FLAGS/SEQ INPUT

HLT   RS
EO   SU
AO   AI
BO   BI
CO   CI
IO   II
/RS   FI
PO   PE
UN   OI
RO   RI
SO   SI
PI   MI
FC   FN
FU   FZ
CK   /CK
+5v   GND

1   2

C2   C3

my
LAB
PCB

Instruction Decoder. Rev: 6

RN6
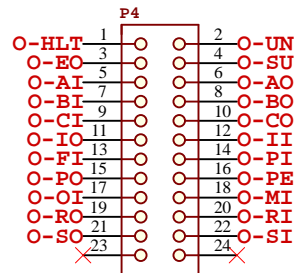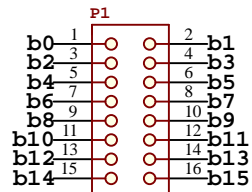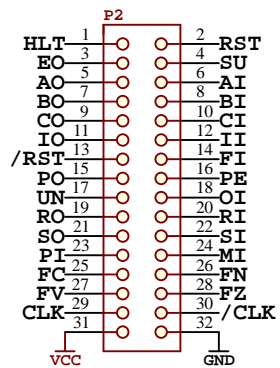
OPCODE INPUT

C4   RN4

OUTPUT
CONNECTOR

RN5

C1

Control BUS Connector Top **Data BUS Connector Top** **Control Logic Decoder Connector** **Instruction Register Connector** **Flags register + Steps counter Connector**

P2

HLT	1	2	RST
EO	3	4	SU
AO	5	6	AI
BO	7	8	BI
CO	9	10	CI
IO	11	12	II
/RST	13	14	FI
PO	15	16	PE
UN	17	18	OI
RO	19	20	RI
SO	21	22	SI
PI	23	24	MI
FC	25	26	FN
FV	27	28	FZ
CLK	29	30	/CLK
	31	32	

VCC   GND

P1

b0	1	2	b1
b2	3	4	b3
b4	5	6	b5
b6	7	8	b7
b8	9	10	b9
b10	11	12	b11
b12	13	14	b13
b14	15	16	b15

P4

O-HLT	1	2	O-UN
O-EO	3	4	O-SU
O-AI	5	6	O-AO
O-BI	7	8	O-BO
O-CI	9	10	O-CO
O-IO	11	12	O-II
O-FI	13	14	O-PI
O-PO	15	16	O-PE
O-OI	17	18	O-MI
O-RO	19	20	O-RI
O-SO	21	22	O-SI
	23		24	

