

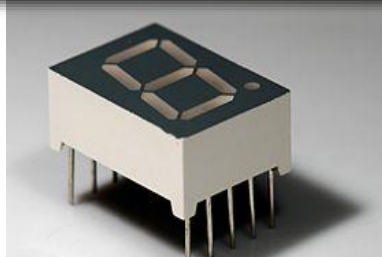


Erasmus+



Better Electro-World

Digital circuits



DIGITAL TEAM

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THE PROJECT SUMMARY

E World (Better Electro World) is a project which is set up on the idea that VET (Vocational Education and Training) can be learned best if a student acquires vocational qualifications by the good samples of practices on peer learning and project based implementations. The main reason for this project is to lessen the educational barriers of VET which hinder a student to be successful and proactive. The idea of this project on peer learning with the good examples of project based learning comes after finding that we have a lot of common needs, problems and reasons for participating in a European partnership.

In the implementation of this project, "Learn & Do" step is improved and reinforced by taking the next step "Learn & Teach". We aim to train trainees/workers for reaching good quality with an international knowledge, vocational skills and individual competence base, relevant to working life. That will increase their employability not only in their national business but also in the EU labor market. In addition, this will set up the frame for their lifelong learning.

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7 segment display

The objective of this work is to represent a decimal count on seven segment display. It allows us to count automatically or manually. It can be used to represent how many cars are in a parking lot or to represent the number on a digital clock, it can also be used for displaying the values on a multimeter and much more.



How to connect a 7 segment display

This project will focus on the connection of a 7 segment display. We will use a display, then we will connect it to a decoder and then to a switch box after that we will switch to a decade binary counter.

Before we start the project we should learn how to find if the display is a common anode or common cathode, find which letters represent which segment and then find the right decoder.

After connecting everything we use the switches to showcase the numbers on the display and then we change it to an automatic counter.

Materials

Power Supply:

We use a power supply that generates voltage, also creates waveforms and has buttons and switches which we use to connect the resets and the clock of the counter.

7 segment display:

It is an electronic display device for displaying decimal numerals, there are two types of displays the common anode and the common cathode, each segment of the display represents a letter from a to g.

Multimeter:

We used it to find if the display was common anode or common cathode and to find what letter each segment represented.



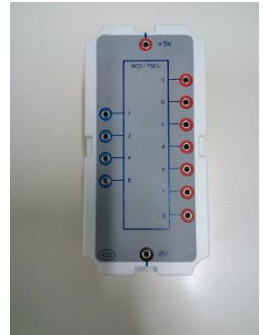
7 segment display block:

This block has a 7 segment display and shows the connections of the inputs (a,b,c,...).

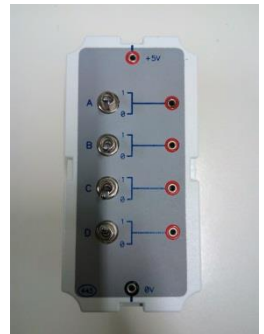


Decoder Block:

This block has a decoder which converts the inputs from binary to the output which is going to be displayed as a decimal number.

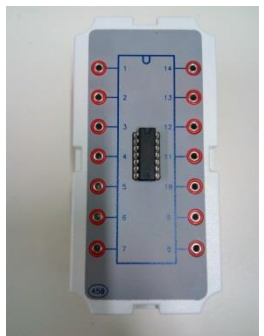
**Switch Block:**

It's a box with 4 switches when we activate a switch it sends a signal (high) to the decoder, that signal will represent a number in binary (1, 2, 4, 8).

**Decade binary counter block:**

We used this block as a counter.

This block has 2 resets one reset a 0 and the other a 9 and doesn't count any more impulses, it only resets if both R0(1) and R0(2) are on a high level (same for the R9). The clock can generate signals if connected to a rectangular wave, which will automatically count but it can also be connected to a button and count manually by pressing the button.



The outputs QA, QB, QC and QD need to be connect to the decoder in the respective binary numbers (1, 2, 4, 8). The clock B needs to be connect to the output QA.

'90A, 'LS90 RESET/COUNT FUNCTION TABLE							
RESET INPUTS				OUTPUT			
R ₀ (1)	R ₀ (2)	R ₉ (1)	R ₉ (2)	Q _D	Q _C	Q _B	Q _A
H	H	L	X	L	L	L	L
H	H	X	L	L	L	L	L
X	X	H	H	H	L	L	H
X	L	X	L	COUNT			
L	X	L	X	COUNT			
L	X	X	L	COUNT			
X	L	L	X	COUNT			

Step 1- Determine the type of display (anode or common cathode)

First we need to find out if the display is anode or cathode. To find it we use a multimeter in the position to test diodes and we put the positive on the common pin and with the negative we test the other pins if they light up it is an anode and to determine if it is cathode we do the opposite, we put the negative on the common pin and see if the led's light up.

