## 8-bit Arithmetische und Logische Befehle

| | B | C | D | E | H | L | (HL) | A | n | (IX+d) | (IY+d) | S | Z | H | P/V | N | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADD . | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | C6XX | DD86XX | FD86XX | * | * | * | * | 0 | * |
| ADC . | 88 | 89 | 8A | 8B | 8C | 8D | 8E | 8F | CEXX | DD8EXX | FD8EXX | * | * | * | * | 0 | * |
| SUB . | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | D6XX | DD96XX | FD96XX | * | * | * | * | 1 | * |
| SBC . | 98 | 99 | 9A | 9B | 9C | 9D | 9E | 9F | DEXX | DD9EXX | FD9EXX | * | * | * | * | 1 | * |
| AND . | A0 | A1 | A2 | A3 | A4 | A5 | A6 | A7 | E6XX | DDA6XX | FDA6XX | * | * | 1 | * | 0 | 0 |
| XOR . | A8 | A9 | AA | AB | AC | AD | AE | AF | EEXX | DDAEXX | FDAEXX | * | * | 1 | * | 0 | 0 |
| OR . | B0 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | F6XX | DDB6XX | FDB6XX | * | * | 1 | * | 0 | 0 |
| CP . | B8 | B9 | BA | BB | BC | BD | BE | BF | FEXX | DDBEXX | FDBEXX | * | * | * | * | 1 | * |
| INC . | 04 | 0C | 14 | 1C | 24 | 2C | 34 | 3C | | DD34XX | FD34XX | * | * | * | * | 0 | - |
| DEC . | 05 | 0D | 15 | 1D | 25 | 2D | 35 | 3D | | DD35XX | FD35XX | * | * | * | * | 1 | - |

| | | S | Z | H | P/V | N | C | |
|---|---|---|---|---|---|---|---|---|
| DAA | 27 | * | * | * | * | - | * | BCD-Korrektur im Akku |
| CPL | 2F | - | - | 1 | - | 1 | - | Komplementiere Akku (1er-Komplement) |
| NEG | ED44 | * | * | * | * | 1 | * | Komplementiere Akku (2er-Komplement) |

## 16-bit Arithmetische und Logische Befehle

| | BC | DE | HL | SP | IX | IY | S | Z | H | P/V | N | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INC . | 03 | 13 | 23 | 33 | DD23 | FD23 | - | - | - | - | - | - |
| DEC . | 0B | 1B | 2B | 3B | DD2B | FD2B | - | - | - | - | - | - |
| ADD HL,. | 09 | 19 | 29 | 39 | | | - | - | * | - | 0 | * |
| ADC HL,. | ED4A | ED5A | ED6A | ED7A | | | * | * | * | * | 0 | * |
| SBC HL,. | ED42 | ED52 | ED62 | ED72 | | | * | * | * | * | 1 | * |
| ADD IX,. | DD09 | DD19 | | DD39 | DD29 | | - | - | * | - | 0 | * |
| ADD IY,. | FD09 | FD19 | | FD39 | | FD29 | - | - | * | - | 0 | * |

## Rotations- und Schiebebefehle

| | B | C | D | E | H | L | (HL) | A | (IX+d) | (IY+d) |
|---|---|---|---|---|---|---|---|---|---|---|
| RR | CB18 | CB19 | CB1A | CB1B | CB1C | CB1D | CB1E | CB1F | DDCBXX1E | FDCBXX1E |
| RL | CB10 | CB11 | CB12 | CB13 | CB14 | CB15 | CB16 | CB17 | DDCBXX16 | FDCBXX16 |
| RRC | CB08 | CB09 | CB0A | CB0B | CB0C | CB0D | CB0E | CB0F | DDCBXX0E | FDCBXX0E |
| RLC | CB00 | CB01 | CB02 | CB03 | CB04 | CB05 | CB06 | CB07 | DDCBXX06 | FDCBXX06 |
| SRA | CB28 | CB29 | CB2A | CB2B | CB2C | CB2D | CB2E | CB2F | DDCBXX2E | FDCBXX2E |
| SLA | CB20 | CB21 | CB22 | CB23 | CB24 | CB25 | CB26 | CB27 | DDCBXX26 | FDCBXX26 |
| SRL | CB38 | CB39 | CB3A | CB3B | CB3C | CB3D | CB3E | CB3F | DDCBXX3E | FDCBXX3E |

