20. 3位格雷码可逆计数器

LIBRARY IEEE;

USE IEEE.std\_ logic\_ 1164.ALL;

USE IEEE.std\_ logic\_ arith.ALL;

USE IEEE .std\_ logic\_ \_unsigned.ALL;

ENTITY COUNTER IS

PORT(clk,k:IN std\_ logic;

q:BUFFER std\_ logic\_ \_vector(2 DOWNTO 0));

END COUNTER;

ARCHITECTURE rtl\_arc OF COUNTER IS

BEGIN

PROCESS(clk,k)

BEGIN

IF(k='1') THEN

CASE q IS

WHEN "000" => q<="00L";

WHEN "001" => q<="011";

WHEN "011" => q<="010";

WHEN"010" => q<="110";

WHEN "110" => q<="111";

WHEN "111" => q<="10L";

WHEN"101" => q<="100";

WHEN "100" => q<="000";

END CASE;

WHEN "100" => q<="000";

END CASE;

ELSE

CASE q IS

WHEN "000" => q<="100";

WHEN "100" => q<="101";

WHEN "101" => q<="111";

WHEN "111" => q<="110";

WHEN "110" => q<="010";

WHEN "010" => q<="011";

WHEN "011" => q<="00L";

WHEN "00L" => q<="000";

END CASE;

END IF;

END PROCESS;

END rtl\_arc;