

**PROJECT SPECIFICATION**

- Project Code : SS0904
- Project Title : CALCULATOR CLOCK WITH WORLD TIME
- CPU : SS0904
- Version : A
- Date : 1998-8-21
- File Name : SS0904 a.DOC

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## 1. GENERAL DESCRIPTION

### 1. Introduction

The SS0904 is a single chip microcomputer that can support seven kinds of application i.e. clock, alarm, calendar, world time, second time units exchange and calculator.

### 2. Basic Features

- The operating voltage is 1.5V
- Crystal oscillation operates at 32.768KHz
- Built-in LCD driver directly drive 1/3 Bias and 1/4 duty, Operation on 4.5V
- 7 modes in one chip which are clock, alarm, calendar, world time, second time units exchange and calculator.

**Clock mode**           display hour, minute and second, 12 or 24 hour 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

**World time mode**     display 16 city time.

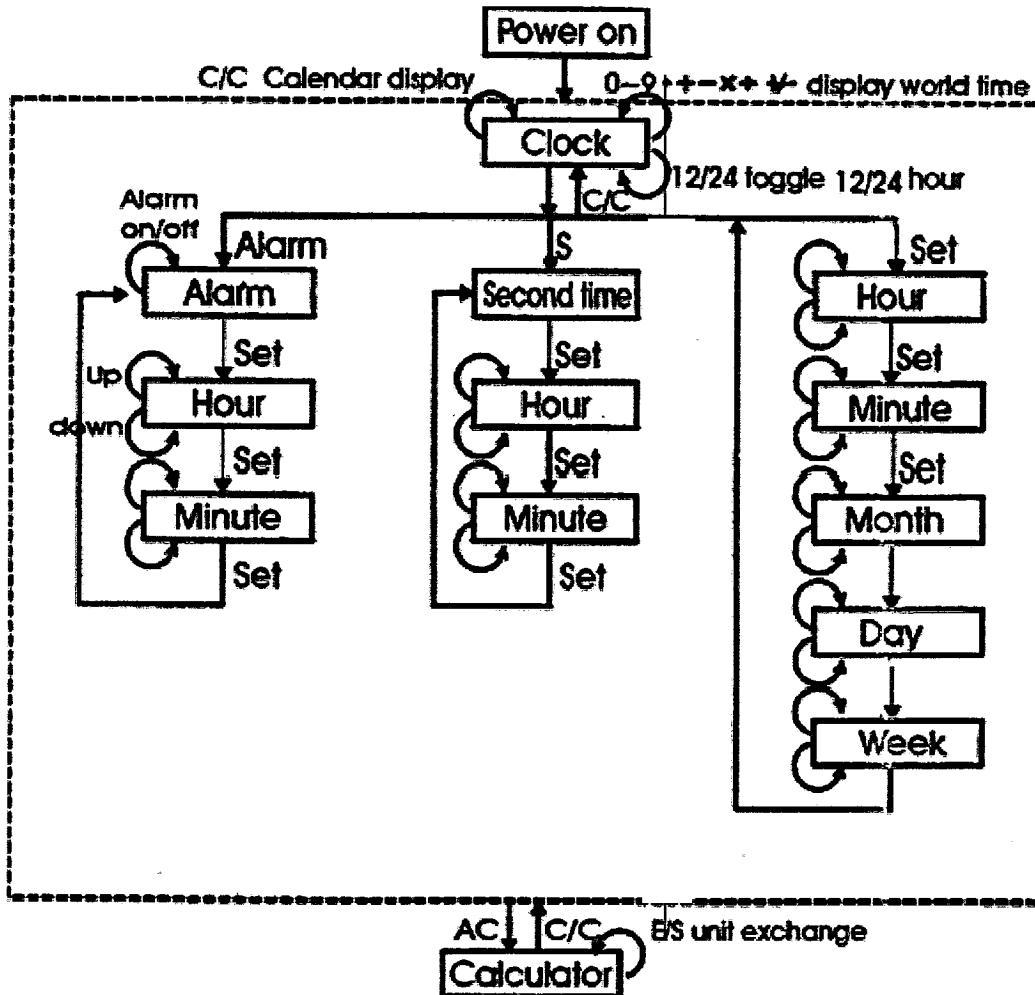
**Second time mode**   display second time.

**Units exchange mode** 16 kinds of units exchange.

**Calculator mode**     8 digit calculator with basic arithmetic operation (addition, subtraction, multiplication and division), plus memory operations such as M+, M-, MR and MC

- Auto return to clock mode.

2. OPERATION FLOWCHART



Remark:

- Up : increase the setting digit.
- Down : decrease the setting digit.

