



Lab-07

Encoder

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Objectives



- Understand the **definition of Encoder.**
- Implement a **Decimal-to-BCD Encoder**
- Implement a **Decimal-to-BCD Priority Encoder.**

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What is Encoder

- A decimal number is converted to be a binary code.

For example:

0 → 0000

3 → 0011

...

9 → 1001

...

15 → 1111

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4 to 2 Encoder

- Decimal numbers 0, 1, 2, and 3 are converted to be respective binary codes **00, 01, 10, and 11**.

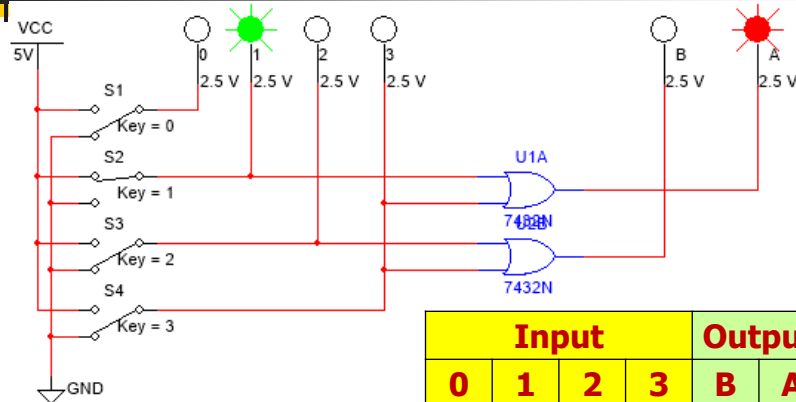
Input				Output	
0	1	2	3	B	A
1	0	0	0	0	0
0	1	0	0	0	1
0	0	1	0	1	0
0	0	0	1	1	1

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4 to 2 Encoder



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8 to 3 Encoder

- Decimal numbers 0, 1, ..., 6, and 7 are converted to be respective binary codes 000, 001, ..., 110, and 111.

Input								Output		
0	1	2	3	4	5	6	7	C	B	A
1	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	1	0
0	0	0	1	0	0	0	0	0	1	1
0	0	0	0	1	0	0	0	1	0	0
0	0	0	0	0	1	0	0	1	0	1
0	0	0	0	0	0	1	0	1	1	0
0	0	0	0	0	0	0	1	1	1	1

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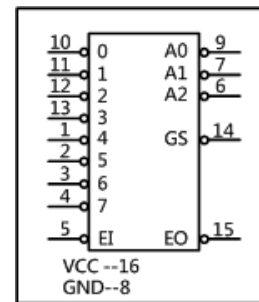
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8 to 3 Priority Encoder 74148



- Decimal numbers 0, 1, ..., 6, and 7 are converted to be respective binary codes 000, 001, ..., 110, and 111.

Input								Output		
0	1	2	3	4	5	6	7	C	B	A
1	0	0	0	0	0	0	0	0	0	0
x	1	0	0	0	0	0	0	0	0	1
x	x	1	0	0	0	0	0	0	1	0
x	x	x	1	0	0	0	0	0	1	1
x	x	x	x	1	0	0	0	1	0	0
x	x	x	x	x	1	0	0	1	0	1
x	x	x	x	x	x	1	0	1	1	0
x	x	x	x	x	x	x	1	1	1	1



74148

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Decimal to BCD Encoder



- Decimal numbers 0, 1, 2, ..., 8, and 9 are converted to be respective BCD codes 0000, 0001, 0010, ..., 1000, and 1001.

