



**UTM**  
UNIVERSITI  
TEKNOLOGI MALAYSIA

Sekolah Pendidikan  
Profesional dan  
Pendidikan Berterusan  
(SPACE)

**JABATAN KEJURUTERAAN ELEKTRIK  
PUSAT PENGAJIAN DIPLOMA (PPD), SPACE  
UNIVERSITI TEKNOLOGI MALAYSIA  
KUALA LUMPUR**

**DIGITAL ELECTRONICS LABORATORY**

**EXPERIMENT 2  
BCD TO DECIMAL DECODER (IC 7442), 7-SEGMENT  
DISPLAY AND BCD to 7-SEGMENT DECODER (IC 7447 &  
7448 )**

## **EXPERIMENT 2 : BCD TO DECIMAL DECODER (IC 7442) AND DETERMINATION THE CONFIGURATION 7-SEGMENT DISPLAY**

### **OBJECTIVE**

1. Understand the theories of basic decoder circuit and integrated decoder circuit (ICs).
2. Understand the function of decoders and its implementation in the digital systems.

### **EQUIPMENTS**

1. Digital Lab Trainer Kit
2. IC 7442, 7447 and 7448
3. 7-segment display (common-anode) - 1
4. 7-segment display (common-cathode) - 2
5. LEDs-2
6. Resistor 330  $\Omega$  - 7
7. IC data sheets

### **Introduction to Digital Lab Trainer kit and logic probe**

Brief discussion about the function of Digital Lab Trainer.

<b>Item</b>	<b>Description</b>
Voltage Source	supply +5 Vdc
LED Display	ON = logic HIGH ( 1 ). OFF = logic LOW ( 0 ).
Data Switch	logic input, position of switch indicate the logic level UP = logic HIGH ( 1 ). DOWN = logic LOW ( 0 ).
Pulse Switch	produce a HIGH logic when the switch is pressed.
Protoboard	place for build the circuit.
DVM Display	Digital Volt Meter.

## EXPERIMENT PROCEDURES

### Part 1 : BCD-to-Decimal Decoder (IC 7442)

1. Built the circuit shown in Figure 1.1. Connect input A, B, C and D to data switch, then connect the outputs to LEDs.

Note: You have to use 10 LEDs. Therefor use 8 LEDs which are on Digital Lab Trainer and add two more LEDs which given in the lab.

