b const	77	8+Y	5b const	pre-dec
88	78	9+Y	5b const	78	9+Y	5b const	pre-dec
89	79	7-Y	5b const	79	7-Y	5b const	pre-dec
8A	7A	6-Y	5b const	7A	6-Y	5b const	pre-dec
8B	7B	5-Y	5b const	7B	5-Y	5b const	pre-dec
8C	7C	4-Y	5b const	7C	4-Y	5b const	pre-dec
8D	7D	3-Y	5b const	7D	3-Y	5b const	pre-dec
8E	7E	2-Y	5b const	7E	2-Y	5b const	pre-dec
8F	7F	1-Y	5b const	7F	1-Y	5b const	pre-dec
90	80	8+SP	5b const	80	8+SP	5b const	pre-dec
91	81	7+SP	5b const	81	7+SP	5b const	pre-dec
92	82	6+SP	5b const	82	6+SP	5b const	pre-dec
93	83	5+SP	5b const	83	5+SP	5b const	pre-dec
94	84	4+SP	5b const	84	4+SP	5b const	pre-dec
95	85	3+SP	5b const	85	3+SP	5b const	pre-dec
96	86	2+SP	5b const	86	2+SP	5b const	pre-dec
97	87	1+SP	5b const	87	1+SP	5b const	pre-dec
98	88	8-SP	5b const	88	8-SP	5b const	pre-dec
99	89	7-SP	5b const	89	7-SP	5b const	pre-dec
9A	8A	6-SP	5b const	8A	6-SP	5b const	pre-dec
9B	8B	5-SP	5b const	8B	5-SP	5b const	pre-dec
9C	8C	4-SP	5b const	8C	4-SP	5b const	pre-dec
9D	8D	3-SP	5b const	8D	3-SP	5b const	pre-dec
9E	8E	2-SP	5b const	8E	2-SP	5b const	pre-dec
9F	8F	1-SP	5b const	8F	1-SP	5b const	pre-dec
A0	90	16-PC	5b const	90	16-PC	5b const	pre-dec
A1	91	15-PC	5b const	91	15-PC	5b const	pre-dec
A2	92	14-PC	5b const	92	14-PC	5b const	pre-dec
A3	93	13-PC	5b const	93	13-PC	5b const	pre-dec
A4	94	12-PC	5b const	94	12-PC	5b const	pre-dec
A5	95	11-PC	5b const	95	11-PC	5b const	pre-dec
A6	96	10-PC	5b const	96	10-PC	5b const	pre-dec
A7	97	9-PC	5b const	97	9-PC	5b const	pre-dec
A8	98	8-PC	5b const	98	8-PC	5b const	pre-dec
A9	99	7-PC	5b const	99	7-PC	5b const	pre-dec
AA	9A	6-PC	5b const	9A	6-PC	5b const	pre-dec
AB	9B	5-PC	5b const	9B	5-PC	5b const	pre-dec
AC	9C	4-PC	5b const	9C	4-PC	5b const	pre-dec
AD	9D	3-PC	5b const	9D	3-PC	5b const	pre-dec
AE	9E	2-PC	5b const	9E	2-PC	5b const	pre-dec
AF	9F	1-PC	5b const	9F	1-PC	5b const	pre-dec
B0	00	16-PC	5b const	00	16-PC	5b const	pre-dec
B1	01	15-PC	5b const	01	15-PC	5b const	pre-dec
B2	02	14-PC	5b const	02	14-PC	5b const	pre-dec
B3	03	13-PC	5b const	03	13-PC	5b const	pre-dec
B4	04	12-PC	5b const	04	12-PC	5b const	pre-dec
B5	05	11-PC	5b const	05	11-PC	5b const	pre-dec
B6	06	10-PC	5b const	06	10-PC	5b const	pre-dec
B7	07	9-PC	5b const	07	9-PC	5b const	pre-dec
B8	08	8-PC	5b const	08	8-PC	5b const	pre-dec
B9	09	7-PC	5b const	09	7-PC	5b const	pre-dec
BA	0A	6-PC	5b const	0A	6-PC	5b const	pre-dec
BB	0B	5-PC	5b const	0B	5-PC	5b const	pre-dec
BC	0C	4-PC	5b const	0C	4-PC	5b const	pre-dec
BD	0D	3-PC	5b const	0D	3-PC	5b const	pre-dec
BE	0E	2-PC	5b const	0E	2-PC	5b const	pre-dec
BF	0F	1-PC	5b const	0F	1-PC	5b const	pre-dec
C0	00	16-PC	5b const	00	16-PC	5b const	pre-dec
C1	01	15-PC	5b const	01	15-PC	5b const	pre-dec
C2	02	14-PC	5b const	02	14-PC	5b const	pre-dec
C3	03	13-PC	5b const	03	13-PC	5b const	pre-dec
