# 秒表串行通信实验

将A机秒表的数值通过串口发送到B机，并用数码管显示

原理图：



程序框图：

发送机：



接收机：



程序源码：

发送机：

;串口发送程序

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;T0中断时，R1指向26H-29H，分别存储毫秒，秒，分，时

;T0中R0扫描段码

;STORE函数中：分别计算毫秒，秒，分，时的段码，存储在1DH--24H

;T1中断方式二，提供波特率4800

;R3存储位码值，左移

LATCH1 BIT P2.2

LATCH2 BIT P2.3

ORG 0000H

LJMP START ;主程序

ORG 0003H

LJMP INT\_0 ;按键中断

ORG 000BH

LJMP T0\_INT ;定时器0，1ms

ORG 001BH

LJMP T1\_INT ;定时器1，串口波特率4800

ORG 0023H

LJMP COM\_INT ;串口，10ms

START:

MOV TCON, #51H

MOV SCON, #40H

MOV PCON, #00H

MOV IP, #10H

MOV TMOD, #21H ;T0工作在方式1，T1方式二

MOV TL0, #018H

MOV TH0, #0FCH ;1ms中断

MOV TL1, #0FAH

MOV TH1, #0FAH ;10ms中断

MOV DPTR, #TABLE

MOV SP, #60H

MOV 32H, #00H ;按键次数

MOV R1, #24H ;指针，访问BCD码

MOV R0, #26H

MOV R3, #11111110B;位码初值

ACALL TRAIN

HERE: SJMP HERE ;原地等待中断

TRAIN:

MOV IE, #9BH

MOV A, @R0

MOV SBUF, A

T1\_INT:

RETI

COM\_INT:

CLR TI

CLR EA

PUSH PSW

PUSH Acc

SETB EA

INC R0

CJNE R0, #2AH, SEND

CLR ES

MOV R0, #26H

NEXT:CLR EA

POP Acc

POP PSW

SETB EA

RETI

SEND:MOV A, @R0

MOV SBUF, A

JMP NEXT

T0\_INT:

CLR EA

PUSH PSW

PUSH Acc

SETB EA

MOV TL0, #018H

MOV T H0, #0FCH

MOV P0, @R1 ;显示程序，@R1为段码输出到P0

SETB LATCH1

CLR LATCH1

MOV P0, R3 ;输出位码

SETB LATCH2

CLR LATCH2

DEC R1

MOV A, R3

RL A

MOV R3, A

CJNE R1, #1CH, EXIT\_SCAN

MOV R1, #24H

EXIT\_SCAN:

MOV A, 32H ;按键计数值，选功能

CJNE A, #01H ,EQU2 ;按键值为1，计数，并转为换段码

SETB TR0

INC 25H

MOV A, 25H

CJNE A, #0AH, EXIT\_T0\_INT ;10ms进一次TIME & STORE

MOV 25H, #00H

MOV 30H, R0

MOV 31H, R1 ;假装 R0, R1入栈

MOV R1, #26H ;指针，访问BCD码

MOV R0, #1DH ;指针，存段码

CALL TIME

CALL STORE

MOV R0, #26H

SETB ES

MOV SBUF, @R0 ;串口发送新数据

MOV R1, 31H

MOV R0, 30H ;假装出栈

MOV A, @R0

MOV SBUF, A

SJMP EXIT\_T0\_INT

EQU2:CJNE A, #02H, EQU3 ;按键值为2，跳过计数过程，实现暂停

SJMP EXIT\_T0\_INT

EQU3:

MOV 30H, R0

MOV 31H, R1 ;假装R1入栈

MOV R1, #26H ;指针，访问BCD码

MOV R0, #1DH ;指针，存段码

MOV 25H, #00H

MOV 26H, #00H ;按键值为3，清零

MOV 27H, #00H

MOV 28H, #00H

MOV 29H, #00H

CALL STORE

MOV R0, #26H

MOV SBUF, @R0

MOV R1, 31H ;假装出栈

MOV R0, 30H

EXIT\_T0\_INT:

CLR EA

POP Acc

POP PSW

SETB EA

RETI

;TIME为毫秒，秒，分，时

TIME:

INC 26H

MOV A, 26H

CJNE A, #64H, EXIT\_TIME

MOV 26H, #00H

INC 27H

MOV A, 27H

CJNE A, #3CH, EXIT\_TIME

MOV 27H, #00H

INC 28H

MOV A, 28H

CJNE A, #3CH, EXIT\_TIME

MOV 28H, #00H

INC 29H

MOV A, 29H

CJNE A, #18H, EXIT\_TIME

MOV 29H, #00H

EXIT\_TIME: RET

;STORE为毫秒，秒，分，时 的段码

STORE:

