

**4-DIGIT ALARM WATCH/CLOCK WITH 3 TIMERS**

SS0845

**1. DESCRIPTION**

The SS0845 is a CMOS 4-digit alarm watch/clock integrated circuit with alarm, and 3 independent count up/down timers. Alarm and timers generate different sounds.

**1.1 FUNCTIONS**

- Real time watch/clock in 24-hour format
- Fast advance for time and alarm time set
- Alarm enable/disable
- 60 seconds alarm auto-stop
- 8 switches selectable operation
- Reset function
- User selectable 3 count-down timers
  - Timer 1 : 99 min 59 sec count-down
  - Timer 2 : 99 min 59 sec count down
  - Timer 3 : 99 hour 59 min count down
  - Timer flag during real time display

**1.2 FEATURES**

- Single-chip CMOS construction
- Drives 4-digit 1:3 multiplexed LCD
- 32,768Hz crystal frequency
- On chip oscillator
- Single 1.5V battery operation

**2. ELECTRICAL CHARACTERISTICS****A) Absolute Maximum Ratings**

Parameter	Symbol	Rating			Unit
		Min.	Typ.	Max	
Supply Voltage (1)	V <sub>ss1</sub>	-3.0	-1.5	-1.2	V
Oscillation Frequency	F <sub>osc</sub>	---	32.768	---	KHz
Booster Capacitor	C1	---	0.1	---	μF
Capacitor Between V <sub>dd</sub> - V <sub>ss2</sub>	C2	---	0.1	---	μF
Capacitor Between V <sub>dd</sub> - V <sub>ss3</sub>	C3	---	0.1	---	μF
Supply Current			2.5		μA

**B) Operating Conditions**

Parameter	Symbol	Rating		Unit
		Min	Max	
Supply Voltage (1)	V <sub>ss1</sub>	-3.0	+0.2	V
Supply Voltage (2)	V <sub>ss2</sub> , V <sub>ss3</sub>	-0.5	+0.2	V
V <sub>ss1</sub> Terminal Voltage	V <sub>I01</sub>	V <sub>SS1</sub> -0.2	+0.2	V
V <sub>ss2</sub> Terminal Voltage	V <sub>I02</sub>	V <sub>SS2</sub> -0.2	+0.2	V
V <sub>ss3</sub> Terminal Voltage	V <sub>I03</sub>	V <sub>SS3</sub> -0.2	+0.2	V
Operating temperature	T <sub>opr</sub>	-20	70	°C
Storage temperature	T <sub>stg</sub>	-40	125	°C

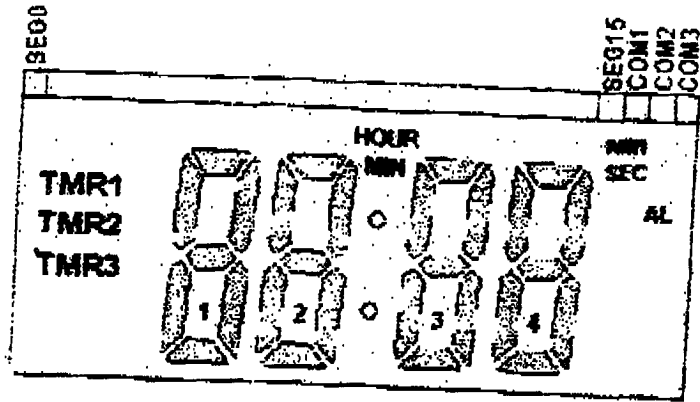
\*Ground is VDD (= 0V)

\*Supply Voltage should be |V<sub>ss1</sub>| ≤ |V<sub>ss2</sub>| ≤ |V<sub>ss3</sub>|

