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Master Clock

- Single high frequency master clock
  - Divided down for system clocks.
  - -> All system clocks stay synchronized

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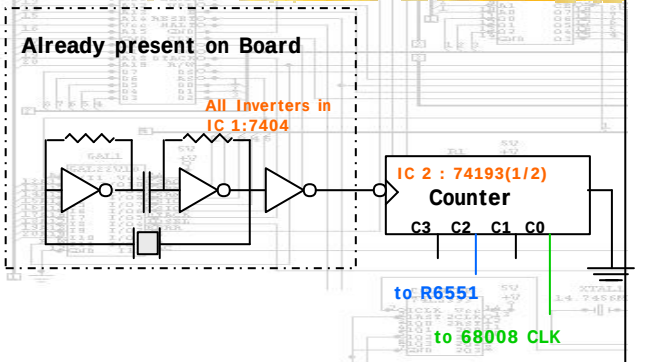
Clock Generation Circuit



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System Control Requirements

- Needs:
  - Initialization on Power-up.
  - Initialization on User Request.
  - Hard vs. Soft Resets.
    - Hard Reset – resets everything
    - Soft Reset – resets software
- Related Needs:
  - Halting the Processor
  - Single-Stepping the Processor

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Problems & Solutions

- Problem:
  - Waiting for Power-up to complete
  - CPU timing restrictions.
- Solution:
  - Various - system dependent.

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68008 System Control

$\overline{\text{BERR}}$ (input)

$\overline{\text{RESET}}$ (bi-directional pull-down)

$\overline{\text{HALT}}$ (bi-directional pull-down)

Complex interaction of $\overline{\text{BERR}}$, $\overline{\text{HALT}}$ and $\overline{\text{RESET}}$

Also a RESET instruction in the instruction set.

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68008 RESET

- Assert both RESET-BAR and Halt –BAR for hard reset.
- Assert for 100 ms at power-up time.
- Assert for at least 10 clock-cycles at other times.

The RESET instruction asserts the RESET-BAR pin for 124 clock-cycle.The processor does not reset but other devices do.

If the processor halts itself, it asserts HALT-BAR

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RESET Circuit Specification

- Circuit to assert HALT-BAR and RESET-BAR for at least 100ms on power-up or when the reset button is pressed.

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Project RESET Circuit

- Use RC circuit to provide timing delay.
- RESET Switch discharge Capacitor.
  - Not to fast! Use protection resistor.
- Use Schmitt Trigger to clean up the signal.
- Beware: both RESET-BAR and HALT-BAR are Pull-Down bi-directional!
  - -> Use Pull-Down Drivers.
- Capacitor is dangerous at Power-Down time!
  - -> Use Diode to protect it.

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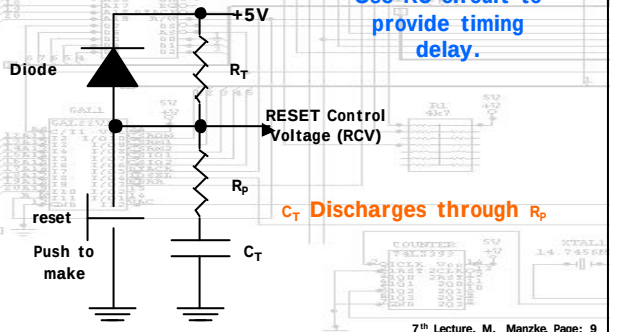
RC Circuit



Use RC circuit to provide timing delay.

C_T Discharges through R_P

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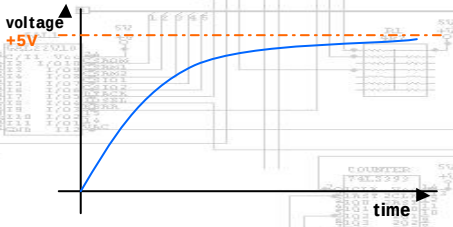
RC Time Constant (charge)

$$RCV = 5V\ (1 - e^{-\frac{t}{R_T R_P C_T}})$$



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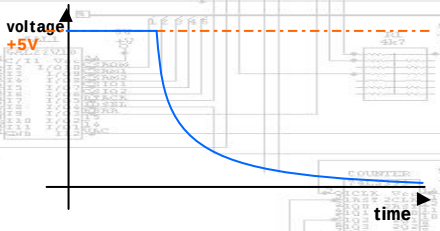
RC Time Constant (discharge)

$$RCV = 5V\ e^{-\frac{t}{R_P C_T}}$$



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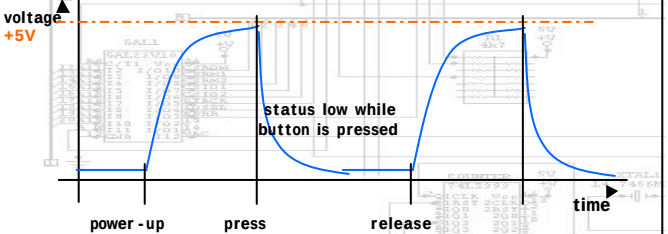
Charge and Discharge

Reset switch discharges capacitor
– not to fast –
use protection resistor.



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The Circuit