config

RA0 input ADC from volage and current and resistance blocks

Output

RC0-> D4 for lcd

RC1 -> D5 for lcd

RC2 -> D6 for lcd

RC3-> D7 for lcd

Output

RD0-> E for lcd

RD1-> RS

Note : RW = 0 (connected to ground)

Input

RB5 - dc volt 5

RB4- dc volt 50

RB3- dc volt 200

RB2- ac volt 5

RB1- ac volt 50

RB0-> ac volt 200

RD7->Dc current

RD6->Ac current

RD5->R 10K value

RD4->R 1M value

Selection for mux

Output

RA4, RA3

to choose the input of ADC0 between

00 dc volt

01 dc current

10 ac volt

11 resistance

RA4 the most sig bit

RA2 ,RA1 to chose the ring of volt ac and dc

00 50-> 200

01 5-> 50

10 0->5

11 xx

RA6 to choose the input of Ac to DC converter

0 Vac

1 Iac

RA5

Note: it has 3 functions but the three functions don't work at the same time

first: choose where the output from first stage in voltage block will go either

 second stage -1 in case of dc

or second stage Ac to Dc converter

0 dc

1 Ac

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Second : the same for the current

0 dc

1 Ac

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third : chose the range of resistance

0 big value of resistance

1 small value of resistance

Equations and selection

Assume the value x has the input value from ADC

Where x=(ADC register *5) / 1023

here I assume the resistance of mux is 350 ohm but we can change the equation if it's not 350 ohm in real world testing

dc volt ranges equ : just 1 Mux so one 350 ohm

If(RB5==1)

RA4=0

RA3=0

RA2 =1

RA1=0

RA5=0

Delay

Calculate x

Y=x * (10051 / 51) * (450 / 20000)

LCD_Display(y)

If(RB4==1)

RA4=0

RA3=0

RA2 =0

RA1=1

RA5=0

Delay

Calculate x

Y=x * (10051 / 51) * (1350 / 20000)

LCD_Display(y)

If(RB3==1)

RA4=0

RA3=0

RA2 =0

RA1=0

RA5=0

Delay

Calculate x

Y=x * (10051 / 51) * (5050 / 20000)

LCD_Display(y)

Ac volt ranges equ : just 2 Mux so two 350 ohm

If(RB2==1)

RA4=1

RA3=0

RA2 =1

RA1=0

RA5=1

RA6=0

Delay

Calculate x

Y=x * (10051 / 51) * (450 / 20000)   *(22700/22000)

LCD_Display(y)

If(RB1==1)

RA4=1

RA3=0

RA2 =0

RA1=1

RA5=1

RA6=0

Delay

Calculate x

Y=x * (10051 / 51) * (1350 / 20000) * (22700/22000)

LCD_Display(y)

If(RB0==1)

RA4=1

RA3=0

RA2 =0

RA1=0

RA5=1

RA6=0

Delay

Calculate x

$Y = x * (10051 / 51) * (5050 / 20000) * (22700/22000)$

LCD_Display(y)

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current equ:

If(RD7==1) just 1 Mux so one 350 ohm

RA4=0

RA3=1

RA5=0

RA5=0

Delay

Calculate x

$Y = x * 2 * (1/10) * (100350/100000)$

LCD_Display(y)

If(RD6==1) just 2 Mux so two 350 ohm

RA4=1

RA3=0

RA5=1

RA6=1

RA5=1

Delay

Calculate x

Y= x* 2* (1/10) *(22700/22000)

 LCD_Display(y)

Resistance equ :

If(RD5==1) just 1 Mux so one 350 ohm

RA4=1

RA3=1

RA5=1

Delay

Calculate x

Y= (1350 * x) / (5-x)

LCD_Display(y)

If(RD4==1) just 1 Mux so one 350 ohm

RA4=1

RA3=1

RA5=0

Delay

Calculate x

Y= (1500350 * x) / (5-x)

LCD_Display(y)