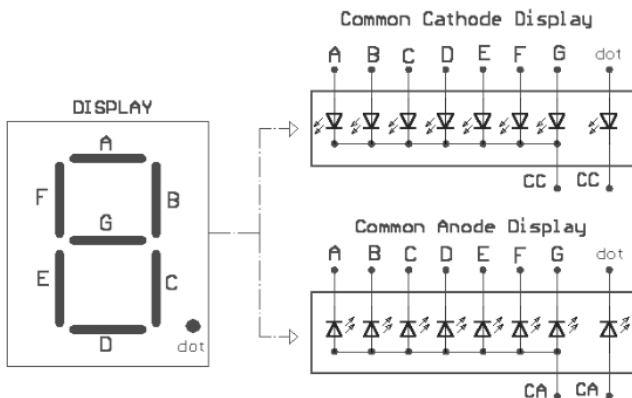
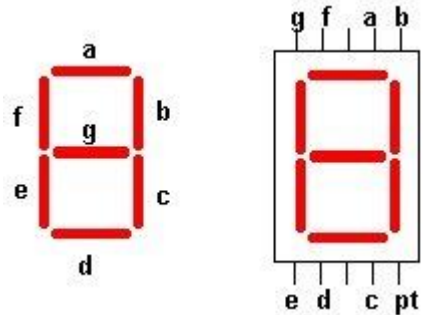


Fig.7-- Common Anode/Cathode DISPLAY Sam 6/02

Step 2 – Identify the arrangement of display terminal (a, b, c ...)

In this step we will continue to use the multimeter to identify which letter the segments represent in the display. Depending on the display we put the positive or negative of the multimeter on the common pin of the display and then test each segment.



Step 3 – Care to choose the appropriate decoder for the display type

In this step we need to choose the right decoder for the display that we have.

Step 4 – Execute the connections between the decoder and the display

In this step we connect the display block to the right decoder.

Step 5 – Check the correct operation of the circuit using a switch box

Now we connect the switch box to the decoder and then we test every possible number we can input to the display (0 to 9).

BINARY NUMBER				
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	10
1	0	1	1	11
1	1	0	0	12
1	1	0	1	13
1	1	1	0	14
1	1	1	1	15

Step 6 – Consult the datasheet of the CI 7940 (decade binary counter)

In this step we consult the datasheet of a decade binary counter to check which are the inputs and the outputs of the integrated and to check which connections we will need to make to the decoder and the switches.

Step 7 – Apply a clock signal to the counter and check the functioning of the circuit

In this step we try the manual clock in which we connect to a button and press it to count manually and then switch it to a rectangular waveform so that it will count automatically.

Things To Be Aware Of

- 1) We need to be aware of the type of display we are going to use (anode or cathode).
- 2) How to identify each segment of the display.
- 3) When choosing the decoder it is essential to know what display we have, if we have an anode display it is needed a decoder with the outputs on a low level and if we have a cathode display we need to have a decoder with the outputs on high level.
- 4) The resets on the decade binary counter will only work if both R0(1) and R0(2) (same for the R9) are on an high level.
- 5) The clock will only count automatically if connected to a rectangular waveform.

Questions:

- 1) Which types of displays can we use?
 - a) Common Anode and Common Counter;
 - b) Common Cathode and Common Decoder;
 - c) Common Anode and Common Cathode.

- 2) How to find what type of display we have and the segments from a to g.

- 3) What type of equipment is used to discover the segments of the display?
 - a) Oscilloscope
 - b) Multimeter
 - c) Ostrobolescope

- 4) What type of decoder do we have to use for a common cathode display?
 - a) A decoder with the outputs on Low level.
 - b) A decoder with the outputs on High level.

- 5) How to input the numbers 3, 5, 8, 9 to the display.

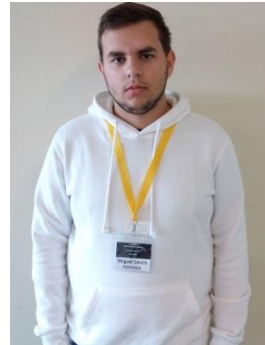
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Hi, I am Miguel Louro and I am an electronics, automation and computers technician student in Almada, Portugal.

The area I'm more interested in my course is the electronic area because I like to work with my hands and to construct electric circuits.



I like to play video-games, going to the beach, listen to music and travel with friends or family. This is the first Erasmus project I worked on and I like it a lot because not only the work was interesting but also talking to the students from other countries and develop my english speaking skills and also learn more about their cultures and the differences between the countries.

Žan Dolar

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Hi, I am Žan and I am electric and energetic student in Celje, Slovenia. I am very interested in electric motor and electric grid engineering. My interests are sport, music, travelling and all the things connected to electric. This is my first Erasmus project and I am very excited about it, especially because it is about electric. I am looking forward to learning something new, to get to know about new cultures and how things work in different countries.



Eray Yildizoglu

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Hello, my name is Eray Yildizoglu, I'm a 12th grade student.

I am studying at Samandıra Vocational and Technical Anatolian High School.



My father is busy with the ceramic business My mum is a housewife. The biggest dream since childhood is to be a good electrical engineer.

My hobbies are cycling and making electrical circuits. Since childhood I like to work with electricity. I participated in this project which started in our school because I was very happy to learn both about electricity and to teach it. I think this project is a useful project. I recommend everyone to participate.

Juan Fran Tejera

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Hi, my name is Juan Fran Tejera.

I'm a telecommunications student.

I'm studying a IES Santa Lucía.

My favourite hobbies are play football with my friends in the park of my village, I also like to go out with them to the mall and I like go to the mountains to ride in my mountain bike.

In my opinion, the idea of learning with partners from other countries is very good and so learn how they do it in other countries. I also learn the customs of the sites we visited.



Noah Rondineau

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My name is Noah Rondineau

My hobbies is video games , manga ,
music and watch movies

I´m studying at lycee clement ader
high vocational school in bernay

It´s my first erasmus



Pictures

