

(ch4.)

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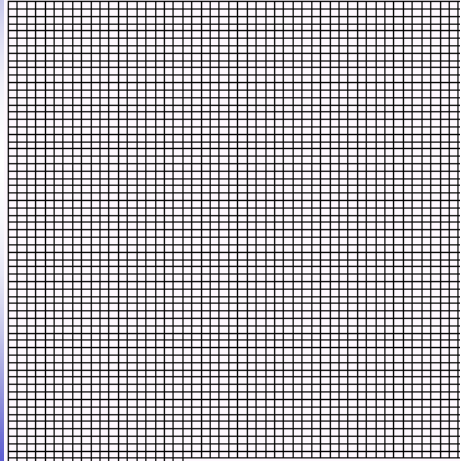
4.1 () - #0.

1) PSU 가	1/2 (DUAL PSU)
2)	1 ---->
3)	1 ---->
4) 89C51 CPU	1
40	1
5) 8 DIP SW	1
6) X - TAL (12MHz)	1
7) LED	8
8) (470ohm)	8
9) (8.2kohm)	1
10) (20pF)	2
11) (10uF)	1

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4.1 ()
- #0.

만능기판 실체 배선도



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4.1 ()
- #0.

- 1) ** 4.5 ($\frac{1}{2}$)
- 2) (xxx - 1.t51 --> xxx - 1.o51)
- 3) 89c51 EEPROM writing
- 4) 가(+5V)
- 5) -->
- 6) -->

*** ()

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4.1 ()
- #0.

```
>edit 4-4.t51 ; 8051 assembler source file

>a 4-4 ; 4-4.t51 file assembling batch file

--> file : 4-4.t51 ; source file( )
    4-4.c51 ; link control file( )

--> file : 4-4.o51 ; object file( )
    4-4.a51 ; absolute file(INTEL HEX format)
           ( )
    4-4.l51 ; list file( --> object )
    4-4.m51 ; merge file( --> link )

***
```

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4.1 ()
- #0. (2)

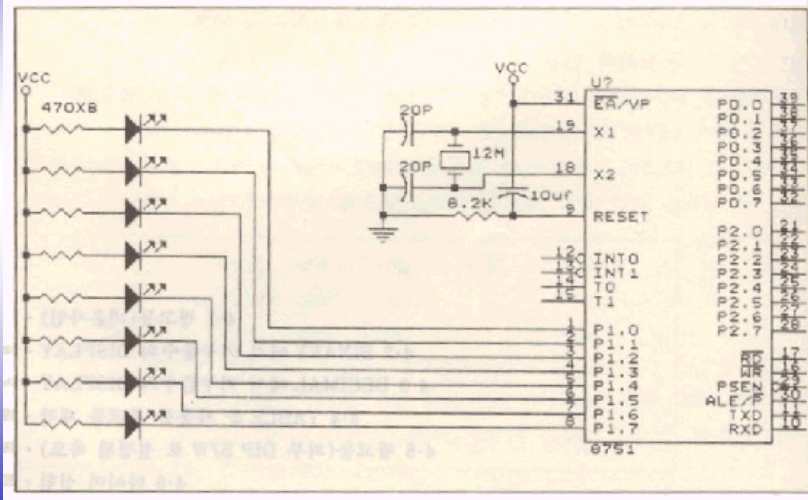
```
1) a.bat
=====
a51 %1.t51 /L
L51 %1 /M

2) 4-4.c51
=====
*
LIST T,X
*
CSEG 00000H
*
LOAD 4-4.o51 * START ADDRESS
*
END

***
```

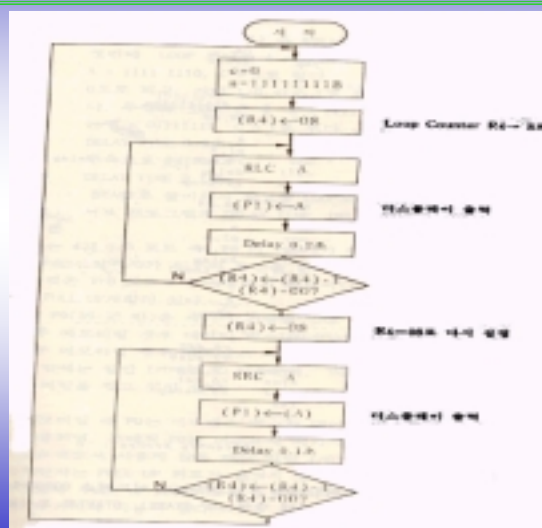
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4.1 () - #1.