P3

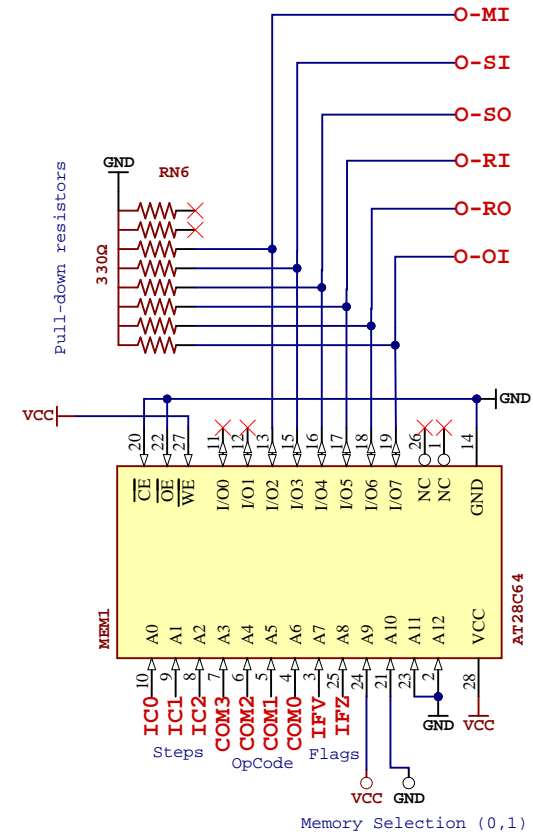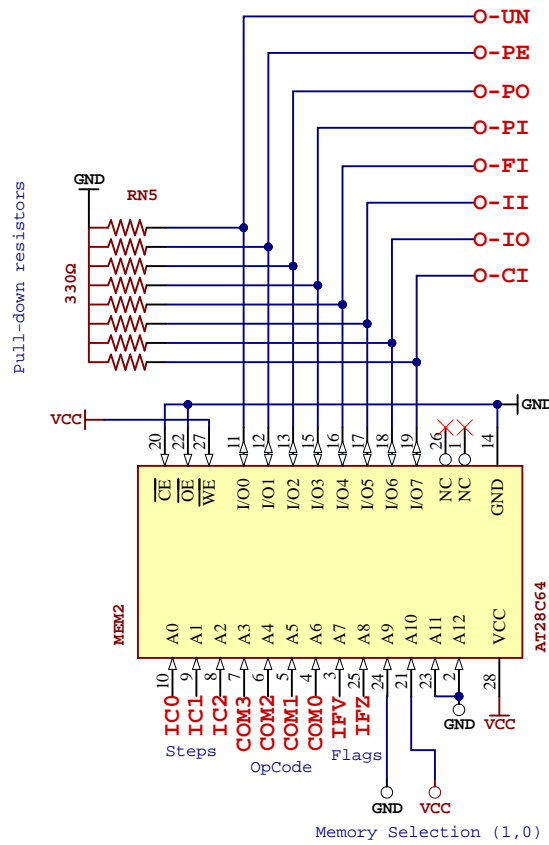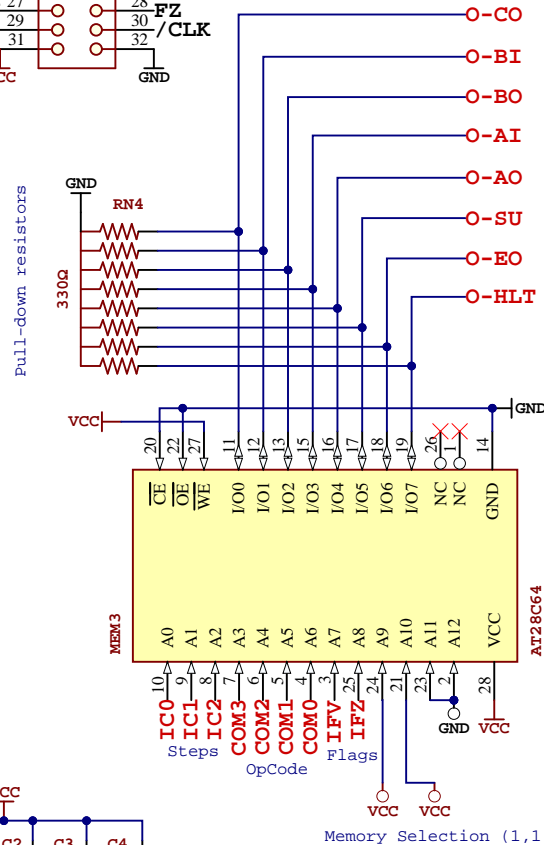| COM0 | 1 | 2 | COM1 |
COM2	3	4	COM3
COM4	5	6	COM5
COM6	7	8	COM7

Decoder use the most significative word stored in the instruction register which correspond with the command OPCODE.

P6

IC0	1	2	IC1
IC2	3	4	
	5	6	IFV
IFZ	7	8	
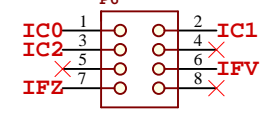
Flags signals used are IFV, IFZ which are stored in the Flag Register not the current values of FV and FZ which come through the control BUS.

