|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **11.A) GENERATE A HALF RECTIFIED SINE WAVE FORM USING THE DAC INTERFACE. (THE OUTPUT OF THE DAC IS TO BE DISPLAYED ON THE CRO).** | | | | | | |
| **LABEL** | **NEMONIC** | **OPERAND (MEMORY/REGISTER)** | | |  | **COMMENTS** |
|  | **.MODEL** | **SMALL** | | | **;** |  |
|  | **.DATA** |  | | | **;** | **THETA=05 DEGREE** |
| **PA** | **EQU** | **0XXXXH** | | | **;** | **ADDRESS OF PORT A** |
| **PB** | **EQU** | **0XXXXH** | | | **;** | **ADDRESS OF PORT B** |
| **PC** | **EQU** | **0XXXXH** | | | **;** | **ADDRESS OF PORT C** |
| **CTRL** | **EQU** | **0XXXXH** | | | **;** | **ADDRESS OF CONTROL WORD** |
| **POSCYCLE** | **DB** | **80H,8BH,96H,0A1H,0ABH,0B6H,0C0H,0C9H,0D2H,0DAH,0E2H,0E8H,0EEH,0F4H,0F8H,0FBH,0FEH,**  **0FFH,**  **0FEH,0FBH,0F8H,0F4H,0EEH,0E8H,0E2H,0DAH,0D2H,0C9H,0C0H,0B6H,0ABH,0A1H,96H,8BH,80H** | | | **;** | **35 PRE COMPUTED SAMPLED VALUES OF POSITIVE HALF CYCLE OF SINE WAVE AT THETA=05 DEGREE** |
| **NEGCYCLE** | **DB** | **80H,75H,6AH,5FH,55H,4AH,40H,37H,2EH,26H,18H,12H,0CH,08H,05H,02H,01H,**  **00H,**  **01H,02H,05H,08H,0CH,12H,18H,26H,2EH,37H,40H,4AH,55H,5FH,6AH,75H,80H** | | | **;** | **35 PRE COMPUTED SAMPLED VALUES OF NEGATIVE HALF CYCLE OF SINE WAVE AT THETA=05 DEGREE** |
|  | **.CODE** |  | **,** |  | **;** |  |
|  | **MOV** | **AX** | **,** | **@DATA** | **;** | **INITIALIZATION OF DATA SEGMENT** |
|  | **MOV** | **DS** | **,** | **AX** | **;** |  |
|  |  |  |  |  |  |  |
|  | **MOV** | **DX** | **,** | **CTRL** | **;** | **INITIALIZATION OF 8255 CONTROL WORD** |
|  | **MOV** | **AL** | **,** | **80H** | **;** |  |
|  | **OUT** | **DX** | **,** | **AL** | **;** |  |
|  |  |  |  |  |  |  |
| **AGAIN:** | **LEA** | **SI** | **,** | **POSCYCLE** | **;** | **POINT SI TO POSCYCLE ARRAY OF VALUES** |
|  | **MOV** | **CX** | **,** | **35** | **;** | **LOAD THE COUNTER NUMBER OF VALUES** |
|  |  |  |  |  |  |  |
| **NXTVAL1:** | **MOV** | **AL** | **,** | **[ SI ]** | **;** | **SEND A VALUE TO PORT A OF DAC INTERFACE** |
|  | **MOV** | **DX** | **,** | **PORTA** | **;** |  |
|  | **OUT** | **DX** | **,** | **AL** | **;** |  |
|  | **CALL** | **DELAY** |  |  | **;** | **DELAY TO COVERT DIGITAL TO ANALOG VALUE** |
|  | **INC** | **SI** |  |  | **;** | **INCREMENT THE SI TO POINT NEXT VALUE** |
