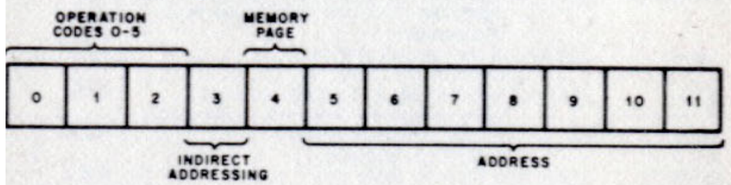
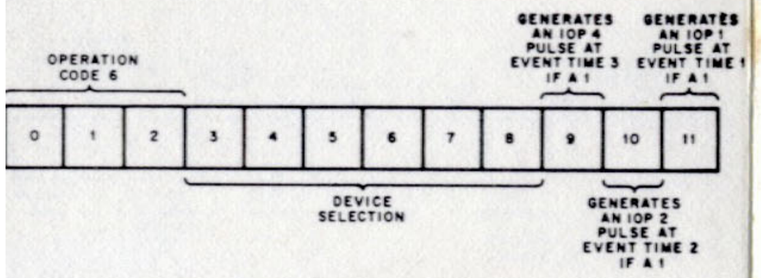
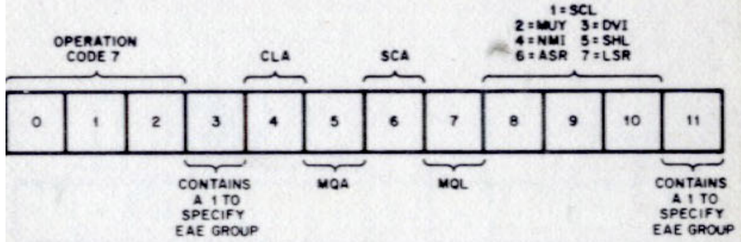



Memory Reference Instruction Bit Assignments




IOT Instruction Bit Assignments




Logical Sequence:

1 — CLA
2 — MQA, MQL, SCA
3 (Bits 8 thru 10=1) — SCL
3 (Bits 8 thru 10=2) — MUY
3 (Bits 8 thru 10=3) — DVI
3 (Bits 8 thru 10=4) — NMI
3 (Bits 8 thru 10=5) — SHL
3 (Bits 8 thru 10=6) — ASR
3 (Bits 8 thru 10=7) — LSR

EAE Microinstruction Bit Assignments

## ASCII CODE

| Character | Code | Character | Code |
|---|---|---|---|
| A | 301 | ! | 241 |
| B | 302 | " | 242 |
| C | 303 | # | 243 |
| D | 304 | $ | 244 |
| E | 305 | % | 245 |
| F | 306 | & | 246 |
| G | 307 | ' | 247 |
| H | 310 | ( | 250 |
| I | 311 | ) | 251 |
| J | 312 | * | 252 |
| K | 313 | + | 253 |
| L | 314 | , | 254 |
| M | 315 | - | 255 |
| N | 316 | . | 256 |
| O | 317 | / | 257 |
| P | 320 | : | 272 |
| Q | 321 | ; | 273 |
| R | 322 | < | 274 |
| S | 323 | = | 275 |
| T | 324 | > | 276 |
| U | 325 | ? | 277 |
| V | 326 | @ | 300 |
| W | 327 | [ | 333 |
| X | 330 | \ | 334 |
| Y | 331 | ] | 335 |
| Z | 332 | ↑ | 336 |
| 0 | 260 | ← | 337 |
| 1 | 261 | EOT | 204 |
| 2 | 262 | W RU | 205 |
| 3 | 363 | RU | 206 |
| 4 | 264 | BELL | 207 |
| 5 | 265 | Line Feed | 212 |
| 6 | 266 | Return | 215 |
| 7 | 267 | Space | 240 |
| 8 | 270 | ALT MODE | 375 |
| 9 | 271 | Rub Out | 377 |
| | | Escape | 233 |

| Rim Loader (Low Speed) | | Rim Loader (High Speed) | |
|---|---|---|---|
| 7756/ | 6032 | 7756/ | 6014 |
| 7757/ | 6031 | 7757/ | 6011 |
| 7760/ | 5357 | 7760/ | 5357 |
| 7761/ | 6036 | 7761/ | 6016 |
| 7762/ | 7106 | 7762/ | 7106 |
| 7763/ | 7006 | 7763/ | 7006 |
| 7764/ | 7510 | 7764/ | 7510 |
| 7765/ | 5357 | 7765/ | 5374 |
| 7766/ | 7006 | 7766/ | 7006 |
| 7767/ | 6031 | 7767/ | 6011 |
| 7770/ | 5367 | 7770/ | 5367 |
| 7771/ | 6034 | 7771/ | 6016 |
| 7772/ | 7420 | 7772/ | 7420 |
| 7773/ | 3776 | 7773/ | 3776 |
| 7774/ | 3376 | 7774/ | 3376 |
| 7775/ | 5356 | 7775/ | 5357 |