| | S | Z | H | P/V | N | C | |
|---|---|---|---|---|---|---|---|
| RR/RL | * | * | 0 | * | 0 | * | Rotiere Reg rechts/links durch Carry |
| RRC/RLC | * | * | 0 | * | 0 | * | Rotiere Reg rechts/links |
| SRA/SLA | * | * | 0 | * | 0 | * | Shift Reg rechts/links arithmetisch |
| SRL | * | * | 0 | * | 0 | * | Shift Reg rechts/links logisch |

| | | S | Z | H | P/V | N | C | |
|---|---|---|---|---|---|---|---|---|
| RRCA | 0F | - | - | 0 | - | 0 | * | Rotiere Akku rechts |
| RLCA | 07 | - | - | 0 | - | 0 | * | Rotiere Akku links |
| RRA | 1F | - | - | 0 | - | 0 | * | Rotiere Akku rechts durch Carry |
| RLA | 17 | - | - | 0 | - | 0 | * | Rotiere Akku links durch Carry |
| RLD(HL) | ED6F | * | * | 0 | * | 0 | - | Rotiere Ziffer links zwischen Akku und (HL) |
| RRD(HL) | ED67 | * | * | 0 | * | 0 | - | Rotiere Ziffer rechts zwischen Akku und (HL) |

## Einzelbitbefehle

| | B | C | D | E | H | L | (HL) | A | (IX+d) | (IY+d) |
|---|---|---|---|---|---|---|---|---|---|---|
| BIT 0 | CB40 | CB41 | CB42 | CB43 | CB44 | CB45 | CB46 | CB47 | DDCBXX46 | FDCBXX46 |
| BIT 1 | CB48 | CB49 | CB4A | CB4B | CB4C | CB4D | CB4E | CB4F | DDCBXX4E | FDCBXX4E |
| BIT 2 | CB50 | CB51 | CB52 | CB53 | CB54 | CB55 | CB56 | CB57 | DDCBXX56 | FDCBXX56 |
| BIT 3 | CB58 | CB59 | CB5A | CB5B | CB5C | CB5D | CB5E | CB5F | DDCBXX5E | FDCBXX5E |
| BIT 4 | CB60 | CB61 | CB62 | CB63 | CB64 | CB65 | CB66 | CB67 | DDCBXX66 | FDCBXX66 |
| BIT 5 | CB68 | CB69 | CB6A | CB6B | CB6C | CB6D | CB6E | CB6F | DDCBXX6E | FDCBXX6E |
| BIT 6 | CB70 | CB71 | CB72 | CB73 | CB74 | CB75 | CB76 | CB77 | DDCBXX76 | FDCBXX76 |
| BIT 7 | CB78 | CB79 | CB7A | CB7B | CB7C | CB7D | CB7E | CB7F | DDCBXX7E | FDCBXX7E |
| RES 0 | CB80 | CB81 | CB82 | CB83 | CB84 | CB85 | CB86 | CB87 | DDCBXX86 | FDCBXX86 |
| RES 1 | CB88 | CB89 | CB8A | CB8B | CB8C | CB8D | CB8E | CB8F | DDCBXX8E | FDCBXX8E |
| RES 2 | CB90 | CB91 | CB92 | CB93 | CB94 | CB95 | CB96 | CB97 | DDCBXX96 | FDCBXX96 |
| RES 3 | CB98 | CB99 | CB9A | CB9B | CB9C | CB9D | CB9E | CB9F | DDCBXX9E | FDCBXX9E |
| RES 4 | CBA0 | CBA1 | CBA2 | CBA3 | CBA4 | CBA5 | CBA6 | CBA7 | DDCBXXA6 | FDCBXXA6 |
| RES 5 | CBA8 | CBA9 | CBAA | CBAB | CBAC | CBAD | CBAE | CBAF | DDCBXXAE | FDCBXXAE |
| RES 6 | CBB0 | CBB1 | CBB2 | CBB3 | CBB4 | CBB5 | CBB6 | CBB7 | DDCBXXB6 | FDCBXXB6 |
| RES 7 | CBB8 | CBB9 | CBBA | CBBB | CBBC | CBBD | CBBE | CBBF | DDCBXXBE | FDCBXXBE |
| SET 0 | CBC0 | CBC1 | CBC2 | CBC3 | CBC4 | CBC5 | CBC6 | CBC7 | DDCBXXC6 | FDCBXXC6 |
| SET 1 | CBC8 | CBC9 | CBCA | CBCB | CBCC | CBCD | CBCE | CBCF | DDCBXXCE | FDCBXXCE |
| SET 2 | CBD0 | CBD1 | CBD2 | CBD3 | CBD4 | CBD5 | CBD6 | CBD7 | DDCBXXD6 | FDCBXXD6 |
| SET 3 | CBD8 | CBD9 | CBDA | CBDB | CBDC | CBDD | CBDE | CBDF | DDCBXXDE | FDCBXXDE |
| SET 4 | CBE0 | CBE1 | CBE2 | CBE3 | CBE4 | CBE5 | CBE6 | CBE7 | DDCBXXE6 | FDCBXXE6 |
| SET 5 | CBE8 | CBE9 | CBEA | CBEB | CBEC | CBED | CBEE | CBEF | DDCBXXEE | FDCBXXEE |
| SET 6 | CBF0 | CBF1 | CBF2 | CBF3 | CBF4 | CBF5 | CBF6 | CBF7 | DDCBXXF6 | FDCBXXF6 |
| SET 7 | CBF8 | CBF9 | CBFA | CBFB | CBFC | CBFD | CBFE | CBFF | DDCBXXFE | FDCBXXFE |

