Display Control through Pygmy

G. V. V. Sharma *

Contents

Abstract—We show how to use Pygmy as a decade counter.

1 Software

All codes used in this manual are available at the following link.

https://github.com/gadepall/vaman/tree/master/sevenseg/codes

2 Setup

2.1. The pin sheet for the Pygmy is available in Fig. 2.1.3. Connect the pins in the bank J5 of the pygmy with the seven segment display shown in Fig. 2.1.1 according to Table 2.1.1. Ensure that the COM pin is connected to 3.3V through a resistor.

Display	Pygmy
a	IO_4
b	IO_5
c	IO_6
d	IO_7
e	IO_8
f	IO_10
g	IO_11
COM	3.3 V

TABLE 2.1.1: Seven segment display - pygmy connection.

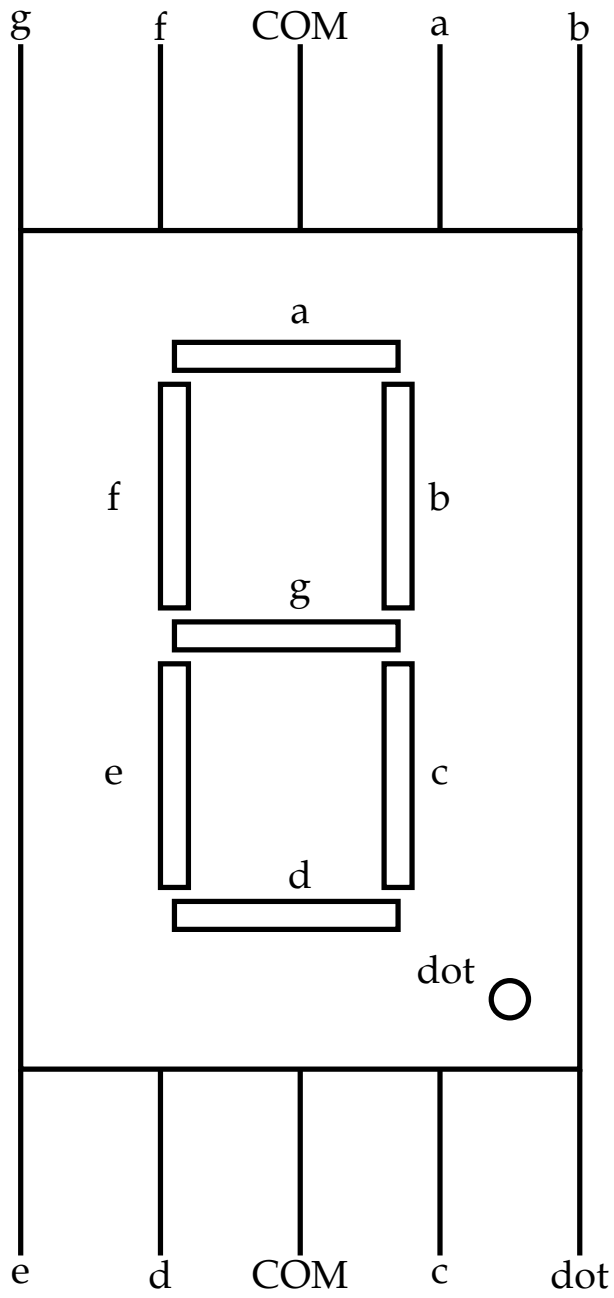

Fig. 2.1.1: seven segment display

2.2. Now execute the following code.

codes/static/sevenseg.v

Flash the helloworldfpga.bin file to pygmy. You should see the number 5

*The author is with the Department of Electrical Engineering, IIT Hyderabad, 502285, India. email: gadepall@ee.iith.ac.in.

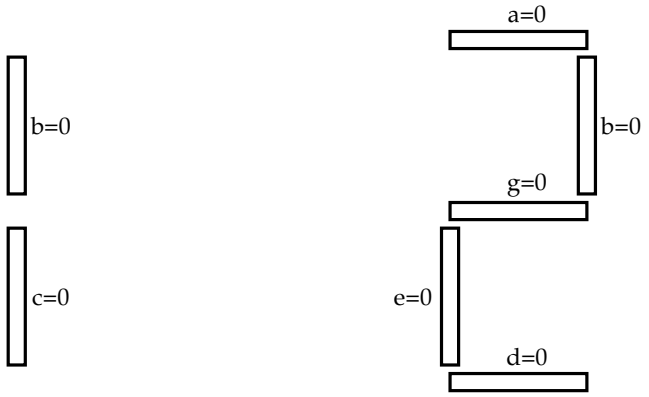

Fig. 2.1.2: Companion figure for Table 2.3.1.

displayed. The following lines are used for generating numbers on the display.

```
assign      a=0;
assign      b=1;
assign      c=0;
assign      d=0;
assign      e=1;
assign      f=0;
assign      g=0;
```

2.3. Modify the above code appropriately with the help of Table 2.3.1 and Fig. 2.1.2 to generate the numbers from 0-9 on the display.

a	b	c	d	e	f	g	decimal
1	0	0	1	1	1	1	1
0	0	1	0	0	1	0	2

TABLE 2.3.1: Pin values used for generating decimal numbers on the seven segment display.