**4-DIGIT ALARM WATCH/CLOCK WITH 3 TIMERS****SS0845****3. SETTING SEQUENCE AND SWITCH OPERATION**

- a. To Set Time
- At normal time display, keep pressing the "Clock" button (for about 3 second) until the 4-digit time begin to flash.
  - Set hour with the "Min (Hour)" button and set Minute with the "Sec (Min)" button.
  - Press and release the "Clock" button one time to return to normal time display.
- b. To Set Alarm
- At normal time display, press and release the "Clock" button to enter the alarm setting mode.
  - At alarm setting mode the alarm time and the alarm icon appear.
  - Set hour with the "Min (Hour)" button and set Minute with the "Sec (Min)" button.
  - Press and release the "Clock" button one time to return to normal time display
  - Use the "Start/Stop" button to toggle the alarm on/off at alarm setting mode.
  - If the alarm is turn off,
    - At the alarm setting mode, the alarm icon will flash
    - At the normal time display, the alarm will disappear.
- c. Timer Function
- Press "Timer 1" button to select Timer 1 mode (maximum count up/down 99 minute 59 sec)
  - Press "Timer 2" button to select Timer 2 mode (maximum count up/down 99 minute 59 sec)
  - Press "Timer 3" button to select Timer 3 mode (maximum count up/down 99 hour 59 min)
  - Press the "Start/Stop" button once to begin count up. Press the "Start/Stop" button again to stop the count up. To reset the count up, first press the "Start/Stop" button to stop the counting down. Then press the "Clear" button.
  - For count down operation, set the minute (hour for Time 3) with the "Min (Hour)" button and set the second (minute for Timer 3) with the "Sec (Min)" button. Press the "Start/Stop" button to start/stop the counting down. To reset the count down time setting, first press the "Start/Stop" button to stop the counting down. Then press the "Clear" button.
  - To reset the count down time setting, first press the "Start/Stop" button to stop the counting down. Then press the "Clear" button.
  - When the counting down has finished,
    - Series of beeps will be generated. The beeps will last for 1 minute or be stopped by pressing "Start/Stop" button. (Note: each timer has its own sound of beeps)
    - If the "Start/Stop" button is not pressed, the timer begins to count up (i.e. measuring the amount of time passed after the count down has finished). The counting up process will not stop unless the "Start/Stop" button is pressed. When the timer has counted up to its maximum counting time (99 min 59 sec for Timer 1 and 2, 99 hour and 59 min for Timer 3). The timer returns to 00:00 and start counting up again. To stop the counting up, press "Start/Stop" button to stop the timer, and press "Clear" button to reset the timer.
  - When the timer is/are counting,
    - Press the "Clock" button to return to normal time display
    - At the normal time display, the corresponding timer icon will flash.
- d. The "Reset" Button

LCD FORMAT

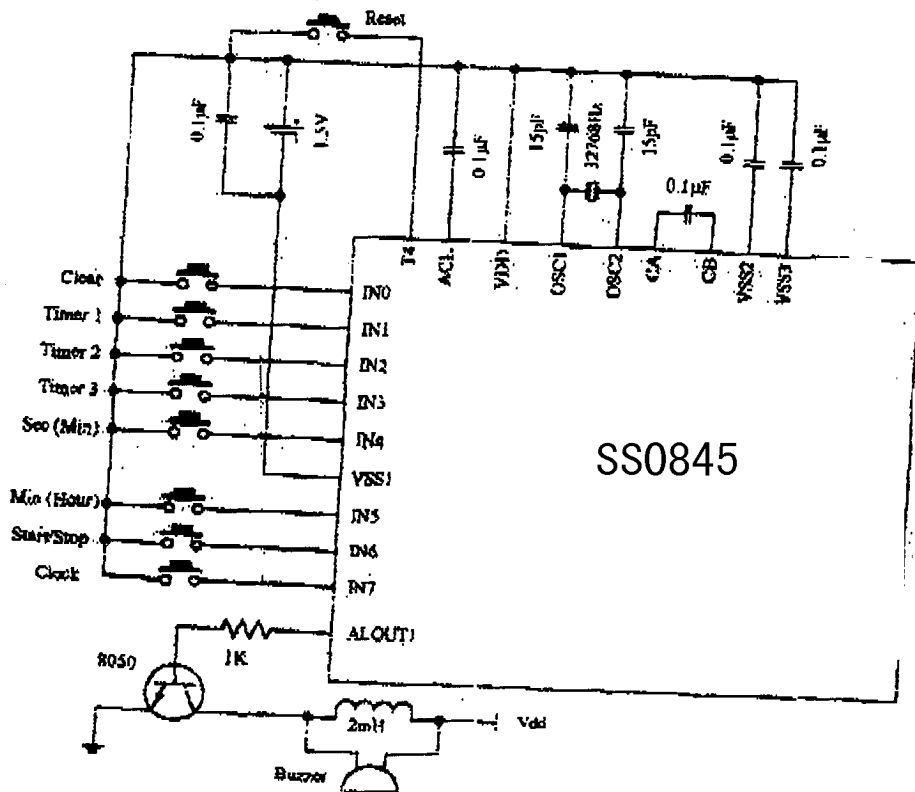


PIN	SEG0	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6	SEG7
COM1	TMR1	1F	1A	1B	2F	2A	2B	HOUR
COM2	TMR2	1E	1G	1C	2E	2G	2C	
COM3	TMR3		1D			2D		

