- Project Code : SS0908
- Project Title : CALCULATOR CLOCK
- CPU : SS0908
- Version : A
- Date : 1999-11-21
- File Name : SS0908 DOC

1. General Description

SS0908 is a single chip 4-bit microcontroller that can support four kinds of applications, i.e. **clock, alarm, calendar** and **calculator** It is in dice form .

2. Features

- Dice form.
- Crystal oscillator is 32.768KHz.
- Operation voltage is 1.5V.
- LCD driver build-in and drive 1/2 bias, 1/3 duty LCD panel.
- Bonding option to choose desktop or watch version.
- At any mode, if key is not pressed for 4 minutes that will auto return to clock mode.
- 4 modes in one chip which are clock, alarm, calendar and calculator.

Clock mode: Display hour, minute and second. 12 o 24 hour is selectable.

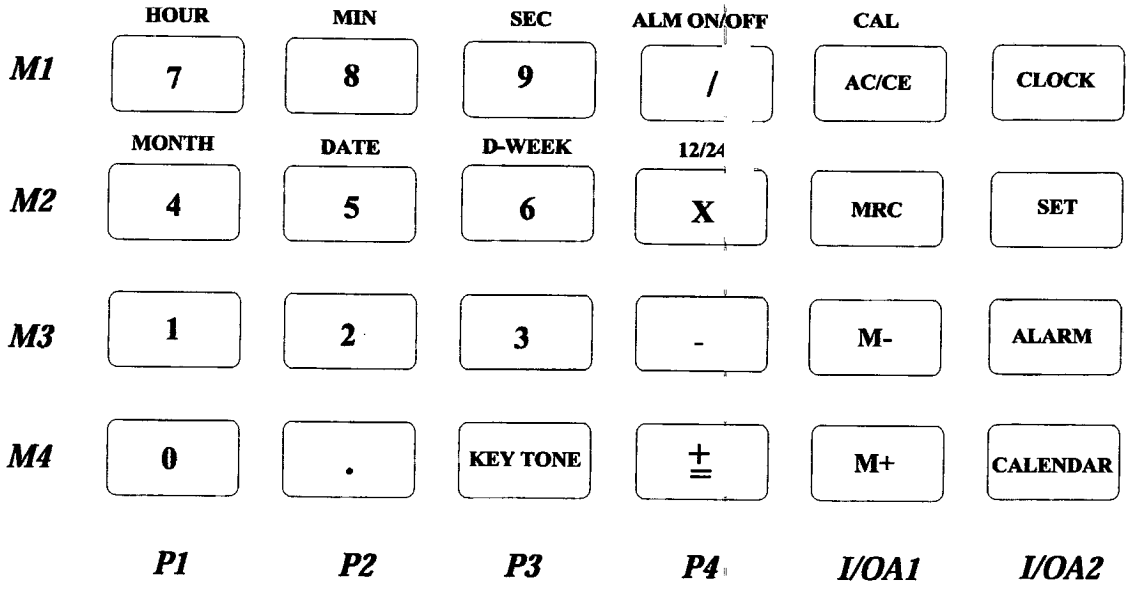
Alarm mode: The alarm is a daily alarm and can be set in hour and minute.

Calendar mode: A calendar with month, date, day of week. Auto update in leap year.

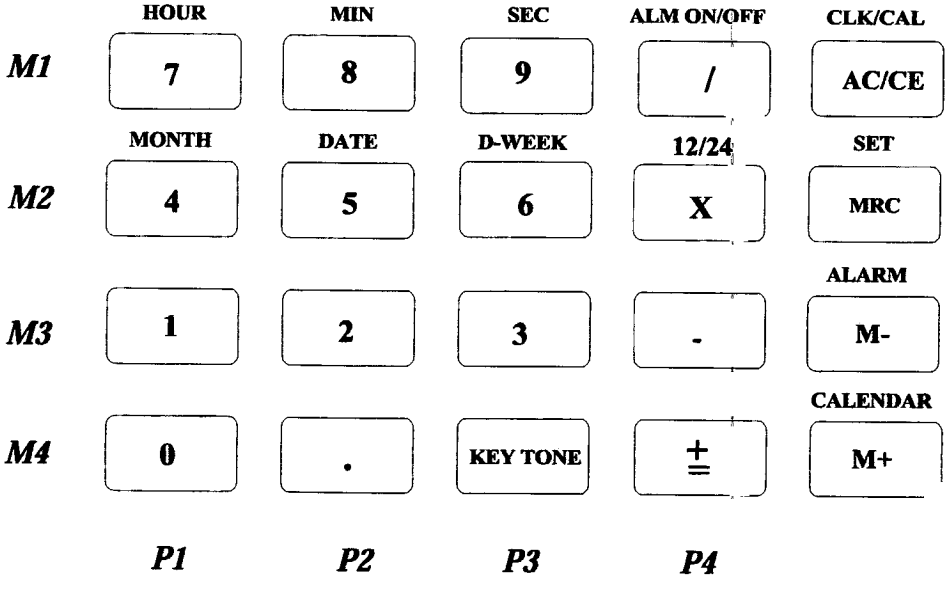
Calculator mode: 8-digit calculator with basic arithmetic operation (Addition, Subtraction, Multiplication and Division) plus memory operations such as M+, M-, MR and MC.

