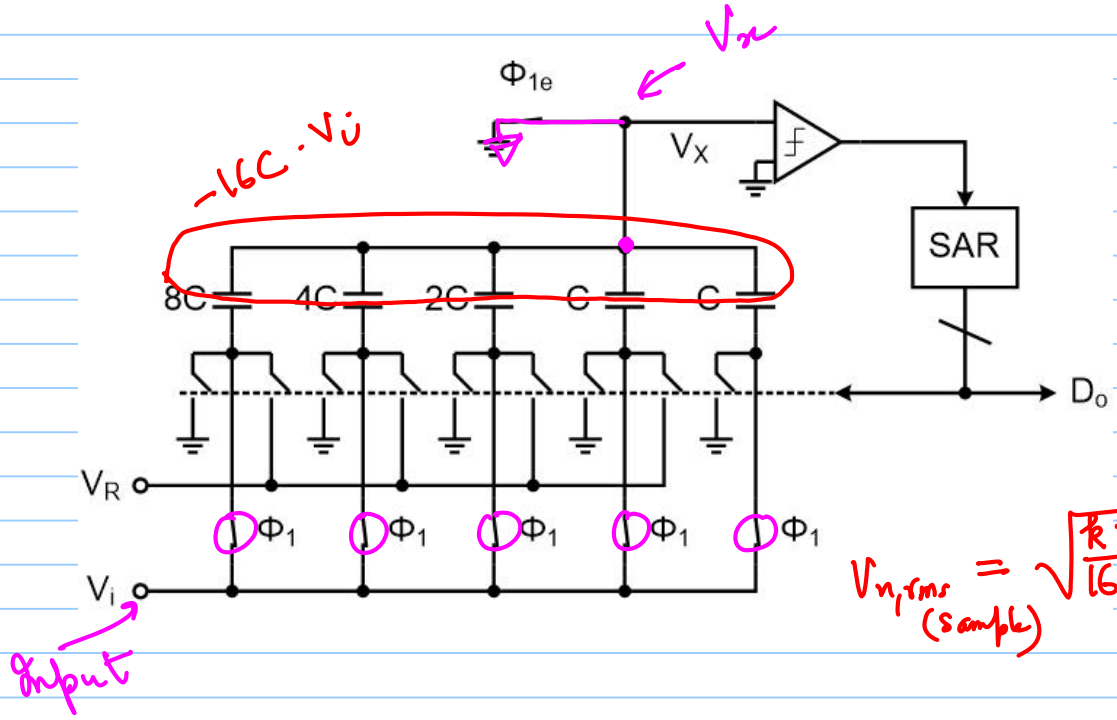
ECE 517 - Lecture 19

Note Title 3/28/2017

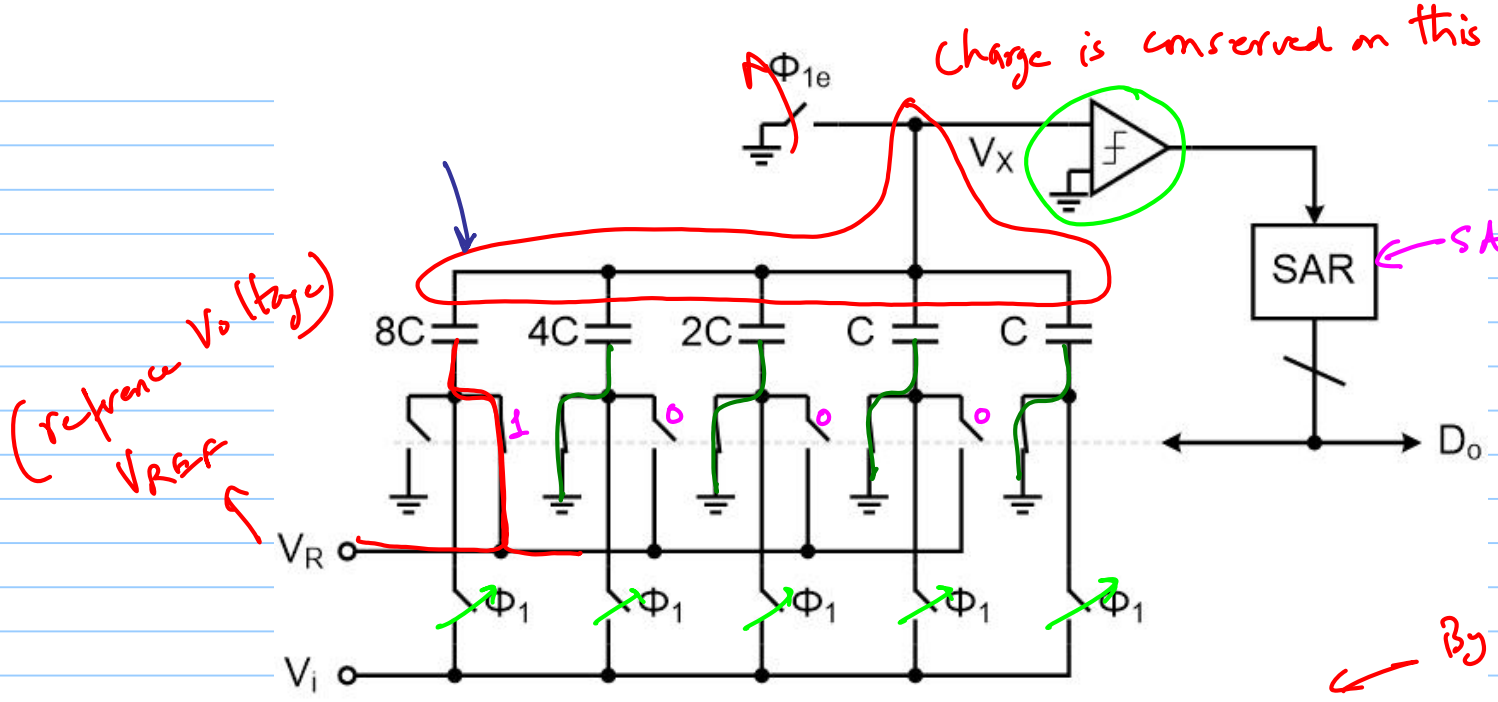


V_n

$-16C \cdot V_i$

V_n $-16CV_i$ $16C$ V_i

$$V_{n,rms\,(sample)} = \sqrt{\frac{kT}{16C}}$$



