

On-Chip Peripheral Program Example

August 1999

Description

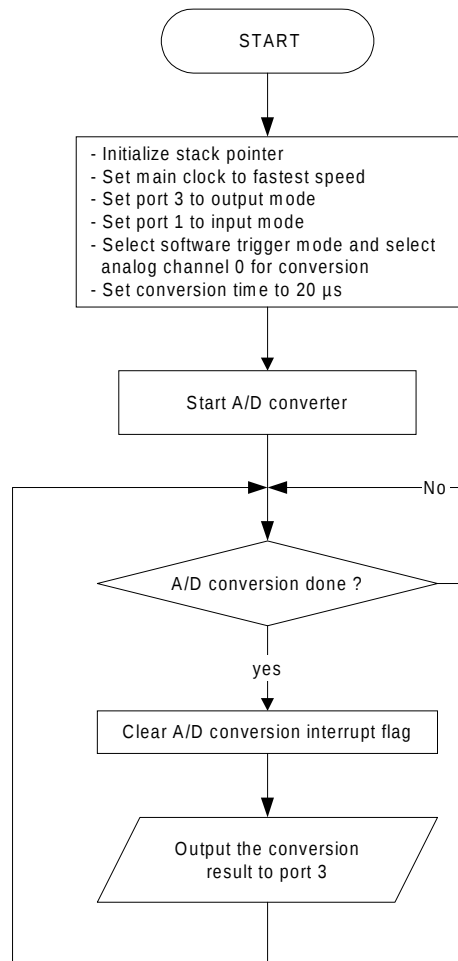
The μ PD7805x/78005x subseries has an 8-channel, 8-bit A/D converter that can be triggered by hardware or software.

This program demonstrates a software-triggered start, where the setting of the operation start bit in the A/D converter mode register starts A/D conversion of the analog input at pin ANI0/P10. After the conversion, the 8-bit data is output to P30–P37 of port 3.

Program Specifications

- ❑ Only analog input 0 (ANI0) is selected
- ❑ Conversion time: 20 μ s
- ❑ Conversion triggered by setting of bit 7 in the A/D converter mode register (ADM)
- ❑ Pins used in program:
 - ANI0/P10: input of the analog voltage
 - P30 – P37: output of the 8-bit digitized value

Flowchart



Assembly Language Program

```

;*****
; Date:      08/09/1999
;
; Parameters: - fastest CPU clock
;              (fx = 5 MHz; 1 CPU clock cycle = 200 ns)
;              - P3.0 - P3.7:  8-BIT converted data
;              - Analog input: Channel 0 (ANI0/P10)
;              - A/D start:   Software triggered
;
;----- A/D conversion formula -----
;
;      ADCR = INT(Vin/AVref) * 256 + 0.5)
;
;      INT = Integer parts of the result
;      Vin = Analog input voltage
;      Vref = AVref0 pin voltage (reference voltage)
;      ADCR = Conversion result register
;*****

;=====
;=      Specify Interrupt Vectors      =
;=====

Res_Vec CSEG      AT 0000h      ; Set main program start vector.
      DW      Start

;=====
;=      Main Program      =
;=====

MAIN      CSEG
Start: DI          ; Disable interrupts
      MOVW      AX, #0FE20h      ; Load SP address
      MOVW      SP, AX          ; Set Stack Pointer
      MOV      OSMS,#01h        ; Don't use scaler
      MOV      PCC, #00h        ; Main system clock at fastest setting
      MOV      P3,#00          ; Set port 3 latch to low
      MOV      PM3,#00          ; Set port 3 to output mode
      SET1     PU03             ; Set pull-up resistors
      MOV      P1, #00h         ; Set port 1 latch to low
      MOV      PM1,#0FFh        ; Set all 8 A/D channels to input mode
      MOV      ADIS,#01h        ; Select only ANI0 as possible analog input
      MOV      ADM,#021h        ; Set A/D converter mode register (ADM):
      ;          A/D input channel = ANI0
      ;          Trigger by software
      ;          Conversion time = 20 µs
      SET1     CS               ; Start conversion

Loop:  NOP
      BF      ADIF,$Loop        ; Wait for completed conversion
      CLR1    ADIF              ; Clear A/D complete interrupt flag
      MOV     A,ADCR             ; Read A/D conversion result
      MOV     P3,A              ; Output A/D data to port 3
      BR      Loop              ; Branch back
      End

```

C Language Program

```

/*****
; Date:      08/09/1999
;
; Parameters: - fastest CPU clock
;              (fx = 5 MHz; 1 CPU clock cycle = 200 ns)
;              - P3.0 - P3.7: 8-BIT converted data
;              - Analog input: Channel 0 (ANI0/P10)
;              - A/D start:   Software triggered
;
;----- A/D conversion formula -----
;
;      ADCR = INT(Vin/AVref) * 256 + 0.5)
;      INT = Integer parts of the result
;      Vin = Analog input voltage
;      Vref = AVref0 pin voltage (reference voltage)
;      ADCR = Conversion result register
;*****/
/* extension functions in K0/K0S compiler */
#pragma sfr      /* key word to allow SFR names in C code */

/*;=====
;=      Constants/Variables      =
;=====*/
#define TRUE      1
#define FALSE     0
unsigned char AD_data;          /* holds A/D conversion result */

/*=====
;=      Main Program      =
;=====*/
void main(void)
{
    OSMS = 0x01;          /* Don't use scaler */
    PCC = 0x00;          /* Main system clock at fastest setting */
    P3 = 0x00;          /* Set port 3 latch to low */
    PM3= 0x00;          /* Set port 3 to output mode */
    PU03 = 1;          /* Set pull-up resistors */
    P1 = 0x00;          /* Set port 1 latch to low
    PM1 = 0xFF;          /* Set all 8 A/D channels to input mode */
    ADIS = 0x01;          /* Select only ANI0 as possible analog input */
    ADM = 0x21;          /* Set A/D converter mode register(ADM):
                        A/D input channel = ANI0
                        Trigger by software
                        Conversion time = 20 µs */

    CS = 1;          /* Start conversion */
    while(TRUE)
    {
        while( ADIF == FALSE); /* Wait for completed conversion */
        AD_data = ADCR; /* Read A/D conversion result */
        ADIF = 0; /* Clear A/D complete interrupt flag */
        P3 = AD_data; /* Output A/D data to port 3 */
    } /* end of while(TRUE) */
} /* end of main() */

```



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