2. Complete Table 1.1. Write the status of LEDs (ON or OFF).

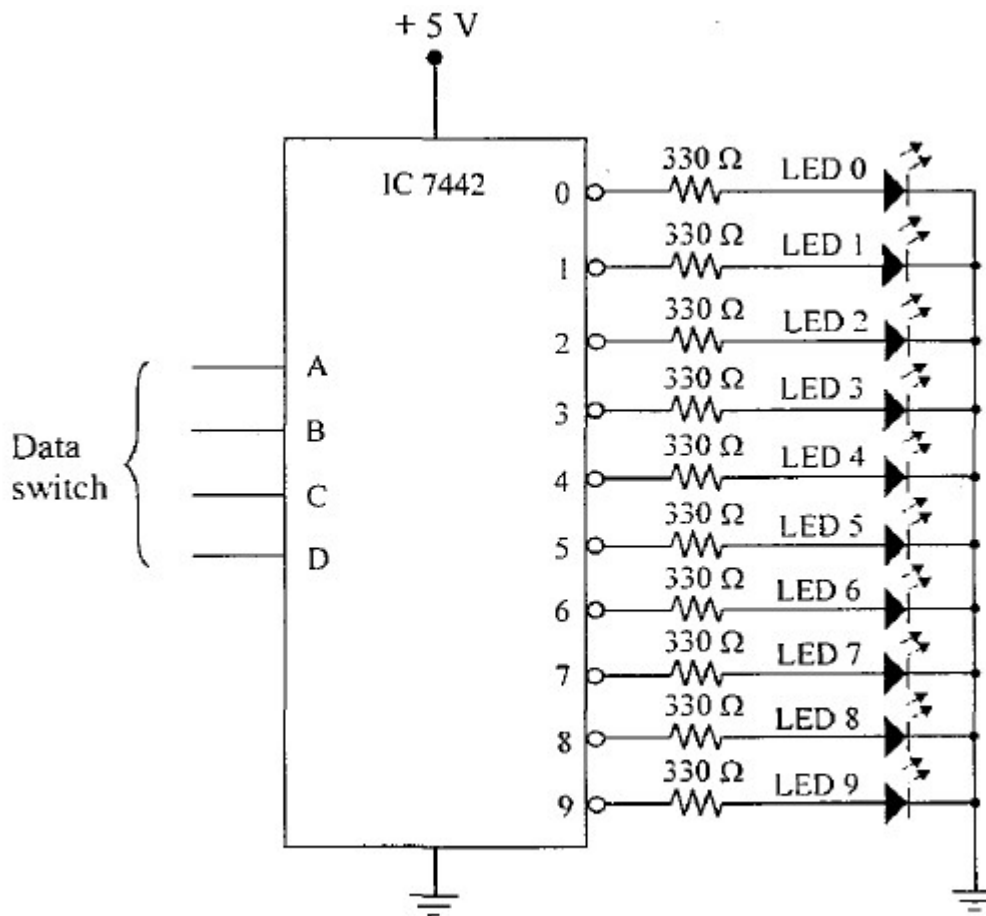


Figure 1.1

**Part 2 : Determination the configuration of 7-Segment display**

- Figure 2.1(a)-(i) shows the connection to determine the common anode configuration. Segment *a* will be light if it is common-anode and if there is no light, two possibilities, it may not function or it is common-cathode.
- Figure 2.1(a)-(ii) shows the connection to determine the common-cathode configuration. Segment *b* will be light if it is common-cathode and if there is no light, two possibilities, it may not function or it is common-anode.

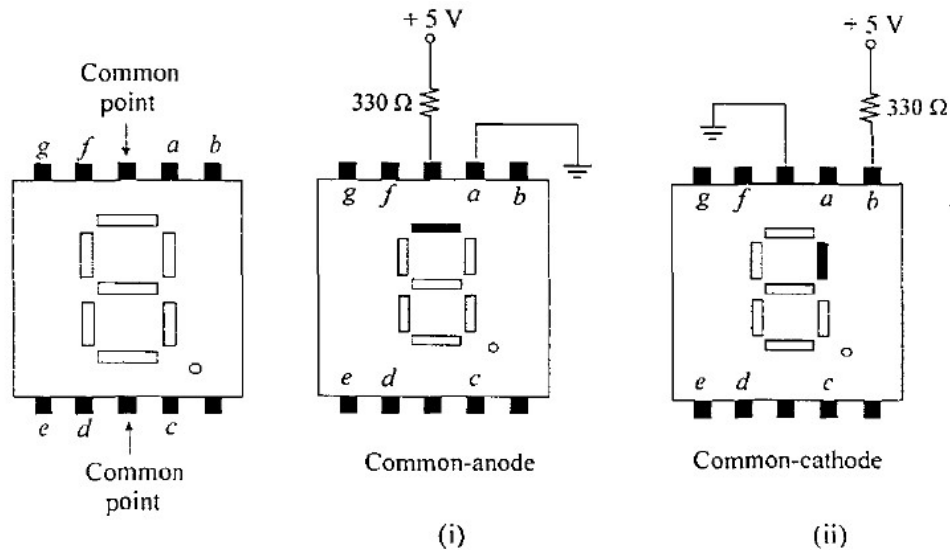


Figure 2.1 (a)

- Choose one 7-segment display and do the connection as shown in Figure 2.2(b).
- Segment *c* will be light or will not be light; it is all depending on the type of configurations. Answer related questions provided in result-sheet. The answer of these questions is depends on your observations from the result of your experiment.

