Seven Segment Controller

The controller supports up to eight digits along with the decimal point. All of the output types can be inverted to support either common anode or cathode. The input to the controller is hexadecimal, along with individual selection of the decimal points.

Macro Name	Ident	Length	Logic Elements	Memory (bits)
mb_seven_seg	0x1013	5	364	0

The outputs from the controller are shown below:

a,b,c,d,e,f,g:	Seven segment outputs, can be inverted
dp:	Decimal place output, inverted with segment outputs.
seg_sel[7..0]:	Digit selection output, can be inverted.

Address	Read/Write	Value	
Base	Read	0x1013	Ident
Base + 1	Read	0x0005	Length
Base + 2	Read/Write	4 digits	Hex
Base + 3	Read/Write	4 digits	Hex
Base + 4	Read/Write	control reg	

Address Map

Base + 2 (four digits)

MSB   LSB

15,14,13,12	11,10,9,8	7,6,5,4	3,2,1,0
digit 4 (hex)	digit 3 (hex)	digit 2 (hex)	digit 1 (hex)

Base + 3 (four digits)

MSB   LSB

15,14,13,12	11,10,9,8	7,6,5,4	3,2,1,0
digit 8 (hex)	digit 7 (hex)	digit 6 (hex)	digit 5 (hex)

Display for each hex value:

0 – 0	4 – 4	8 – 8	C – c
1 – 1	5 – 5	9 – 9	D – d
2 – 2	6 – 6	A – A	E – E
3 – 3	7 – 7	B – b	F – F

Base + 4 (control register)

MSB   LSB

15	14,13,12	11,10	9	8	7,6,5,4,3,2,1,0
not used	# segments	not used	invert select	invert digits	decimal point

7,6,5,4,3,2,1,0: Turn on respective decimal point. '1' – ON, '0' – OFF.

8: When   '0' the outputs a,b,c,d,e,f,g are normal.
              '1' the outputs a,b,c,d,e,f,g are inverted.

9: When   '0' the select outputs are asserted high (only one output high).
              '1' the select outputs are inverted. (only one output low).

11,10:   Not used.

14,13,12:   Number of seven segment outputs. Can be used to blank upper digits.
              '000' – One digit
              '001' – Two digits
              '010' – Three digits
              '011' – Four digits
              '100' – Five digits
              '101' – Six digits
              '110' – Seven digits
              '111' – Eight digits

15:    Not used.

Revisions

August 2023 – Base