Review and Lab Prep

q hotmail account on mailing list doesn’t work

Memory Architecture Review

Show the memory after execution from reset

MOV A,@R1;  
MOV R1,A;  
MOV A,#FEH;  
MOV 64H,A;  
MOV A,FEH;  
JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

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JMP 20H;

MOV A,FEH;

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MOV 64H,A;

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MOV A,FEH;

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MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;

MOV A,FEH;

MOV A,#FEH;

MOV 64H,A;

MOV A,FEH;

JMP 20H;
Basic RC review

\[ V_o = V_i(1-e^{-t/RC}) \] so \( V_o/V_i = 4/5 = 0.8 = (1-e^{-t/RC}) \)

\[ t = -RC\ln(1 - .8) = 49\text{mSec} \]

What is the voltage across the cap after button release?

~4V

Careful w/ Coils (motors, valves, etc)

Steady state on current: \( Vcc/R \)
\( Vds \sim 0 \) (\( Rds \sim 4\text{mOhm} \))

But, when we try to turn off the Mosfet quickly, what happens?

- \( Rds \) goes up quickly, but \( Ids \) drops slowly
- If \( Rds \) becomes 1K, then \( Vds \) becomes 100V
- And instantaneous power becomes 10W
Saturation Mode Amp

- Use a current amplifier (PNP Transistor)
  - $I_{ce} = \beta I_b$ (assume $\beta = 100$)
  - Assume $V_{be} = 0.7V$ when "on"
  - Assume $V_{ce} = 1V$ when "on"
  - Assume $tone1 = 0V$
  - Pick $R_c$ to protect the speaker
  - Pick $R_b$ to protect the processor while turning on the transistor

Assumptions:

- $Is = ((.2/8)^.5)/3 = \approx 50mA$
- $R_c: 5 - (50mA \times 8) - V_{ce} - (50mA \times R_c) = 0$
  - $so: R_c = (5 - 1 - 0.4)/.05 = 72\text{ohms}$
- $R_b: V_{b}/1mA = [5 - (8*.05) - .7]/1mA = 3.9K!$

Last Year's Model

- $8051$
- $5V$
- $8\text{ohms}$
This Year’s Model

Digital to Analog Converter

8051

SW?

DAC

8

Computer Speaker

AMP

(V to I)

Voltage signal

Speaker cares about current, not voltage

How can we generate two simultaneous tones of 500Hz and 1KHz using only 1 timer interrupt?

Sine Wave Program (in psuedo-C)

const unsigned byte sine[256] = {

};

interrupt routine (25.6KHz):

P0 = sine[i];
i++;
return

How do I get two tones with one interrupt (constant sample rate)?
Digital to Analog Converter

Effective network is

DB[7:0] = 10000000
out =

DB[7:0] = 10000001
out =

each bit pumps more current into Rfb in different amounts depending on position

Digital-to-Analog Converter

FUNCTIONAL BLOCK DIAGRAM

WRITE CYCLE TIMING DIAGRAM

8051 port0
\write
8051

DAC

out1

CS

Rfb

AMP

Vref

input

gnd

CSE466 Autumn '00-9

CSE466 Autumn '00-10
**Sampling**

Add sampled sine waves to get multiple tones

two frequencies with same rate. How fast can you go?