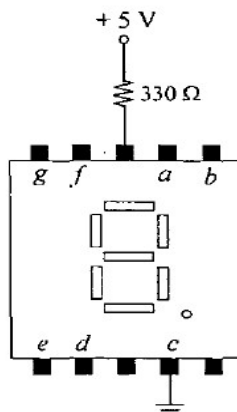


Figure 2.2 (b)

**Part 3.1 : BCD-to-7-Segment Decoder (IC 7447)**

1. Refer to Figure 3.1. Complete Table 3.1. Draw the decimal number that's appears on the display corresponding to the sequence inputs. No need to do the experiment.

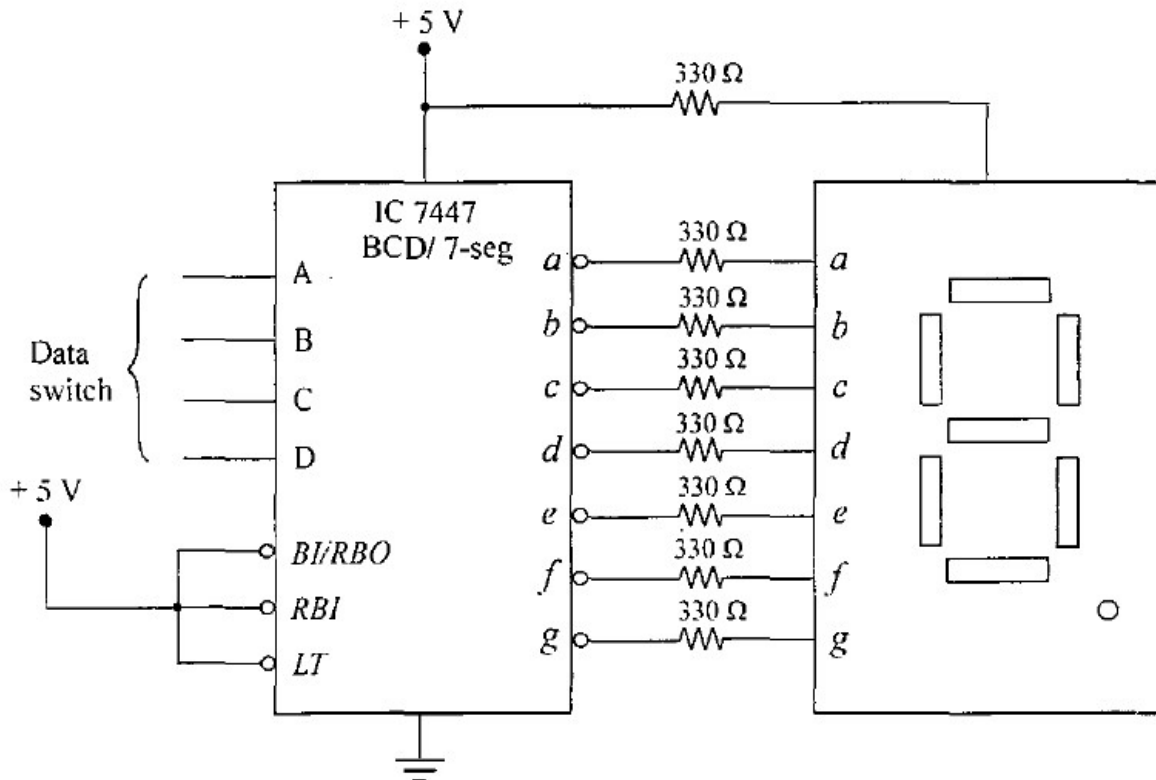


Figure 3.1

**Part 3.2 : BCD-to-7-Segment Decoder (IC 7448)**

1. Built the circuit shown in Figure 3.2. Connect input A, B, C and D to data switch, then connect the outputs to 7-segment display (common-cathode).
2. Complete Table 3.2 Draw the decimal number that's appears on the display corresponding to the sequence inputs.

