EE2361 - Lecture 29
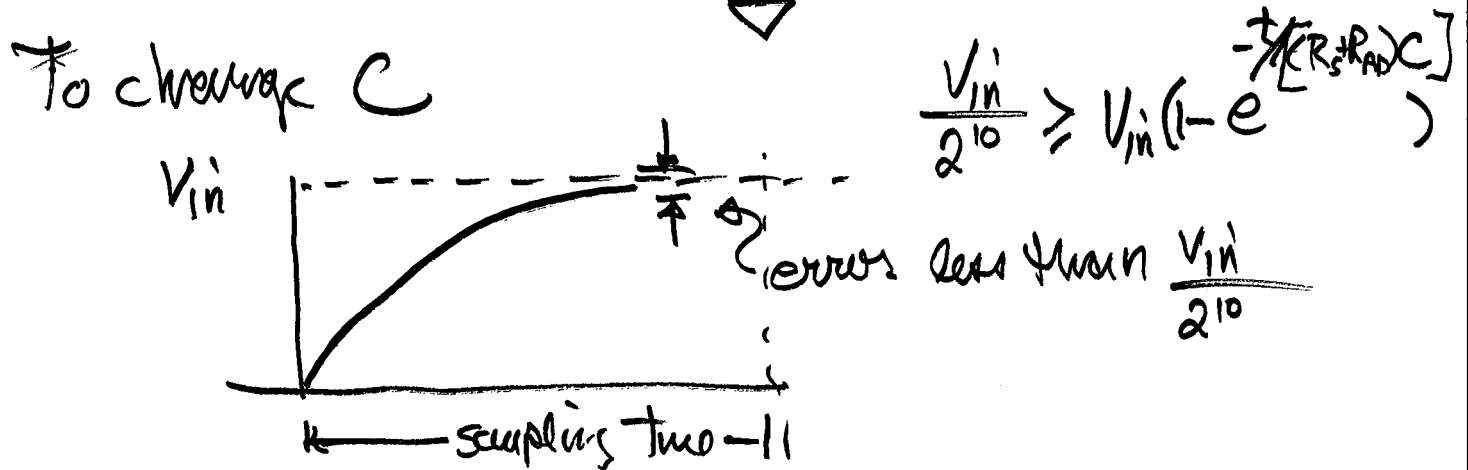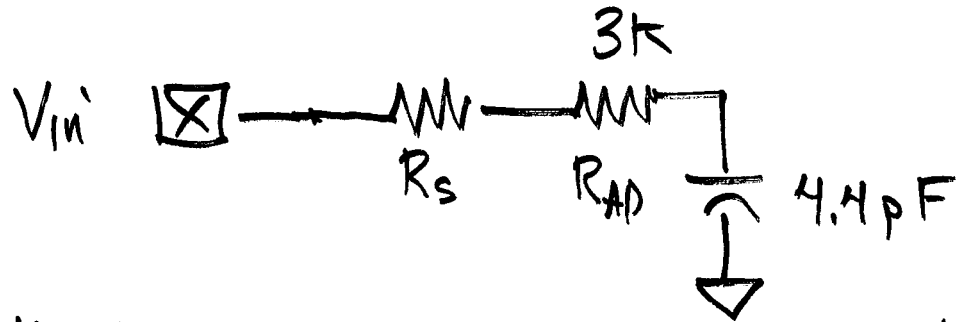11/16/16