C4	04	12-PC	5b const	04	12-PC	5b const	pre-dec
C5	05	11-PC	5b const	05	11-PC	5b const	pre-dec
C6	06	10-PC	5b const	06	10-PC	5b const	pre-dec
C7	07	9-PC	5b const	07	9-PC	5b const	pre-dec
C8	08	8-PC	5b const	08	8-PC	5b const	pre-dec
C9	09	7-PC	5b const	09	7-PC	5b const	pre-dec
CA	0A	6-PC	5b const	0A	6-PC	5b const	pre-dec
CB	0B	5-PC	5b const	0B	5-PC	5b const	pre-dec
CC	0C	4-PC	5b const	0C	4-PC	5b const	pre-dec
CD	0D	3-PC	5b const	0D	3-PC	5b const	pre-dec
CE	0E	2-PC	5b const	0E	2-PC	5b const	pre-dec
CF	0F	1-PC	5b const	0F	1-PC	5b const	pre-dec
D0	00	16-PC	5b const	00	16-PC	5b const	pre-dec
D1	01	15-PC	5b const	01	15-PC	5b const	pre-dec
D2	02	14-PC	5b const	02	14-PC	5b const	pre-dec
D3	03	13-PC	5b const	03	13-PC	5b const	pre-dec
D4	04	12-PC	5b const	04	12-PC	5b const	pre-dec
D5	05	11-PC	5b const	05	11-PC	5b const	pre-dec
D6	06	10-PC	5b const	06	10-PC	5b const	pre-dec
D7	07	9-PC	5b const	07	9-PC	5b const	pre-dec
D8	08	8-PC	5b const	08	8-PC	5b const	pre-dec
D9	09	7-PC	5b const	09	7-PC	5b const	pre-dec
DA	0A	6-PC	5b const	0A	6-PC	5b const	pre-dec
DB	0B	5-PC	5b const	0B	5-PC	5b const	pre-dec
DC	0C	4-PC	5b const	0C	4-PC	5b const	pre-dec
DD	0D	3-PC	5b const	0D	3-PC	5b const	pre-dec
DE	0E	2-PC	5b const	0E	2-PC	5b const	pre-dec
DF	0F	1-PC	5b const	0F	1-PC	5b const	pre-dec
E0	00	16-PC	5b const	00	16-PC	5b const	pre-dec
E1	01	15-PC	5b const	01	15-PC	5b const	pre-dec
E2	02	14-PC	5b const	02	14-PC	5b const	pre-dec
E3	03	13-PC	5b const	03	13-PC	5b const	pre-dec
E4	04	12-PC	5b const	04	12-PC	5b const	pre-dec
E5	05	11-PC	5b const	05	11-PC	5b const	pre-dec
E6	06	10-PC	5b const	06	10-PC	5b const	pre-dec
E7	07	9-PC	5b const	07	9-PC	5b const	pre-dec
E8	08	8-PC	5b const	08	8-PC	5b const	pre-dec
E9	09	7-PC	5b const	09	7-PC	5b const	pre-dec
EA	0A	6-PC	5b const	0A	6-PC	5b const	pre-dec
EB	0B	5-PC	5b const	0B	5-PC	5b const	pre-dec
EC	0C	4-PC	5b const	0C	4-PC	5b const	pre-dec
ED	0D	3-PC	5b const	0D	3-PC	5b const	pre-dec
EE	0E	2-PC	5b const	0E	2-PC	5b const	pre-dec
EF	0F	1-PC	5b const	0F	1-PC	5b const	pre-dec
F0	00	16-PC	5b const	00	16-PC	5b const	pre-dec
F1	01	15-PC	5b const	01	15-PC	5b const	pre-dec
F2	02	14-PC	5b const	02	14-PC	5b const	pre-dec
F3	03	13-PC	5b const	03	13-PC	5b const	pre-dec
F4	04	12-PC	5b const	04	12-PC	5b const	pre-dec
F5	05	11-PC	5b const	05	11-PC	5b const	pre-dec
F6	06	10-PC	5b const	06	10-PC	5b const	pre-dec
F7	07	9-PC	5b const	07	9-PC	5b const	pre-dec
F8	08	8-PC	5b const	08	8-PC	5b const	pre-dec
F9	09	7-PC	5b const	09	7-PC	5b const	pre-dec
FA	0A	6-PC	5b const	0A	6-PC	5b const	pre-dec
FB	0B	5-PC	5b const	0B	5-PC	5b const	pre-dec
FC	0C	4-PC	5b const	0C	4-PC	5b const	pre-dec
FD	0D	3-PC	5b const	0D	3-PC	5b const	pre-dec
FE	0E	2-PC	5b const	0E	2-PC	5b const	pre-dec
FF	0F	1-PC	5b const	0F	1-PC	5b const	pre-dec