$$-8C(V_R - V_x) - (4C + 2C + C + C)(0 - V_x) = -16C\,V_i$$

$$-8C\,V_R + 16C\,V_x = -16C\cdot V_i$$

$$V_x = \frac{8CV_R - 16CV_i}{16C}$$

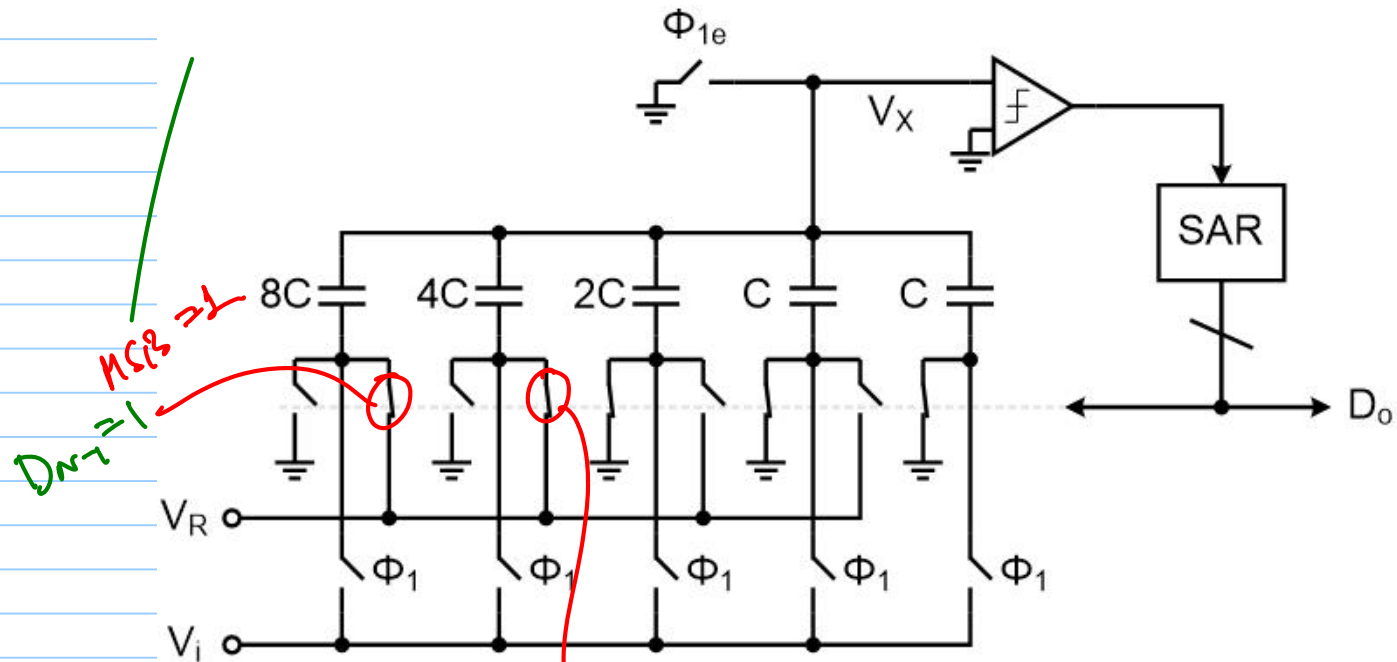
$$\Rightarrow V_x = \frac{V_R}{2} - V_i$$

Zero crossing detector

$V_x > 0 \Rightarrow V_i < \frac{V_R}{2} \Rightarrow MSB = 0$

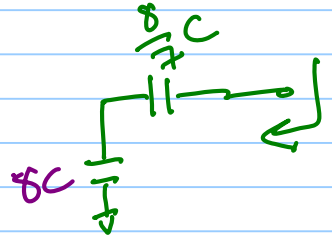
If $V_x < 0 \Rightarrow V_i > \frac{V_R}{2} \Rightarrow MSB = 1$

D[N-1:0]



