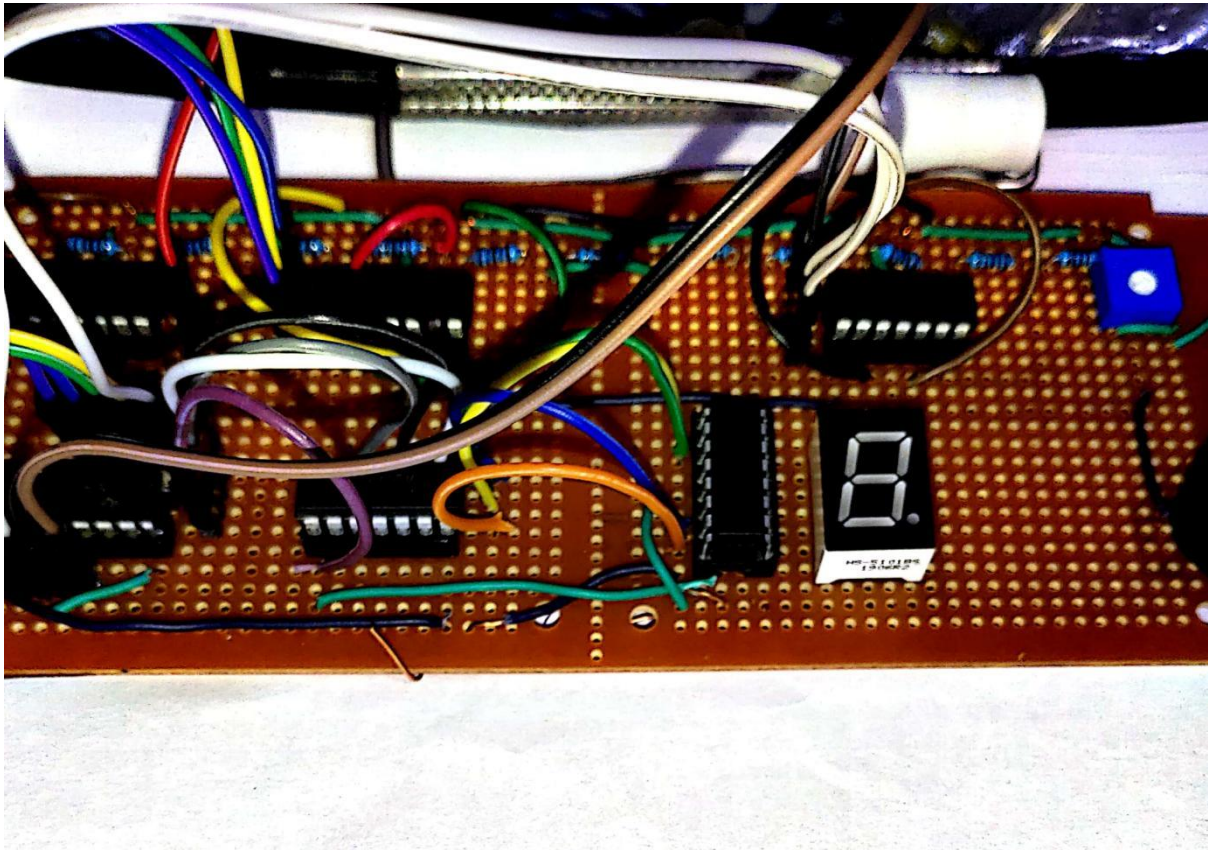


Analog to Digital Converter – Pembacaan variable resistor



- Rentang ADC

Rumus : $2^n - 1$

$2^4 - 1 = 15$ (range 4 bit ADC adalah 0 sampai 15)

