4to2 Encoder - on ESP32(IOT Appliction)

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Contents

Abstract

This manual shows the implementation of 4to2 encoder using FPGA in vaman board.

Figure 1.1

1 Components

Components	Values	Quantity
Vaman	ESP32	1
JumperWires	M-M	9
Breadboard		1
LEDs	-	2

2 Implementation

The truth table for Figure -1.1 is available in Table-1

D3	D2	D1	D0	Q1	Q0
0	0	0	1	0	0
0	0	1	0	0	1
0	1	0	0	1	0
1	0	0	0	1	1

TABLE 1.1

The Digital Encoder more commonly called a Binary Encoder takes ALL its data inputs one at a time and then converts them into a single encoded output. So we can say that a binary encoder, is a multi-input combinational logic circuit that converts the logic level "1" data at its inputs into an equivalent binary code at its output.
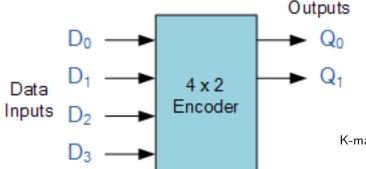
Karnugh Map :

K-map for Q0 :

$D2D3$

$D0D1$	00	01	11	10
00	0	0	0	1
01	0	0	0	0
11	0	0	0	0
10	1	0	0	0

K-map for Q1 :

$D2D3$

$D0D1$	00	01	11	10
00	0	0	0	0
01	0	1	0	0
11	0	0	0	0
10	1	0	0	0

Figure 2.1

Using Boolean logic, output Q0 Q1 in Table 1 can be expressed in terms of the inputs D0,D1,D2,D3 as

$Q0 = D3'.D2'.D1.D0' + D3.D2'.D1'.D0'$ (eq2.1)

$Q1 = D3'.D2.D1'.D0' + D3.D2'.D1'.D0'$ (eq2.2)

The expressions in (2.1) AND (2.2) can be minimized by the observing the outputs logic

Thus, after minimization can be expressed as

$Q0 = D1 + D3$ by eq2.1

Q1 = D2 + D3 by eq2.2
Verify the truth table for Q0 and Q1 in TABLE 1.1.

2.1 SOLUTION :

2,4,5,10 Pins of vaman board are manually given inputs as D1,D2,D3,D0 Respectively and verify the logic of Q0,Q1 in Table 1

Encoder	D1	D2	D3	D0	Q1	Q0
Vaman	2	4	5	10	32	33

TABLE 2.1

The code below realizes the Boolean logic for 4to2 encoder in 1.1 using 5V,GND of Vaman as binary Inputs with the help of breadboard and jumperwires. Built in LED at pin-32 of Vaman-esp32 will glow for the logic'1' of Q1,and off for the logic'0' of Q1 and a LED circuit at pin-33 of Vaman-esp32 will glow for the logic'1' of Q0,and off for the logic'0' of Q0

https://github.com/chanduputta/FWC−Module1/tree/
main/iot−assignment

Clone this folder of repository and Follow given Instructions termuxubuntu.txt file to compile and send the code using bash(.sh) files