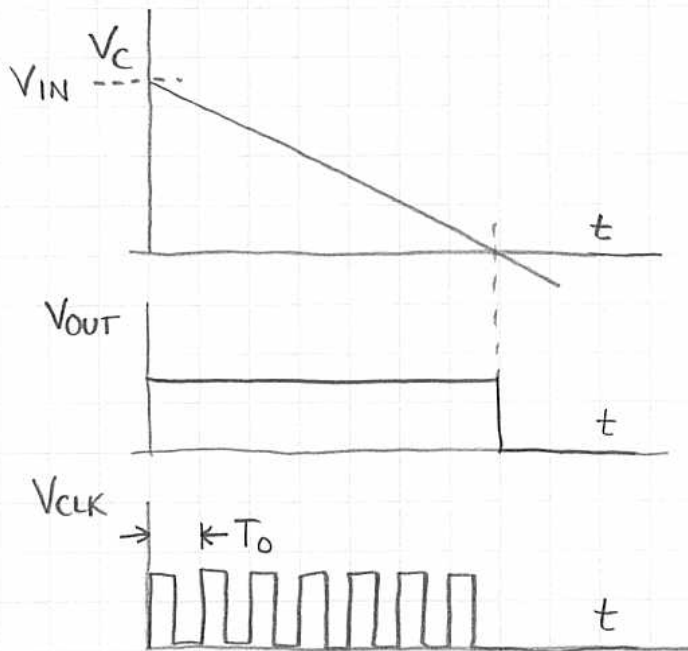
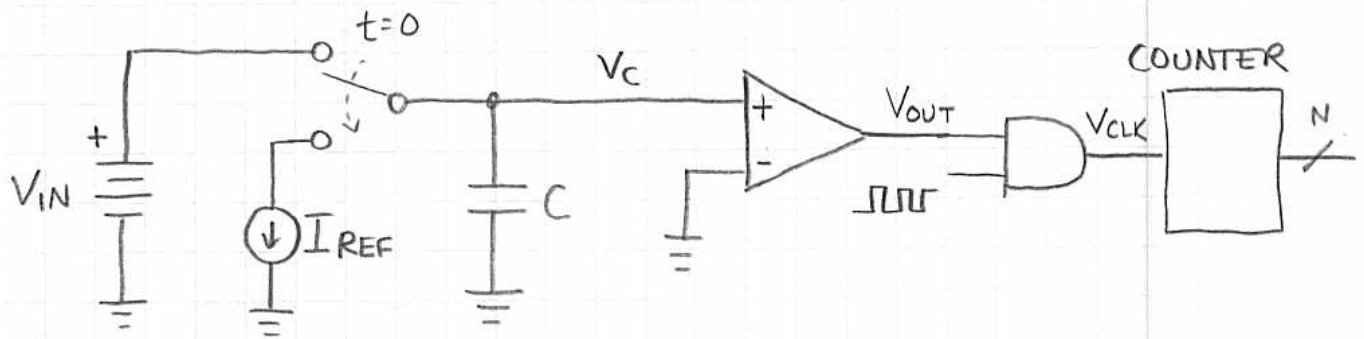


RAMP A/D CONVERTER



$\leftarrow nT_0 \rightarrow$

n CLOCK PULSES
COUNTED

FOR CAPACITOR

$$\frac{I}{C} = \frac{dV}{dt}$$

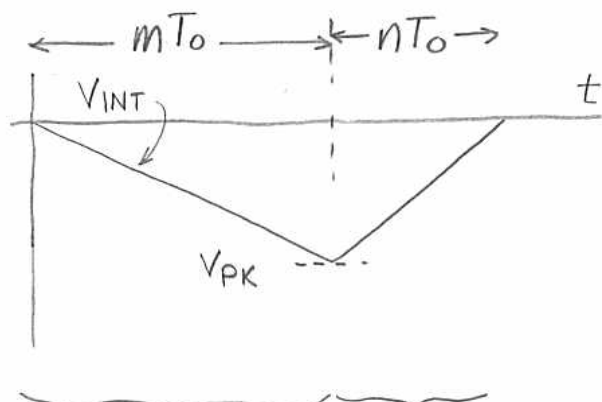
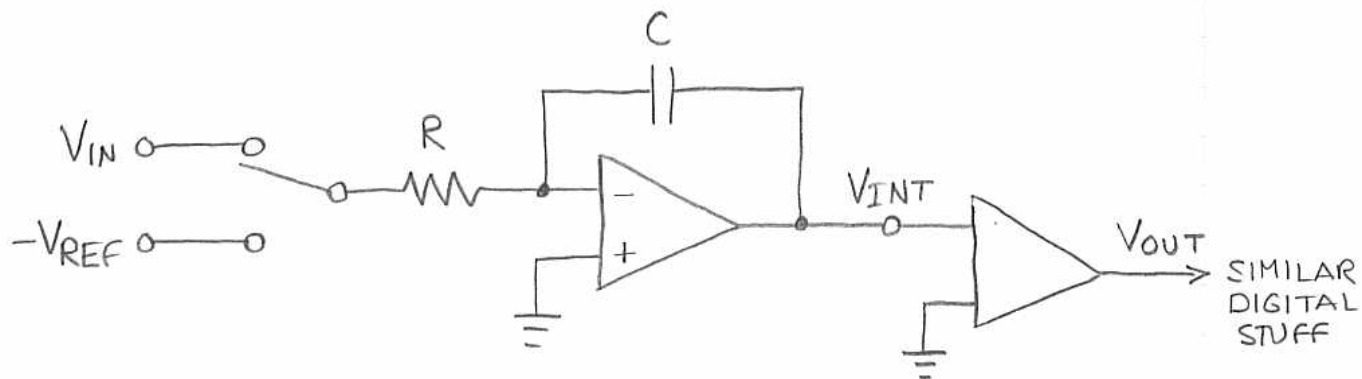
$$\frac{I_{REF}}{C} = \frac{V_{IN}}{nT_0}$$

$$n = V_{IN} \left[\frac{C}{I_{REF} T_0} \right]$$

GOOD: $n \propto V_{IN}$

BAD: PROPORTIONALITY
FACTOR DEPENDS
ON I_{REF} , T_0 , C

DUAL-SLOPE A/D CONVERTER (INTEGRATING ADC)



INTEGRATE
 V_{IN} FOR mT_0
 $m = 2^N$
N-BIT ADC

INTEGRATE
 $-V_{REF}$ UNTIL
 $V_{INT} = 0$
AFTER
TIME nT_0

FOR INTEGRATOR

$$V_{PK} = -RC V_{IN} mT_0$$

ALSO

$$-V_{PK} = -RC(-V_{REF})nT_0$$

SOLVE FOR n

$$-RC V_{IN} mT_0 = -RC V_{REF} nT_0$$

$$n = V_{IN} \left[\frac{m}{V_{REF}} \right]$$

NICE: NOW

PROPORTIONALITY FACTOR
DEPENDS ONLY ON V_{REF}
VALUES OF R, C, T_0
UNIMPORTANT (AS LONG AS
THEY ARE STABLE DURING
THE CONVERSION TIME)