**3. KEY ASSIGNMENT AND FUNCTIONS**

**3.1 Key Layout**


M+	M-	MR	MC	C/C
up	down	set	clear	
7	8	9	/	AC
London	Paris	Cairo	Riyadh	
4	5	6	x	♪
Kioto	Bangkok	Hong Kong	Tokyo	
1	2	3	-	E/S
Sydney	Wellington	Hawaii	Los Angeles	
0	.	±	+	=
Denver	Chicago	New York	Rio De Janeiro	12/24

M+	M-	MR	MC	C/C
up	down	set	clear	
7	8	9	/	AC
inch→cm	cm→inch	foot→metre	metre→foot	
4	5	6	x	♪
yard→metre	metre→yard	mile→km	km→mile	
1	2	3	-	E/S
gallon→litre	litre→gallon	ounce→g	g→ounce	
0	.	±	+	=
pound→kg	kg→pound	°C→°F	°F→°C	12/24

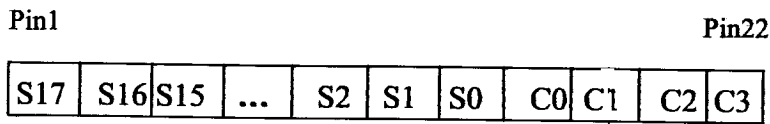
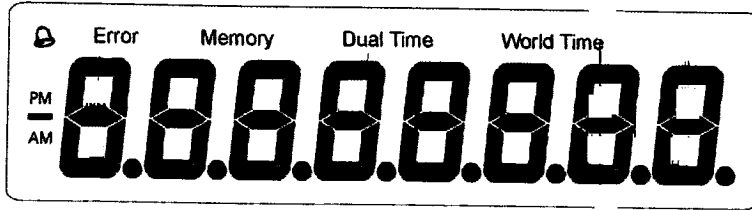
**Remark:**

- AC : all clear
- C/C: clock/Calendar
- ♪ : key tone
- E/S: units exchange/second time

**3.2 Key Function**

- 0-9 : decimal digit entry in calculator mode.  
display world time in real time clock mode.  
units exchange in units exchange mode.
- . : decimal point entry .  
display world time in real time clock mode.  
unit exchange in unit exchange mode.
- M+/UP : add display value to memory buffer in calculator mode.  
increase the setting digit in clock, alarm, calendar, second time setting mode.
- M-/DOWN : subtract display value to memory buffer in calculator mode.  
decrease the setting digit in clock, alarm, calendar, second time setting mode.
- MR/SET : memory recall in calculator mode.  
enter clock, alarm, calendar, second time setting mode in clock, alarm, calendar, second time mode.
- MC/ALARM : memory clear in calculator mode.  
enter alarm mode in clock, calendar, second time mode.
- +/- : change sign in calculator mode.  
display world time in real time clock mode.  
units exchange in units exchange mode
- +, -, x, / : operate the four basic arithmetic operation in calculator mode.  
display world time in real time clock mode.  
units exchange in units exchange mode
- =/12/24 : start calculation in calculator mode.  
select 12/24 hour in real time clock mode.
- E/S : units exchange in calculator mode.  
enter second time mode in real time clock mode.
- CIC : return to clock in other mode.  
enter calendar display mode in real time clock mode.
- AC : clear all calculation procedure.  
enter calculator mode in other modes.
-  : toggle on/off key tone.

**4. LCD PATTERN**






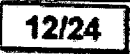


- Bias  $\frac{1}{3}$
- Duty  $\frac{1}{4}$
- Operation Voltage 4.5V
- Total segments 72

## 5. OPERATIONAL DESCRIPTION

### 5.1 Power On Reset Status






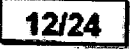
Calendar: 1-1 sunday Real time clock: 12:00 00 AM HongKong  
 Alarm : 12:00 AM alarm off Second time: 12:00 AM

### 5.2 Real Time Clock Mode


- Press  key to enter calculator mode
- Press  key to enter calendar display mode.
- Press  key to enter alarm mode.
- Press  key to toggle on/off 12 or 24 hour format.
- Press 0~9 , . , + , - , × , ÷ key to display world time
- Press  key to enter clock setting mode.
- Press  key to toggle on/off key tone.

### 5.3 World time mode

#### 5.4 Alarm Mode

- Press  key to enter real time clock mode.
- Press  key to enter calculator mode.
- Press  key to enter alarm setting mode.
- Press  key to toggle on/off alarm.
- Press  key to toggle on/off key tone.
- Press  key to toggle on/off 12 or 24 hour format.
- Press 0~9 , . , + , - , × , ÷ key to display world time

#### 5.5 Clock and calendar Setting Mode

- Press  key ,the setting sequence is followed.