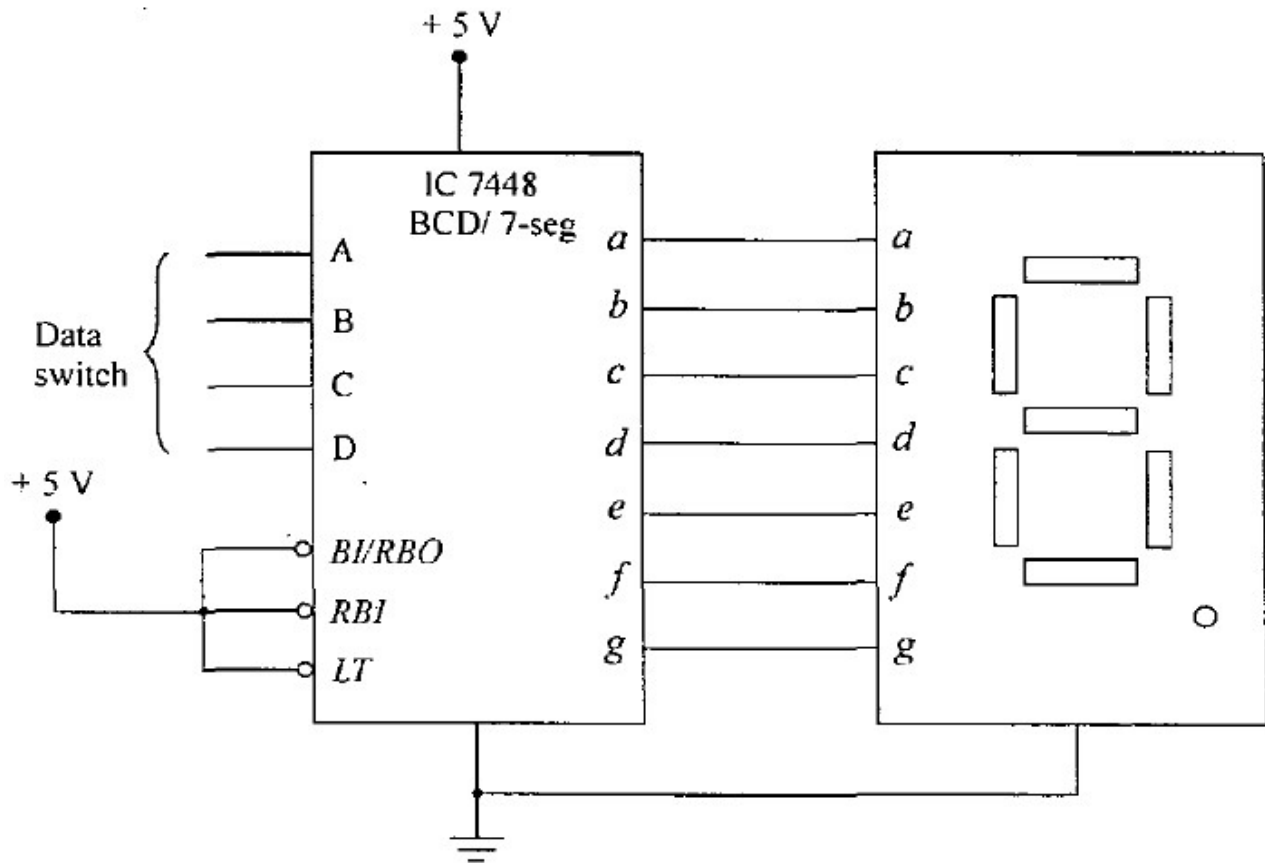


Figure 3.2

### Part 3.3 : Multidigit Displays

1. Built the circuit shown in Figure 3.3. Connect input SW 1, SW 2, SW 3, SW 4, SW 5, SW 6, SW 7 and SW 8 to data switch, and then connect the outputs of each IC to 7-segment displays.
2. Complete Table 3.3. Draw the decimal number that's appears on each display corresponding to the applied inputs.

