**LCD Controller**

library IEEE;

use IEEE.STD\_LOGIC\_1164.ALL;

use IEEE.STD\_LOGIC\_ARITH.ALL;

use IEEE.STD\_LOGIC\_UNSIGNED.ALL;

entity LCD\_CONTROLLER is

port(clk:in std\_logic;

d\_out:out std\_logic\_vector(7 downto 0);

rs,rw,en:out std\_logic);

end LCD\_CONTROLLER;

architecture Behavioral of LCD\_CONTROLLER is

type state is (s0,s1,s2,s3,s4,s5,s6,s7,s8,s9,s10,s11,s12,s13,s14,s15);

signal pr\_state, ns\_state:state;

signal clk\_lcd: std\_logic\_vector(15 downto 0):=(others=>'0');

begin

--process(clk)

--begin

--if rising\_edge(clk) then

--clk\_lcd<=clk\_lcd+1;

-- end if;

--end process;

--process(clk\_lcd(15), pr\_state, ns\_state)

--begin

--if rising\_edge(clk\_lcd(15)) then

--pr\_state<=ns\_state;

--end if;

--end process;

[[1]](#footnote-1)process(clk, pr\_state, ns\_state)

begin

if rising\_edge(clk) then

case pr\_state is

when s0=> d\_out<=x"38"; rs<='0';rw<='0';en<='1';ns\_state<=s1;

when s1=> d\_out<=x"38"; rs<='0';rw<='0';en<='0';ns\_state<=s2;

when s2=> d\_out<=x"0C"; rs<='0';rw<='0';en<='1';ns\_state<=s3;

when s3=> d\_out<=x"0C"; rs<='0';rw<='0';en<='0';ns\_state<=s4;

when s4=> d\_out<=x"06"; rs<='0';rw<='0';en<='1';ns\_state<=s5;

when s5=> d\_out<=x"06"; rs<='0';rw<='0';en<='0';ns\_state<=s6;

when s6=> d\_out<=x"01"; rs<='0';rw<='0';en<='1';ns\_state<=s7;

when s7=> d\_out<=x"01"; rs<='0';rw<='0';en<='0';ns\_state<=s8;

when s8=> d\_out<=x"53"; rs<='1';rw<='0';en<='1';ns\_state<=s9;

when s9=> d\_out<=x"53"; rs<='1';rw<='0';en<='0';ns\_state<=s10;

when s10=> d\_out<=x"49"; rs<='1';rw<='0';en<='1';ns\_state<=s11;

when s11=> d\_out<=x"49"; rs<='1';rw<='0';en<='0';ns\_state<=s12;

when s12=> d\_out<=x"54"; rs<='1';rw<='0';en<='1';ns\_state<=s13;

when s13=> d\_out<=x"54"; rs<='1';rw<='0';en<='0';ns\_state<=s14;

when s14=> d\_out<=x"53"; rs<='1';rw<='0';en<='1';ns\_state<=s15;

when s15=> d\_out<=x"53"; rs<='1';rw<='0';en<='0';ns\_state<=s15;

end case;

end if;

end process; end behavioral;

1. Please see the coloured code part carefully.it is about clock clock reduction [↑](#footnote-ref-1)