NEC

Serial Interface Channel 0 in 2-Wire Serial I/O Mode

On-Chip Peripheral Program Example August 1999

Description

The serial channel 0 of the μPD7805x/78005x subseries can be used in 2-wire serial I/O mode, 3-wire serial I/O mode or serial bus interface mode.

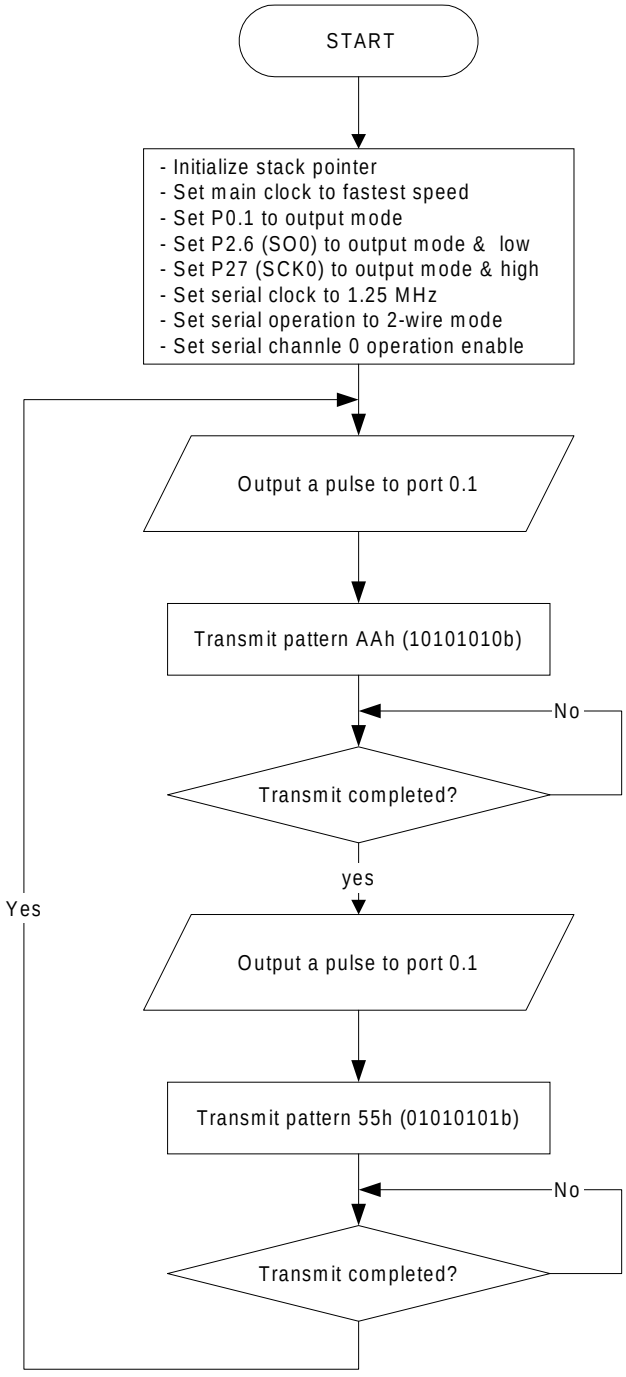
This program demonstrates the 2-wire serial interface in transfer-only mode. A short start pulse is output to port 0.1 before a test pattern is output to the serial output pin SO0/P26.

Caution: When using the program on an NEC emulator, connect pull-up resistors (1 kΩ typ.) to the SO0 data and SCK0 clock signals.

Program Specifications

- Serial clock selection: fx/4 (1.25 MHz)
- Output data format: 8-bit
- Data pattern: AAh followed by 55h continuously
- Pins used in program:
  - Data output: SO0/SB1/P26
  - Serial clock output: SCK0/P27
  - Transmission start pulse: P01/INTP1/TI01

Flowchart


START
- Initialize stack pointer
- Set main clock to fastest speed
- Set P0.1 to output mode
- Set P2.6 (SO0) to output mode & low
- Set P27 (SCK0) to output mode & high
- Set serial clock to 1.25 MHz
- Set serial operation to 2-wire mode
- Set serial channle 0 operation enable
Output a pulse to port 0.1
Transmit pattern AAh (10101010b)
No
Transmit completed?
yes
Yes
Output a pulse to port 0.1
Transmit pattern 55h (01010101b)
No
Transmit completed?

