

Description

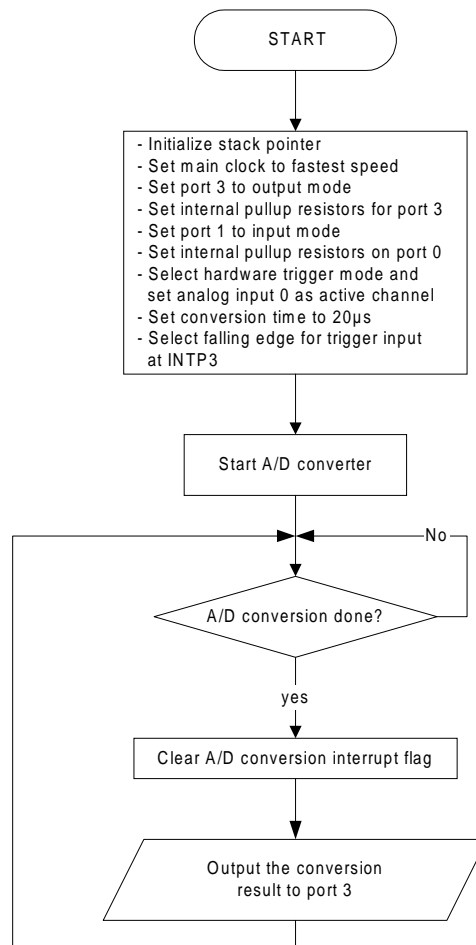
The μ PD7805x/78005x subseries has an 8-channel, 8-bit A/D converter that can be triggered by hardware or software.

This program demonstrates a hardware-triggered start, where a falling edge at external interrupt input 3 (INTP3/P03) 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 falling edge of external interrupt 3
- ❑ Pins used in program:
 - INTP3/P03: external trigger input that starts the conversion
 - 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:   Hardware triggered by INTP3/P03
;
;-----      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
        SET1      PM0.3           ; Set port 0.3 to input mode
        SET1      PU00            ; Set pull up resistors on port 0
        MOV       ADIS,#01h       ; Select only ANI0 as possible analog input
        MOV       ADM,#61h        ; Set A/D converter mode register (ADM):
        ;           A/D input channel = ANI0
        ;           Trigger by hardware
        ;           Conversion time = 20 µs
        MOV       INTM1, #00h     ; Set falling edge as conversion trigger
        SET1      CS              ; Start conversion
Loop:   NOP
        BF       ADIF,$Loop       ; Wait for completed conversion
        MOV       A,ADCR          ; Read A/D conversion result
        CLR1     ADIF             ; Clear A/D complete interrupt flag
        MOV       P3,A            ; Output A/D data to the 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:   Hardware triggered by INTP3/P03
;
;-----      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/KOS 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 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 */
    PM0.3 = 1; /* Set port 0.3 to input mode */
    PU00 = 1; /* Set pull up resistors on port 0 */
    ADIS = 0x01; /* Select only ANI0 as possible analog input */
    ADM = 0x61; /* Set A/D converter mode register (ADM):
                A/D input channel = ANI0
                Trigger by hardware
                Conversion time = 20 µs */

    INTM1 = 0x00; /* Set falling edge as conversion trigger */
    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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