# Timing

switch issues
forward biasing diodes
charge injection

pseudo-C code
#define ADC_CTL 0x1000 // 32 bit words, 4 bytes
#define ADC_RES 0x1004
#define DAC_CTL 0x1008
#define BATTERY 3

int gain = 4; // 1..8
mux = BATTERY;

50 = 1
*ADC_CTL = (gain-1) << 4 | muX << 1 | 00;

*ADC_CTL = *ADC_CTL & (1<<1); // reset 30

for (i=0; i<100; i++); // Wait 100 cycles of 10 MHz times cycle 100
x = *ADC_RES;

there are better ways to do this
Issues with switches:
- charge injection
- forward biased diodes (p, n)

V settles close to ground by end of $\phi_1$
Initially negative

if there were no op-amp, when $p_2$ goes high
$V_-$ would go to $-V_{in}$, e.g., -0.8V

Worse if $C_1 \gg C_2$ ($G = 8$)

$R_{SWITCH} = R_{ON} (C_1$ series $C_2) < R_{AMP}$

$V_{in}$ is large
$\phi_2$ has a fast edge

What if $V_\text{in} = -0.1V$?

= -0.5V?

$V_\text{ref} = V_{in} + \frac{B}{2^n} V_{ref}$

if $V_{in} = 0$ and $B = 0xFF$, $V_\text{in} \approx 2V_{ref}$

never happens, but if $B = 0x80$

$V_\text{in} \approx 1.5V_{ref} = 1.2V$

1.2V - 0.8V

$1.2 \rightarrow 0.8$