|  | **LOOP** | **NXTVAL1** |  |  | **;** | **LOOP TO NEXT VALUE** |
|  |  |  |  |  |  |  |
|  | **LEA** | **SI** | **,** | **NEGCYCLE** | **;** | **POINT SI TO NEGCYCLE ARRAY OF VALUES** |
|  | **MOV** | **CX** | **,** | **35** | **;** | **LOAD THE COUNTER NUMBER OF VALUES** |
|  |  |  |  |  |  |  |
| **NXTVAL2:** | **MOV** | **AL** | **,** | **[ SI ]** | **;** | **SEND A VALUE TO PORT A OF DAC INTERFACE** |
|  | **MOV** | **DX** | **,** | **PORTA** | **;** |  |
|  | **OUT** | **DX** | **,** | **AL** | **;** |  |
|  | **CALL** | **DELAY** |  |  | **;** | **DELAY TO COVERT DIGITAL TO ANALOG VALUE** |
|  | **INC** | **SI** |  |  | **;** | **INCREMENT THE SI TO POINT NEXT VALUE** |
|  | **LOOP** | **NXTVAL2** |  |  | **;** | **LOOP TO NEXT VALUE** |
|  |  |  |  |  |  |  |
|  | **MOV** | **AH** | **,** | **06** | **;** | **SENSE KEY HIT** |
|  | **MOV** | **DL** | **,** | **0FFH** | **;** |  |
|  | **INT** | **21H** |  |  | **;** |  |
|  | **CMP** | **AL** | **,** | **00** | **;** | **IF KEY HIT = TRUE THEN BREAK** |
|  | **JZ** | **AGAIN** |  |  | **;** | **CONTINUE PUMPING THE VALUES** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **DELAY** | **PROC** |  |  |  | **;** | **DELAY PROCEDURE TO ELAPSE TIME** |
|  | **PUSH** | **CX** |  |  |  | **SAVE THE CONTENTS OF CX** |
|  |  |  |  |  | **;** |  |
|  | **MOV** | **CX** | **,** | **0FH** | **;** | **SET OUTER LOOP COUNT** |
| **OUTER:** | **PUSH** | **CX** |  |  | **;** |  |
|  |  |  |  |  | **;** |  |
|  | **MOV** | **CX** |  | **0FFFFH** | **;** | **SET INNER LOOP COUNT** |
| **INNER:** | **NOP** |  |  |  | **;** | **NO OPERATION INSTRUCTIONS** |
|  | **NOP** |  |  |  | **;** |  |
|  | **NOP** |  |  |  | **;** |  |
|  | **LOOP** | **INNER** |  |  | **;** | **GOTO INNER** |
|  |  |  |  |  |  |  |
|  | **POP** | **CX** |  |  | **;** |  |
|  | **LOOP** | **OUTER** |  |  | **;** | **GOTO OUTER** |
|  |  |  |  |  |  |  |
|  | **POP** | **CX** |  |  |  | **RESTORE THE CONTENTS OF CX** |
|  |  |  |  |  |  |  |
|  | **RET** |  |  |  | **;** | **RETUREN TO CALLING PROCEDURE** |
| **DELAY** | **ENDP** |  |  |  | **;** | **END OF PROCEDURE** |
|  |  |  |  |  |  |  |
|  | **INT 3** |  |  |  |  |  |
|  | **END** |  |  |  | **;** | **END OF PROGRAM** |

