Vending Machine

Team SL

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Concept

- Implementation of Vending machine on FPGA
- Code Develeopment
- PCB Design
- 3D View of PCB

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Hardware

- Nexys Artix 7 100t FPGA

VHDL Code Implementation

```
8  entity VENDING_SAMPLE_new is
9     Port(
10      clk_in  : in std_logic;
11      reset   : in std_logic;
12      AN_IN   : out std_logic_vector(7 downto 0);
13
14      LED_OUT : out std_logic_vector(6 downto 0);
15      SW2 : in std_logic_vector(2 downto 0);
16      SW3 : in std_logic_vector (1 downto 0);
17      SW4 : in std_logic ;
18      LED_G,LED_R: out std_logic;
19      SW: in std_logic_vector(2 downto 0)
20    );
21 end VENDING_SAMPLE_new;
22
23 architecture Behavioral of VENDING_SAMPLE_new is
24
```

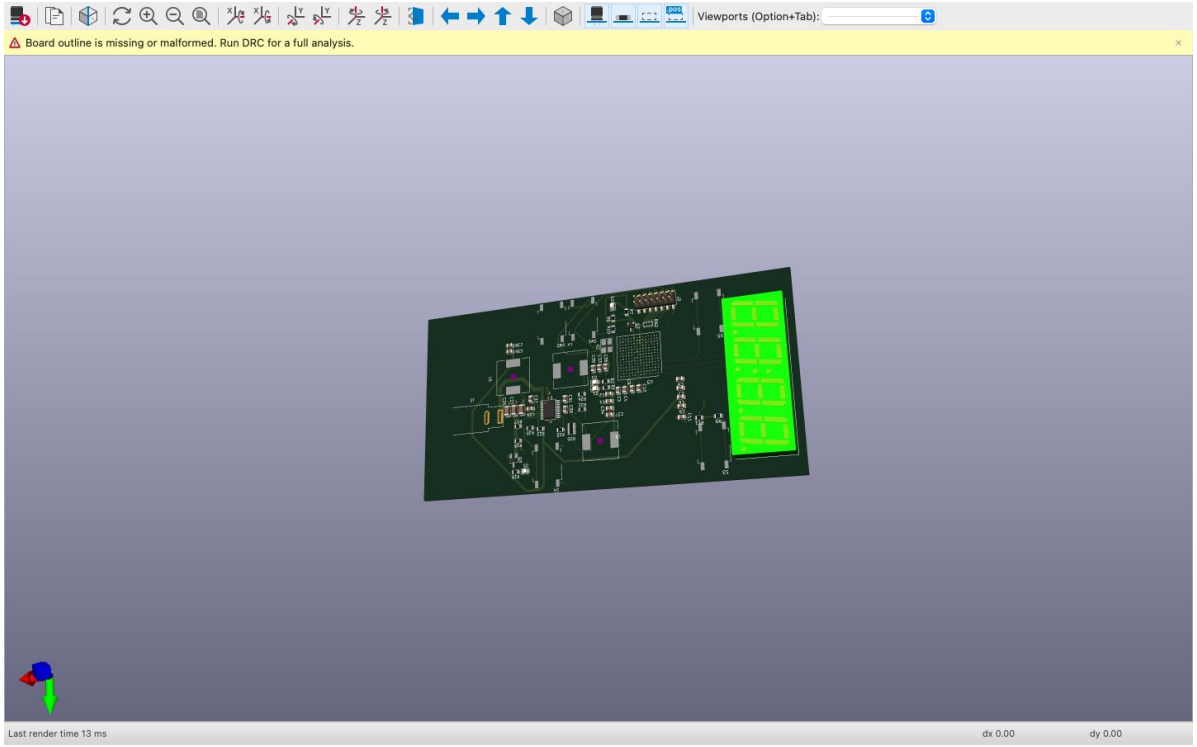
```
22
23  architecture Behavioral of VENDING_SAMPLE_new is
24
25      signal counter : integer range 0 to 1000000 := 0;
26      signal clk_out : std_logic := '0';
27      constant DIVIDER_VALUE : integer := 1000000;
28      signal temp : integer range 0 to 9 := 0;
29
30      type StateType is (Idle, item_select, Coin, Dispense);
31      signal  next_state : StateType:= Idle;
32
33
55
56  process (SW)
57    begin
58
59
60          case SW is
61              when "001" => next_state<= Idle;
62              when "010" => next_state<= item_select;
63              when "100" => next_state<= coin;
64              when "111"=> next_state<= dispense;
65              when others => next_state<= Idle;
66          end case;
67
68
69  end process;
```