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# pdp8/i

# instruction list

| Mnemonic | Code | Operation | Time (μsec.) |
|---|---|---|---|
| **BASIC INSTRUCTIONS** | | | |
| AND | 0000 | logical AND | 3 |
| TAD | 1000 | 2's complement add | 3 |
| ISZ | 2000 | increment and skip if zero | 3 |
| DCA | 3000 | deposit and clear AC | 3 |
| JMS | 4000 | jump to subroutine | 3 |
| JMP | 5000 | jump | 1.5 |
| IOT | 6000 | in/out transfer | 4.25 |
| OPR | 7000 | operate | 1.5 |

## GROUP 1 OPERATE MICROINSTRUCTIONS (1 CYCLE)

| | | | Sequence |
|---|---|---|---|
| NOP | 7000 | no operation | — |
| CLA | 7200 | clear AC | 1 |
| CLL | 7100 | clear link | 1 |
| CMA | 7040 | complement AC | 2 |
| CML | 7020 | complement link | 2 |
| RAR | 7010 | rotate AC and link right one | 4 |
| RAL | 7004 | rotate AC and link left one | 4 |
| RTR | 7012 | rotate AC and link right two | 4 |
| RTL | 7006 | rotate AC and link left two | 4 |
| IAC | 7001 | increment AC | 3 |

## GROUP 2 OPERATE MICROINSTRUCTIONS (1 CYCLE)

| | | | Sequence |
|---|---|---|---|
| SMA | 7500 | skip on minus AC | 1 |
| SZA | 7440 | skip on zero AC | 1 |
| SPA | 7510 | skip on plus AC | 1 |
| SNA | 7450 | skip on non zero AC | 1 |
| SNL | 7420 | skip on non-zero link | 1 |
| SZL | 7430 | skip on zero link | 1 |
| SKP | 7410 | skip unconditionally | 1 |
| OSR | 7404 | inclusive OR, switch register with AC | 3 |
| HLT | 7402 | halts the program | 3 |
| CLA | 7600 | clear AC | 2 |

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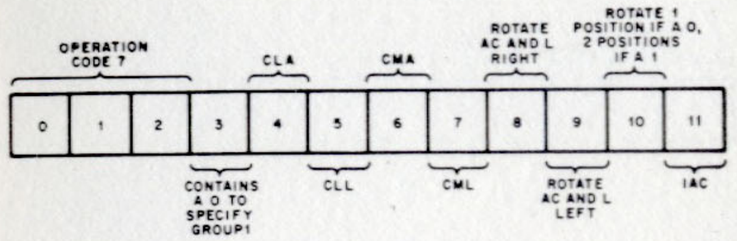
## COMBINED OPERATE MICROINSTRUCTIONS

| | | | Sequence |
|---|---|---|---|
| CIA | 7041 | complement and increment AC | 2, 3 |
| LAS | 7604 | load AC with switch register | 2, 3 |
| STL | 7120 | set link (to 1) | 1, 2 |
| GLK | 7204 | get link (put link in AC bit 11) | 1, 4 |
| CLA CLL | 7300 | clear AC and link | 1 |
| CLA IAC | 7201 | set AC = 1 | 1, 3 |
| CLA CMA | 7240 | set AC = −1 | 1, 2 |
| CLL RAR | 7110 | shift positive number one right | 1, 4 |
| CLL RAL | 7104 | shift positive number one left | 1, 4 |
| CLL RTL | 7106 | clear link, rotate 2 left | 1, 4 |
| CLL RTR | 7112 | clear link, rotate 2 right | 1, 4 |
| SZA CLA | 7640 | skip if AC = 0, then clear AC | 1. 2 |
| SZA SNL | 7460 | skip if AC = 0 or link is 1, or both | 1 |
| SNA CLA | 7650 | skip if AC ≠ 0, then clear AC | 1, 2 |
| SMA CLA | 7700 | skip if AC < 0, then clear AC | 1, 2 |
| SMA SZA | 7540 | skip if AC ≤ 0 | 1 |
| SMA SNL | 7520 | skip if AC < 0 or link is 1, or both | 1 |
| SPA SNA | 7550 | skip if AC > 0 | 1 |
| SPA SZL | 7530 | skip if AC ≥ 0, and if the link is 0 | 1 |
| SPA CLA | 7710 | skip if AC ≥ 0, then clear AC | 1, 2 |
| SNA SZL | 7470 | skip if AC ≠ 0 and link = 0 | 1 |