3.Key Matrix Mapping

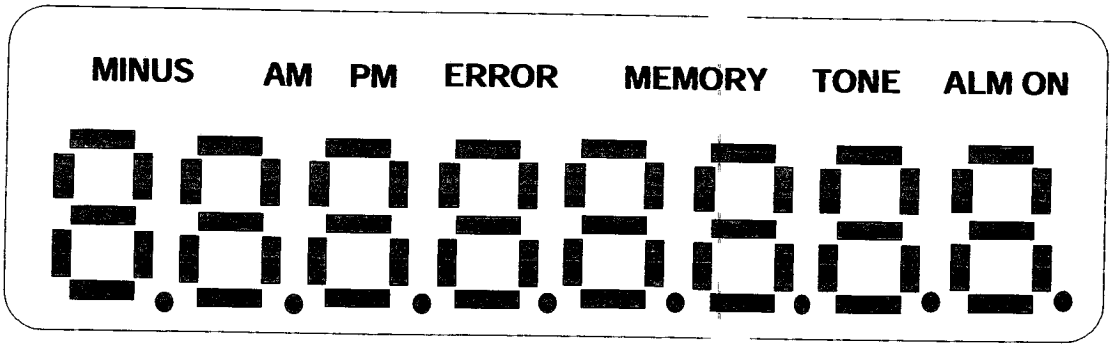
Desktop Version



Watch Version

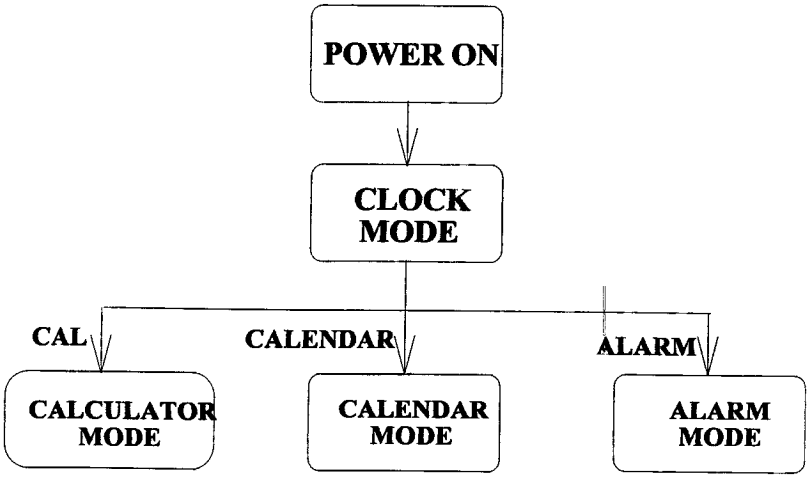


4.LCD Panel Diagram



5.Operation Flow

5.1 Mode Switching



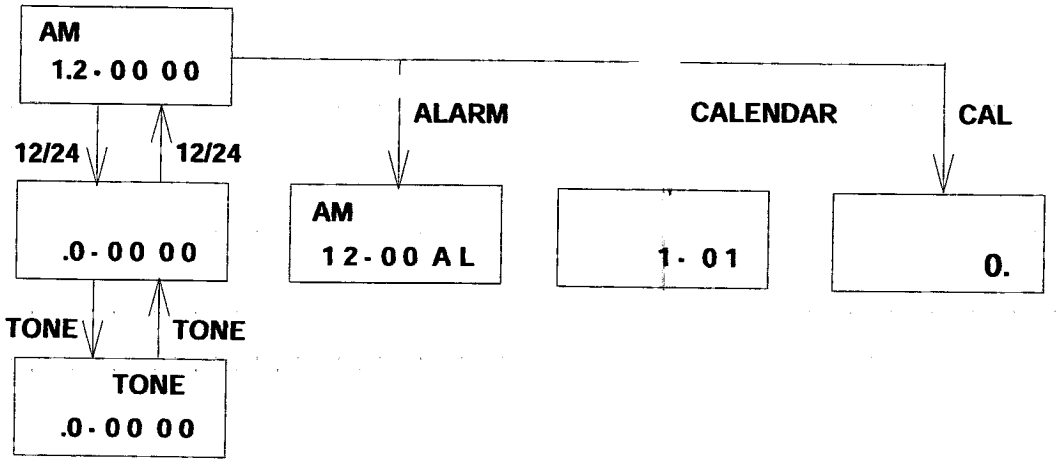
<Note>

After power on, the system will initialize its parameters and entered Clock mode. The initial values of parameters are as the following:

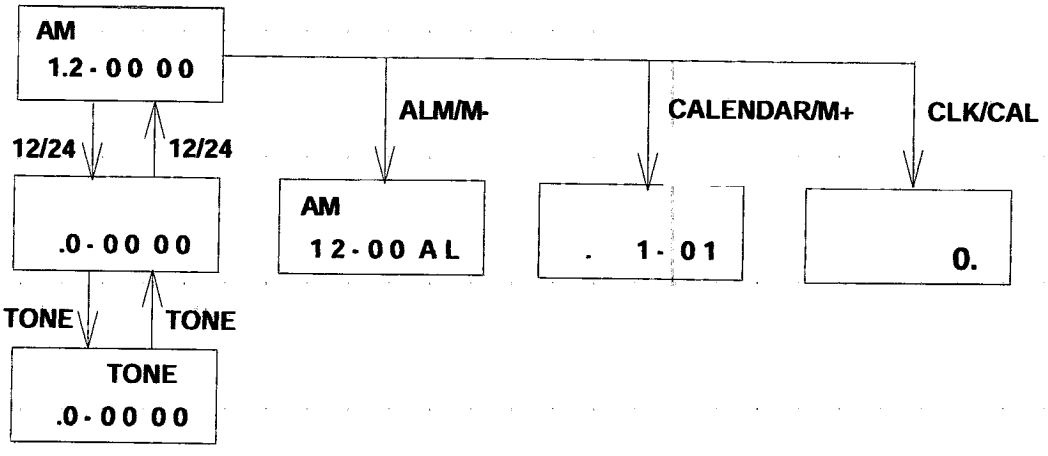
- Clock is set to 12:00 AM
- Alarm time is set to 12:00 AM
- Calendar is set to 1-01 SUN
- Alarm is off