PIN	SEG8	SEG9	SEG10	SEG11	SEG12	SEG13	SEG14	SEG15
COM1	MIN	3F	3A	3B	4F	4A	MIN	SEC
COM2	COL	3E	3G	3C	4E	4G	4B	AL
COM3			3D			4D	4C	

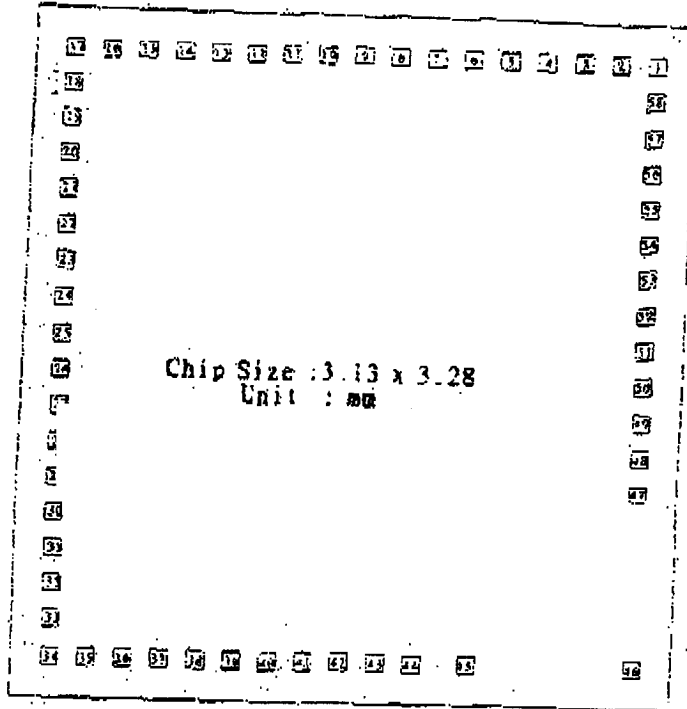
5. APPLICATION CIRCUIT



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**6. PAD DIAGRAM**



Pad No.	Pad Name	X	Y	Pad No.	Pad Name	X	Y	Pad No.	Pad Name	X	Y
1	SEG18	2.6190	2.7720	21	COM1	0.0000	2.1033	41	IN5	1.2231	0.0000
2	SEG17	2.4030	2.7720	22	Vdd3	0.0000	1.9503	42	IN6	1.3898	0.0000
3	SEG16	2.2460	2.7720	23	Vdd2	0.0000	1.7973	43	IN7	1.5561	0.0000
4	SEG15	2.0835	2.7720	24	T7	0.0000	1.6443	44	T2	1.7226	0.0000
5	SEG14	1.9319	2.7720	25	CB	0.0000	1.4913	45	ALOUT 1	2.1490	0.0000
6	SEG13	1.7748	2.7720	26	CA	0.0000	1.3383	46	ALOUT 2	2.6190	0.0000
7	SEG12	1.6178	2.7720	27	OSC2	0.0000	1.1853	47	T5	2.6190	0.5247
8	SEG11	1.4607	2.7720	28	OSC1	0.0000	1.0323	48	T6	2.6190	0.7488
9	SEG10	1.3037	2.7720	29	T9	0.0000	0.8793	49	T1	2.6190	1.0116
10	SEG9	1.1478	2.7720	30	T8	0.0000	0.7263	50	COM3	2.6190	1.1808
11	SEG8	0.9918	2.7720	31	Vdd	0.0000	0.5733	51	SEG26	2.6190	1.3500
12	SEG7	0.8348	2.7720	32	ACL	0.0000	0.4203	52	SEG25	2.6190	1.5192
13	SEG6	0.6777	2.7720	33	T4	0.0000	0.2673	53	SEG24	2.6190	1.6884
14	SEG5	0.5207	2.7720	34	T3	0.0000	0.0000	54	SEG23	2.6190	1.8576
15	SEG4	0.3686	2.7720	35	INO	0.2070	0.0000	55	SEG22	2.6190	2.0268
16	SEG3	0.2070	2.7720	36	IN1	0.3735	0.0000	56	SEG21	2.6190	2.1960
17	SEG2	0.0000	2.7720	37	IN2	0.5400	0.0000	57	SEG20	2.6190	2.3652
18	SEG1	0.0000	2.5623	38	IN3	0.7065	0.0000	58	SEG19	2.6190	2.5344
19	SEG0	0.0000	2.4893	39	IN4	0.8730	0.0000				
20	COM2	0.0000	2.2563	40	Vss1	1.0481	0.0000				

NOTE: The chip substrate is electrically connected to V<sub>ss</sub>

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