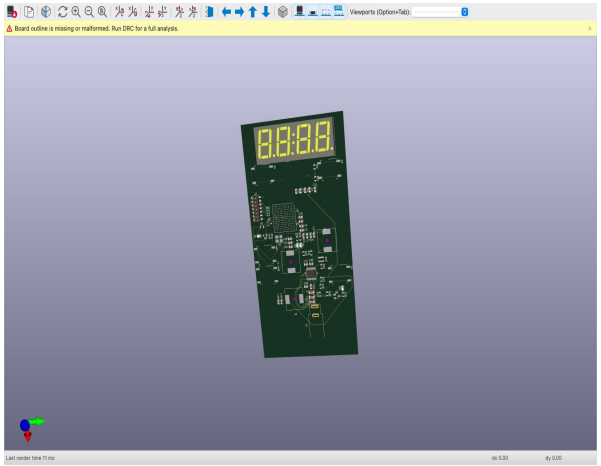
```
247
248   elsif next_state =  dispense then
249
250       case SW4 is
251     when '1' =>
252     -- LED <= '1';
253                 case SW2 is
254                   when "000" =>
255                         case SW3 is
256
257                           when "01" =>
258
259                                   AN_IN <= "11111101";
260                                      LED_OUT <= "1000000";
261                           when "10" =>
```

PCB Design

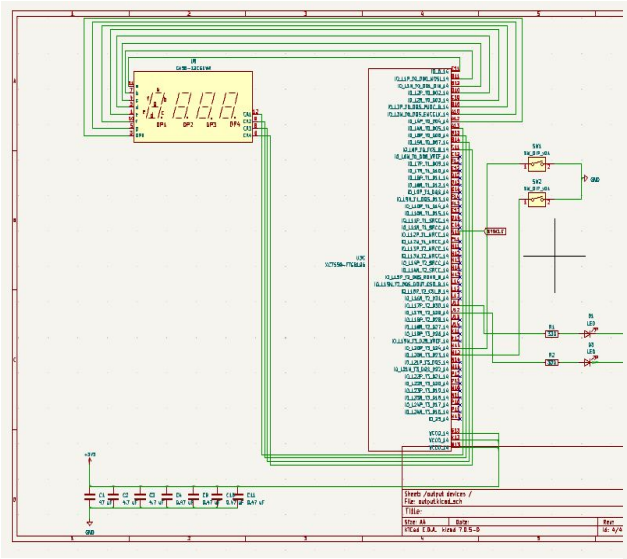
- Develop according to the user need
- Kicad 7 PCB Designing software
- 4 Layer PCB

