

18-12-21

PRACTICAL NO: 1 - STUDY OF TIMER 0 in MODE 2.

Q1: Write a program for generating a square wave on PORT 1.0 with 10 kHz frequency using timer 0 in mode 2. Use 12.0592 MHz as crystal oscillator frequency.

⇒ Given frequency = 10 kHz = F
Crystal frequency = 12.0592 MHz.

$$\therefore T = 1/F = 1/10\text{kHz} = 0.1\text{ms}$$

$$\therefore T_{1/2} = T/2 = 0.1/2 = 0.05\text{ms}$$

$$\text{Clock frequency} = \frac{\text{crystal frequency}}{12} = \frac{12.0592}{12} = 1.004\text{MHz}$$

$$T' = 1/1.004 \times 10^6 = 0.9960\text{ }\mu\text{s}$$

$$n = \frac{T_{1/2}}{T'} = \frac{0.05 \times 10^{-3}}{0.996 \times 10^{-6}} = 50.2 \approx 50$$

$$m = (255 + 1) - n = (255 + 1) - 50 = 206$$

206 in Decimal is CE in Hexadecimal.

Address	Hex code	Label	Instruction/ Mnemonic	Comments
T000	75		MOV TMOD, #02H	Choose timer 0 in mode 2.
	89			
	02			
T003	75		MOV TH0, #0CEH	Load the reload value in TH0.
	8C			
	CE			
T006	B2	LOOP	CPL P1.0	P1.0 is toggled for high and low portions of the pulse.
	90			
T008	D2		SETB TR0	Start the timer 0.
	86			

Address	Hex code	Label	Instruction / Mnemonics	Comments
700A	30 8D FD	AGAIN	JNB TFO, AGAIN	Keep monitoring timer flag (TF) to see if it is raised
700D	C2 8C		CLR TRO	Clear TRO to stop the timer 0.
700F	C2 8D		CLR TFO	Clear the TF flag for the next round.
7011	80 F3		JMP LOOP	Repeat the process.

05-02-2022

PRACTICAL NO: 2 - STUDY OF EXTERNAL INTERRUPTS INT0 / INT1

Q.1. Write a program to display 'PHYSICS' first and 'EXAM' as interrupt comes.

MAIN PROGRAM (To display 'PHYSICS' word).

Address	Hexcode	Label	Instructions/ Mnemonics	Comments
7000	75 AB 00		MOV A8H, #00H	Put off all interrupts
7003	D2 88		SETB 88H	INT0 set for falling edge.
7005	90 91 00		MOV DPTR, #ISR1	DPTR initialized with address of ISR1
7008	AB 82		MOV R3, DPL	} Store address of ISR in R3 and R4
700A	AC 83		MOV R4, DPH	
700C	90 20 20		MOV DPTR, #IE0	
700F	12 06 CD		LCALL TERN	Vector INT0 in scratch pad RAM initialize vector
7012	12 06 1D	BACK	LCALL CLRF	IN scratch pad RAM i.e. JMP ISR.

Address	Hex code	Label	Instructions/ Mnemonics	Comments
7015	90		MOV DPTR, #MSG1	Point to message 1 (PHYSICS)
	60			
	00			
7018	12		LCALL MSGOUT	O/p message
	06			
	06			
701B	20	HERE	JB B2, HERE	Wait till INTO line is high
	B2			
	FD			
701E	75		MOV A8, #81H	Initialize INTO
	A8			
	81			
7021	00		NOP	
7022	00		NOP	
7023	02		LJMP BACK	
	70			
	12			

INTERRUPT SERVICE ROUTINE

Address	Hexcode	Label	Instructions/ Mnemonics	Comments
7100	75		MOV A8, #00H	Disable all Interrupts
	A8			
	00			
7103	30	LOOP	JNB B2, LOOP	wait till INTO line changes from high to low
	B2			
	FD			
7106	78		MOV R0, #17H	}
	17			

Address	Hex code	Label	Instructions/ Mnemonics	Comments
7108	79 FF		MOV R1, #FFH	} Delay of ISR
710A	7A FF		MOV R2, #FFH	
710C	12 06 10		LCALL CLRF	Clear display
710F	90 61 00		MOV DPTR, #MSG2	point to message 2.
7112	12 06 06		LCALL MSGOUT	O/p message 2.
7115	12 01 14	LOOP1	LCALL DELAY	
7118	08 FB		DJNZ R0, LOOP1	
711A	32		RETI	Return to main program

MSG 1 = PHYSICS

6000 50 48 59

6003 53 49 43

6006 53 (03)

END (FULL STOP)

MSG 2 = EXAM

C100 45 58 41

C103 40 (03)