Namun, disini hanya digunakan range 0 sampai 9

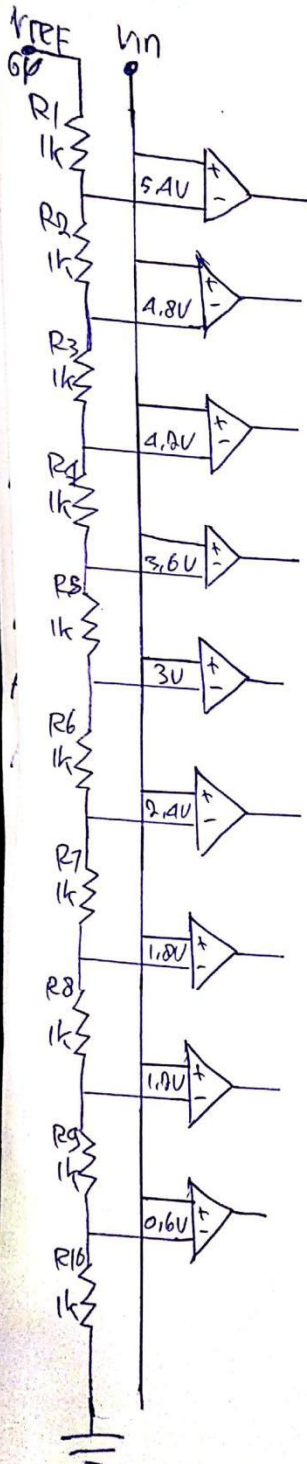
- Menentukan Resolusi ADC

Rumus : $\frac{v_{ref}}{\text{jumlah range ADC}}$

$\frac{6}{10} = 0,6$ (setiap 1 bit biner, adalah 0,6V)

Jumlah resistor = 10

Dengan perincian perhitungan :



$$R_{\text{tot}} = 10$$

$$VR_1 = \frac{1}{10} \times 6 = 0,6 \rightarrow 6 - 0,6 = 5,4V$$

$$VR_2 = \frac{1}{9} \times 5,4 = 0,6 \rightarrow 5,4 - 0,6 = 4,8V$$

$$VR_3 = \frac{1}{8} \times 4,8V = 0,6 \rightarrow 4,8 - 0,6 = 4,2V$$

$$VR_4 = \frac{1}{7} \times 4,2V = 0,6 \rightarrow 4,2 - 0,6 = 3,6V$$

$$VR_5 = \frac{1}{6} \times 3,6 = 0,6 \rightarrow 3,6 - 0,6 = 3$$

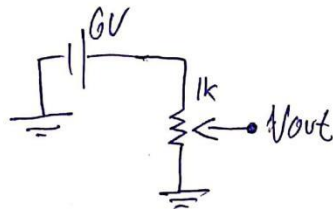
$$VR_6 = \frac{1}{5} \times 3 = 0,6 \rightarrow 3 - 0,6 = 2,4V$$

$$VR_7 = \frac{1}{4} \times 2,4 = 0,6 \rightarrow 2,4 - 0,6 = 1,8$$

$$VR_8 = \frac{1}{3} \times 1,8 = 0,6 \rightarrow 1,8 - 0,6 = 1,2$$

$$VR_9 = \frac{1}{2} \times 1,2 = 0,6 \rightarrow 1,2 - 0,6 = 0,6$$

VIN



- Kondisi Variabel resistor

$$V_{in} = 100\% = \frac{100}{100} \times 6 = 6 \text{ Volt}$$

$$= 90\% = \frac{90}{100} \times 6 = 5,4 \text{ Volt}$$

$$= 80\% = \frac{80}{100} \times 6 = 4,8 \text{ Volt}$$

$$= 70\% = \frac{70}{100} \times 6 = 4,2 \text{ Volt}$$

$$= 60\% = \frac{60}{100} \times 6 = 3,6 \text{ Volt}$$

$$= 50\% = \frac{50}{100} \times 6 = 3 \text{ Volt}$$

$$= 40\% = \frac{40}{100} \times 6 = 2,4 \text{ Volt}$$

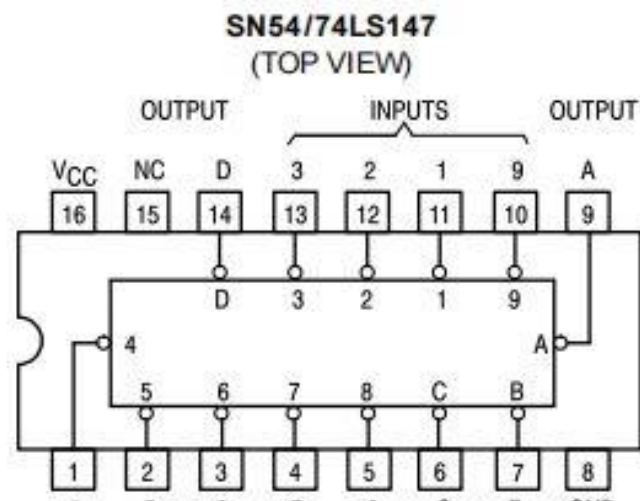
$$= 30\% = \frac{30}{100} \times 6 = 1,8 \text{ Volt}$$