Flagbeeinflussung:

| | S | Z | H | P/V | N | C |
|---|---|---|---|---|---|---|
| BIT | ? | * | 1 | ? | 0 | - |
| SET | - | - | - | - | - | - |
| RES | - | - | - | - | - | - |

## Flag-Register

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| | S | Z | X | H | X | P/V | N | C |

| | gesetzt | nicht gesetzt | wird gesetzt bei |
|---|---|---|---|
| C Carry-Flag | C | NC | Uebertrag von Bit 7 |
| N Add-/Subtract-Flag | | | Subtraktionen |
| P/V Parity-/Overflow-Flag | PE | PO | gerader Paritaet |
| H Half-Carry-Flag | | | Uebertrag von Bit 3 |
| Z Zero-Flag | Z | NZ | Ergebnis 0 |
| S Sign-Flag | M | P | neg. Ergebnis |

X nicht verwendet

Beeinflussung:
- 1 gesetzt
- 0 zurueckgesetzt
- * abhaengig vom Ergebnis einer Operation
- - nicht beeinflusst
- ? unbestimmt

**Kurze Maschinenprogramme lassen sich auch ohne Assembler schnell und einfach mit den hexadezimalen Operationscodes schreiben. Heinz-Peter Curdts hat sich die Mühe gemacht, die Z80-Maschinenbefehle übersichtlich zusammenzustellen.**