O-CO
O-BI
O-BO
O-AI
O-AO
O-SU
O-EO
O-HLT

O-UN
O-PE
O-PO
O-PI
O-FI
O-II
O-IO
O-CI

O-MI
O-SI
O-SO
O-RI
O-RO
O-OI

Pull-down resistors   330Ω   GND   RN4

Pull-down resistors   330Ω   GND   RN5

Pull-down resistors   330Ω   GND   RN6

VCC

MEM3

CE OE WE I/O0 I/O1 I/O2 I/O3 I/O4 I/O5 I/O6 I/O7 NC NC GND

A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 VCC

AT28C64

IC0 IC1 IC2 COM3 COM2 COM1 COM0 IFV IFZ

Steps   OpCode   Flags

GND VCC

VCC VCC

Memory Selection (1,1)

MEM2

CE OE WE I/O0 I/O1 I/O2 I/O3 I/O4 I/O5 I/O6 I/O7 NC NC GND

A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 VCC

AT28C64

IC0 IC1 IC2 COM3 COM2 COM1 COM0 IFV IFZ

Steps   OpCode   Flags

GND VCC

GND VCC

Memory Selection (1,0)

MEM1

CE OE WE I/O0 I/O1 I/O2 I/O3 I/O4 I/O5 I/O6 I/O7 NC NC GND

A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 VCC

AT28C64

IC0 IC1 IC2 COM3 COM2 COM1 COM0 IFV IFZ

Steps   OpCode   Flags

VCC GND

Memory Selection (0,1)

VCC
C1   C2   C3   C4
10µF 100nF 100nF 100nF
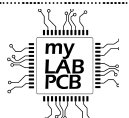GND

Decoupling Capacitors

Memory selector set which byte part of the entire microinstruction are stored in the memory:
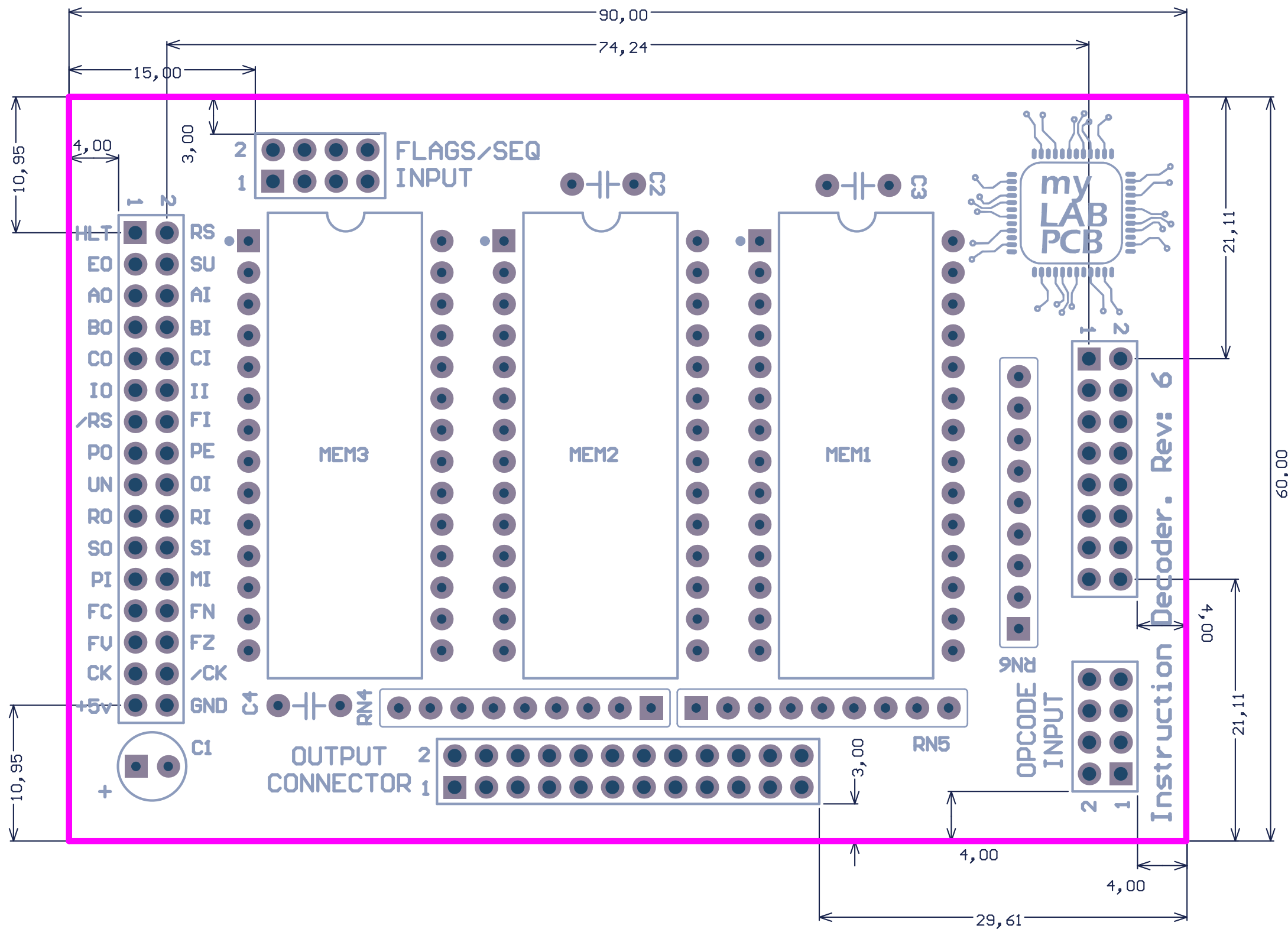MEM1 holds the byte 0-7, MEM2 holds the byte 8-15 and MEM3 holds byte 16-23

