C9

Decoder Circuits: CD4511

CHAPTER ASSIGNMENT

Name _____ Class _____ No. _____ Date _____

> Answer every question in the space given. Show your working. You may use the chapter page to help you.

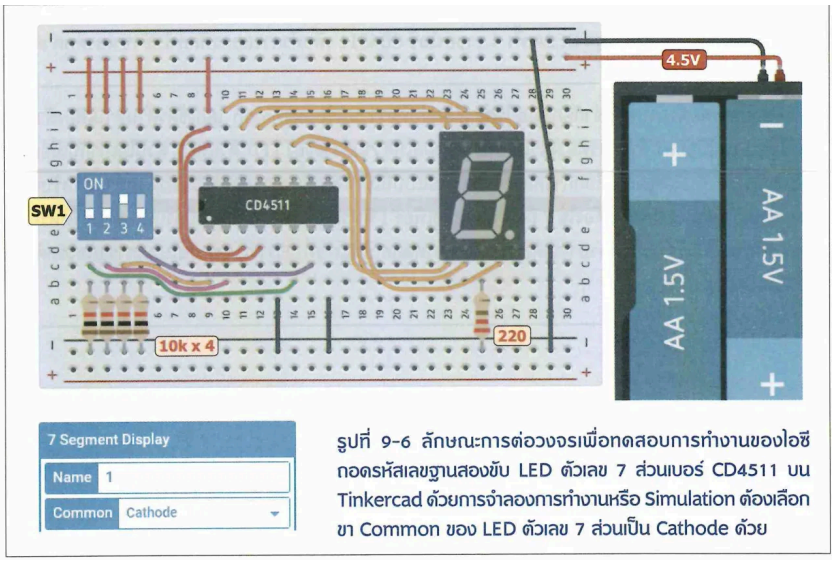
Questions from the Guru Jazzy chapter page, for classroom use.

Labs

9.1 Decode 4 bits

1. Build the circuit in Tinkercad (Fig 9-6). In the 7-segment display's settings, set **Common = Cathode**. Slide the 4 DIP switches to each input in Table 9-1 and watch the display.

2. Build it with real parts (Fig 9-7) and repeat step 1.



รูปที่ 9-6 ลักษณะการต่อวงจรเพื่อทดสอบการทำงานของไอซีถอดรหัสเลขฐานสองขับ LED ตัวเลข 7 ส่วนเบอร์ CD4511 บน Tinkercad ด้วยการจำลองการทำงานหรือ Simulation ต้องเลือกขา Common ของ LED ตัวเลข 7 ส่วนเป็น Cathode ด้วย

ขาควบคุม			ขาอินพุตรหัสเลขฐานสอง				ขาเอาต์พุต							ลักษณะการแสดงผล
LE	$\overline{BL}$	$\overline{LT}$	D	C	B	A	a	b	c	d	e	f	g	
x	x	0	1	1	1	1	1	1	1	1	1	1	1	8
x	0	1	1	0	0	0	1	0	0	0	0	0	0	
0	1	1	0	0	0	0	1	1	1	1	1	1	0	0
			0	0	0	1	0	1	1	0	0	0	0	1
			0	0	1	0	1	1	0	1	1	0	1	2
			0	0	1	1	1	1	1	1	0	0	1	3
			0	1	0	0	0	1	1	0	0	1	1	4
			0	1	0	1	1	0	1	1	0	1	1	5
			0	1	1	0	0	0	1	1	1	1	1	6
			0	1	1	1	1	1	1	0	0	0	0	7
			1	0	0	0	1	1	1	1	1	1	1	8
			1	0	0	1	1	1	1	0	0	1	1	9
			1	0	1	0	0	0	0	0	0	0	0	
			1	0	1	1	0	0	0	0	0	0	0	
			1	1	0	0	0	0	0	0	0	0	0	
			1	1	0	1	0	0	0	0	0	0	0	
			1	1	1	0	0	0	0	0	0	0	0	
			1	1	1	1	0	0	0	0	0	0	0	
1	1	1	x	x	x	x	ค่าล่าสุดก่อนที่ขา LE, BL และ LT จะเป็น "1" พร้อมกันทั้ง 3 ขา							

Activity: Decoder challenges

1. Before each switch setting, convert the binary to decimal and predict the digit. Remember ON = “0”.

2. Connect LT (pin 3) to ground for a moment. What do you see, and why is it useful?

3. Connect BL (pin 4) to ground. What happens?

4. Join Chapter 8 and Chapter 9: drive the CD4511 inputs from the 74HC93’s QD–QA and press the clock button. What happens after 9?

5. Then make the counter a BCD counter (Chapter 8, 8.4) so it never goes blank.

Chapter quiz

1 What does a BCD to 7-segment decoder do?

A	B	C	D
Turns a 7-segment display into binary	Turns binary (or decimal) input into the signals that light the right segments	Counts pulses	Stores 4 bits

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2 Which segments light to show the digit 2?

A. a, b, c B. a, b, g, e, d C. b, c, f, g D. a, f, g, c, d

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3 With a common-cathode display, what must you do to light a segment?

A	B	C	D
Give its pin “0” and the common pin “1”	Give its pin “1” (through a resistor) and connect the common pin to “0”/ground	Connect both to ground	Nothing — they are always on

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4 What is the dp segment for?

A. Display power B. The decimal point C. The minus sign D. Data pin

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5 The 4511 receives the input 1100 (12). What does the display show?

A. 12 B. C C. Nothing — it is blank D. 2

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6 In normal use, what should LT, BL and LE be?

A. LT = 0, BL = 0, LE = 1 B. LT = 1, BL = 1, LE = 0 C. All 0 D. All 1

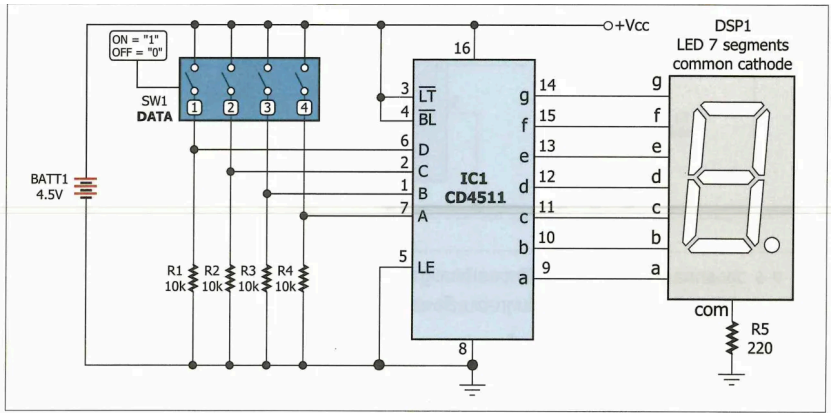
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7 Which 4511 input is the MSB?

A. A (pin 7) B. B (pin 1) C. C (pin 2) D. D (pin 6)

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8 Fig 9-4 uses one resistor on the common pin. What is the downside?



A	B	C	D
The display does not work	Digits with more segments lit look dimmer, so brightness varies	The IC overheats	Only 0 can be shown

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9 In Tinkercad, what must you set on the 7-segment display for this circuit?

A. Common: Anode B. Common: Cathode C. Mode: Voltage D. Nothing

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End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/tinkercad/chapter-9-decoder/