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4.1 () - #1. Flow chart



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4.1 () - #1. ASM coding

```

org 0h
jmp Start
;
Start:
clr c
mov a,#11111111b
mov r4,#8
Loop:
rlc a
mov p1,a
mov r5,#10 ;delay 200ms
call Delay
djnz r4,Loop
;
mov r4,#8
Loopl:
rrc a
mov p1,a
mov r5,#5 ;delay 100ms
call Delay
djnz r4,Loopl
jmp Start
;

```

```

;
;-----
;delay time=r5*(20ms)
;-----
Delay:
mov r6,#40
Del: mov r7,#249
djnz r7,$
djnz r6,Del
djnz r5,Delay
ret
end

```

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4.1 () - #1. ASM coding(128-up/down)

```

; 8bit(128) up-down counter
;
org 0h
jmp Start
;
Start:
clr c
mov a,#11111111b
mov r4,#128
Loop:
dec a
mov p1,a
mov r5,#10 ;delay 200ms
;;: mov r5,#50 ;delay 1s
call Delay
djnz r4,Loop
;
mov r4,#128
Loopl:
inc a
mov p1,a
mov r5,#5 ;delay 100ms
call Delay
djnz r4,Loopl
jmp Start
;

```

```

;
;-----
;delay time=r5*(20ms)
;-----
Delay:
mov r6,#40
Del: mov r7,#249
djnz r7,$
djnz r6,Del
djnz r5,Delay
ret
end

```

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4.2 () - #2.

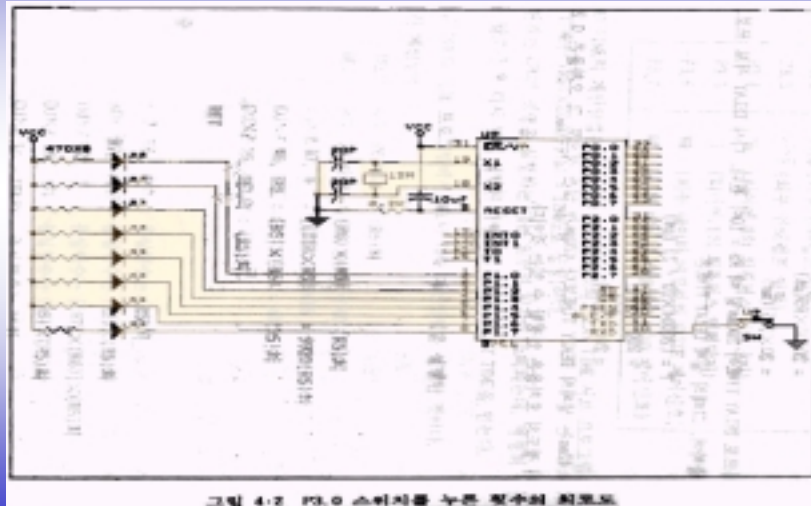
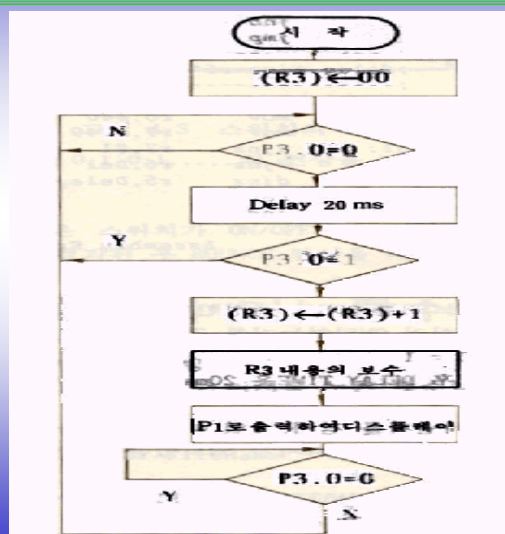