Input										Output			
0	1	2	3	4	5	6	7	8	9	D	C	B	A
1	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	0	0	0	1	0
0	0	0	1	0	0	0	0	0	0	0	0	1	1
0	0	0	0	1	0	0	0	0	0	0	1	0	0
0	0	0	0	0	1	0	0	0	0	0	1	0	1
0	0	0	0	0	0	1	0	0	0	0	1	1	0
0	0	0	0	0	0	0	1	0	0	0	1	1	1
0	0	0	0	0	0	0	0	1	0	1	0	0	0
0	0	0	0	0	0	0	0	0	1	1	0	0	1

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Decimal to BCD Priority Encoder



- Decimal numbers 0, 1, 2, ..., 8, and 9 are converted to be respective BCD codes 0000, 0001, 0010, ..., 1000, and 1001.

Input										Output			
0	1	2	3	4	5	6	7	8	9	D	C	B	A
1	0	0	0	0	0	0	0	0	0	0	0	0	0
X	1	0	0	0	0	0	0	0	0	0	0	0	1
X	X	1	0	0	0	0	0	0	0	0	0	1	0
X	X	X	1	0	0	0	0	0	0	0	0	1	1
X	X	X	X	1	0	0	0	0	0	0	1	0	0
X	X	X	X	X	1	0	0	0	0	0	1	0	1
X	X	X	X	X	X	1	0	0	0	0	1	1	0
X	X	X	X	X	X	X	1	0	0	0	1	1	1
X	X	X	X	X	X	X	X	1	0	1	0	0	0
X	X	X	X	X	X	X	X	X	1	1	0	0	1

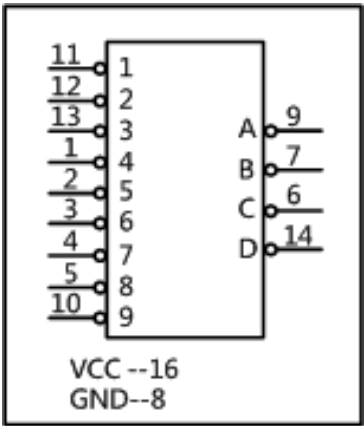
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Decimal to BCD Priority Encoder



- TTL 74147: Decimal to BCD priority encoder with active low.



74147

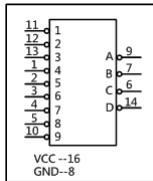
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Decimal to BCD Priority Encoder



- Decimal to BCD priority encoder with **active low**.
Such as **TTL-IC 74147**



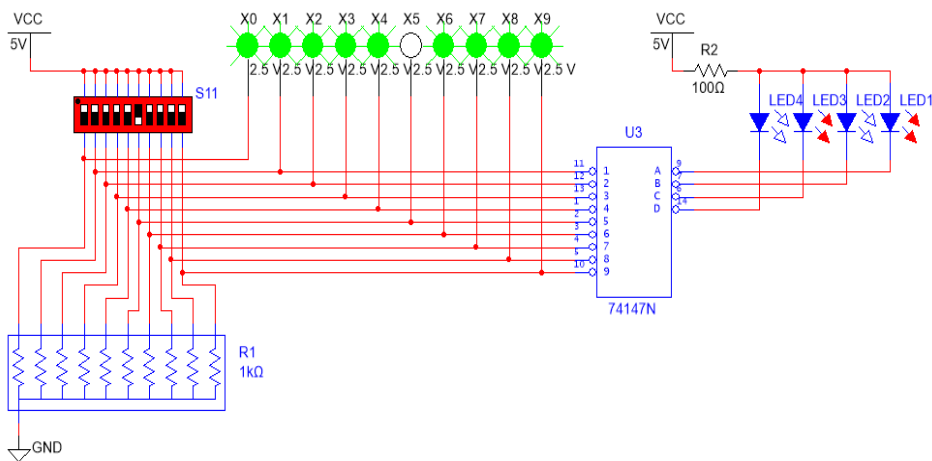
74147

Input										Output			
/0	/1	/2	/3	/4	/5	/6	/7	/8	/9	/D	/C	/B	/A
0	1	1	1	1	1	1	1	1	1	1	1	1	1
X	0	1	1	1	1	1	1	1	1	1	1	1	0
X	X	0	1	1	1	1	1	1	1	1	1	0	1
X	X	X	0	1	1	1	1	1	1	1	1	0	0
X	X	X	X	0	1	1	1	1	1	1	0	1	1
X	X	X	X	X	0	1	1	1	1	1	0	1	0
X	X	X	X	X	X	0	1	1	1	1	0	0	1
X	X	X	X	X	X	X	0	1	1	1	0	0	0
X	X	X	X	X	X	X	X	0	1	0	1	1	1
X	X	X	X	X	X	X	X	X	0	0	1	1	0