- Press **UP** key to increase the setting digit.
- Press **DOWN** key to decrease the setting digit.
- Press **ALARM** key to enter alarm mode.
- Press **AC** key to enter calculator mode.
- Press **C/C** key to enter clock mode.
- Press **♪** key to toggle on/off key tone.
- Press **12/24** key to toggle on/off 12 or 24 hour format.
- Press **0-9** , **.** , **+** , **-** , **x** , **÷** key to display world time

### 5.6 Alarm Setting Mode



- Press **SET** key to select the setting digit.







- Press **UP** key to increase the setting digit.
- Press **DOWN** key to decrease the setting digit.
- Press **ALARM** key to enter alarm mode.
- Press **AC** key to enter calculator mode
- Press **C/C** key to enter clock mode.
- Press **♪** key to toggle on/off key tone.
- Press **12/24** key to toggle on/off 12 or 24 hour format.
- Press **0-9** , **.** , **+** , **-** , **x** , **÷** key to display world time

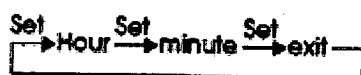
### 5.7 Second time Mode



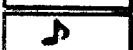

- Press **ALARM** key to enter alarm mode.
- Press **C/C** key to enter real time clock mode
- Press **AC** key to enter calculator mode.
- Press **SET** key to enter second time setting mode.

- Press  key to toggle on/off key tone.
- Press  key to toggle on/off 12 or 24 hour format.
- Press 0~9 , . , + , - , × , ÷ key to display world time



### 5.8 Second time setting mode

- Press  key to enter alarm mode.
- Press  key to enter real time clock mode.
- Press  key to enter calculator mode
- Press  key to select the setting digit.



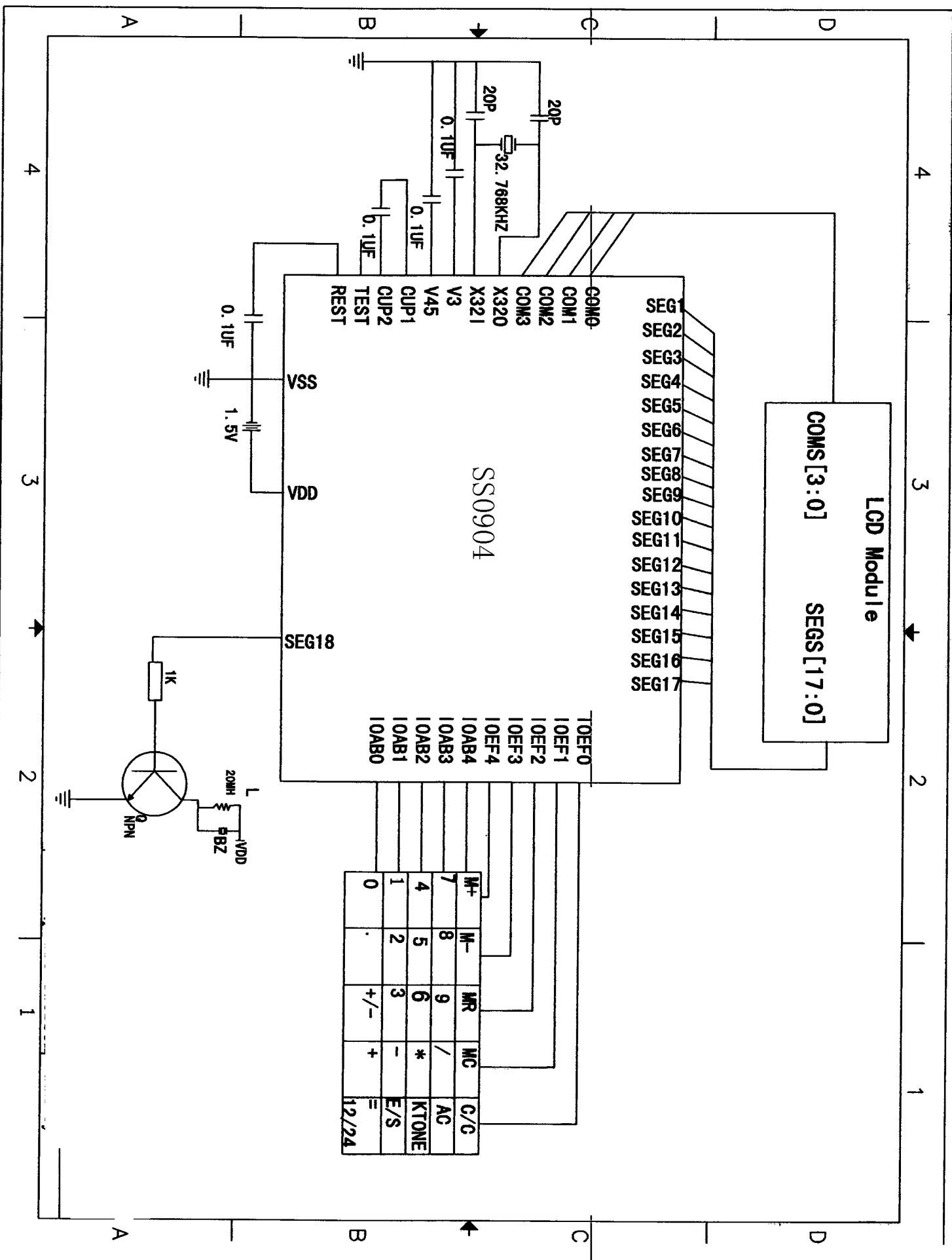
- Press  key to increase the setting digit.
- Press  key to decrease the setting digit.
- Press  key to toggle on/off key tone.
- Press  key to toggle on/off 12 or 24 hour format.
- Press 0~9 , . , + , - , × , ÷ key to display world time .