5.2 Clock Mode

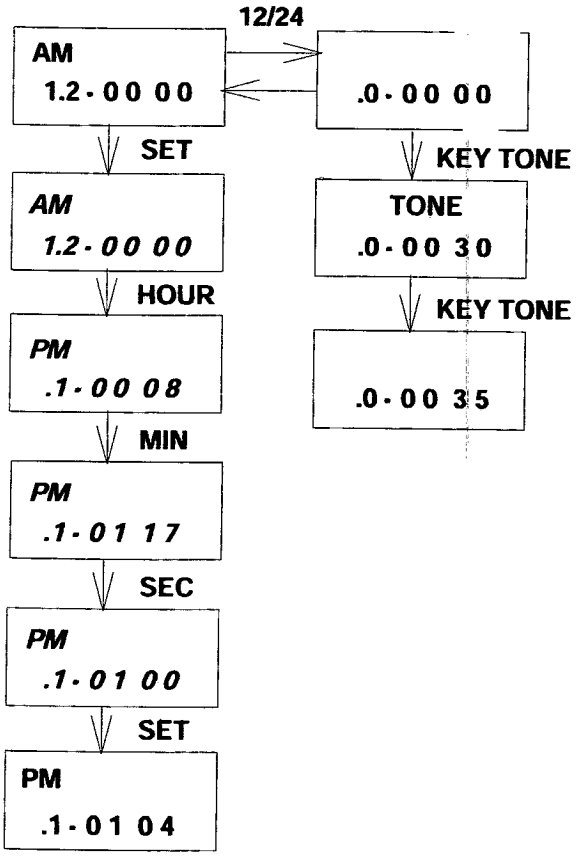
Desktop Version



Watch Version



5.3 Clock Setting Mode

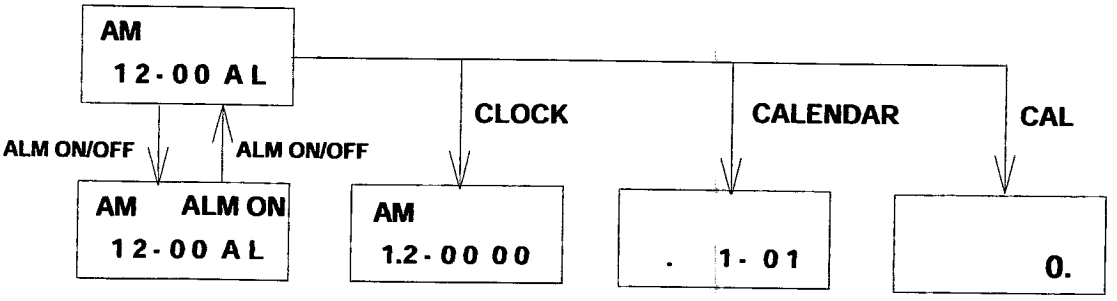


<Note>

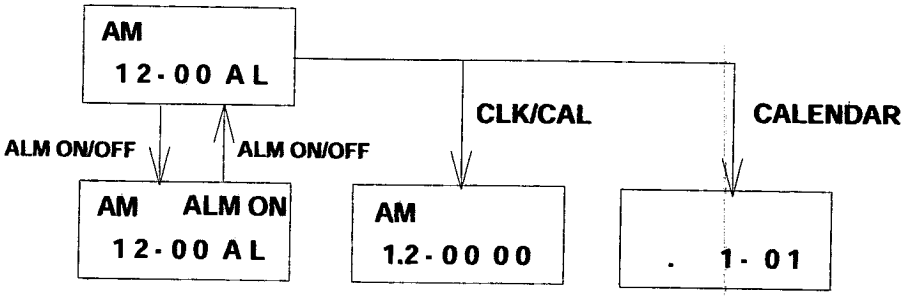
The italic stands for flashing. While enter setting status, the display will flash at 1 Hz.