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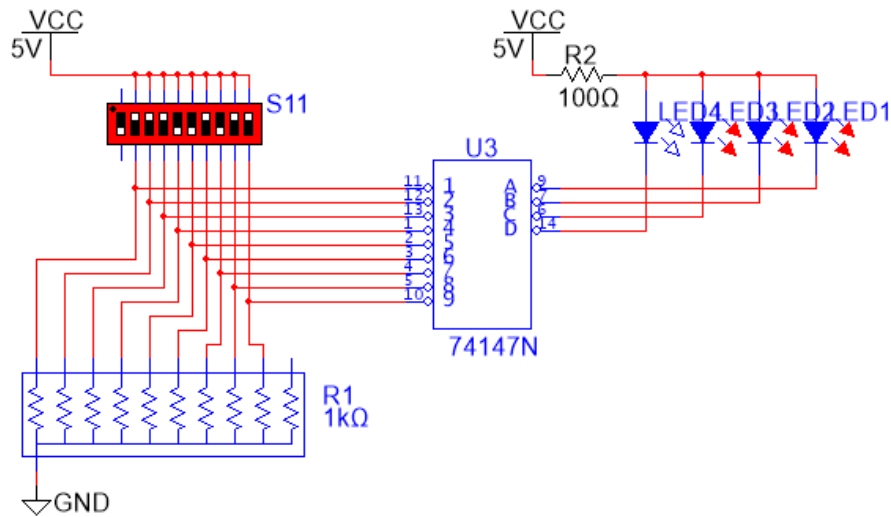
Decimal to BCD Priority Encoder



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Decimal to BCD Priority Encoder

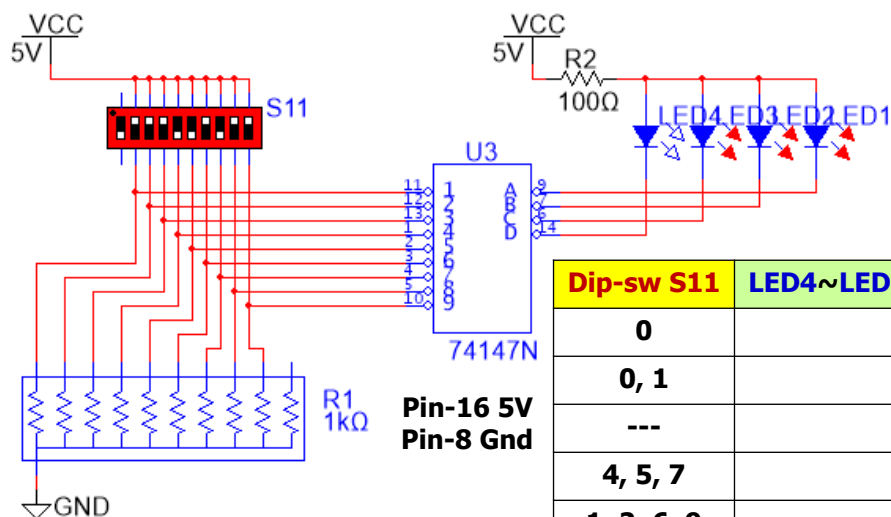


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Experiment-1

Decimal to BCD Priority Encoder 74147



Pin-16 5V
Pin-8 Gnd

Dip-sw S11	LED4~LED1
0	
0, 1	

4, 5, 7	
1, 2, 6, 9	

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