### 5.9 Calculator Mode

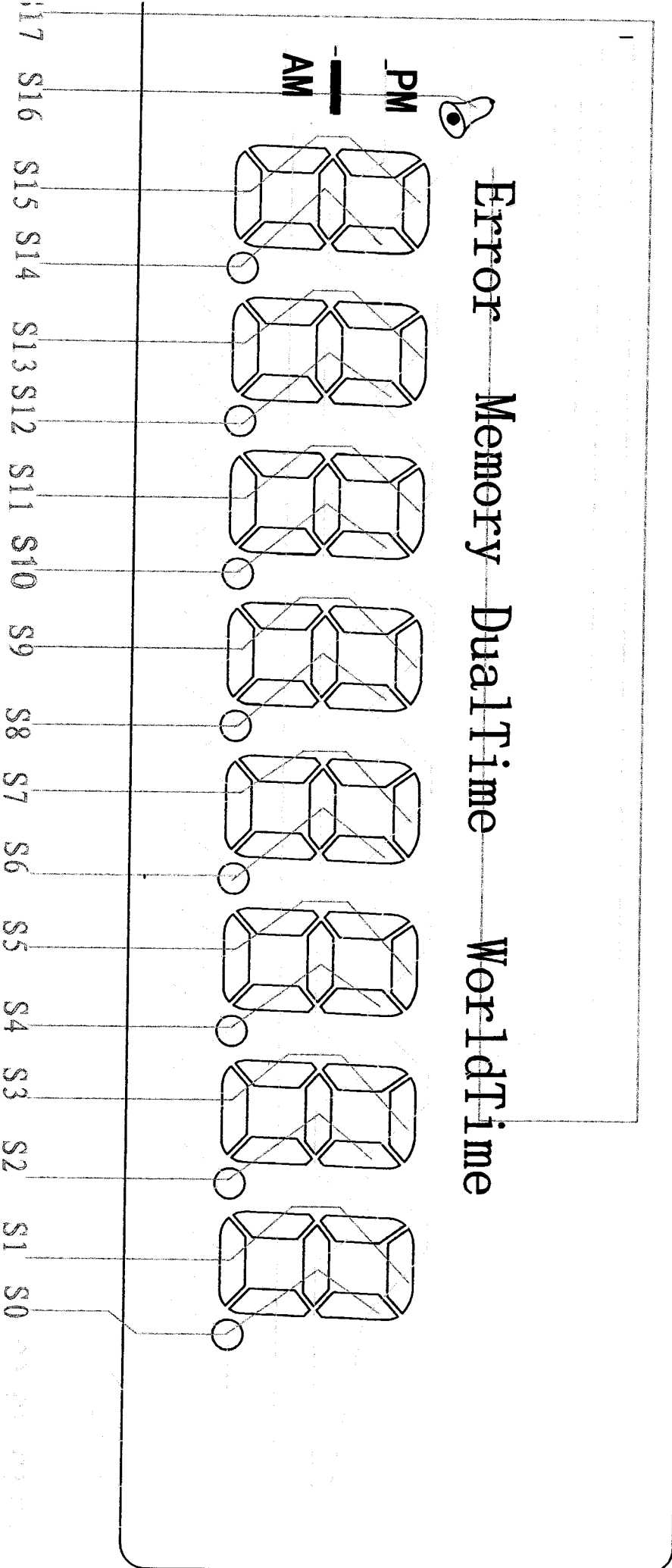
- Press  key to enter real time clock mode.
- Press  key to toggle on/off key tone.
- 8 digit simple calculator with memory.
- Input digits ,then press E/S key to enter units exchange mode, press 0-9 , +/- key to exchange.

