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;FILE: M0.ASM
;
;THIS PROGRAM TRANSMITS THE HEX VALUE AA REPETITIVELY ACCROSS THE SERIAL
PORT
;OF A MCS-51 MICROCONTROLLER IN MODE 0
;
;DETAILS:
;
;MODE 0: SERIAL DATA EXITS AND ENTERS THROUGH THE RXD PIN.  THE TXD PIN
OUTPUTS
;THE SHIFT CLOCK.  IN MODE 0, 8 BITS ARE TRANSMITTED/RECEIVED STARTING
WITH THE
;LEAST SIGNIFICANT BIT.  THE BAUD RATE IS FIXED TO 1/12 THE OSCILLATOR
FREQUENCY.
;
;
      ORG 00H
;
      JMP MAIN
MAIN:  MOV SCON,#00H                ;SET UP FOR MODE 0
      CLR TI                       ;READY TO TRANSMIT
LOOP:  MOV SBUF,#0AAH              ;TRANSMIT AAH
      JNB TI,$                     ;WAIT FOR END OF
TRANSMISSION
      CLR TI                       ;CLEAR TRANSMIT FLAG
      JMP LOOP                     ;DO IT ALL AGAIN
      END

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;FILE: M1INT.ASM
;
;THIS PROGRAM RECEIVES A VALUE ENTERING INTO THE SERIAL PORT PIN RXD AND
PUTS
;THE DATA OUT TO PORT 1
;
;
;DETAILS:
;
;THE PROGRAM IS DESIGNED TO BE IN A CONTINUOUS NEVER ENDING LOOP UNTIL A
BYTE OF DATA HAS BEEN
;COMPLETELY RECEIVED. THE LOOP IS EXITED BECAUSE OF THE OCCURANCE OF A
SERIAL INTERRUPT. AFTER
;THE INTERRUPT HAS BEEN SERVICED, THE PROGRAM GOES BACK INTO IT'S
ENDLESS LOOP UNTIL ANOTHER
;INTERRUPT OCCURS
;
;
PCON EQU 87H ;DEFINE PCON REGISTER LOCATION
;
ORG 00H
;
JMP MAIN
;
ORG 023H ;STARTING ADDRESS OF SERIAL INTERRUPT
JMP SERIAL_INT
;
MAIN: MOV SCON, #50H ;SET UP SERIAL PORT FOR MODE 0 WITH RECEIVE
ENABLED
MOV TMOD, #20H ;SET UP TIMER 1 AS AUTO-RELOAD 8-BIT TIMER
MOV TH1, #0DDH ;BAUD RATE EQUALS 2400 BAUD AT 16Mhz
MOV PCON, #80H ;SET THE DOUBLE BAUD RATE BIT
MOV IE, #90H ;ENABLE THE SERIAL PORT AND GLOBAL INTERRUPT
BITS
MOV TCON, #40H ;START TIMER 1
CLR RI ;ENSURE THAT THE RECEIVE INTERRUPT FLAG IS
CLEAR
LOOP: JMP LOOP ;ENDLESS LOOP (UNLESS INTERRUPT OCCURS)
;
SERIAL_INT: ;SERIAL INTERRUPT ROUTINE
CLR RI ;CLEAR THE RI BIT (SINCE WE KNOW THAT WAS THE
BIT THAT CAUSED THE
;
INTERUPT)
MOV P1, SBUF ;MOVE THE RECEIVED DATA OUT TO PORT ONE
RETI ;EXIT THE SERIAL INTERRUPT ROUTINE
END

