

# 6502 Assembly Language Reference Card

|       | flags | impl   | #nn    | \$nn   | \$nn,X | \$nn,Y | \$nnnn | \$nnnn,X | \$nnnn,Y | (\$nnnn) | (\$nn,X) | (\$nn),Y |     |
|-------|-------|--------|--------|--------|--------|--------|--------|----------|----------|----------|----------|----------|-----|
| ADC   | NVZC  |        | 69   2 | 65   3 | 75   4 |        | 6d   4 | 7d   4+  | 79   4+  |          | 61   6   | 71   5+  | ADC |
| AND   | NZ    |        | 29   2 | 25   3 | 35   4 |        | 2d   4 | 3d   4+  | 39   4+  |          | 21   6   | 31   5+  | AND |
| ASL   | NZC   | 0a   2 |        | 6   5  | 16   6 |        | 0e   6 | 1e   7   |          |          |          |          | ASL |
| BIT   | NVZ   |        |        | 24   3 |        |        | 2c   4 |          |          |          |          |          | BIT |
| CMP   | NZC   |        | c9   2 | c5   3 | d5   4 |        | cd   4 | dd   4+  | d9   4+  |          | c1   6   | d1   5+  | CMP |
| CPX   | NZC   |        | e0   2 | e4   3 |        |        | ec   4 |          |          |          |          |          | CPX |
| CPY   | NZC   |        | c0   2 | c4   3 |        |        | cc   4 |          |          |          |          |          | CPY |
| DEC   | NZ    |        |        | c6   5 | d6   6 |        | ce   3 | de   7   |          |          |          |          | DEC |
| EOR   | NZ    |        | 49   2 | 45   3 | 55   4 |        | 4d   4 | 5d   4+  | 59   4+  |          | 41   6   | 51   5+  | EOR |
| INC   | NZ    |        |        | e6   5 | f6   6 |        | ee   6 | fe   7   |          |          |          |          | INC |
| JMP   |       |        |        |        |        |        | 4c   3 |          |          | 6c   5   |          |          | JMP |
| JSR   |       |        |        |        |        |        | 20   6 |          |          |          |          |          | JSR |
| LDAN  | NZ    |        | a9   2 | a5   3 | b5   4 |        | ad   4 | bd   4+  | b9   4+  |          | a1   6   | b1   5+  | LDA |
| LDXN  | NZ    |        | a2   2 | a6   3 |        | b6   4 | ae   4 |          | be   4+  |          |          |          | LDX |
| LDYN  | NZ    |        | a0   2 | a4   3 | b4   4 |        | ac   4 | bc   4+  |          |          |          |          | LDY |
| LSRN  | NZC   | 4a   2 |        | 46   5 | 56   6 |        | 4e   6 | 5e   7   |          |          |          |          | LSR |
| ORAN  | NZ    |        | 9   2  | 5   3  | 15   4 |        | 0d   4 | 1d   4+  | 19   4+  |          | 1   6    | 11   5+  | ORA |
| ROLN  | NZC   | 2a   2 |        | 26   5 | 36   6 |        | 2e   6 | 3e   7   |          |          |          |          | ROL |
| RORN  | NZC   | 6a   2 |        | 66   5 | 76   6 |        | 6e   6 | 7e   7   |          |          |          |          | ROR |
| SBCN  | NVZC  |        | e9   2 | e5   3 | f5   4 |        | ed   4 | fd   4+  | f9   4+  |          | e1   6   | f1   5+  | SBC |
| STA   |       |        |        | 85   3 | 95   4 |        | 8d   4 | 9d   5   | 99   5   |          | 81   6   | 91   6   | STA |
| STX   |       |        |        | 86   3 |        | 96   4 | 8e   4 |          |          |          |          |          | STX |
| STY   |       |        |        | 84   3 | 94   4 |        | 8c   4 |          |          |          |          |          | STY |
| bytes |       |        | 1      | 2      | 2      | 2      | 2      | 3        | 3        | 3        | 3        | 3        |     |

## Implicit Instructions

|     | NV | -B | D | I | Z | C | Hex | Cyc |
|-----|----|----|---|---|---|---|-----|-----|
| BRK |    |    | 1 | 1 |   |   | 00  | 7   |
| CLC |    |    |   |   |   | 0 | 18  | 2   |
| CLD |    |    | 0 |   |   |   | d8  | 2   |
| CLI |    |    |   | 0 |   |   | 58  | 2   |
| CLV | 0  |    |   |   |   |   | b8  | 2   |
| DEX | N  |    |   |   | Z |   | ca  | 2   |
| DEY | N  |    |   |   | Z |   | 88  | 2   |
| INX | N  |    |   |   | Z |   | e8  | 2   |
| INY | N  |    |   |   | Z |   | c8  | 2   |
| NOP |    |    |   |   |   |   | ea  | 2   |
| PHA |    |    |   |   |   |   | 48  | 3   |
| PHP |    |    |   |   |   |   | 08  | 3   |
| PLA | N  |    |   |   | Z |   | 68  | 4   |
| PLP | NV |    | D | I | Z | C | 28  | 4   |
| RTI | NV |    | D | I | Z | C | 40  | 6   |
| RTS |    |    |   |   |   |   | 60  | 6   |
| SEC |    |    |   |   | 1 |   | 38  | 2   |
| SED |    |    | 1 |   |   |   | f8  | 2   |
| SEI |    |    |   | 1 |   |   | 78  | 2   |
| TAX | N  |    |   |   | Z |   | aa  | 2   |
| TAY | N  |    |   |   | Z |   | a8  | 2   |
| TSX | N  |    |   |   | Z |   | ba  | 2   |
| TXA | N  |    |   |   | Z |   | 8a  | 2   |
| TXS |    |    |   |   |   |   | 9a  | 2   |
| TYA | N  |    |   |   | Z |   | 98  | 2   |

All opcodes: 1 byte

## Compare Instructions

|     | Hex | Unsigned | Signed |
|-----|-----|----------|--------|
| BCC | 90  | A < #    |        |
| BCS | b0  | A >= #   |        |
| BEQ | f0  | A == #   | A == # |
| BMI | 30  |          | A < #  |
| BNE | d0  | A != #   | A != # |
| BPL | 10  |          | A >= # |
| BVC | 50  |          |        |
| BVS | 70  |          |        |

All instructions 2 bytes  
Cycle count: 2, add 1 if taken  
2 if taken and crosses page