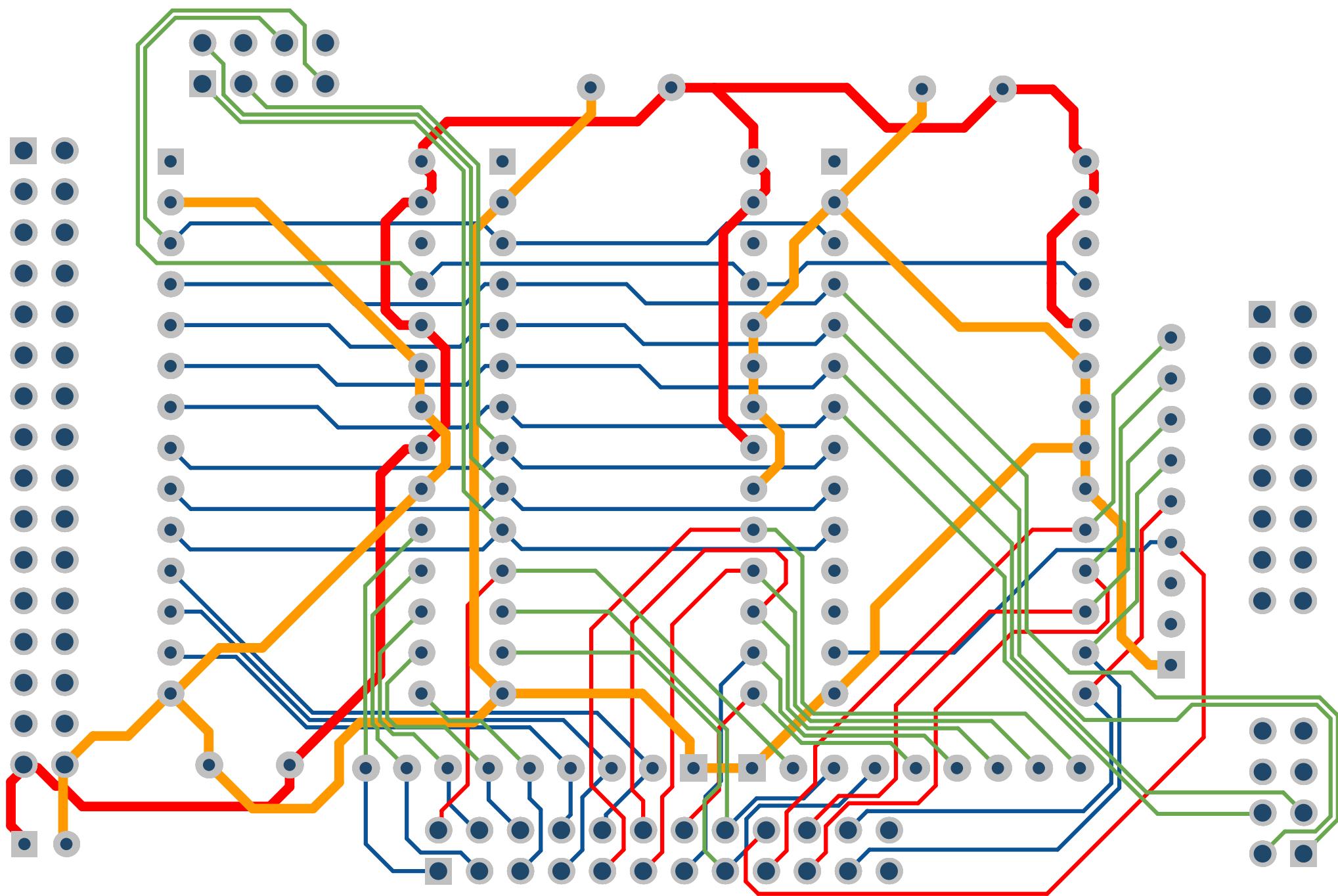**Project:** myCPU Instruction Decoder module

