Control Unit:

This control unit includes a ROM 32x256.

Each micro operation is set to has at most 8 directed micro programs or more undirected ones.  
This structure is architecture to be flexible and to use Mano base computer Assembly language.

ROM STRING BITS:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| AD | BR | CD | F3 | F2 | F1 |
| 8 | 2 | 4 | 6 | 6 | 6 |

1.This is performed to Mano basic computer(including interrupt and diversity of usable registers).

2.Available parts to define new micro operations and micro programs.

3.F1 , F2 and F3 commands can be used with the minimum conflicts number.

F1:

|  |  |
| --- | --- |
| NONE | 000000 |
| BUS <- M[AR] | 000001 |
| BUS <- AR | 000010 |
| BUS <- PC | 000011 |
| BUS <- DR | 000100 |
| BUS <- AC | 000101 |
| BUS <- IR | 000110 |
| BUS <- TR | 000111 |
| CLR AR | 001000 |
| CLR PC | 001001 |
| CLR DR | 001010 |
| CLR TR | 001011 |
| INCR AR | 001100 |
| INCR PC | 001101 |
| INCR DR | 001110 |
| INCR TR | 001111 |

The operations are putting on the bus and CLR and INCR registers.

F2:

|  |  |
| --- | --- |
| NONE | 000000 |
| M[AR] <- BUS | 000001 |
| AR <- BUS | 000010 |
| PC <- BUS | 000011 |
| DR <- BUS | 000100 |
| IR <- BUS | 000101 |
| TR <- BUS | 000110 |
| FGO <- 1 | 000111 |
| IEN <- 1 | 001000 |
| R <- 1 | 001001 |
| S <- 1 | 001010 |
| FGO <- 0 | 001011 |
| IEN <- 0 | 001100 |
| R <- 0 | 001101 |
| S <- 0 | 001110 |

The operations are loading from the bus and changing the value of the flags.

F3:

|  |  |
| --- | --- |
| NONE | 000000 |
| AC <- AC ^ DR | 000001 |
| AC <- AC + DR | 000010 |
| AC <- DR | 000011 |
| AC <- INPR | 000100 |
| AC <- AC’ | 000101 |
| AC , E <- SHR(AC , E) | 000110 |
| AC , E <- SHL(AC , E) | 000111 |
| INCR AC | 001000 |
| CLR AC | 001001 |
| E <- 1 | 001010 |
| E <- 0 | 001011 |

The operations are related to ALU ,AC and E. Alse changing the value of the E.

CD:

|  |  |
| --- | --- |
| ALWAYS = 1 | 0000 |
| DR(15) = 1 | 0001 |
| AC(15) = 1 | 0010 |
| AC = 0 | 0011 |
| FGO = 1 | 0100 |
| R = 1 | 0101 |
| IEN = 1 | 0110 |
| S = 1 | 0111 |

It’s considered 4 bits to be available to expand conditions.

BR:

|  |  |  |
| --- | --- | --- |
| CAR <- AD | JMP | 00 |
| CAR <- AD  SBR <- CAR +1 | CALL | 01 |
| CAR <- SBR | RET | 10 |
| CAR(0-2) <- 0  CAR(3-8)<-OPCODE | MAP | 11 |

Else CAR <- CAR + 1.