**library ieee;**

**use ieee.std\_logic\_1164.all;**

**use ieee.std\_logic\_unsigned.all;**

**entity counter is**

**port( clk1:in std\_logic;**

**clr:in std\_logic;**

**settime:in std\_logic;**

**qin:in std\_logic\_vector(23 downto 0);**

**qout:out std\_logic\_vector(23 downto 0));**

**end;**

**architecture art of counter is**

**signal temph1:std\_logic\_vector(3 downto 0);//时的两个数字**

**signal temph2:std\_logic\_vector(3 downto 0);**

**signal tempm1:std\_logic\_vector(3 downto 0);//分的两个数字**

**signal tempm2:std\_logic\_vector(3 downto 0);**

**signal temps1:std\_logic\_vector(3 downto 0);//秒的两个数字**

**signal temps2:std\_logic\_vector(3 downto 0);**

**signal flag:std\_logic;**

**begin**

**p1:process(settime,clr,clk1,qin)**

**begin**

**if( clk1'event and clk1='1')then //clr信号清零**

**if(clr='1')then**

**temph1<="0000";**

**temph2<="0000";**

**tempm1<="0000";**

**tempm2<="0000";**

**temps1<="0000";**

**temps2<="0000";**

**elsif(settime='1' )then //时间设置**

**temph1<=qin(23 downto 20);**

**temph2<=qin(19 downto 16);**

**tempm1<=qin(15 downto 12);**

**tempm2<=qin(11 downto 8);**

**temps1<=qin(7 downto 4);**

**temps2<=qin(3 downto 0);**

**else**

**if(temps2<"1001")then**

**temps2<=temps2+1;**

**end if;**

**if(temps1<"0101" and temps2="1001" )then //秒的进位**

**temps1<=temps1+1;**

**temps2<="0000";**

**end if;**

**if(tempm2<"1001" and temps1="0101" and temps2="1001" )then //秒向分的进位**

**tempm2<=tempm2+1;**

**temps1<="0000";**

**temps2<="0000";**

**end if;**

**if(tempm1<"0101" and tempm2="1001" and temps1="0101" and temps2="1001" )then //分的进位**

**tempm1<=tempm1+1;**

**tempm2<="0000";**

**temps1<="0000";**

**temps2<="0000";**

**end if;**

**if(temph1<"0010" and temph2<"1001" and tempm1="0101" and tempm2="1001" and temps1="0101" and temps2="1001")then //时的进位**

**temph2<=temph2+1;**

**tempm1<="0000";**

**tempm2<="0000";**

**temps1<="0000";**

**temps2<="0000";**

**end if;**

**if(temph1<"0010" and temph2="1001" and tempm1="0101" and tempm2="1001" and temps1="0101" and temps2="1001" ) then**

**temph1<=temph1+1;**

**temph2<="0000";**

**tempm1<="0000";**

**tempm2<="0000";**

**temps1<="0000";**

**temps2<="0000";**

**end if;**

**if(temph1="0010" and temph2<"0011" and tempm1="0101" and tempm2="1001" and temps1="0101" and temps2="1001" )then**

**temph2<=temph2+1;**

**tempm1<="0000";**

**tempm2<="0000";**

**temps1<="0000";**

**temps2<="0000";**

**end if;**

**if(temph1="0010" and temph2="0011" and tempm1="0101" and tempm2="1001" and temps1="0101" and temps2="1001" )then //一天时间过去 全部清零**

**temph1<="0000";**

**temph2<="0000";**

**tempm1<="0000";**

**tempm2<="0000";**

**temps1<="0000";**

**temps2<="0000";**

**end if;**

**end if;**

**end if;**

**qout<=temph1&temph2&tempm1&tempm2&temps1&temps2;**

**end process;**

**end art;**