

CHARACTER MODULE INITIALIZATION

Internal Reset Circuit

The module is automatically initialized when the power is applied. The following commands are executed during initialization. The busy flag is kept in the busy state until initialization is complete. The busy state lasts for 10 ms after V_{DD} reaches 4.5 volts.

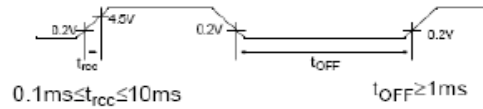
- 1) Clear Display
DL=1.....8-bit data length for interface
- 2) Function set
N=0.....Single-line display
F=0.....5x7 dot matrix character font
- 3) Display ON/OFF Control
D=0.....Display OFF
C=0.....Cursor OFF
B=0.....Blink function OFF
- 4) Entry Mode Set
I/D=1.....Increment Mode
S=0.....Display shift OFF

NOTE:

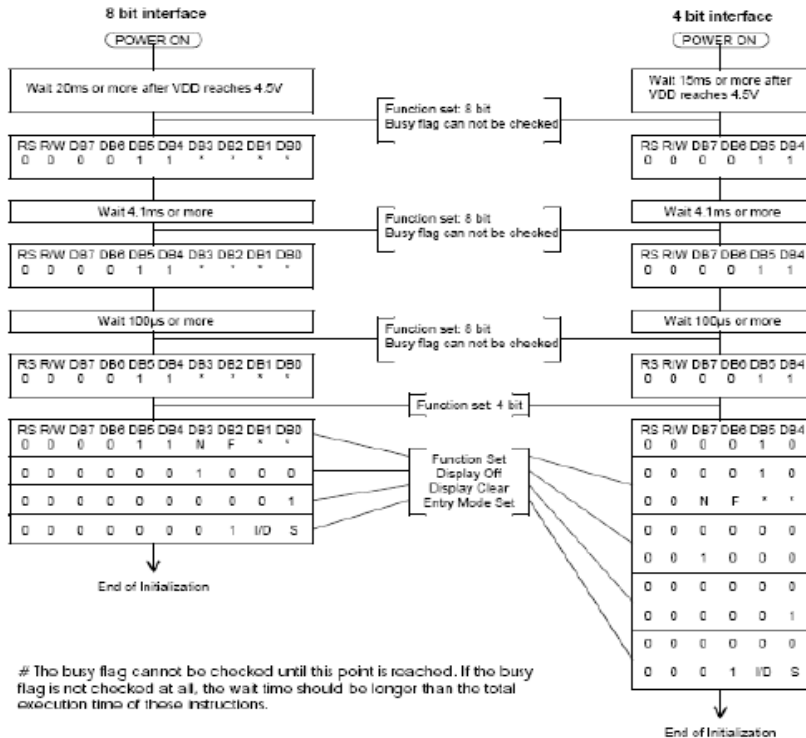
If the following power conditions are not satisfied, the internal reset circuit does not function properly. In this case, the initialization should be executed by the series of instructions from outside the MPU (Software Initialization).

Power Conditions for Internal Reset

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Power Supply Rise Time	t_{rcc}	0.1	-	10	ms
Power Supply Off time	t_{OFF}	1.0	-	-	ms



Software Initialization



PIN ASSIGNMENT

PIN NO.	SYMBOL	LEVEL	FUNCTION
1	VSS	-	Power Supply
2	VDD	-	
3	Vo	-	
4	RS	H / L	Selects Registers H : Data register (When Writing And Reading) L : Instruction Register (Writing) Busy Flag And Address Counter (Reading)
5	R / W	H / L	Read/Write Select Signal H : Data read (Module→MPU) L : Data write (Module→MPU)
6	E	H, H→L	Enable Signal
7	DB0	H / L	Databus lines, see description below DB4~DB7: High-order lines of data bus with three-state, bi-directional function for use in data transfer with the MPU. DB7 may also be used to check the busy flag. DB0~DB3: Low-order lines of data bus with three-state, bi-directional function for use in data transfer with the MPU. These lines are not used when interfacing with a 4-bit microprocessor.
8	DB1	H / L	
9	DB2	H / L	
10	DB3	H / L	
11	DB4	H / L	
12	DB5	H / L	
13	DB6	H / L	
14	DB7	H / L	