그림 4.2 P3.0 스위치를 누른 횟수의 회로도

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4.2 () - #2. Flow chart



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4.2 () - #2. ASM Coding

```

; 4-2.151
;
org 0h
mov r3,#0 ; push # counter
;
Wait:
jb p3.0,Wait ;1-bit SW(push BT.)

mov r5,#1 ;delay 20ms
call Delay

jb p3.0,Wait ;Bounce

inc r3
mov a,r3
cpl a ; if"0"->LED ON
mov p1,a ; LED display

WaitKeyRelease:
jnb p3.0,WaitKeyRelease
;
jmp Wait
;

```

```

;
;-----
;delay time=r5*(20ms)
;-----
Delay:
mov r6,#40
Del: mov r7,#249
djnz r7,$
djnz r6,Del
djnz r5,Delay
ret
end

```

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4.2 () - #2b . ASM Coding

```

org 0h
mov r3,#0
;
Wait:
jb p3.0,Wait ;1-bit SW(push BT.)

mov r5,#1 ;delay 20ms
call Delay

jb p3.0,Wait ;Bounce

inc r3
mov a,r3
; 가
anl a,#00001111b
swap a
mov b,a
mov a,r3
anl a,#00001111b
orl a,b
;...
cpl a ; "0"=LED ON
mov p1,a

WaitKeyRelease:
jnb p3.0,WaitKeyRelease
jmp Wait
;

```

```

;
;-----
;delay time=r5*(20ms)
;-----
Delay:
mov r6,#40
Del: mov r7,#249
djnz r7,$
djnz r6,Del
djnz r5,Delay
ret
end

```

```

.
. LED ← SW push down
0000 0000
0001 0001
0010 0010
0011 0011
0100 0100
....

```

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. ASM Coding

```
;delay time=r5*(20ms)
```

- LED ← SW push down

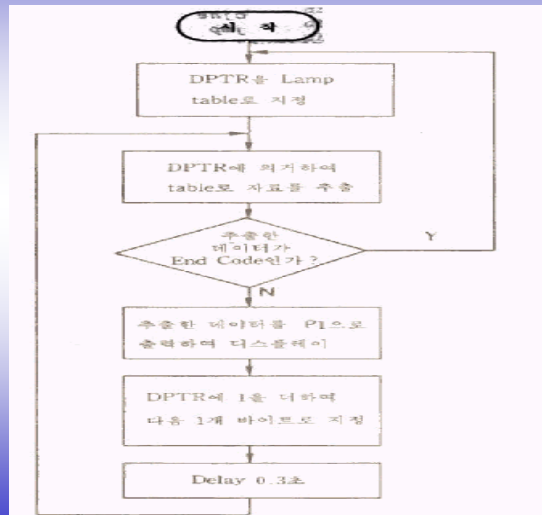
● ● ● ● **● ● ● ●**

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#3.



4.4 (Table) - #3. Flow chart



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4.4 (Table) - #3. ASM coding(1)

```

CSEG
EndCode EQU 0ah
org 0h
Restart:
mov dptr,#LampTable
Loop:
clr a
movc a,@a+dptr
cjne a,#EndCode,Continue
jmp Restart
Continue:
mov p1,a
mov r5,#15
call Delay
inc dptr
jmp Loop
  
```

```

;
;-----
;delay time=r5*(20ms)
;-----
Delay:
mov r6,#40
Del: mov r7,#249
djnz r7,$
djnz r6,Del
djnz r5,Delay
ret
end
  
```

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4.4 (Table #3. ASM coding(2))