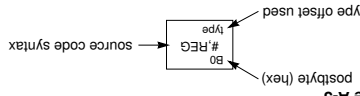


Table A-6. Loop Primitive Postbyte Encoding (lb)

00	A	10	DBEQ	A	20	A	30	A	40	A	50	A	60	A	70	A	80	A	90	A	A0	A	B0	A
(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)
01	B	11	DBEQ	B	21	DBNE	B	31	DBNE	B	41	B	51	B	61	B	71	B	81	B	A1	B	B1	B
(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)
02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A2	—	B2	—
(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)
03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A3	—	B3	—
(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)
04	D	14	DBEQ	D	24	DBNE	D	34	DBNE	D	44	D	54	D	64	D	74	D	84	D	A4	D	B4	D
(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)
05	X	15	DBEQ	X	25	DBNE	X	35	DBNE	X	45	X	55	X	65	X	75	X	85	X	A5	X	B5	X
(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)
06	Y	16	DBEQ	Y	26	DBNE	Y	36	DBNE	Y	46	Y	56	Y	66	Y	76	Y	86	Y	A6	Y	B6	Y
(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)
07	SP	17	DBEQ	SP	27	DBNE	SP	37	DBNE	SP	47	SP	57	SP	67	SP	77	SP	87	SP	A7	SP	B7	SP
(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(+)

Key to Table A-6

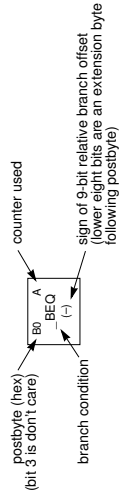


Table A-7. Branch/Complementary Branch

Branch			Complementary Branch				
Test	Mnemonic	Opcode	Boolean	Test	Mnemonic	Opcode	Comment
r<m	BGT	2E	Z + (N ⊕ V) = 0	r<m	BLE	2F	Signed
r<m	BGE	2C	N ⊕ V = 0	r<m	BLT	2D	Signed
r<m	BEQ	27	Z = 1	r<m	BNE	26	Signed
r<m	BLE	2F	Z + (N ⊕ V) = 1	r<m	BGT	2E	Signed
r<m	BLT	2D	N ⊕ V = 1	r<m	BGE	2C	Signed
r<m	BHS/BCC	24	C + Z = 0	r<m	BLS	23	Unsigned
r<m	BLO/BCS	24	C = 0	r<m	BLO/BCS	25	Unsigned
r<m	BEQ	27	Z = 1	r<m	BNE	26	Unsigned
r<m	BLS	23	C + Z = 1	r<m	BHI	22	Unsigned
r<m	BLO/BCS	25	C = 1	r<m	BHS/BCC	24	Unsigned
Carry	BCC	25	C = 1	No Carry	BCC	24	Simple
Negative	BMI	2B	N = 1	Plus	BPL	2A	Simple
Overflow	BVS	29	V = 1	No Overflow	BVC	28	Simple
r=0	BEQ	27	Z = 1	r≠0	BNE	26	Simple
Always	BRA	20	—	Never	BRN	21	Unconditional

For 16-bit offset long branches precede opcode with a \$18 page prebyte.

TRANSFERS		EXCHANGES	
7	SP ← A	A ← A	SP ← SP
6	SP ← Y	A ← B	SP ← Y
5	SP ← X	B ← B	SP ← X
4	SP ← D	B ← C	SP ← D
3	SP ← TMP2	C ← B	SP ← TMP2
2	SP ← CCR	C ← C	SP ← CCR
1	SP ← B	B ← B	SP ← B
0	SP ← A	A ← A	SP ← A
MS ←			
7	SP ← SP	SP ← A	SP ← SP
6	SP ← Y	SP ← Y	SP ← Y
5	SP ← X	SP ← X	SP ← X
4	SP ← D	SP ← D	SP ← D
3	SP ← TMP2	SP ← TMP2	SP ← TMP2
2	SP ← CCR	SP ← CCR	SP ← CCR
1	SP ← B	SP ← B	SP ← B
0	SP ← A	SP ← A	SP ← A
MS ←			

Table A-5. Transfer and Exchange Postbyte Encoding

TMP2 and TMP3 registers are for factory use only.