5.4 Alarm Mode

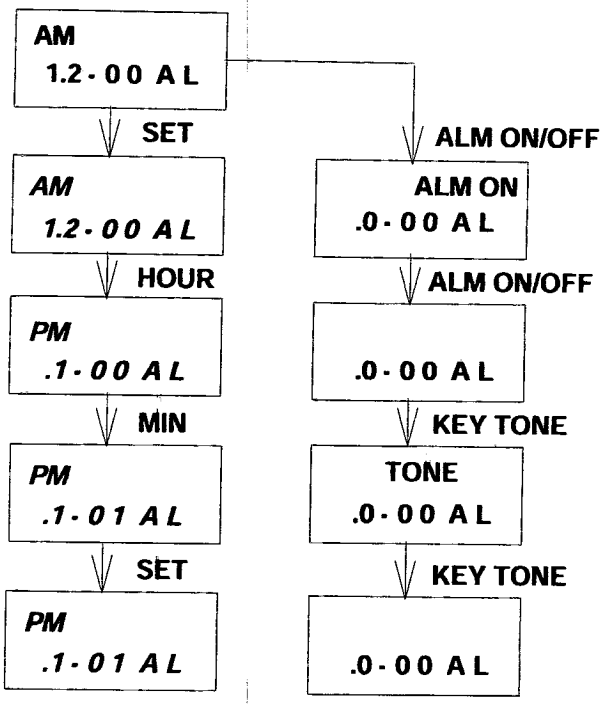
Desktop Version



Watch Version



5.5 Alarm Setting Mode

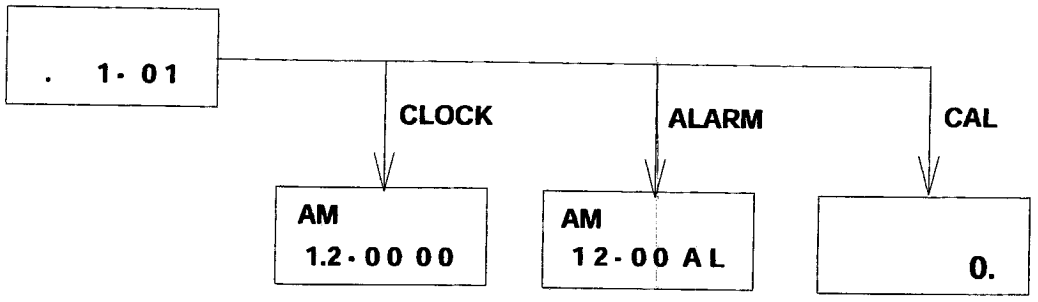


<Note>

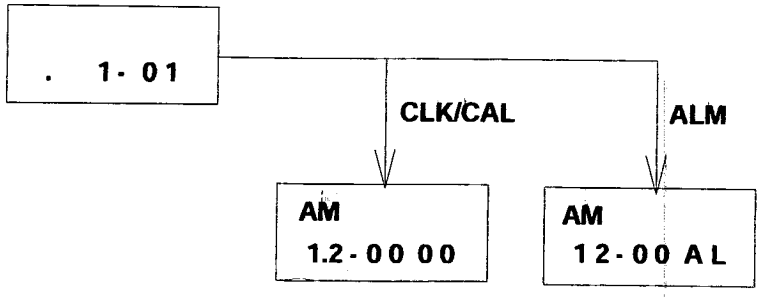
The italic stands for flashing. While enter setting status, the display will flash at 1 Hz.

5.6 Calendar Mode

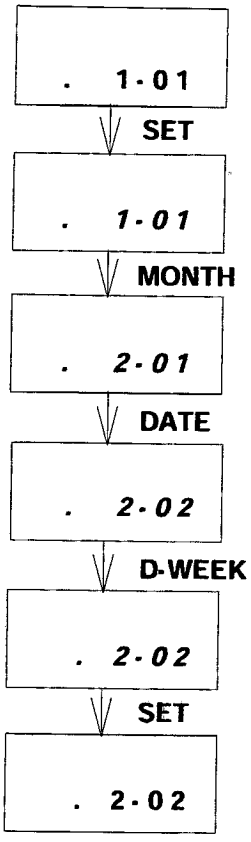