Continue w/ ADC
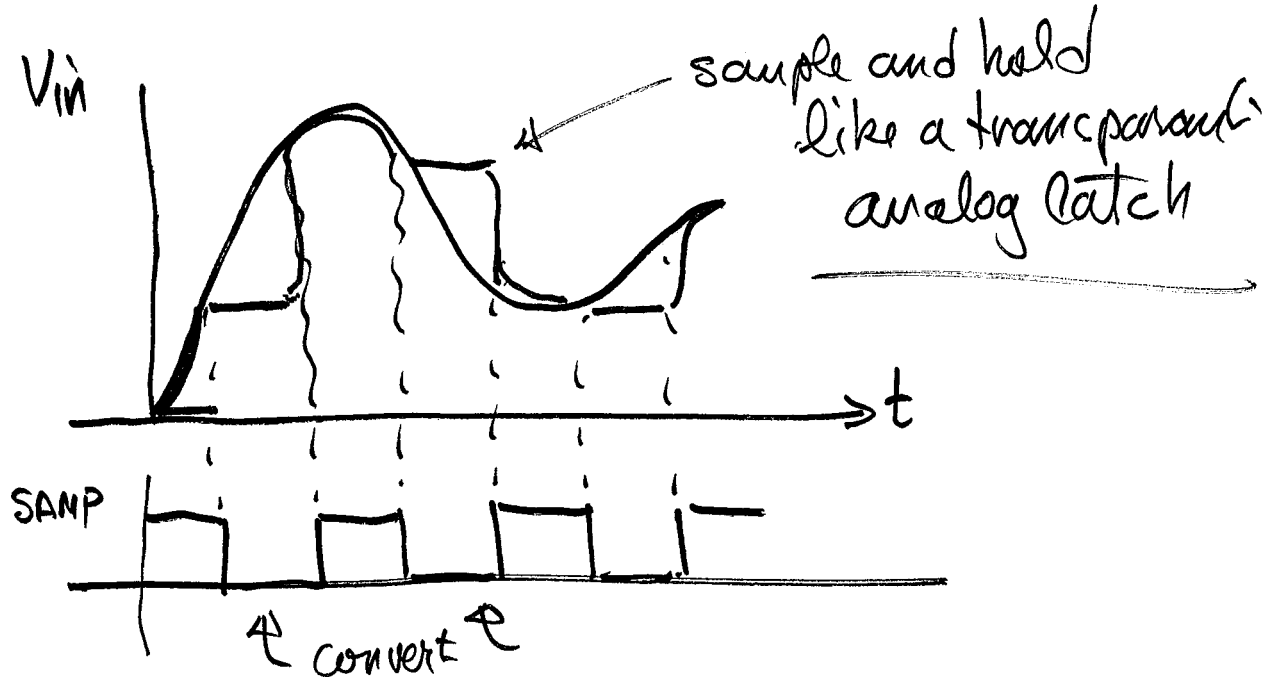

Reference, microchip AN693
"Understanding A/D Converter Performance
Specifications"

For the S/H

Vin ⊠ ——/\/\/\——/\/\/\— 3K
R_S R_{AD} ⊥ 4.4 pF
                      ▽

To charge C

Vin ┆‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ ‾ ↨ ‾ ‾ ‾
    │   ___—————
    │   /
    │   /
    │ /
    │ /
    │/
    └─────────────────────
    ├——— sampling time —11

$$\frac{V_{in}}{2^{10}} \geq V_{in}\left(1 - e^{\frac{-t}{[(R_S + R_{AD})C]}}\right)$$

↕ error less than $\dfrac{V_{in}}{2^{10}}$

More complicated since Vin varies

Vin

sample and hold
like a transparent
analog catch

→ t

SAMP

← convert →

Two parts to discretizing an analog input

10-bit A/D

12 T_{AD}

|———————————————|————————————————|
sample time   conversion
                 time

(T$_{AD}$ for each bit + 2T_{AD})

———————————————|—————————————————→ t
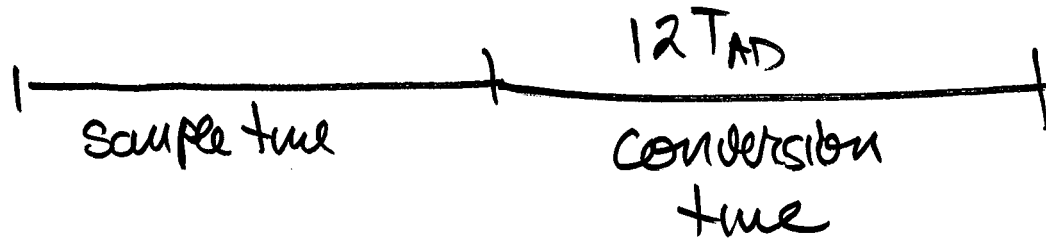
sample time
manually or
automatically

T_{AD} can be a multiple
of T_{CY} but needs to
be at least 75ns

AD initialization

Example 17-1 in PIC24F FRM

A/D module as a number of registers
to configure for many different possibilites
of operations.

17-2

17-4

Automatic Sample Start

Replace ADICON1bits.SAMP=1;

with ADICON1bits.ASAM=1

Auto sampling

17-5 ~~auto~~ automatically set SAMP=1