### 8-bit-Ladebefehle

| | A | B | C | D | E | H | L | (HL) | (BC) | (DE) | (nn) | n |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LD A,. | 7F | 78 | 79 | 7A | 7B | 7C | 7D | 7E | 0A | 1A | 3AXXXX | 3EXX |
| LD B,. | 47 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | | | | 06XX |
| LD C,. | 4F | 48 | 49 | 4A | 4B | 4C | 4D | 4E | | | | 0EXX |
| LD D,. | 57 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | | | | 16XX |
| LD E,. | 5F | 58 | 59 | 5A | 5B | 5C | 5D | 5E | | | | 1EXX |
| LD H,. | 67 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | | | | 26XX |
| LD L,. | 6F | 68 | 69 | 6A | 6B | 6C | 6D | 6E | | | | 2EXX |
| LD (HL),. | 77 | 70 | 71 | 72 | 73 | 74 | 75 | | | | | 36XX |
| LD (BC),. | 02 | | | | | | | | | | | |
| LD (DE),. | 12 | | | | | | | | | | | |
| LD (nn),. | 32XXXX | | | | | | | | | | | |

| | A | B | C | D | E | H | L |
|---|---|---|---|---|---|---|---|
| LD .,(IX+d) | DD7EXX | DD46XX | DD4EXX | DD56XX | DD5EXX | DD66XX | DD6EXX |
| LD .,(IY+d) | FD7EXX | FD46XX | FD4EXX | FD56XX | FD5EXX | FD66XX | FD6EXX |
| LD (IX+d),. | DD77XX | DD70XX | DD71XX | DD72XX | DD73XX | DD74XX | DD75XX |
| LD (IY+d),. | FD77XX | FD70XX | FD71XX | FD72XX | FD73XX | FD74XX | FD75XX |

LD (IX+d),n DD36XXXX LD (IY+d),n FD36XXXX

| | | S | Z | H | P/V | N | C |
|---|---|---|---|---|---|---|---|
| LD A,I | ED57 | * | * | 0 | * | 0 | - |
| LD A,R | ED5F | * | * | 0 | * | 0 | - |
| LD I,A | ED47 | - | - | - | - | - | - |
| LD R,A | ED4F | - | - | - | - | - | - |

### 16-bit-Ladebefehle

| | BC | DE | HL | SP | IX | IY |
|---|---|---|---|---|---|---|
| LD ..,nn | 01XXXX | 11XXXX | 21XXXX | 31XXXX | DD21XXXX | FD21XXXX |
| LD ..,(nn) | ED4BXXXX | ED5BXXXX | 2AXXXX | ED7BXXXX | DD2AXXXX | FD2AXXXX |
| LD (nn),.. | ED43XXXX | ED53XXXX | 22XXXX | ED73XXXX | DD22XXXX | FD22XXXX |
| LD SP | | | F9 | | DDF9 | FDF9 |

| | BC | DE | HL | AF | IX | IY |
|---|---|---|---|---|---|---|
| PUSH .. | C5 | D5 | E5 | F5 | DDE5 | FDE5 |
| POP .. | C1 | D1 | E1 | F1 | DDE1 | FDE1 |

| | | | |
|---|---|---|---|
| EX (SP),HL | E3 | EX DE,HL | EB |
| EX (SP),IX | DDE3 | EX AF,AF' | 08 |
| EX (SP),IY | FDE3 | EXX | D9 BC-BC' DE-DE' HL-HL' |

### Blocktransfer- und Suchbefehle

| | | S | Z | H | P/V | N | C | |
|---|---|---|---|---|---|---|---|---|
| LDI | EDA0 | - | - | 0 | * | 0 | - | LD(DE),(HL);INC HL;INC DE;DEC BC |
| LDIR | EDB0 | - | - | 0 | 0 | 0 | - | wie LDI,wiederholen bis BC=0 . |
| LDD | EDA8 | - | - | 0 | * | 0 | - | LD(DE),(HL);DEC HL;DEC DE;DEC BC |
| LDDR | EDB8 | - | - | 0 | 0 | 0 | - | wie LDD,wiederholen bis BC=0 |
| CPI | EDA1 | * | * | * | * | 1 | - | LD A,(HL);INC HL;DEC BC |
| CPIR | EDB1 | * | * | * | * | 1 | - | wie CPI,wiederholen bis BC=0 oder Zeichen gefunden |
| CPD | EDA9 | * | * | * | * | 1 | - | LD A,(HL);DEC HL;DEC BC |
| CPDR | EDB9 | * | * | * | * | 1 | - | wie CPD,wiederholen bis BC=0 oder Zeichen gefunden |