**Formula**

**Value = 128 + 128\*sin Ɵ**

**Ɵ = 00 , 5 0 ,  10o  ......... 900 , 85o, ........... 0o  for positive cycle.**

**Ɵ = 00 , -5 0 ,  -10o  ......... -900 ,- 85o, ........... 0o  for negative cycle.**

**OUTPUT**

* **Edit filename.asm**
* **Masm filename.asm;**
* **Link filename;**
* **allowio 0x1080H**
* **Debug filename.exe**

**-g**

**Sine wave written in graph sheet**

**-q**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **11.B) GENERATE A HALF RECTIFIED SINE WAVE FORM USING THE DAC INTERFACE. (THE OUTPUT OF THE DAC IS TO BE DISPLAYED ON THE CRO).** | | | | | | |
| **LABEL** | **NEMONIC** | **OPERAND (MEMORY/REGISTER)** | | |  | **COMMENTS** |
|  | **.MODEL** | **SMALL** | | | **;** |  |
|  | **.DATA** |  | | | **;** | **THETA=05 DEGREE** |
| **PA** | **EQU** | **0XXXXH** | | | **;** | **ADDRESS OF PORT A** |
| **PB** | **EQU** | **0XXXXH** | | | **;** | **ADDRESS OF PORT B** |
| **PC** | **EQU** | **0XXXXH** | | | **;** | **ADDRESS OF PORT C** |
| **CTRL** | **EQU** | **0XXXXH** | | | **;** | **ADDRESS OF CONTROL WORD** |
| **POSCYCLE** | **DB** | **80H,8BH,96H,0A1H,0ABH,0B6H,0C0H,0C9H,0D2H,0DAH,0E2H,0E8H,0EEH,0F4H,0F8H,0FBH,0FEH,**  **0FFH,**  **0FEH,0FBH,0F8H,0F4H,0EEH,0E8H,0E2H,0DAH,0D2H,0C9H,0C0H,0B6H,0ABH,0A1H,96H,8BH,80H** | | | **;** | **PRE COMPUTED SAMPLED VALUES OF POSITIVE HALF CYCLE OF SINE WAVE AT THETA=05 DEGREE** |
|  | **DB** | **35 DUP(80H)** | | | **;** |  |
|  | **.CODE** |  | **,** |  | **;** |  |
|  | **MOV** | **AX** | **,** | **@DATA** | **;** | **INITIALIZATION OF DATA SEGMENT** |
|  | **MOV** | **DS** | **,** | **AX** | **;** |  |
|  |  |  |  |  |  |  |
|  | **MOV** | **DX** | **,** | **CTRL** | **;** | **INITIALIZATION OF 8255 CONTROL WORD** |
|  | **MOV** | **AL** | **,** | **80H** | **;** |  |
|  | **OUT** | **DX** | **,** | **AL** | **;** |  |
|  |  |  |  |  |  |  |
| **AGAIN:** | **LEA** | **SI** | **,** | **POSCYCLE** | **;** | **POINT SI TO POSCYCLE ARRAY OF VALUES** |
|  | **MOV** | **CX** | **,** | **70** | **;** | **LOAD THE COUNTER NUMBER OF VALUES** |
|  |  |  |  |  |  |  |
| **NXTVAL:** | **MOV** | **AL** | **,** | **[ SI ]** | **;** | **SEND A VALUE TO PORT A OF DAC INTERFACE** |
|  | **MOV** | **DX** | **,** | **PORTA** | **;** |  |
|  | **OUT** | **DX** | **,** | **AL** | **;** |  |
|  | **CALL** | **DELAY** |  |  | **;** | **DELAY TO COVERT DIGITAL TO ANALOG VALUE** |
|  | **INC** | **SI** |  |  | **;** | **INCREMENT THE SI TO POINT NEXT VALUE** |
|  | **LOOP** | **NXTVAL** |  |  | **;** | **LOOP TO NEXT VALUE** |
|  |  |  |  |  |  |  |
|  | **CALL** | **DELAY** |  |  | **;** |  |
|  | **MOV** | **AH** | **,** | **06** | **;** | **SENSE KEY HIT** |
|  | **MOV** | **DL** | **,** | **0FFH** | **;** |  |
|  | **INT** | **21H** |  |  | **;** |  |
|  | **CMP** | **AL** | **,** | **00** | **;** | **IF KEY HIT = TRUE THEN BREAK** |
|  | **JZ** | **AGAIN** |  |  | **;** | **CONTINUE PUMPING THE VALUES** |
|  |  |  |  |  |  |  |
|  | **INT 3** |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **DELAY** | **PROC** |  |  |  | **;** | **DELAY PROCEDURE TO ELAPSE TIME** |
|  | **PUSH** | **CX** |  |  |  | **SAVE THE CONTENTS OF CX** |
|  |  |  |  |  | **;** |  |
|  | **MOV** | **CX** | **,** | **0FH** | **;** | **SET OUTER LOOP COUNT** |
| **OUTER:** | **PUSH** | **CX** |  |  | **;** |  |
|  |  |  |  |  | **;** |  |
|  | **MOV** | **CX** |  | **0FFFFH** | **;** | **SET INNER LOOP COUNT** |
| **INNER:** | **NOP** |  |  |  | **;** | **NO OPERATION INSTRUCTIONS** |
|  | **NOP** |  |  |  | **;** |  |
|  | **NOP** |  |  |  | **;** |  |
|  | **LOOP** | **INNER** |  |  | **;** | **GOTO INNER** |
|  |  |  |  |  |  |  |
|  | **POP** | **CX** |  |  | **;** |  |
|  | **LOOP** | **OUTER** |  |  | **;** | **GOTO OUTER** |
|  |  |  |  |  |  |  |
|  | **POP** | **CX** |  |  |  | **RESTORE THE CONTENTS OF CX** |
|  |  |  |  |  |  |  |
|  | **RET** |  |  |  | **;** | **RETUREN TO CALLING PROCEDURE** |
| **DELAY** | **ENDP** |  |  |  | **;** | **END OF PROCEDURE** |
|  |  |  |  |  |  |  |
|  | **END** |  |  |  | **;** | **END OF PROGRAM** |

**Formula**

**Value = 128 + 128\*sin Ɵ**

**Ɵ = 00 , 5 0 ,  10o  ......... 900 , 85o, ........... 0o  for positive cycle.**

**Ɵ = 00 , -5 0 ,  -10o  ......... -900 ,- 85o, ........... 0o  for negative cycle.**

**OUTPUT**

* **Edit filename.asm**
* **Masm filename.asm;**
* **Link filename;**
* **allowio 0x1080H**
* **Debug filename.exe**

**-g**

**Half rectified written in graph sheet**

**-q**