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;FILE: M1INT.ASM
;
;THIS PROGRAM RECEIVES A VALUE ENTERING INTO THE SERIAL PORT PIN RXD AND
PUTS
;THE DATA OUT TO PORT 1
;
;
;DETAILS:
;
;THE PROGRAM IS DESIGNED TO BE IN A CONTINUOUS NEVER ENDING LOOP UNTIL A
BYTE OF DATA HAS BEEN
;COMPLETELY RECEIVED. THE LOOP IS EXITED BECAUSE OF THE OCCURANCE OF A
SERIAL INTERRUPT. AFTER
;THE INTERRUPT HAS BEEN SERVICED, THE PROGRAM GOES BACK INTO IT'S
ENDLESS LOOP UNTIL ANOTHER
;INTERRUPT OCCURS
;
;
;       PCON EQU 87H       ;DEFINE PCON REGISTER LOCATION
;
;       ORG 00H
;
;       JMP MAIN
;
;       ORG 023H       ;STARTING ADDRESS OF SERIAL INTERRUPT
;       JMP SERIAL_INT
;
MAIN:   MOV SCON, #50H   ;SET UP SERIAL PORT FOR MODE 0 WITH RECEIVE
ENABLED
        MOV TMOD, #20H   ;SET UP TIMER 1 AS AUTO-RELOAD 8-BIT TIMER
        MOV TH1, #0DDH   ;BAUD RATE EQUALS 2400 BAUD AT 16MhZ
        MOV PCON, #80H   ;SET THE DOUBLE BAUD RATE BIT
        MOV IE, #81H
        MOV TCON, #40H   ;START TIMER 1
        CLR RI           ;ENSURE THAT THE RECEIVE INTERRUPT FLAG IS
CLEAR
LOOP:   JMP LOOP       ;ENDLESS LOOP (UNLESS INTERRUPT OCCURS)
;
SERIAL_INT:           ;SERIAL INTERRUPT ROUTINE
        CLR RI           ;CLEAR THE RI BIT (SINCE WE KNOW THAT WAS THE
BIT THAT CAUSED THE
;
;       INTERUPT)
        MOV P1, SBUF     ;MOVE THE RECEIVED DATA OUT TO PORT ONE
        RETI           ;EXIT THE SERIAL INTERRUPT ROUTINE
        END

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;FILE: M1T1.ASM
;
;THIS PROGRAM TRANSMITS THE HEX VALUE AA REPETITIVELY ACCROSS THE SERIAL
PORT
;OF A MCS-51 IN MODE 1 USING TIMER 1 AT A RATE OF 2400 BAUD
;
;DETAILS:
;
;MODE 1: TEN BITS ARE TRANSMITTED THROUGH TXD OR RECEIVED THROUGH RXD
;WITH THE START BIT FIRST (0), 8 DATA BITS WITH THE LEAST SIGNIFICANT
BIT
;FIRST, AND A STOP BIT (1). ON RECEIVE, THE STOP BIT GOES INTO RB8 IN
;SPECIAL FUNCTION REGISTER SCON. THE BAUD RATE IS VARIABLE.
;
;
PCON EQU 87H

ORG 00H
JMP MAIN
MAIN:  MOV SCON,#40H           ;SET SERIAL PORT FOR MODE 1 OPERATION
      MOV PCON,#80H         ;SET DOUBLE BAUD RATE BIT
      MOV TMOD,#20H        ;SET TIMER 1 TO AUTO RELOAD
      MOV TH1,#0DDH        ;LOAD RELOAD VALUE FOR 2400 BAUD AT
16MHZ
      MOV TCON,#40H        ;START TIMER 1
      CLR TI
LOOP:  MOV SBUF,#053H       ;TRANSMIT AA HEX OUT THE TXD LINE
      JNB TI,$             ;WAIT UNTIL TRANSMISSION COMPLETED
      CLR TI               ;READY TO TRANSMIT ANOTHER
      JMP LOOP             ;DO IT ALL OVER AGAIN
      END

