

6502 Instructions

Name and Description	Addressing Modes	Op- Codes	Status N Z C I D V
ADC Add memory to accumulator with carry	ADC #Imm ADC ZP ADC ZP,X ADC Abs ADC Abs,X ADC Abs,Y ADC (ZP,X) ADC (ZP),Y	69 65 75 6D 7D 79 61 71	•••••
AND "AND" memory with accumulator	AND #Imm AND ZP AND ZP,X AND Abs AND Abs,X AND Abs,Y AND (ZP,X) AND (ZP),Y	29 25 35 2D 3D 39 21 31	•••••
ASL Shift left one bit (Memory or Accumulator)	ASL A ASL ZP ASL ZP,X ASL Abs ASL Abs,X	0A 06 16 0E 1E	•••••
BCC Branch on carry clear	BCC Rel	90	-----
BCS Branch on carry set	BCS Rel	80	-----
BEQ Branch on result zero	BEQ Rel	F0	-----
BIT Test bits in memory with accumulator	BIT ZP BIT Abs	24 2C	•••••
BMI Branch on result minus	BMI Rel	30	-----
BNE Branch on result not zero	BNE Rel	D0	-----
BPL Branch on result plus	BPL Rel	10	-----
BRK Force break	BRK	00	---1---
BVC Branch on overflow clear	BVC Rel	50	-----
BVS Branch on overflow set	BVS Rel	70	-----
CLC Clear carry flag	CLC	18	--0---
CLD Clear decimal mode	CLD	D8	----0--
CLI Clear interrupt disable status	CLI	58	---0---
CLV Clear overflow flag	CLV	B8	----0--
CMP Compare memory and accumulator	CMP #Imm CMP ZP CMP ZP,X CMP Abs CMP Abs,X CMP Abs,Y CMP (ZP,X) CMP (ZP),Y	C9 C5 D5 CD DD D9 C1 D1	•••••
CPX Compare memory and index X	CPX #Imm CPX ZP CPX Abs	E0 E4 EC	•••••
CPY Compare memory and index Y	CPY #Imm CPY ZP CPY Abs	C0 C4 CC	•••••
DEC Decrement memory by one	DEC ZP DEC ZP,X DEC Abs DEC Abs,X	C6 D6 CE DE	•••••
DEX Decrement index X by one	DEX	CA	•••••
DEY Decrement index Y by one	DEY	88	•••••
EOR "Exclusive-Or" memory with accumulator	EOR #Imm EOR ZP EOR ZP,X EOR Abs EOR Abs,X EOR Abs,Y EOR (ZP,X) EOR (ZP),Y	49 45 55 4D 5D 59 41 51	•••••

ABBREVIATIONS
 #Imm Immediate Value
 ZP Zero Page Address
 Abs Absolute Address
 Rel Relative Address
 () Indirect Address
 A Accumulator
 X Index Register X
 Y Index Register Y

STATUS REGISTER
 • May change
 - No change
 0 Changes to 0
 1 Changes to 1

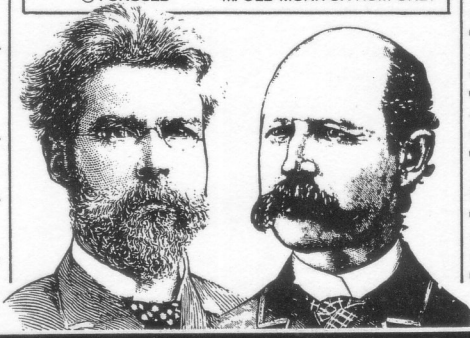
The dashes following the Op-Code indicate the total length of the instruction— 2 dashes in a 3 byte instruction, 1 in a 2-byte instruction, and none in a 1-byte instruction.