### Sprungbefehle

| | Z | NZ | C | NC | PE | PO | M | P |
|---|---|---|---|---|---|---|---|---|
| JP | CAXXXX | C2XXXX | DAXXXX | D2XXXX | EAXXXX | E2XXXX | FAXXXX | F2XXXX |
| CALL | CCXXXX | C4XXXX | DCXXXX | D4XXXX | ECXXXX | E4XXXX | FCXXXX | F4XXXX |
| RET | C8 | C0 | D8 | D0 | E8 | E0 | F8 | F0 |
| JR | 28XX | 20XX | 38XX | 30XX | | | | |

| | unbedingt | (HL) | (IX) | (IY) |
|---|---|---|---|---|
| JP | C3XXXX | E9 | DDE9 | FDE9 |
| CALL | CDXXXX | | | |
| RET | C9 | | | |
| JR | 18XX | | | |

| RST | 00 | 08 | 10 | 18 | 20 | 28 | 30 | 38 |
|---|---|---|---|---|---|---|---|---|
| | C7 | CF | D7 | DF | E7 | EF | F7 | FF |

| | | |
|---|---|---|
| DJNZ | 10XX | DEC B;JR NZ,d |
| RETI | ED4D | zurueck vom Interrupt |
| RETN | ED45 | zurueck vom nicht maskierbaren Interrupt |

### CPU-Steuerbefehle

| | | S | Z | H | P/V | N | C | |
|---|---|---|---|---|---|---|---|---|
| NOP | 00 | - | - | - | - | - | - | Leerbefehl |
| HALT | 76 | - | - | - | - | - | - | |
| CCF | 3F | - | - | * | - | 0 | * | Komplementiere Carry-Flag |
| SCF | 37 | - | - | 0 | - | 0 | 1 | Setze Carry-Flag |
| EI | FB | - | - | - | - | - | - | Interrupts freigeben |
| DI | F3 | - | - | - | - | - | - | Interrupts sperren |
| IM 0 | ED46 | - | - | - | - | - | - | Interrupt-Modus 0 |
| IM 1 | ED56 | - | - | - | - | - | - | Interrupt-Modus 1 |
| IM 2 | ED5E | - | - | - | - | - | - | Interrupt-Modus 2 |

### Ein-/Aussabebefehle

| | A | B | C | D | E | H | L | S | Z | H | P/V | N | C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IN .,(C) | ED78 | ED40 | ED48 | ED50 | ED58 | ED60 | ED68 | * | * | 0 | * | 0 | - |
| OUT (C),. | ED79 | ED41 | ED49 | ED51 | ED59 | ED61 | ED69 | - | - | - | - | - | - |

| | | S | Z | H | P/V | N | C | |
|---|---|---|---|---|---|---|---|---|
| IN A,n | DBXX | - | - | - | - | - | - | |
| OUT n,A | D3XX | - | - | - | - | - | - | |
| INI | EDA2 | ? | * | ? | ? | 1 | - | IN (HL),(C);INC HL;DEC B |
| INIR | EDB2 | ? | 1 | ? | ? | 1 | - | wie INI,wiederholen solange B()0 |
| IND | EDAA | ? | * | ? | ? | 1 | - | IN (HL),(C);DEC HL;DEC B |
| INDR | EDBA | ? | 1 | ? | ? | 1 | - | wie IND,wiederholen solange B()0 |
| OUTI | EDA3 | ? | * | ? | ? | 1 | - | OUT (C),(HL);INC HL;DEC B |
| OTIR | EDB3 | ? | 1 | ? | ? | 1 | - | wie OUTI,wiederholen solange B()0 |
| OUTD | EDAB | ? | * | ? | ? | 1 | - | OUT (C),(HL);DEC HL;DEC B |
| OTDR | EDBB | ? | 1 | ? | ? | 1 | - | wie OUTD,wiederholen solange B()0 |