ELECTRIC MAXIMUM RATINGS

ITEM	SYMBOL	MIN	MAX	UNIT	REMARKS
Power Supply For Logic	VDD-VSS	-0.3	7.0	V	
Signal Input Voltage	VIN	$-3 \leq V_{IN} \leq VDD+0.3$		V	
Static Electricity	-	-	100	V	See Note

Note: Electro-static discharge resistance is tested by charging a 200pf capacitor and discharging it by contact with a interface connector pin .

EXAMPLE OF POWER SUPPLY

FIG.1 Normal Temperature Type

FIG.2 Extended Temperature Type

*Note: If V vary from recommended value, you cannot get proper contrast or viewing angle.

■ Examples of Temperature Compensation Circuits for Extended Temp Type. (Only for reference)

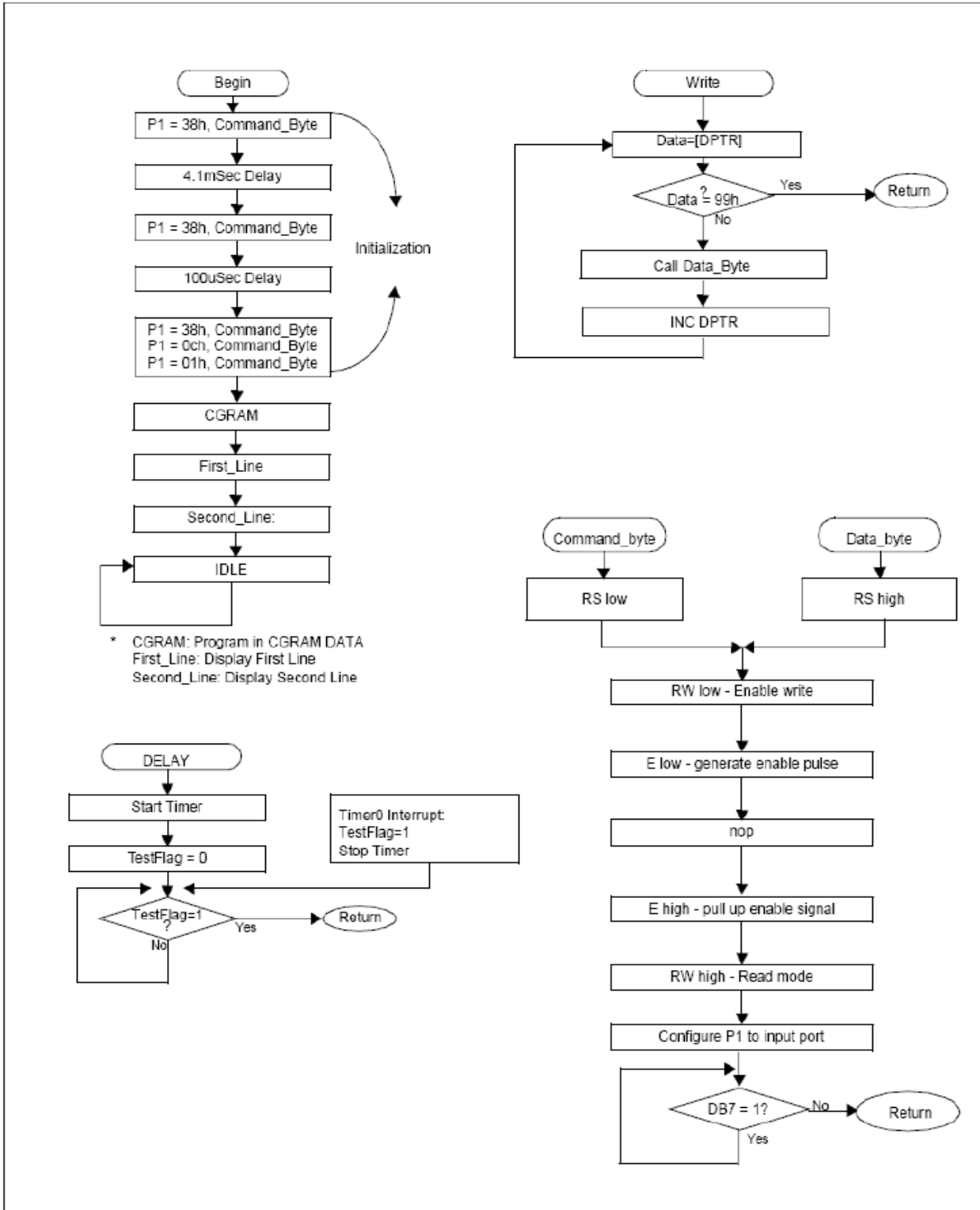
(A) 1/8Duty = 1/4Bias

(B) 1/16Duty = 1/5Bias

Thermistor: Rth(25°C)=15[k-ohm], B=4200[K]
Resistors: Rp=30[k-ohm], Rb=6.6[k-ohm], Rm=3.3[k-ohm]
Transistors: PNP Type
Vcc: +5V, Vss: 0V(Logic Supply)
Vz: -8V(-7.5~ -8.2V)
Vee<Vz, Rz=(Vz-Vee)/5 [k-ohm]

Thermistor: Rth(25°C)=15[k-ohm], B=4200[K]
Resistors: Rp=150[k-ohm], Rb=8.2[k-ohm], Rm=3.0[k-ohm]
Transistors: PNP Type
Vcc: +5V, Vss: 0V(Logic Supply)
Vz: -11V(-10.725~ -11.275V)
Vee<Vz, Rz=(Vz-Vee)/5 [k-ohm]

III. Software Flowchart:



Deepakshi Display Devices Pvt Ltd

Application Note

```

;*****
;
;Application Note:
;-----
;-----
;Displaying Characters on 0802 LCD Module
;Description:    Demo software to display
;
;characters.
; Controller:    AT89S52
;*****
Equates
;*****
lcdport      data      p1
e             equ       p3.3
rw           equ       p3.1
rs           equ       p3.0
;*****
; Interrupt Vectors
; *****
org 000h
jmp start    ; Power up reset vector
org 003h
reti         ; External interrupt 0 vector
org 00bh
reti         ; Counter/ Timer 0 int vector
org 013h
reti         ; External int 1 vector
org 01bh ;
reti         ; Timer 1 int vector
org 023h
reti         ; I2C serial int vector

;*****
;Start Program
;*****
start:
                acall init

main:           acall delay_large