3 Examples

3.1. Table 2.1.1 and the PU 64 table in Fig. 3.2.1 explain the pin numbering in the following file.

```
codes/static/pygmy.pcf
```

3.2. Execute the code below. All the pins in the display are controlled using a 7 bit word.

```
codes/static/sevenseg_word.v
```

The above file is used for generating the number 4 on the display. The process is explained by the completion of Table 2.3.1.

```
gpio_out=7'b0100100;
```

3.3. Use a verilog function that takes a decimal input and display it on the seven segement display.
Solution: Execute the following code.

```
codes/static/sevenseg_dec.v
```

3.4. Use the pygmy as a decade counter.
Solution: Execute the following code.

```
codes/loop/decade_counter.v
```

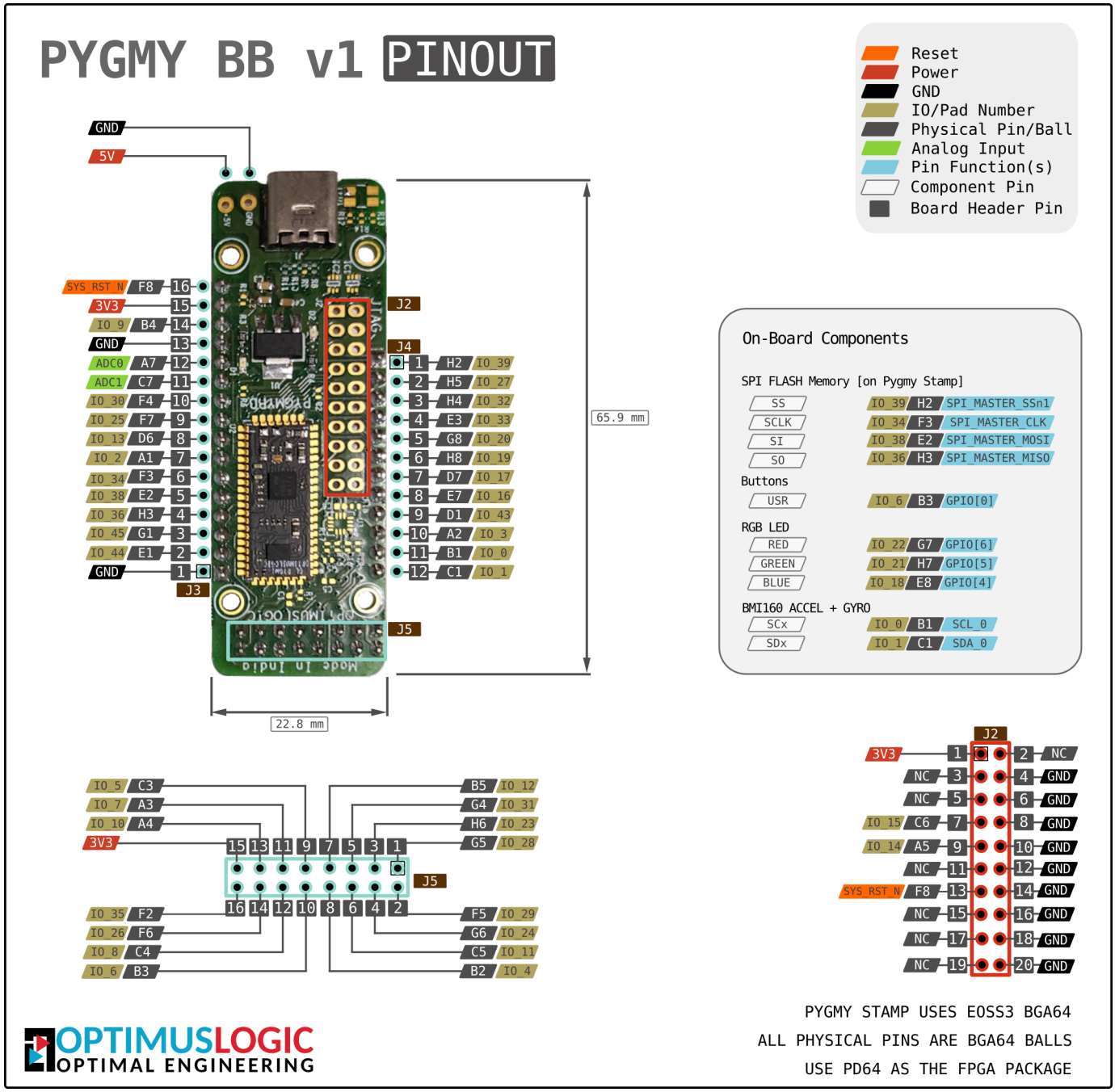

Fig. 2.1.3: Pin Diagram

PD64		
IO Locatic	Alias	IO Type
B1	IO_0	BIDIR
C1	IO_1	BIDIR
A1	IO_2	BIDIR
A2	IO_3	BIDIR
B2	IO_4	BIDIR
C3	IO_5	BIDIR
B3	IO_6	BIDIR
A3	IO_7	BIDIR/CLOCK
C4	IO_8	BIDIR/CLOCK
B4	IO_9	BIDIR
A4	IO_10	BIDIR
C5	IO_11	BIDIR
B5	IO_12	BIDIR
D6	IO_13	BIDIR
A5	IO_14	BIDIR
C6	IO_15	BIDIR
E7	IO_16	BIDIR
D7	IO_17	BIDIR
E8	IO_18	BIDIR
H8	IO_19	BIDIR
G8	IO_20	BIDIR
H7	IO_21	BIDIR
G7	IO_22	BIDIR/CLOCK
H6	IO_23	BIDIR/CLOCK
G6	IO_24	BIDIR/CLOCK
F7	IO_25	BIDIR
F6	IO_26	BIDIR
H5	IO_27	BIDIR
G5	IO_28	BIDIR
F5	IO_29	BIDIR
F4	IO_30	BIDIR
G4	IO_31	BIDIR
H4	IO_32	SDIOMUX
E3	IO_33	SDIOMUX
F3	IO_34	SDIOMUX
F2	IO_35	SDIOMUX
H3	IO_36	SDIOMUX