$V_2 = \frac{3}{4}V_R - V_i$

Split DAC Topology



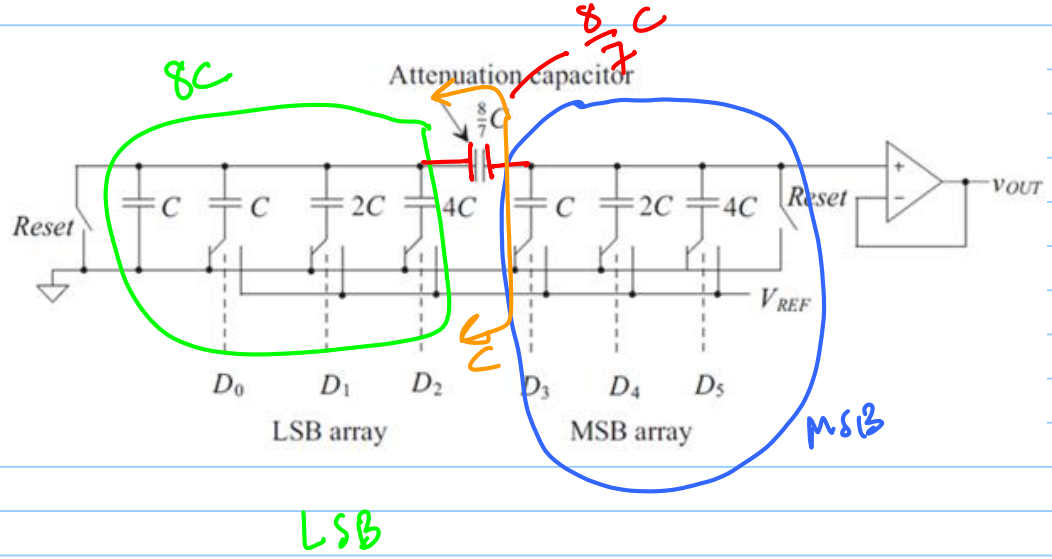
$$\frac{8 \times 8/7}{8 + 8/7} = C$$

6-bit SAR ADC

MSB capacitor

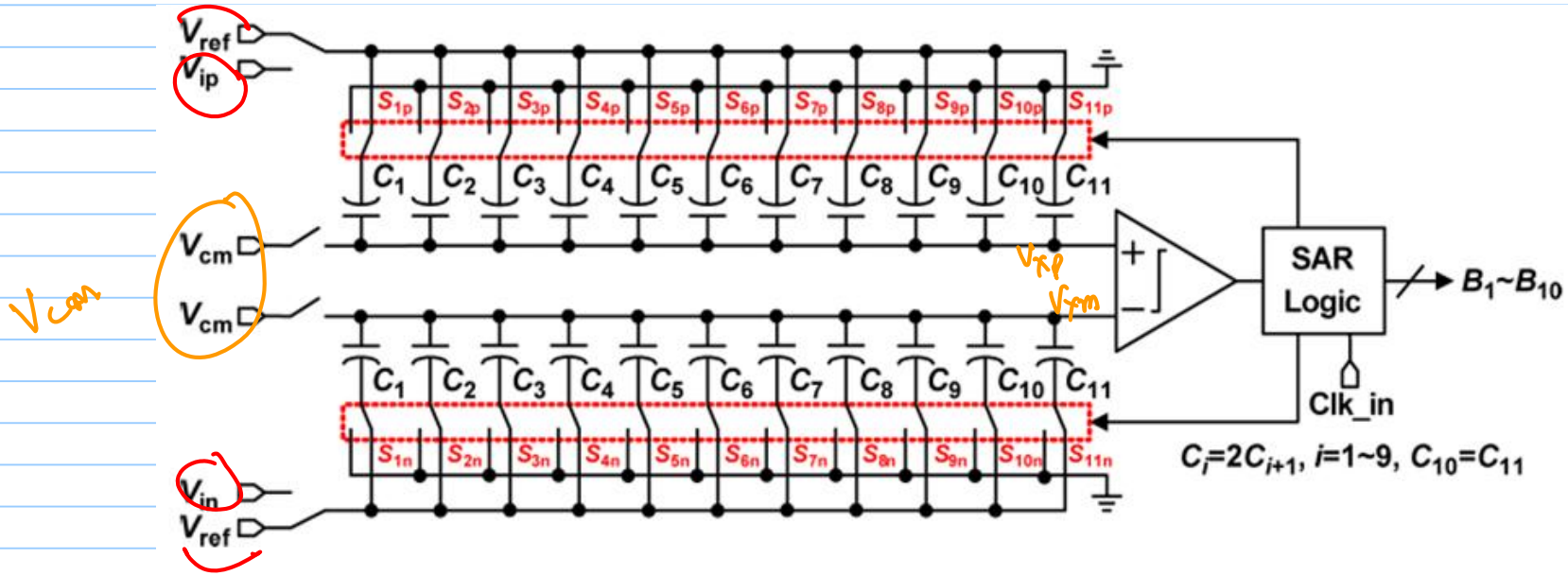
$(2^{6-1})C$

$= 32C$



C-2C Ladder Topology

Fully Differential SAR



V_{com}