*6. APPLICATION CIRCUIT*

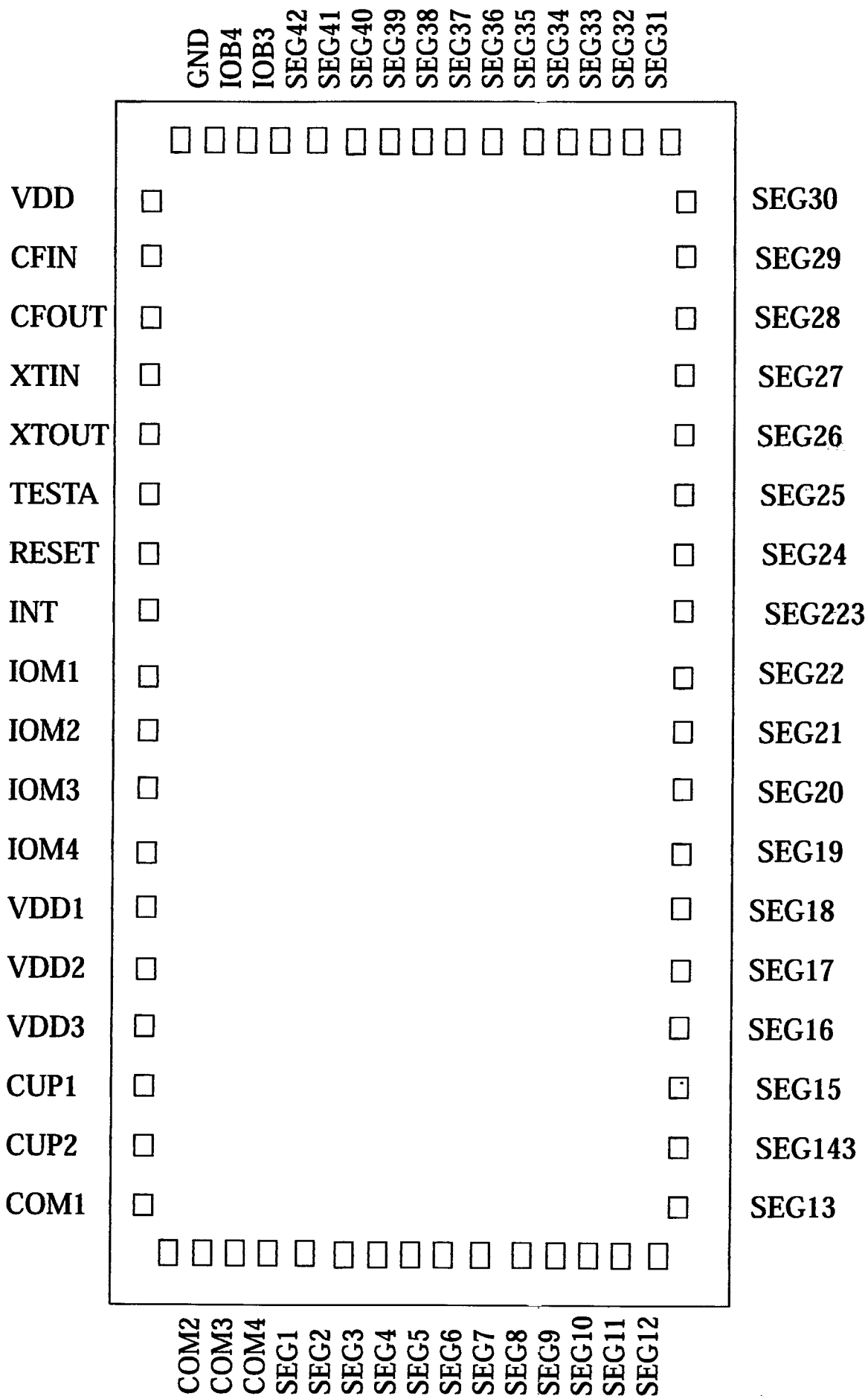
See attached pages.



M+	M-	MR	MC	G/C
7	8	9	/	AC
4	5	6	*	K/TONE
1	2	3	-	E/S
0	.	+/-	+	=
				12/24



IC 脚位图:



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