Revision: 6   **Date:** 28/06/2022

Author: Rafa Hernández

my LAB PCB

90,00

74,24

15,00

3,00

4,00

10,95

2 FLAGS/SEQ
1 INPUT

C2

C3

my
LAB
PCB

21,11

60,00

1 2

HLT RS
EO SU
AO AI
BO BI
CO CI
IO II
/RS FI
PO PE
UN OI
RO RI
SO SI
PI MI
FC FN
FV FZ
CK /CK
+5v GND

MEM3

MEM2

MEM1

RN6

1 2

Instruction Decoder. Rev: 6

4,00

21,11

C4

RN4

C1

+

OUTPUT 2
CONNECTOR 1

RN5

3,00

OPCODE
INPUT

2 1

4,00

4,00

29,61

Bill of Materials

Designator	Description	Value	Q
C1	Electrolytic capacitor 16v/50v	10µF	1
C2, C3, C4	Ceramic or tantalum capacitor	100nF	3
MEM1, MEM2, MEM3	EEProm 64K, 8K x 8 bits	AT28C64	3
P1	Pin Header, THT, pitch 2.54mm, Dual Row, Vertical, 16p	16P	1
P2	Pin Header, THT, pitch 2.54mm, Dual Row, Vertical, 32p	32p	1
P3, P6	WR-PHD Pin Header, THT, pitch 2.54mm, Dual Row, Vertical, 8p	8p	2
P4	Pin Header, THT, pitch 2.54mm, Dual Row, Vertical, 24p	24p	1
RN4, RN5, RN6	Resistor array 8 elements,9 pins	330Ω	3

Assembly List

Desig.	Description	Value
C1	Electrolytic capacitor 16v/50v	10µF
C2	Ceramic or tantalum capacitor	100nF
C3	Ceramic or tantalum capacitor	100nF
C4	Ceramic or tantalum capacitor	100nF
MEM1	EEProm 64K, 8K x 8 bits	AT28C64
MEM2	EEProm 64K, 8K x 8 bits	AT28C64
MEM3	EEProm 64K, 8K x 8 bits	AT28C64
P1	Pin Header, THT, pitch 2.54mm, Dual Row, Vertical, 16p	16P
P2	Pin Header, THT, pitch 2.54mm, Dual Row, Vertical, 32p	32p
P3	WR-PHD Pin Header, THT, pitch 2.54mm, Dual Row, Vertical, 8p	8p
P4	Pin Header, THT, pitch 2.54mm, Dual Row, Vertical, 24p	24p
P6	WR-PHD Pin Header, THT, pitch 2.54mm, Dual Row, Vertical, 8p	8p
RN4	Resistor array 8 elements,9 pins	330Ω
RN5	Resistor array 8 elements,9 pins	330Ω
RN6	Resistor array 8 elements,9 pins	330Ω