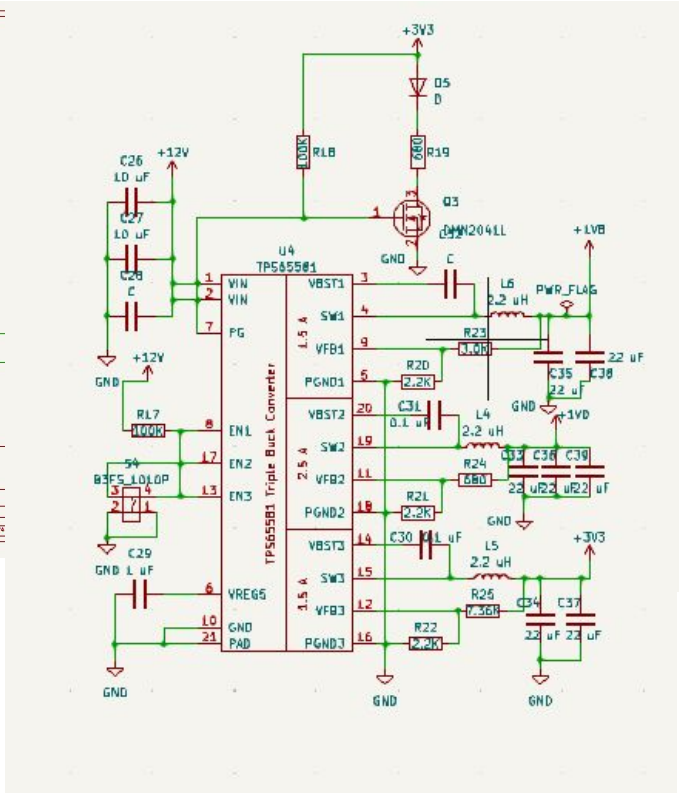
3D View of PCB

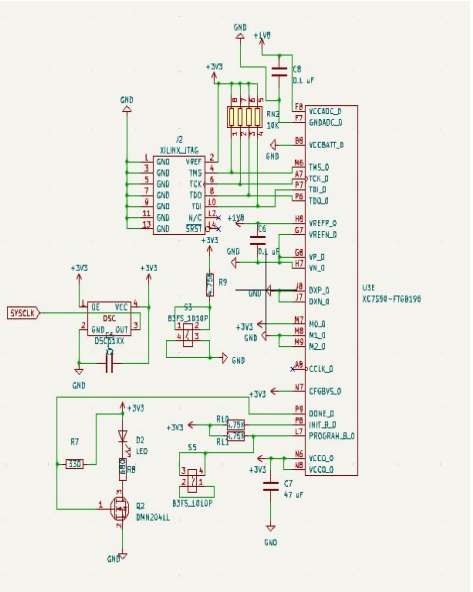




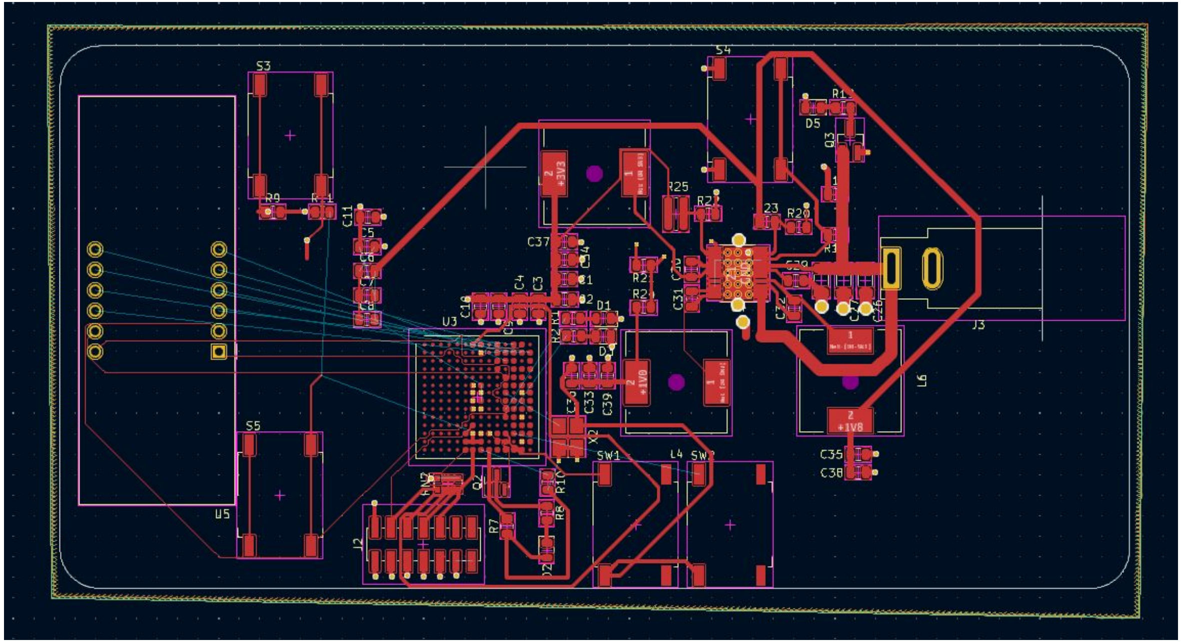
Schematic Design







PCB Design



S3
S4
S5
R9
C11
C5
C37
C4
C3
U3
R25
R20
D5
Q3
D1
C33
C39
C31
+3V3
+1V0
+1V8
J3
L6
C35
C38
SW1
L4
X2
R10
R8
R7
Q2
U5
J2

Thank You