G2	IO_37	SDIOMUX
E2	IO_38	SDIOMUX
H2	IO_39	SDIOMUX
D2	IO_40	SDIOMUX
F1	IO_41	SDIOMUX
H1	IO_42	SDIOMUX
D1	IO_43	SDIOMUX
E1	IO_44	SDIOMUX
G1	IO_45	SDIOMUX

PU64		
IO Locatic	Alias	IO type
4	IO_0	BIDIR
5	IO_1	BIDIR
6	IO_2	BIDIR
2	IO_3	BIDIR
3	IO_4	BIDIR
64	IO_5	BIDIR
62	IO_6	BIDIR
63	IO_7	BIDIR/CLOCK
61	IO_8	BIDIR/CLOCK
60	IO_9	BIDIR
59	IO_10	BIDIR
57	IO_11	BIDIR
56	IO_12	BIDIR
55	IO_13	BIDIR
54	IO_14	BIDIR
53	IO_15	BIDIR
40	IO_16	BIDIR
42	IO_17	BIDIR
38	IO_18	BIDIR
36	IO_19	BIDIR
37	IO_20	BIDIR
39	IO_21	BIDIR
34	IO_22	BIDIR/CLOCK
33	IO_23	BIDIR/CLOCK
32	IO_24	BIDIR/CLOCK
31	IO_25	BIDIR
30	IO_26	BIDIR
28	IO_27	BIDIR
27	IO_28	BIDIR
26	IO_29	BIDIR
25	IO_30	BIDIR
23	IO_31	BIDIR
22	IO_32	SDIOMUX
21	IO_33	SDIOMUX
20	IO_34	SDIOMUX
18	IO_35	SDIOMUX
17	IO_36	SDIOMUX
15	IO_37	SDIOMUX
16	IO_38	SDIOMUX
11	IO_39	SDIOMUX
13	IO_40	SDIOMUX
14	IO_41	SDIOMUX
10	IO_42	SDIOMUX
7	IO_43	SDIOMUX
8	IO_44	SDIOMUX
9	IO_45	SDIOMUX

WR42		
IO Locatic	Alias	IO Type
A7	IO_0	BIDIR
B7	IO_1	BIDIR
C7	IO_3	BIDIR
A6	IO_6	BIDIR
B6	IO_8	BIDIR/CLOCK
A5	IO_9	BIDIR
B5	IO_10	BIDIR
A4	IO_14	BIDIR
B4	IO_15	BIDIR
E1	IO_16	BIDIR
D1	IO_17	BIDIR
C1	IO_19	BIDIR
F2	IO_20	BIDIR
E2	IO_23	BIDIR/CLOCK
D2	IO_24	BIDIR/CLOCK
D3	IO_25	BIDIR
F3	IO_28	BIDIR
E3	IO_29	BIDIR
F4	IO_30	BIDIR
E4	IO_31	BIDIR
D5	IO_34	SDIOMUX
F5	IO_36	SDIOMUX
E6	IO_38	SDIOMUX
F6	IO_39	SDIOMUX
D7	IO_43	SDIOMUX
E7	IO_44	SDIOMUX
F7	IO_45	SDIOMUX

Fig. 3.2.1: Pin Definitions