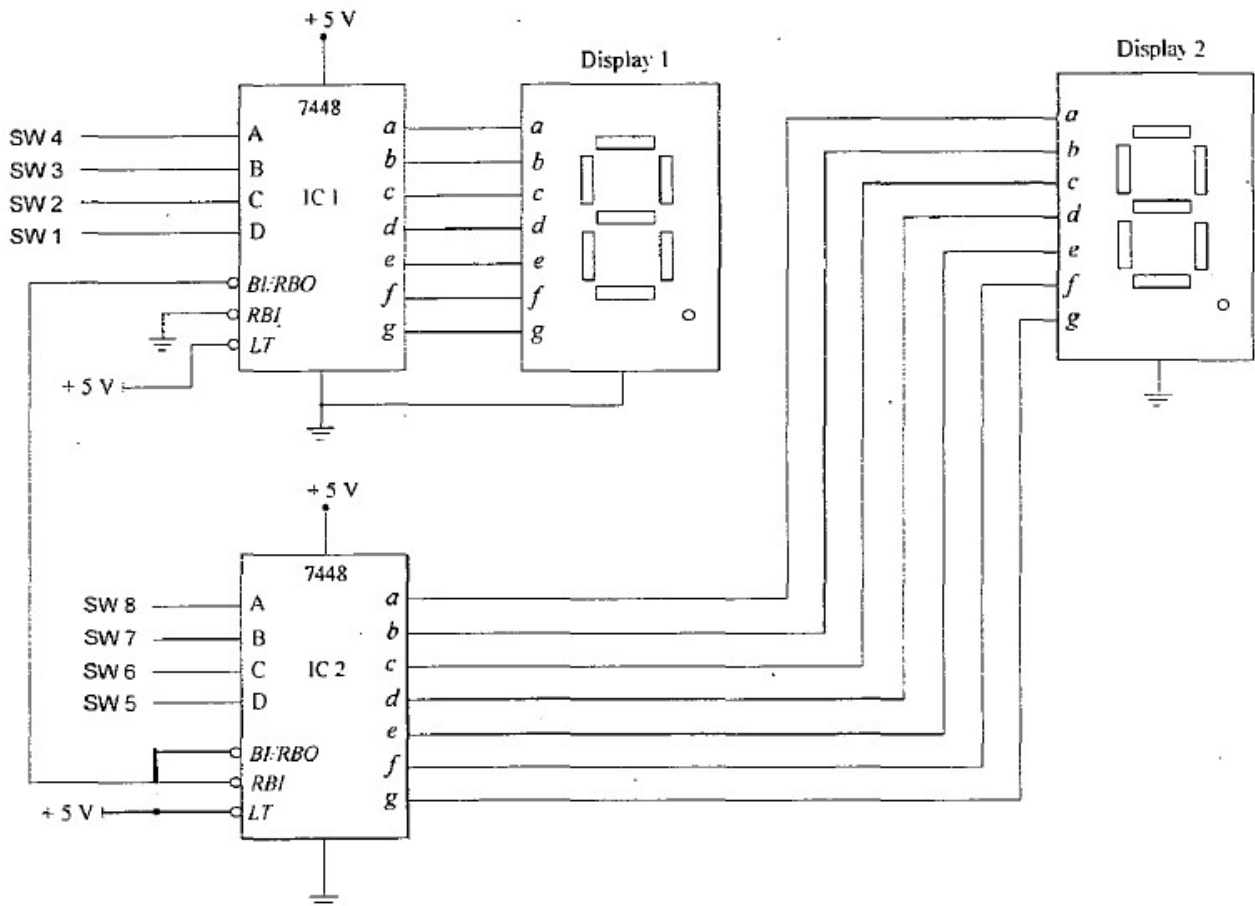


Figure 3.3