MOV A, @R1

MOV B, #10

DIV AB

MOVC A, @A+DPTR

INC R0

MOV @R0, A

MOV A,B

MOVC A, @A+DPTR

DEC R0

MOV @R0, A

INC R0

INC R0

INC R1

CJNE R1, #2AH, STORE

RET

INT\_0:

CLR EA

PUSH PSW

PUSH Acc

SETB EA

INC 32H ;按键中断计数

MOV A, 32H

CJNE A, #04H, NEXT0

MOV 32H, #01H

NEXT0:CLR EA

POP Acc

POP PSW

SETB EA

RETI

TABLE:DB 3FH,06H,5BH,4FH,66H,6DH,7DH,07H,7FH,6FH ;共阴字码表

END

接收机：

NEWFLAG EQU 26H

LATCH1 BIT P2.2;段锁存

LATCH2 BIT P2.3;位锁存

ORG 0000H ;主程序入口地址

LJMP START

ORG 000BH ;T0中断入口地址

LJMP T0SUB

ORG 0023H ;串口中断入口地址

LJMP COM\_INT

ORG 0100H

START:

MOV SP, #60H;堆栈指针值赋为60H

MOV 23H, #00H

MOV 22H, #00H

MOV 21H, #00H

MOV 20H, #00H

MOV NEWFLAG, #01H

MOV TMOD, #21H

MOV TH0, #0FCH

MOV TL0, #18H

MOV TH1, #0FAH ;设置T1定时器初值，波特率为9600

MOV TL1, #0FAH

MOV PCON, #00H

MOV IE, #82H

MOV SCON, #50H

MOV IP, #10H

SETB TR0

SETB TR1

SETB EA ;总中断打开

WAIT: JNB RI, WAIT

CLR RI

SETB ES

MOV R0, #30H ;R0为显示缓冲区首地址30H

MOV R1, #23H

MOV R2, #0FEH ;R2赋值11111110

MOV DPTR, #TABLE ;数据指针首地址

LCALL STORE ;将二进制转换成BCD码七段码存入37H到30H

;将二进制转换成BCD码七段码，实现将20H到23H转换成七段码存入37H到30H

STORE:

MOV A, 23H

MOV B, #10

DIV AB

MOVC A, @A+DPTR

MOV 36H, A

MOV A, B

MOVC A, @A+DPTR

MOV 37H, A

MOV A, 22H

MOV B, #10

DIV AB

MOVC A, @A+DPTR

MOV 34H, A

MOV A, B

MOVC A, @A+DPTR

ADD A, #80H

MOV 35H, A

MOV A, 21H

MOV B, #10

DIV AB

MOVC A, @A+DPTR

MOV 32H, A

MOV A, B

MOVC A, @A+DPTR

ADD A, #80H

MOV 33H, A

MOV A, 20H

MOV B, #10

DIV AB

MOVC A, @A+DPTR

MOV 30H, A

MOV A, B

MOVC A, @A+DPTR

ADD A, #80H

MOV 31H, A

LOOP:

MOV A, NEWFLAG ;NEWFLAG值存入A

CJNE A, #00H, LOOP3 ;检测A的内容与0比较，不是0则跳到STORE，是0则跳到LOOP

JMP LOOP

LOOP3:

MOV NEWFLAG, #00H

LJMP STORE

T0SUB:

CLR EA

PUSH PSW

PUSH Acc

SETB EA

MOV TH0, #0FCH ;T0定时1ms

MOV TL0, #18H

MOV P0, @R0 ;段码P0口输出，段锁存

SETB LATCH1

CLR LATCH1

INC R0

MOV P0, R2

SETB LATCH2

CLR LATCH2

MOV A, R2

RL A

MOV R2, A ;R2左移

CJNE R0, #38H, RE ;与38H作比较，不相等则跳到RE中断返回

MOV R0, #30H ;R0变为显示缓冲区首地址30H

MOV R2, #0FEH ;R2赋值11111110

RE:

CLR EA

POP Acc

POP PSW

SETB EA

RETI

COM\_INT:

PUSH DPL

PUSH DPH

PUSH Acc

CLR RI

MOV @R1, SBUF

DEC R1

CJNE R1, #1FH, SHOU

MOV NEWFLAG, #01H ;4个数传完才给newflag

MOV R1, #23H

SHOU:

POP Acc

POP DPH

POP DPL

RETI

TABLE:DB 3FH,06H,5BH,4FH,66H,6DH,7DH,07H,7FH,6FH ;共阴字码表

END

结果分析：

