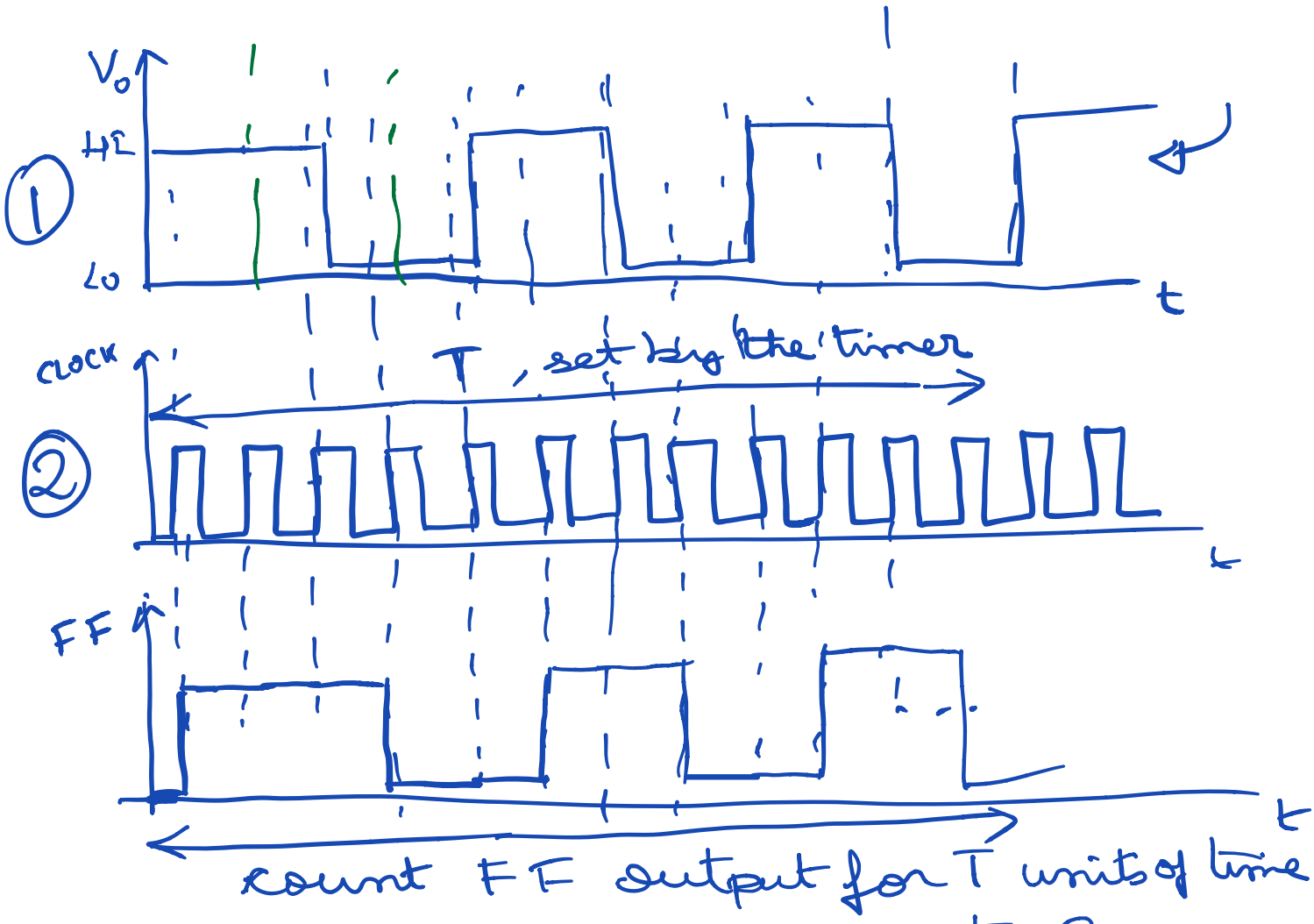
ELL301

16.01.2019

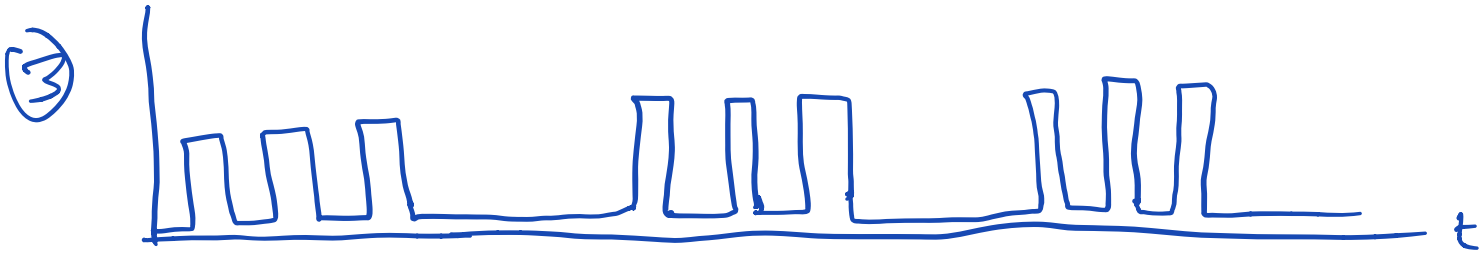
Timing Diagram (to compute $\frac{t}{T}$)

Check: Bouwens' Chapter on ADC



Does this give the ratio $\frac{t}{T}$?

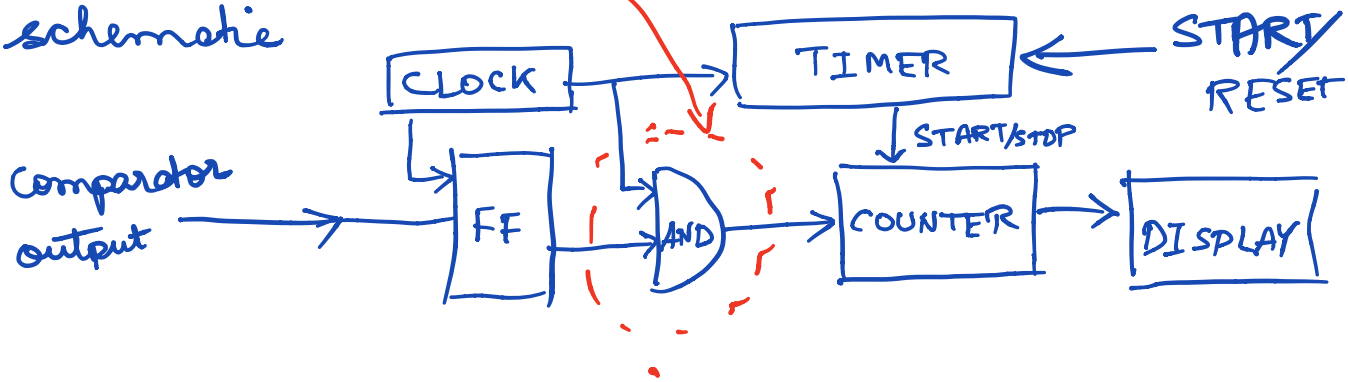
The desired pulse sequence that should be counted is



This will give the 9 clock pulses out of 12 where the comparator output is high.

↑ clock pulses in duration 1

This suggests the following circuit schematic



3 ADC techniques we touched upon

- Delta-pulse-modulation
- Staircase ramp compensation
- voltage → time conversion (integrator ADC)

Others include

- dual integrating ADC
- Successive Approximation method

(2) Convert all inputs into dc voltage (ex: ac voltage, current ...)

(3) Other functions:

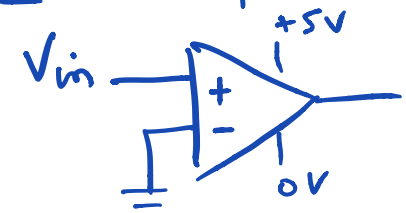
Zeroing, Polarity detection

Ex: Start/Reset of counter

input polarity detected and sent to the display separately

(1) Analog to Digital Converter (ADC)

Sample & Hold



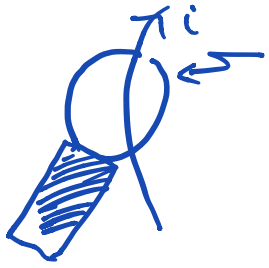
How is this done?

- above techniques discretisation in output also.

Additional functionalities include

- RMS detection
  - True → through detection of heat generated from input periodic signal and equating to heat generated by internal dc source
  - → digital solutions

Ammeter



jaws can open to encircle a wire whose current needs to be measured.

Clamp-based current measurement has the advantage that the circuit under measurement does not have to be broken.

How does this work?

→ current transformer (AC)

→ Hall effect (AC/DC)