

6502 OP CODES

ARRANGED IN LOGICAL ORDER BY JIM BUTTERFIELD, TORONTO

	IMM 2	ZPAG 2	Z,X 2	Z,Y 2	ABS 3	A,X 3	A,Y 3
ASL		06	16		0E	1E	
ROL		26	36		2E	3E	
LSR		46	56		4E	5E	
ROR		66	76		6E	7E	
STX		86		96	8E		
LDX	A2	A6		B6	AE		BE
DEC		C6	D6		CE	DE	
INC		E6	F6		EE	FE	

OP CODE ENDS IN -2, -6, OR -E

	IMM 2	ZPAG 2	Z,X 2	ABS 3	A,X 3
BIT		24		2C	
STY		84	94	8C	
LDY	A0	A4	B4	AC	BC
CPY	C0	C4		CC	
CPX	E0	E4		EC	

Misc. -0, -4, -C

	IMM 2	ZPAG 2	Z,X 2	(I,X) 2	(I),Y 2	ABS 3	A,X 3	A,Y 3
ORA	09	05	15	01	11	0D	1D	19
AND	29	25	35	21	31	2D	3D	39
EOR	49	45	55	41	51	4D	5D	59
ADC	69	65	75	61	71	6D	7D	79
STA		85	95	81	91	8D	9D	99
LDA	A9	A5	B5	A1	B1	AD	BD	B9
CMP	C9	C5	D5	C1	D1	CD	DD	D9
SBC	E9	E5	F5	E1	F1	ED	FD	F9

OP CODE ENDS IN -1, -5, -9, OR -D

BPL	10	BMI	30
BVC	50	BVS	70
BCC	90	BCS	B0
BNE	DO	BEQ	F0

BRANCHES -0

	ABS	(IND)
JSR	20	
JMP	4C	6C

JUMPS

	0-	1-	2-	3-	4-	5-	6-	7-	8-	9-	A-	B-	C-	D-	E-	F-
-0	BRK				RTI		RTS									
-8	PHP	CLC	PLP	SEC	PHA	CLI	PLA	SEI	DEY	TYA	TAY	CLV	INY	CLD	INX	SED
-A	ASL-A		ROL-A		LSR-A		ROR-A		TXA	TXS	TAX	TSX	DEX		NOP	

SINGLE-BYTE OP CODES -0, -8, -A

Another OP-CODE chart? Yes, but there is a reason.

This chart groups the codes logically. This way, you get three benefits.

First, you get to see how the codes are classified and decoded. A glance at the chart shows that LDA and ADC, for example, are close cousins: same addressing modes, same timing, and quite similar OP-CODES; on the other hand, LDA and LDX are noticeably different. The classification idea can be useful to those who want to dig into op-codes, say to write an assembler or a disassembler.

Secondly, it's handy for looking up an OP-CODE-maybe easier than an alphabetical list. You'll very quickly learn to look at the right box and spot the code you want right away. As you get used to the groupings, you'll also develop a feel for the addressing modes that are allowed.

Thirdly, you'll find it convenient for identifying an unknown op-code--- ("What the heck is CE, anyway?")

Jim B.

EDITORS NOTE: I have found this chart to be extremely useful in designing opcode decode algorithms etc.