|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Order | Old | New | Function | Time |
| 00 |  |  |  |  |
| 01 | STOP | STOP | Stop computer | N/A |
| 02 | F | ADDL | Add L register to A register | 123 |
| 03 | D(m) | DIV m | Divide A by the contents of memory location m, put the result in A rounded to 30 binary digits. Contents of L are lost (probably cleared but should not be assumed) | 633 |
| 04 | C(m) | STC m | Transfer A to memory location m, and clear A | 285 |
| 05 | A(m) | ADD m | Add the contents of memory location m to A | 285 |
| 06 |  |  |  |  |
| 07 |  |  |  |  |
| 10 | M(m) | MUL m | Multiply L by the contents of memory m, rounded to 30 binary digits, put in A. | 654 |
| 11 | K | TALC | Transfer A to L, and Clear A | 123 |
| 12 | L | TAL | Transfer A to L | 123 |
| 13 | H(m) | STA m | Transfer A to memory location m. | 285 |
| 14 | T(m) | JMC m | If A is negative, then set the program counter to m ; clear Accumulator in either case. Note that instructions are in pairs in each word. | 123 |
| 15 | S(m) | SUB m | Subtract the contents of memory location m from A | 285 |
| 16 |  |  |  |  |
| 17 |  |  |  |  |
| 20 | U(m) | JMP m | Set the program counter to m. | 123 |
| 21 |  |  |  |  |
| 22 | + | ASHL | Shift A left, losing the sign digit | 123 |
| 23 | - | ASHR | Shift A right, preserving the sign digit. | 123 |
| 24 | BP | BRK | Stop if the break point switch is set | 123 |
| 25 | SKIP | NOP | Do nothing (used for padding unused instruction space if a branch is the first instruction in a word) | 123 |
| 26 |  |  |  |  |
| 27 |  |  |  |  |

Registers

31 bit Accumulator 'A'

31 bit auxiliary register 'L' (contains multiplicand/divisor during those arithmetic instructions)

9 bit program counter 'Memory Position Counter'

The packing is shown (albeit backwards !) in Fig 1 of Auerbach. There is a 5 bit order field and a 9 bit address field, giving 512 words of memory, 1024 instructions. (Using 14 and 29 this can be expanded to 1k of memory, 2048 instructions)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **30 Sign** | **29 MSD** | **28-24** | **23-15** | **14** | **13-9** | **8-0** |
| Unused | Unused | Order 1 | Address 1 | Unused | Order 2 | Address 2 |

Note that in an emulation a 10 bit “Memory Position Counter” is used and called the Program Counter, bit 0 selects the half of the word to use. This is translated to 9 bits + 1 bit by the CPUStatus() method.