Desktop Version



Watch Version



5.7 Calendar Setting Mode



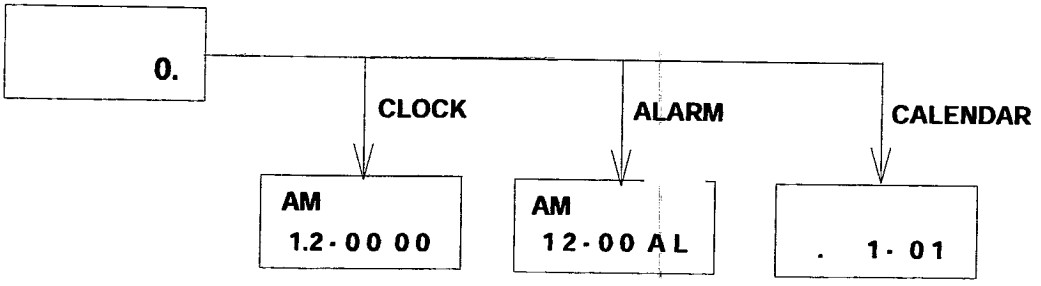
* The dot stands for day of week, press D-WEEK the dot will shift one grid.

<Note>

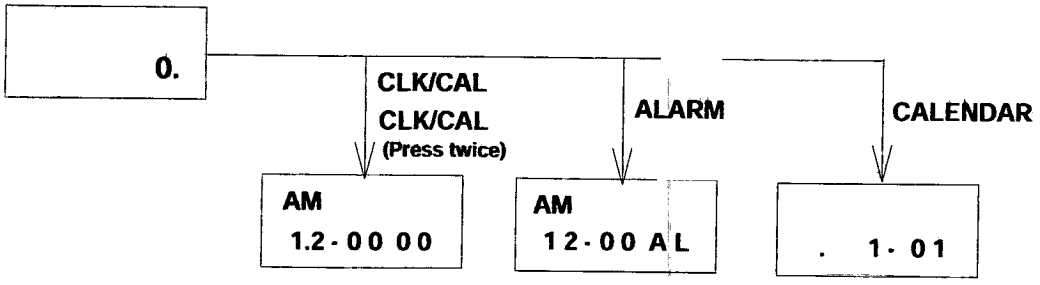
The italic stands for flashing. While enter setting status, the display will flash at 1 Hz.