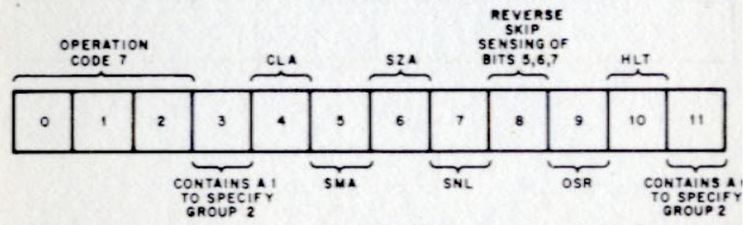
| Mnemonic | Code | Operation | Time (μsec.) |
|---|---|---|---|
| **EAE MICROINSTRUCTIONS TYPE KE 8/I** | | | |
| DVI | 7407 | divide | 5.2—7.8 |
| NMI | 7411 | normalize | 1.5+0.25n |
| SHL | 7413 | shift left | 3.0+0.25n |
| ASR | 7415 | arithmetic shift right | 3.0+0.25n |
| LSR | 7417 | logical shift right | 3.0+0.25n |
| MQL | 7421 | load AC into MQ, clear AC | 1.5 |
| MUY | 7405 | multiply | 4.8—7.2 |
| MQA | 7501 | inclusive OR, MQ with AC | 1.5 |
| CAM | 7621 | clear AC and MQ | 1.5 |
| SCA | 7441 | read SC into AC | 1.5 |
| CLA | 7601 | clear AC | 1.5 |
| SCL | 7403 | load the step counter | 3.0 |
| **10T MICROINSTRUCTIONS** | | | |
| **PROGRAM INTERRUPT** | | | |
| ION | 6001 | turn interrupt on | 1.5 |
| IOF | 6002 | turn interrupt off | 1.5 |
| **EXTENDED MEMORY TYPE MC8/I** | | | |
| CDF | 62n1 | change to data field n | 1.5 |
| CIF | 62n2 | change to instruction field n | 1.5 |
| RDF | 6214 | read data field into AC 6-8 | 1.5 |
| RIF | 6224 | read instruction field into AC 6-8 | 1.5 |
| RMF | 6244 | restore memory field | 1.5 |
| RIB | 6234 | read interrupt buffer | 1.5 |

| Mnemonic | Code | Operation | Time μsec.) |
|---|---|---|---|
| **TELETYPE KEYBOARD/READER** | | | |
| KSF | 6031 | skip if keyboard/reader flag=1 | 4.25 |
| KCC | 6032 | clear AC and keyboard/reader flag | 4.25 |
| KRS | 6034 | read keyboard/reader buffer, static | 4.25 |
| KRB | 6036 | Clear AC, read keyboard buffer clear keyboard flag | 4.25 |
| **TELETYPE TELEPRINTER/PUNCH** | | | |
| TSF | 6041 | skip if teleprinter/punch flag=1 | 4.25 |
| TCF | 6042 | clear teleprinter/punch flag | 4.25 |
| TPC | 6044 | load teleprinter/punch buffer, select and print | 4.25 |
| TLS | 6046 | load teleprinter/punch buffer, select and print, and clear teleprinter/punch flag | 4.25 |
| **HIGH SPEED PERFORATED TAPE READER TYPE PR8/I** | | | |
| RSF | 6011 | skip if reader flag=1 | 4.25 |
| RRB | 6012 | read reader buffer, and clear flag | 4.25 |
| RFC | 6014 | clear flag and buffer and fetch character | 4.25 |
| **HIGH SPEED PERFORATED TAPE PUNCH TYPE PP8/I** | | | |
| PSF | 6021 | skip if punch flag=1 | 4.25 |
| PCF | 6022 | clear flag and buffer | 4.25 |
| PPC | 6024 | load buffer and punch character | 4.25 |
| PLS | 6026 | clear flag and buffer; load and punch | 4.25 |
| **DECTAPE AND CONTROL TYPE TU56/TC08** | | | |
| DTRA | 6761 | read status register A | 4.25 |
| DTCA | 6762 | clear status register A | 4.25 |
| DTXA | 6764 | load status register A | 4.25 |
| DTSF | 6771 | skip on flags | 4.25 |
| DTRB | 6772 | read status register B | 4.25 |
| DTLB | 6774 | load status register B | 4.25 |
| **RANDOM ACCESS DISC FILE TYPE DF32D** | | | |
| DCMA | 6601 | clear disk memory address register, & disk flags | 4.25 |
| DMAR | 6603 | load disk memory address register & read | 4.25 |
| DMAW | 6605 | load disk memory address register and write | 4.25 |
| DCEA | 6611 | clear disk extended address register and memory address extension | 4.25 |
| DSAC | 6612 | skip on address confirmed flag | 4.25 |
| DEAL | 6615 | load disk extended address and memory address extension | 4.25 |
| DEAC | 6616 | read disk extended address register | 4.25 |
| DFSE | 6621 | skip on zero error flag | 4.25 |
| DFSC | 6622 | skip on data completion flag | 4.25 |
| DMAC | 6626 | read disk memory address register | 4.25 |




Logical Sequences:
1—CLA, CLL
2—CMA, CML
3—IAC
4—RAR, RAL, RTR, RTL

Group 1 Operate Instruction Bit Assignments




Logical Sequences:
1 (Bit 8 is Zero)—Either SMA or SZA or SNL
1 (Bit 8 is One)—Both SPA and SNA and SZL
2 — CLA
3 — OSR, HLT

Group 2 Operate Instruction Bit Assignments