

## Experiment# 7: Study of Schmitt Triggers

### CKT diagrams:

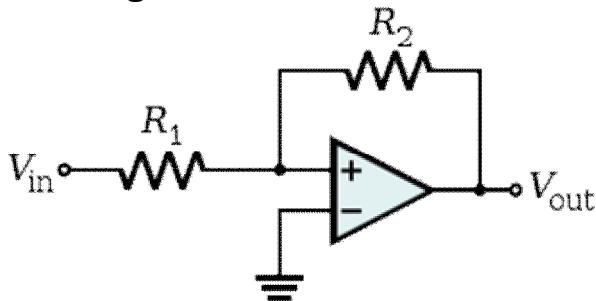


Fig. 1: Non-inverting Schmitt Trigger

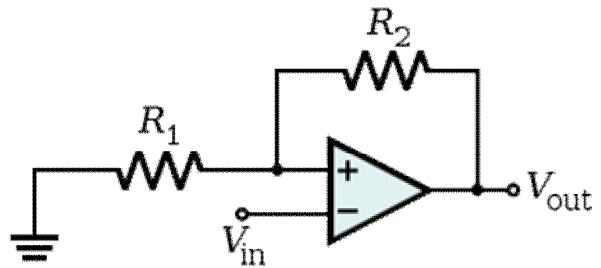


Fig. 2: Inverting Schmitt Trigger

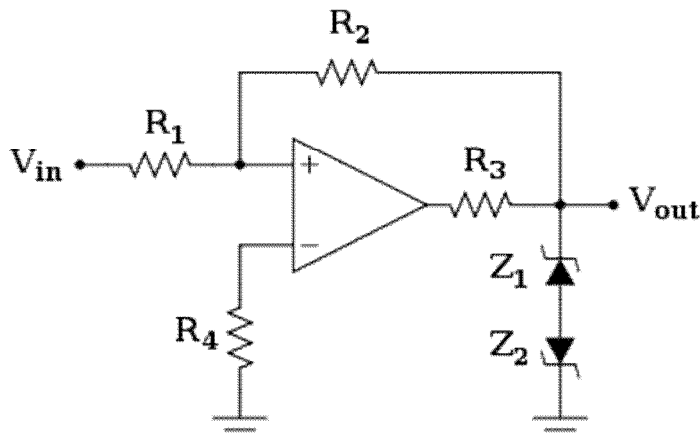


Fig. 3: Practically used Schmitt Trigger

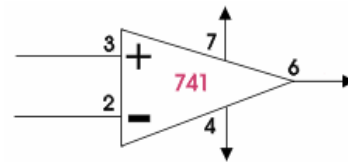
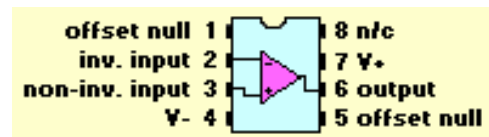


Fig. 4: Connection of an Op-Amp

### Apparatus:

1. Op-Amp 741 (1pc; Set  $V_+ = +5V$  and  $V_- = -5V$  following Fig. 4)
2. Resistor (4 pcs;  $R_1 = 1K\Omega$ ,  $R_2 = 2K\Omega$ ,  $R_3 = 10K\Omega$ , and  $R_4 = 10K\Omega$ )
3. Zener diodes (2 pcs;  $Z_1 = 2.7V$  and  $Z_2 = 3.3V$ )

### Procedure:

For all figures –

1. Slowly increase the input from 0V and observe the output in the oscilloscope. Record the value of  $V_{in}$  for which the output changes.
2. Slowly decrease the input to 0V and observe the output in the oscilloscope. Record the value of  $V_{in}$  for which the output changes.
3. Apply sine wave (10V p-p 50 Hz) as input and observe the output in the oscilloscope.

### Question:

1. Why the designs in Fig. 1 and Fig. 2 are not generally used in real circuits?
2. Why  $R_3$  and  $R_4$  are used in Fig. 3?
3. What is the purpose of using  $Z_1$  and  $Z_2$  in Fig. 3?

### Report:

Report should cover the following points:

1. Objective
2. Circuit diagram and input-output wave shapes
3. Answer to the questions
4. Discussion of the findings
5. Applications of your study