                mov dptr,#ka
                acall nxt
                call init1
                mov dptr,#k1
                acall nxt

here:          ajmp here

```

```

nxt:           clr a
                movc a,@a+dptr
                cjne a,#0ffh,go_on
                ret

go_on:        acall datawr
                acall delay
                inc dptr
                mov p1,a
                ajmp nxt

command:      setb e
                clr rs
                clr rw
                mov p1,a
                clr e
                ret

datawr:       setb e
                setb rs
                clr rw
                mov p1,a
                acall delay
                clr e
                ret

;*****
;INITIALIZATION
;*****
init:         mov a,#38h ;function set
                acall command
                acall delay

                mov a,#38h ;function set
                acall command
                acall delay

                mov a,#38h ;funtion set
                acall command
                acall delay

                mov a,#0ch ;display on/off
                acall command
                acall delay

                mov a,#01h ;clear display
                acall command
                acall delay
                mov a,#80h ;set ddram
                acall command
                acall delay
                ret

```

```
init1:          mov a,#0c0h   ;set ddram
                acall command
                acall delay

                ret
```

```
*****
;
ka:             db   '*DDDPL**',0ffh
k1:             db   'DISPLAYS',0ffh
;*****
;DELAY
;*****
;
```

```
delay_large:   mov r4,#32
abc:           mov r5,#100
sm:           mov r6,#100
mn:           djnz r6,mn
              djnz r5,sm
              djnz r4,abc
              ret
```

```
delay:         mov r4,#05d   ; delay of 60ms
delay1:        mov r5,#60d
la:           djnz r5,la
              djnz r4,delay1
              ret
              end
```