5.8 Calculator Mode

Desktop Version

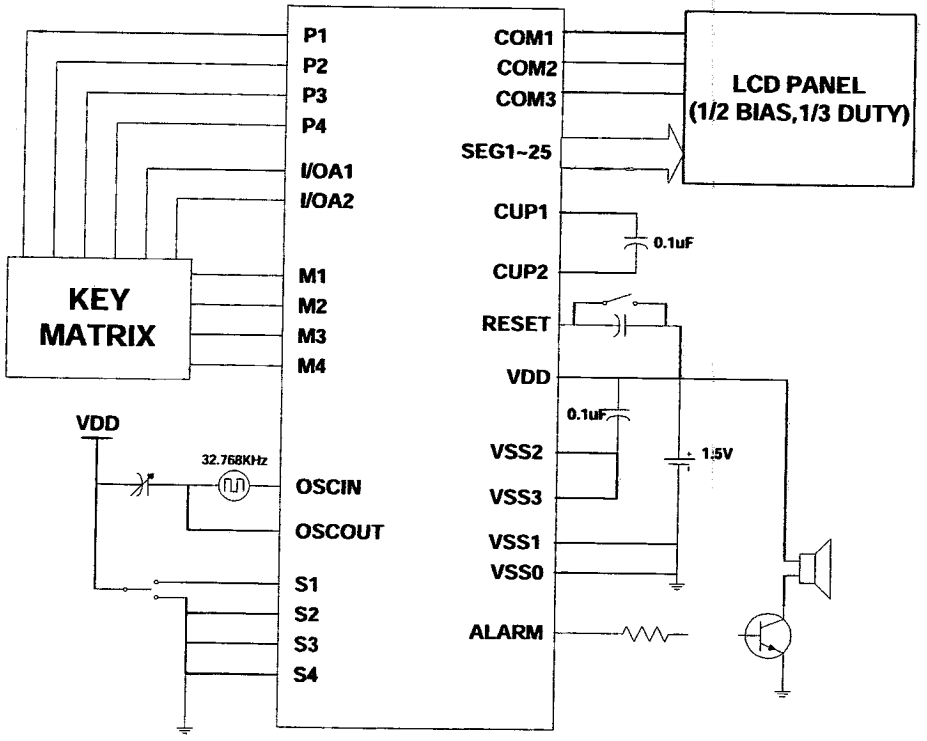


Watch Version



* Press AC/CE to clear to 0 and press AC/CE (CLK/CAL) again to return to clock mode

