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; Author : ADI - Apps

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; Date : October 2003

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; File : UART.asm

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; Hardware : ADuC842/ADuC843

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; Description : This Program transmits a number (starting at 0)

; down the UART every second. Pressing the INT0

; button increases the number being outputted.

; Pressing a key on the keyboard causes the ASCII

; char to be transmitted. Eg Pressing the 'A' button

; causes the number '41h' to appear on the

; hyperterminal program.

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$MOD842 ;Use 8052 predefined Symbols

LED EQU P3.4

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; DEFINE VARIABLES IN INTERNAL RAM

DSEG

ORG 0060h

INPUT: DS 1 ; data byte received by SPI

OUTPUT: DS 1 ; data byte to send by SPI

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; BEGINNING OF CODE

CSEG

ORG 0000H

JMP MAIN

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; INTERRUPT VECTOR SPACE

ORG 0003h ; (.................... INT0 ISR)

INC OUTPUT

RETI

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ORG 0060H ; Start code at address above interrupts

MAIN: ; Main program

MOV PLLCON,#03H

MOV T3CON,#83h

MOV T3FD,#02Dh

MOV SCON,#52h

; CONFIGURE INTERRUPT 0...

SETB IT0 ; INT0 edge triggered

SETB EX0 ; enable INT0 interrupt

; ENABLE INTERRUPTS & ENTER MAIN LOOP...

MOV OUTPUT,#0 ; set initial value for output byte

SETB EA ; enable inturrupts

TXDATA:

CPL LED ; CPL LED with each transmission

MOV A, OUTPUT ; output value

CALL SENDVAL

MOV DPTR,#SEPERATOR ; send line-feed & crdg-return..

CALL SENDSTRING ; ..out the UART

MOV A, #100

CALL DELAY ; delay for 1s

JNB RI, TXDATA ; check if data is received from keyboard

MOV OUTPUT, SBUF

CLR RI

JMP TXDATA

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; SENDSTRING

SENDSTRING: ; sends ASCII string to UART starting at location

; DPTR and ending with a null (0) value

PUSH ACC

PUSH B

CLR A

MOV B,A

IO0010: MOV A,B

INC B

MOVC A,@A+DPTR

JZ IO0020

CALL SENDCHAR

JMP IO0010

IO0020: POP B

POP ACC

RET

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; SENDCHAR

SENDCHAR: ; sends ASCII value contained in A to UART

JNB TI,$ ; wait til present char gone

CLR TI ; must clear TI

MOV SBUF,A

RET

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; SENDVAL

SENDVAL: ; converts the hex value of A into two ASCII chars,

; and then spits these two characters up the UART.

; does not change the value of A.

PUSH ACC

SWAP A

CALL HEX2ASCII

CALL SENDCHAR ; send high nibble

POP ACC

PUSH ACC

CALL HEX2ASCII

CALL SENDCHAR ; send low nibble

POP ACC

RET

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; HEX2ASCII

HEX2ASCII: ; converts A into the hex character representing the

; value of A's least significant nibble

ANL A,#00Fh

CJNE A,#00Ah,$+3

JC IO0030

ADD A,#007h

IO0030: ADD A,#'0'

RET

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; DELAY

DELAY: ; Delays by 100ms \* A

; 100mSec based on 2.097152MHZ

; Core Clock

MOV R5,A ; Acc holds delay variable (1 clock)

DLY0: MOV R6,#01Bh ; Set up delay loop0 (2 clocks)

DLY1: MOV R7,#0FFh ; Set up delay loop1 (2 clocks)

DJNZ R7,$ ; Dec R7 & Jump here until R7 is 0 (3 clocks)

DJNZ R6,DLY1 ; Dec R6 & Jump DLY1 until R6 is 0 (3 clocks)

DJNZ R5,DLY0 ; Dec R5 & Jump DLY0 until R5 is 0 (3 clocks)

RET ; Return from subroutine

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SEPERATOR: DB 10,13,0

END