LampTable:

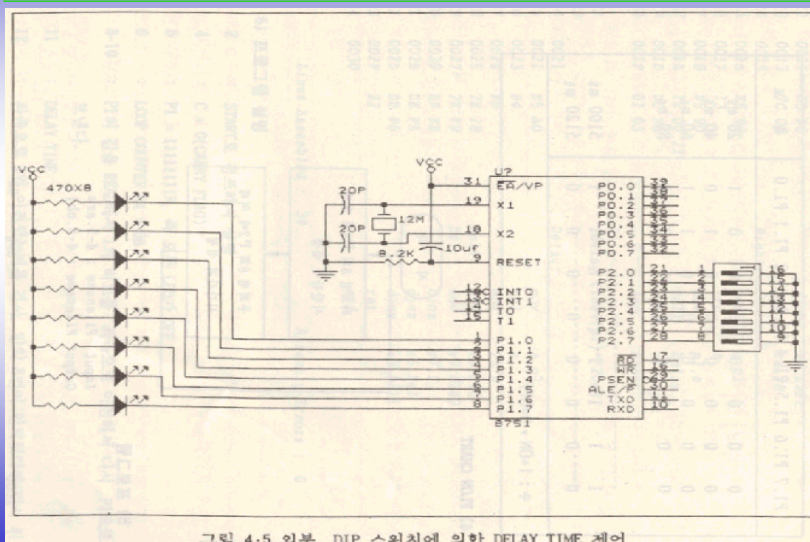
```
db 11111110b
db 11111101b
db 11111011b
db 11110111b
db 11101111b
db 11011111b
db 10111111b
db 01111111b
;
db 10111111b
db 11011111b
db 11101111b
db 11110111b
db 11111011b
db 1111110b
;
```

```
;
db 11111111b
db 00000000b
db 11111111b
db 00000000b
db 11111111b
db 00000000b
db 11111111b
db 00000000b
db 11111111b
db 00000000b
db 11111111b
db 00000000b
db 11111111b
db 00000000b
db 11111111b
db 00000000b
db 11111111b
db 00000000b
;
```

```
;
db 00111111b
db 11001111b
db 11110011b
db 1111100b
;
db 11110011b
db 11001111b
db 00111111b
;
db EndCode
end
```

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4.5 (- DIP #4.)



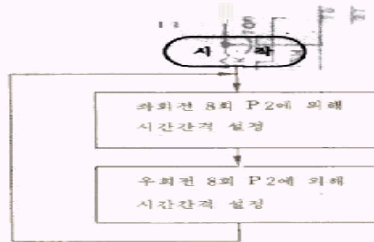
20

4.5 (- DIP) #4. Flow Chart

P1.7	P1.6	P1.5	P1.4	P1.3	P1.2	P1.1	P1.0	속도
0	0	0	0	0	0	0	1	20 ms
0	0	0	0	0	0	1	0	40 ms
0	0	0	0	0	0	1	1	60 ms
0	0	0	0	0	1	0	0	80 ms
:	:	:	:	:	:	:	:	:
1	1	1	1	1	1	1	1	5100 ms
0	0	0	0	0	0	0	0	5120 ms

※ : 1=ON , 0=OFF

4) FLOW CHART



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4.5 (- DIP) #4. ASM Coding

; INPUT FILE NAME : 4-5.t51

```

ORG 0h
JMP START
;
START:
CLR C
MOV P1,#11111111B
MOV R4,#8
Left:
mov a,p1
RLC A
MOV P1,A
CALL DELAY
DJNZ R4,Left
;
MOV R4,#8
Right:
mov a,p1
RRC A
MOV P1,A
CALL DELAY
DJNZ R4,Right
JMP START

```

DELAY TIME = P1 X (20msec)

```

DELAY:
mov a,p2
cpl a
mov r5,a
Del1: MOV R6,#40
Del:  MOV R7,#249
DJNZ R7,$
DJNZ R6,Del
DJNZ R5,Del1
RET
END

```

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