Assembly Language Program

```
;*********************************************************************
; Date:       08/12/1999
;
; Parameters: - fastest CPU clock
;               (fx=5 MHz; 1 CPU clock cycle = 200 ns)
;             - Serial clock speed:        fx/4 (1.25 MHz)
;             - Data format:               8-bit, MSB first
;             - Data patterns:             Consecutively AAh and 55H by turn
;             - Data output:               SO0/P26/SB0
;             - Serial clock output:       SCK0/P27
;             - Transmission start signal: Port 0.1
;*********************************************************************

;=======================================
;       Constants/Variables             =
;=======================================

TXDirPort          equ      PM2.6     ;TX direction port
TXDataPort         equ      P2.6      ;TX Data port
SCKDirPort         equ      PM2.7     ;SCK direction port
SCKDataPort        equ      P2.7      ;SCK data port

;=======================================
;=      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
           CLR1     P0.1              ; Latch port 0.1 to low
           CLR1     PM0.1             ; Set port 0.1 to output
           SET1     PUOL.0            ; Use pull-up resister on port 0.1
           CLR1     TXDirPort         ; Set TX port to output direction
           CLR1     TXDataPort        ; Latch TX port low
           CLR1     SCKDirPort        ; Set SCK0 to output direction
           SET1     SCKDataPort       ; Latch SCK0 high
           MOV      CSIM0,#9Bh        ; Operation settings:
                                      ;   - Use clock specified in TCL3 register
                                      ;   - Setup for 2-wire mode
                                      ;   - Operation enable
           MOV      TCL3,#07h         ; Set serial clock speed to 1.25 MHz
           SET1     CSIMK0            ; Mask serial channel 0 interrupt flag
           CLR1     CSIIF0            ; Clear transfer done interrupt flag
           EI                         ; Enable interrupt
Loop:      SET1     P0.1              ; Set port 0.1
```

```
          CLR1    P0.1              ; Clear port 0.1
          MOV     SIO0,#0AAh        ; Transmit AAh (10101010b)
Wait1:    NOP
          BF      CSIIF0,$Wait1     ; If transmission done, then continue
          CLR1    CSIIF0            ; Clear transmission done interrupt flag
          SET1    P0.1              ; Set port 0.1
          CLR1    P0.1              ; Clear port 0.1
          MOV     SIO0,#055h        ; Transmit 55h (01010101)
Wait2:    NOP
          BF      CSIIF0,$Wait2     ; If transmission done, then continue
          CLR1    CSIIF0            ; Clear transmission done interrupt flag
          BR      Loop              ; Branch back to transmit start
          END
```

C Language Program

```
/*********************************************************************
; Date:        08/12/1999
;
; Parameters: - fastest CPU clock
;               (fx=5 MHz; 1 CPU clock cycle = 200 ns)
;             - Serial clock speed:        fx/4 (1.25 MHz)
;             - Data format:               8-bit, MSB first
;             - Data patterns:             Consecutively AAh and 55H by turn
;             - Data output:               SO0/P26/SB0
;             - Serial clock output:       SCK0/P27
;             - Transmission start signal: Port 0.1
;*********************************************************************/
/* extension functions in K0/K0S compiler */
#pragma sfr                 /* key word to allow SFR names in C code */
#pragma EI                  /* key word for EI instruction in C code */

/*=====================================
;        Constants/Variables          =
;=====================================*/
#define TRUE       1
#define FALSE      0
#define TXDirPort           PM2.6    // TX direction port
#define TXDataPort          P2.6     // TX Data port
#define SCKDirPort          PM2.7    // SCK direction port
#define SCKDataPort         P2.7     // SCK data port

/*=====================================
;        Main Program                 =
;=====================================*/
void main(void)
{
        OSMS = 0x01;                /* Don't use scaler */
        PCC = 0x00;                 /* Main system clock at fastest setting */
        P0.1 = 0;                   /* Latch port 0.1 to low */
        PM0.1 = 0;                  /* Set port 0.1 to output */
        PUOL.0 = 1;                 /* Set pull-up resister to port 0.1 */
        TXDirPort =0;               /* Set TX to output direction */
        TXDataPort=0;               /* Latch TX port low */
        SCKDirPort =0;              /* Set SCK0 to output direction */
        SCKDataPort=1;              /* Latch SCK0 high */
        CSIM0 = 0x9B;               /* Operation settings:
                                           - Use clock specified in TCL3 register
                                           - Setup for 2-wire mode
                                           - Operation enable */
        TCL3 = 0x07;                /* Set serial clock speed to 1.25 MHz */
        CSIMK0 = 1;                 /* Mask serial channel 0 interrupt flag */
        CSIIF0 = 0;                 /* Clear transfer done interrupt flag */
        EI();                       /* interrupt enable */
        while(TRUE)                 /* while loop */
        {
                P0.1 = 1;           /* Set port 0.1 */
                P0.1 = 0;           /* Clear port 0.1 */
                SIO0 = 0xAA;        /* Transmit AAh (10101010b) */
                while(!CSIIF0);     /* If transmission is done, the continue */
                CSIIF0 = 0;         /* Clear transmission interrupt flag */
```

```
                P0.1 = 1;          /* Set port 0.1 */
                P0.1 = 0;          /* Clear port 0.1 */
                SIO0 = 0x55;       /* Transmit 55h (01010101b) */
                while(!CSIIF0);    /* If transmission is done, then continue */
                CSIIF0 = 0;        /* Clear transmission done interrupt flag */
        }                          /* end of WHILE loop */
}                                  /* end of MAIN() */
```