$$= 20\% = \frac{20}{100} \times 6 = 1,2 \text{ Volt}$$

$$= 10\% = \frac{10}{100} \times 6 = 0,6 \text{ Volt}$$

$$= 0\% = \frac{0}{100} \times 6 = 0 \text{ Volt}$$

- Proses output Op-Amp ke IC 74LS147



SN54/74LS147
FUNCTION TABLE

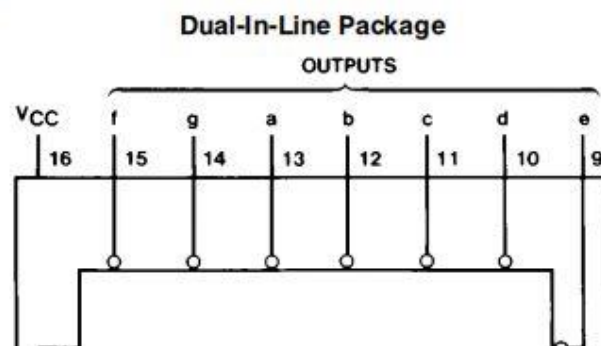
| INPUTS | | | | | | | | | OUTPUTS | | | |
|--------|---|---|---|---|---|---|---|---|---------|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | C | B | A |
| H | H | H | H | H | H | H | H | H | H | H | H | H |
| X | X | X | X | X | X | X | X | L | L | H | H | L |
| X | X | X | X | X | X | X | L | H | L | H | H | H |
| X | X | X | X | X | X | L | H | H | H | L | L | L |
| X | X | X | X | X | L | H | H | H | H | L | L | H |
| X | X | X | X | L | H | H | H | H | H | L | H | L |
| X | X | X | L | H | H | H | H | H | H | L | H | H |
| X | X | L | H | H | H | H | H | H | H | H | L | L |
| X | L | H | H | H | H | H | H | H | H | H | L | H |
| L | H | H | H | H | H | H | H | H | H | H | H | L |

H = HIGH Logic Level, L = LOW Logic Level, X = Irrelevant

Ca

- Proses IC 7447

Connection Diagram



Function Table

46A, 47A

| Decimal or Function | Inputs | | | | | | BI/RBO (Note 1) | Outputs | | | | | | | Note |
|---------------------|--------|-----|---|---|---|---|-----------------|---------|---|---|---|---|---|---|------|
| | LT | RBI | D | C | B | A | | a | b | c | d | e | f | g | |
| 0 | H | H | L | L | L | L | H | L | L | L | L | L | L | H | (2) |
| 1 | H | X | L | L | L | H | H | H | L | L | H | H | H | H | |
| 2 | H | X | L | L | H | L | H | L | L | H | L | L | H | L | |
| 3 | H | X | L | L | H | H | H | L | L | L | L | H | H | L | |
| 4 | H | X | L | H | L | L | H | H | L | L | H | H | L | L | |
| 5 | H | X | L | H | L | H | H | L | H | L | L | H | L | L | |
| 6 | H | X | L | H | H | L | H | H | H | L | L | L | L | L | |
| 7 | H | X | L | H | H | H | H | L | L | L | H | H | H | H | |
| 8 | H | X | H | L | L | L | H | L | L | L | L | L | L | L | |
| 9 | H | X | H | L | L | H | H | L | L | L | H | H | L | L | |
| 10 | H | X | H | L | H | L | H | H | H | H | L | L | H | L | |
| 11 | H | X | H | L | H | H | H | H | H | L | L | H | H | L | |
| 12 | H | X | H | H | L | L | H | H | L | H | H | H | L | L | |
| 13 | H | X | H | H | L | H | H | L | H | H | L | H | L | L | |
| 14 | H | X | H | H | H | L | H | H | H | H | L | L | L | L | |
| 15 | H | X | H | H | H | H | H | H | H | H | H | H | H | H | |
| BI | X | X | X | X | X | X | L | H | H | H | H | H | H | H | (3) |
| RBI | H | L | L | L | L | L | L | H | H | H | H | H | H | H | (4) |
| LT | L | X | X | X | X | X | H | L | L | L | L | L | L | L | (5) |

g f COM a b