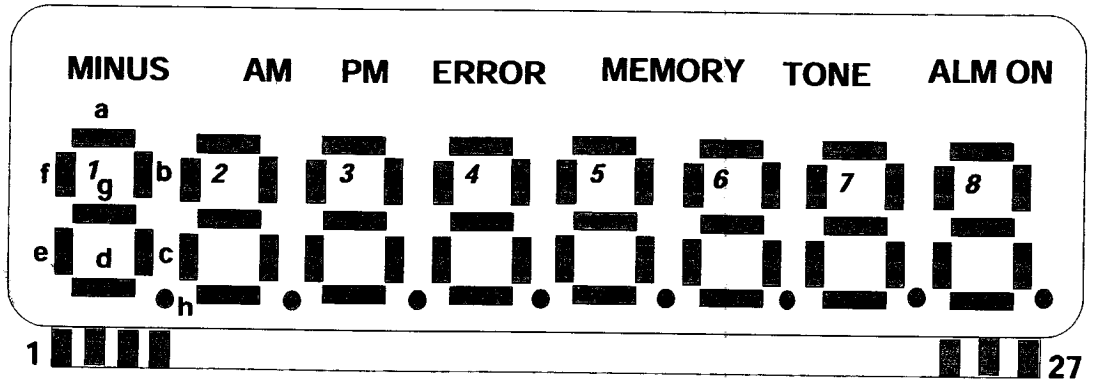
6. Typical Application Circuit



<Note>

Bonding option: **S1 -> VDD** **Desktop version**
S1 -> VSS **Watch version**

7.LCD Panel Definition

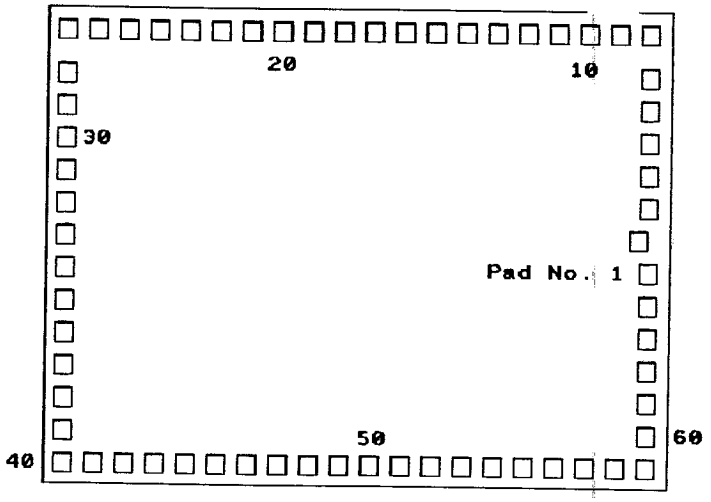


Pin No	COM1	COM2	COM3	Pin No	COM1	COM2	COM3
1	COM1	-	-	15	5a	5g	5d
2	1f	MINUS	1e	16	MEMORY	5b	5c
3	1a	1g	1d	17	6f	6e	5h
4	AM	1b	1c	18	6a	6g	6d
5	2f	2e	1h	19	TONE	6b	6c
6	2a	2g	2d	20	7f	7e	6h
7	PM	2b	2c	21	7a	7g	7d
8	3f	3e	2h	22	ALARM ON	7b	7c
9	3a	3g	3d	23	8f	8e	7h
10	-	3b	3c	24	8a	8g	8d
11	4f	4e	3h	25	8b	8c	8h
12	4a	4g	4d	26	-	COM2	-
13	ERROR	4b	4c	27	-	-	COM3
14	5f	5e	4h				

<Note>

LCD panel should be 1/2 bias, 1/3 duty and operating voltage is 3V.

8.Pad Assignment



Unit : um

Pad No.	Name	Coordinate		Pad No.	Name	Coordinate	
		X	Y			X	Y
1	VDD	3118	1010	33	OSCIN	50	1170
2	GND	3087	1170	34	CAP	50	1010
3	VSS1	3113	1330	35	OSCOUT	50	850
4	VSSO	3118	1490	36	COM1	50	690
5	VSS2	3118	1650	37	SEG1	50	530
6	ALARM	3118	1810	38	SEG2	50	370
10	IOA1	2775	2196	42	SEG6	370	50
11	IOA2	2615	2196	43	SEG7	530	50
12	IOA3	2455	2196	44	SEG8	690	50
13	IOA4	2295	2196	45	SEG9	850	50
14	IOB1	2135	2196	46	SEG10	1010	50
15	IOB2	1975	2196	47	SEG11	1170	50
16	IOB3	1815	2196	48	SEG12	1330	50
17	IOB4	1655	2196	49	SEG13	1490	50
18	RESET	1495	2196	50	SEG14	1650	50
19	INT	1335	2196	51	SEG15	1810	50
20	P1	1175	2196	52	SEG16	1970	50
21	P2	1015	2196	53	SEG17	2130	50
22	P3	855	2196	54	SEG18	2290	50
23	P4	695	2196	55	SEG19	2450	50
24	M1	535	2196	56	SEG20	2610	50

25	M2	375	2196	57	SEG21	2770	50
26	M3	215	2196	58	SEG22	2930	50
27	M4	50	2196	59	SEG23	3118	50
28	TESTA	50	1970	60	SEG24	3118	210
29	CUP1	50	1810	61	SEG25	3118	370
30	CUP2	50	1650	62	COM3	3118	530
31	S2	50	1490	63	COM2	3118	690
32	S1	50	1330	64	VSS3	3118	850

9.The Notes at Bonding and COB

9.1 The substrate *must* connect to VDD.

9.2 The TESTA pin *must* connect to VSS or set to float.

9.3 VSS0 pin *must* connect to VSS.

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