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; Date : 5 November 2001

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; File : DACsine.asm

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; Hardware : ADuC836

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; Description : DAC outputs a sine wave 1.1kHz to pin 12.

; Rate calculations assume an 32.768kHz crystal

; producing a core frequency of 12.58MHz.

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$MOD836 ; Use 8052&ADuC836 predefined symbols

LED EQU P3.4 ; P3.4 drives red LED on eval board

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; BEGINNING OF CODE

CSEG

ORG 0000h

MOV PLLCON, #00H ; set core frequency to 12.58MHz

MOV DACCON,#03h ; Configure DAC with

; DAC on

; 12bit

; o/p @ pin 10

; Range 0-> Vref (2.5V internal ref)

MOV DACH,#08h ; DAC to mid-scale (1.25V) to start

MOV DACL,#00h ; transmissions from mid-scale

MOV DPTR, #TABLE

STEP: CLR A ; 1

MOVC A,@A+DPTR ; get high data byte from table.. 2

MOV DACH,A ; ..and move it into DAC register 1

INC DPTR ; move on to get low byte 2

CLR A ; 1

MOVC A,@A+DPTR ; get low data byte from table.. 2

MOV DACL,A ; ..and update DAC output 1

INC DPTR ; move on for next data point 2

MOV A, DPL ; Check if DPL=80h, if so then the 1

CJNE A,#80h,STEP ; table has been outputted and we 2

MOV DPTR, #TABLE ; should reset the DPTR to 1000h

CPL LED ; and start outputting data again

JMP STEP ;

; Numbers at right in the above loop represent the number of machine

; cycles for each instruction. The typical loop ends after the CJNE

; command thus requiring 15 machine cycles.

; With a 12.583MHz master clock, a machine cycle takes 0.953us to

; execute, so the above loop takes 14.3us to update each data point.

; Since there are 64 data points in the below sine lookup table,

; this results in a 915us period, i.e. a 1.1kHz frequency.

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; SINE LOOKUP TABLE

ORG 01000h

TABLE:

DB 007h, 0FFh

DB 008h, 0C8h

DB 009h, 08Eh

DB 00Ah, 051h

DB 00Bh, 00Fh

DB 00Bh, 0C4h

DB 00Ch, 071h

DB 00Dh, 012h

DB 00Dh, 0A7h

DB 00Eh, 02Eh

DB 00Eh, 0A5h

DB 00Fh, 00Dh

DB 00Fh, 063h

DB 00Fh, 0A6h

DB 00Fh, 0D7h

DB 00Fh, 0F5h

DB 00Fh, 0FFh

DB 00Fh, 0F5h

DB 00Fh, 0D7h

DB 00Fh, 0A6h

DB 00Fh, 063h

DB 00Fh, 00Dh

DB 00Eh, 0A5h

DB 00Eh, 02Eh

DB 00Dh, 0A7h

DB 00Dh, 012h

DB 00Ch, 071h

DB 00Bh, 0C4h

DB 00Bh, 00Fh

DB 00Ah, 051h

DB 009h, 08Eh

DB 008h, 0C8h

DB 007h, 0FFh

DB 007h, 036h

DB 006h, 070h

DB 005h, 0ADh

DB 004h, 0EFh

DB 004h, 03Ah

DB 003h, 08Dh

DB 002h, 0ECh

DB 002h, 057h

DB 001h, 0D0h

DB 001h, 059h

DB 000h, 0F1h

DB 000h, 09Bh

DB 000h, 058h

DB 000h, 027h

DB 000h, 009h

DB 000h, 000h

DB 000h, 009h

DB 000h, 027h

DB 000h, 058h

DB 000h, 09Bh

DB 000h, 0F1h

DB 001h, 059h

DB 001h, 0D0h

DB 002h, 057h

DB 002h, 0ECh

DB 003h, 08Dh

DB 004h, 03Ah

DB 004h, 0EFh

DB 005h, 0ADh

DB 006h, 070h

DB 007h, 036h ; end of table

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END