

Solution to Assignment 2

Question 1

A possible solution is shown below.

```
-- ELEC 379 Assignment 2 Solution
-- MC74AC323 bidirectional shift/store 8-bit register
-- Ed Casas, Jan 25 1998

library ieee ;
use ieee.std_logic_1164.all ;

entity MC74AC323 is
    port (
        io : inout std_logic_vector (0 to 7) ;
        s0, s1, oe1, oe2, ds0, ds7, cp, sr : in std_logic ;
        q0, q7 : out std_logic ) ;
end MC74AC323 ;

architecture rtl of MC74AC323 is
    signal q : std_logic_vector (0 to 7) ;
    signal s : std_logic_vector (1 downto 0) ;
begin

    -- tri-state control
    io <=
        q when ( ( oe1 = '0' ) and ( oe2 = '0' ) and
            ( s /= "11" ) ) else
            "ZZZZZZZZ" ;

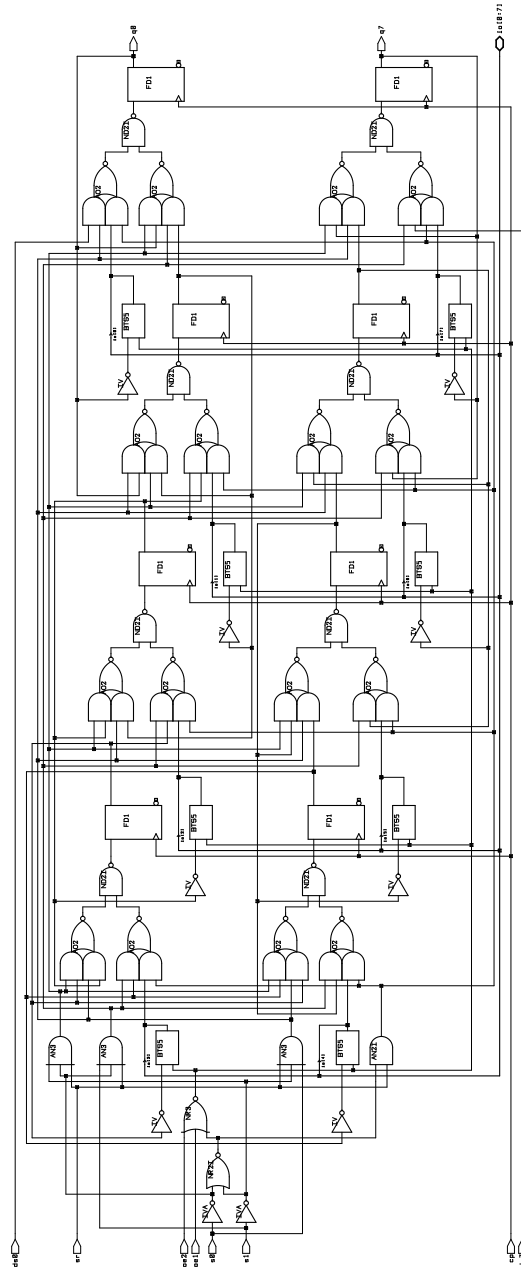
    -- LS and MS bit outputs
    q0 <= q(0) ;
    q7 <= q(7) ;

    -- shift control
    s <= s1 & s0 ;

    process(cp,sr,s)
    begin
        if cp'event and cp = '1' then
            if sr = '0' then
                q <= "00000000" ;
            else
                case s is
                    when "11" => q <= io ;
                    when "01" => q <= ds0 & q(0 to 6) ;
                    when "10" => q <= q(1 to 7) & ds7 ;
                    when others => q <= q ;
                end case ;
            end if ;
        end if ;
    end process ;

end rtl ;
```

The resulting schematic is:



Project: MC74AC323	Designer: Ed Casas	Date: 1/25/98	Sheet: 1 of 1
Technology: CMOS	Company: UIC ECE		