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;FILE: M2.ASM
;
;THIS PROGRAM TRANSMITS THE HEX VALUE AA REPETITIVELY ACCROSS THE SERIAL
PORT
;OF A MCS-51 IN MODE 2 AT A RATE OF 1/32 THE OSCILLATOR FREQUENCY
;
;DETAILS:
;
;MODE 2: 11 BITS ARE TRANSMITTED THROUGH TXD OR RECEIVED THROUGH RXD.
;STARTING WITH A START BIT (0), 8 DATA BITS WITH THE LEAST SIGNIFICANT
BIT
;FIRST, A PROGRAMMABLE 9TH DATA BIT, AND A STOP BIT (1). ON TRANSMIT,
THE
;9TH DATA BIT, TB8 IN SCON, CAN BE ASSIGNED A VALUE OF 0 OR 1. FOR
EXAMPLE
;THE PARITY BIT, P FROM PSW, COULD BE MOVED INTO TB8. ON RECEIVE, THE
NINTH
;DATA BIT GOES INTO RB8 IN SCON WHILE THE STOP BIT IS IGNORED. (THE
VALIDITY
;OF THE STOP BIT CAN BE CHECKED WITH FRAMING ERROR DETECTION) THE BAUD
RATE
;IS PROGRAMABLE TO IETHER 1/32 OR 1/64 THE OSCILLATOR FREQUENCY. IF THE
;SMOD1 BIT IN THE PCON REGISTER IS 0, THEN THE BAUD RATE IS 1/64 THE
;OSCILLATOR FREQUENCY, IF SMOD1 IS 1, THE THE BAUD RATE IS 1/32 THE
;OSCILLATOR FREQUENCY.
;
;
;
PCON EQU 87H

ORG 00H
JMP MAIN
MAIN: MOV SCON,#80H ;SET UP FOR MODE 2
MOV PCON,#80H ;BAUD RATE EQUALS 1/32 OSC.
FREQ
CLR TI ;READY TO TRANSMIT
LOOP: MOV SBUF,#0AAH ;TRANSMIT AAH
JNB TI,$ ;WAIT FOR END OF TRANSMISSION
CLR TI ;READY TO TRANSMIT
JMP LOOP ;DO IT ALL AGAIN
END

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;FILE: M3T2.ASM
;
;THIS PROGRAM TRANSMITS THE HEX VALUE AA REPETITIVELY ACCROSS THE SERIAL
PORT
;OF A MCS-51 IN MODE 3 USING TIMER 2 AS A BAUD RATE GENERATOR TO
;GENERATE A BAUD RATE OF 2400 BAUD AT 16MHZ WITH A PARITY BIT
;
;DETAILS:
;
;MODE 3: 11 BITS ARE TRANSMITTED THROUGH TXD OR RECEIVED THROUGH RXD
;TRANSMISSION STARTS WITH A START BIT (0), EIGHT DATA BITS WITH THE
LEAST
;SIGNIFICANT BIT FIRST, A PROGRAMMABLE 9TH DATA BIT, AND A STOP BIT (1).
;MODE 3 IS THE SAME AS MODE 2 EXCEPT THAT MODE 3 HAS A VARIABLE
;BAUD RATE
;
;
RCAP2H EQU 0CBH
RCAP2L EQU 0CAH
T2CON EQU 0C8H

ORG 00H
JMP MAIN
MAIN: MOV SCON,#0C0H ;SET UP FOR SERIAL MODE 3
MOV RCAP2H,#0FFH ;LOAD HIGH BYTE TO GENERATE 2400 BAUD AT
16MHZ
MOV RCAP2L,#30H ;LOAD LOW BYTE TO GENERATE 2400 BAUD AT
16MHZ
MOV T2CON,#14 ;TIMER 2 BAUD RATE GENERATOR AND START TIMER
MOV A,#0AAH ;PUT THE VALUE TO BE TRANSMITTED IN THE ACC
MOV C,P ;PARITY INFORMATION TO CARRY FLAG
MOV TB8,C ;PARITY INFO FROM CARRY TO PROGRAMABLE BIT *
; *NOTE: THE CONTENTS OF THE CARRY FLAG IN
THE
; PSW MAY BE ALTERED
CLR TI ;READY TO TRANSMIT
LOOP: MOV SBUF,A ;TRANSMIT AAH
JNB TI,$ ;WAIT UNTIL DONE TRANSMITING
CLR TI ;READY TO TRANSMIT
JMP LOOP ;DO IT ALL OVER AGAIN
END

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