Name and Description	Addressing Modes	Op- Codes	Status N Z C I D V
INC Increment memory by one	INC ZP INC ZP,X INC Abs INC Abs,X	E6 F6 EE FE	•••••
INX Increment index X by one	INX	E8	•••••
INY Increment index Y by one	INY	C8	•••••
JMP Jump to new location	JMP Abs JMP (Abs)	4C 6C	-----
JSR Jump to new location saving return address	JSR Abs	20	-----
LDA Load accumulator with memory	LDA #Imm LDA ZP LDA ZP,X LDA Abs LDA Abs,X LDA Abs,Y LDA (ZP,X) LDA (ZP),Y	A9 A5 B5 AD BD B9 A1 B1	•••••
LDX Load index X with memory	LDX #Imm LDX ZP LDX ZP,Y LDX Abs LDX Abs,Y	A2 A6 B6 AE BE	•••••
LDY Load index Y with memory	LDY #Imm LDY ZP LDY ZP,X LDY Abs LDY Abs,X	A0 A4 B4 AC BC	•••••
LSR Shift right one bit (memory or accumulator)	LSR A LSR ZP LSR ZP,X LSR Abs LSR Abs,X	4A 46 56 4E 5E	0••••

APPLE ZERO-PAGE USAGE

Dec:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hex:	\$0	\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	\$9	\$A	\$B	\$C	\$D	\$E	\$F
0 \$00	AM	AM	A	A	A	A	A	A	A	A	A	A	A	A	A	A
16 \$10	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	M*
32 \$20	M	M	M	M	M	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM
48 \$30	M	M	M	M	M	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM
64 \$40	DM	DM	DM	DM	DM	DM	DM	DM	DM	DM	D	D	D	D	M	M
80 \$50	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	A	A	A	A	A	A
96 \$60	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
112 \$70	AD	A	A	AD	AD	AD	AD	AD	AD	AD	A	A	A	A	A	A
128 \$80	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
144 \$90	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
160 \$A0	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	AD
176 \$B0	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
192 \$C0	A	A	A	A	A	A	A	A	A	A	AD	AD	AD	AD	A	A
208 \$D0	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
224 \$E0	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
240 \$F0	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

A: APPLESOFT M: MONITOR
 D: DOS M*: ILE MONITOR ONLY
 O: UNUSED m: OLD MONITOR ROM ONLY



Beagle Bros
 Micro Software Inc.

Name and Description	Addressing Modes	Op- Codes	Status N Z C I D V
NOP No operation	NOP	EA	-----
ORA "OR" memory with accumulator	ORA #Imm ORA ZP ORA ZP,X ORA Abs ORA Abs,X ORA Abs,Y ORA (ZP,X) ORA (ZP),Y	09 05 15 0D 1D 19 01 11	•••••
PHA Push accumulator on stack	PHA	48	-----
PHP Push processor status on stack	PHP	08	-----
PLA Pull accumulator from stack	PLA	68	•••••
PLP Pull processor status from stack	PLP	28	•••••
ROL Rotate one bit left (memory or accumulator)	ROL A ROL ZP ROL ZP,X ROL Abs ROL Abs,X	2A 26 36 2E 3E	•••••
ROR Rotate one bit right (memory or accumulator)	ROR A ROR ZP ROR ZP,X ROR Abs ROR Abs,X	6A 66 76 6E 7E	•••••
RTI Return from interrupt	RTI	40	•••••
RTS Return from subroutine	RTS	60	-----
SBC Subtract memory from accumulator with borrow	SBC #Imm SBC ZP SBC ZP,X SBC Abs SBC Abs,X SBC Abs,Y SBC (ZP,X) SBC (ZP),Y	E9 E5 F5 ED FD F9 E1 F1	•••••
SEC Set carry flag	SEC	38	--1---
SED Set decimal mode	SED	F8	----1--
SEI Set interrupt disable status	SEI	78	---1---
STA Store accumulator in memory	STA ZP STA ZP,X STA Abs STA Abs,X STA Abs,Y STA (ZP,X) STA (ZP),Y	85 95 8D 9D 99 81 91	-----
STX Store index X in memory	STX ZP STX ZP,Y STX Abs	86 96 8E	-----
STY Store index Y in memory	STY ZP STY ZP,X STY Abs	84 94 8C	-----
TAX Transfer accumulator to index X	TAX	AA	•••••
TAY Transfer accumulator to index Y	TAY	A8	•••••
TSX Transfer stack pointer to index X	TSX	BA	•••••
TXA Transfer index X to accumulator	TXA	8A	•••••
TXS Transfer index X to stack pointer	TXS	9A	-----
TYA Transfer index Y to accumulator	TYA	98	•••••