



8 Digits Calculator with Two Currency Exchange IC

C9831

Displaying on Dual Lines LCD(Default rate built in)

GENERAL DESCRIPTION

C9831 is a CMOS LSI calculator chip with 8 digits arithmetic operations and currency exchange function of 2 countries, designed for triplex LCD application with 1.5V battery or solar cell power supply. In converter mode, LCD displays in two lines, each line has 8 digits with 2 icons. The result of currency exchange and its following operations displays in two decimals and is rounded to two decimals if it exceeds two decimals.

The rate can be set, otherwise the rate is default value which was built in. Exchange rates will be kept in the special memory even after power off.

FUNCTIONS

- 1.5V power supply (battery or solar cell)
- Turn on in currency converter mode with two currency exchange function
(The nature of the conversion is thus from Country2 (Euro) to Country1(FF))
- 8-digits with '▶' and '≐' two icons display on each line of dual lines LCD in currency converter mode
- The result of currency exchange and its following operations displays in two decimals and is rounded to two decimals if it exceeds two decimals. If the decimal point is less than two digits, the result doesn't add '0'. LCD display '0.' when result is zero.
- The rate can be set and kept in special memory even after power off. Otherwise, the rate is default value which was built in.
- Using Country2(Euro) display line with 'M', '-' and 'E' icons in normal calculator mode .
- Four standard functions (+, -, x, ÷).
- Auto-constant calculations (constant: multiplicand, divisor, addend and subtrahend)
- Extraction of square root.
- Mark-up and mark-down calculations.
- Percentage calculations.
- Chain addition, subtraction, multiplication and division

APPLICATION

This specification contains complete informations of functional description, electrical characteristics, packaging, and crating requirements of C9831.

FEATURES

- Accumulating memory: M+, M-, MRC
- Special memory: RATE, SET
- Floating decimal in calculator operation
- Overflow indication : 'E'
- Automatic power off function.
- The key matrix have the following keys:
0,1,2,3,4,5,6,7,8,9,.,+,-,x,÷,=,ON/Euro,Cal/C,
CE,OFF,M+,M-,MRC,+/-,%,SET , RATE,◀
- 1/4 duty cycle, 1/2 bias LCD

ABSOLUTE MAXIMUM RATINGS

Parameters	Symbol	Value	Unit	Note
Extremely voltage	V _{DD}	- 0.3 ~ + 2.0	V	1
	V _{IN}	- 0.3 ~ V _{DD} + 0.3	V	1
Solar Supply Voltage	V _{SB}	1.1 ~ 3.0	V	2
	V _{GG} (LIM)	1.1 ~ 1.8	V	3
Operating temperature range	T _{OPR}	0 ~ + 50	° C	--
Storage temperature range	T _{STG}	- 55 ~ + 125	° C	--

Note 1 : Maximum voltage on any pin is referenced to GND.

Note 2 : V_{SB} is solar supply voltage.

Note 3 : V_{GG} (lim) is limited voltage.

ELECTRICAL CHARACTERISTICS

(Ta = 25°C, V_{DD} = 1.5V unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition	Note
Input Voltage	V _{IH}	V _{DD} -0.4	--	--	V	--	4
	V _{IL}	--	--	0.4	V	--	
Input Current	I _{IH}	--	--	1	μA	V _{IN} = V _{DD}	5
	I _{IL}	0.3	1	3	μA	V _{IN} = 0V	
Output Voltage 1	V _{OH}	V _{DD} -0.15	--	--	V	No load	6
	V _{OL}	--	--	0.15	V	I _{OUT} = 15μA	
Output Voltage 2	V _{OA}	2.8	2.95	--	V	No load	7
	V _{OB}	1.3	1.5	1.7	V	No load	
	V _{OC}	--	0	0.2	V	No load	
Display Frequency	F _d	40	55	65	Hz	V _{DD} = 1.3V while display is ON.	7
Dissipation Current	I _{OFF}	--	--	0.2	μA	Display is OFF	8
	I _{DIS}	--	4.2	6	μA	V _{DD} = 1.3V while display is on.	9
	I _{OP}	--	6.8	--	μA	V _{DD} = 1.1V , while operation.	10

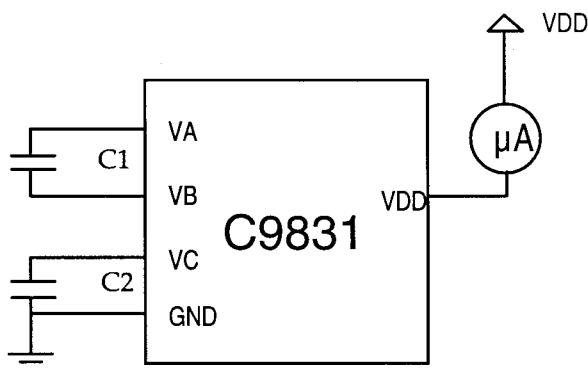
Note 4 : Applies to Pins K2 ~ K6.

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Note 6 : Applies to P1,P2, A2X ~ A5X.

Note 7 : Applies to H1 ~ H4, A0 ~ A16, B1 ~ B16.

Note 8 : Measured by the test circuit below after power supply automatically turns off.



Note 9 : Measured by the test circuit while "0" is being displayed after auto - clear operation and while key is not being depressed.

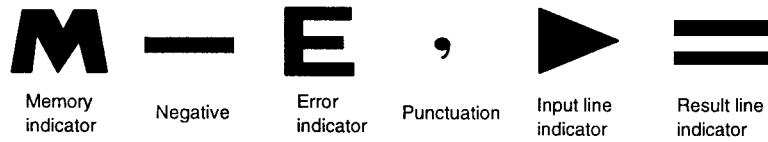
Note 10 : Measured by the test circuit while operation is being made by ON/C key and while key is not being depressed.

DISPLAY FONTS

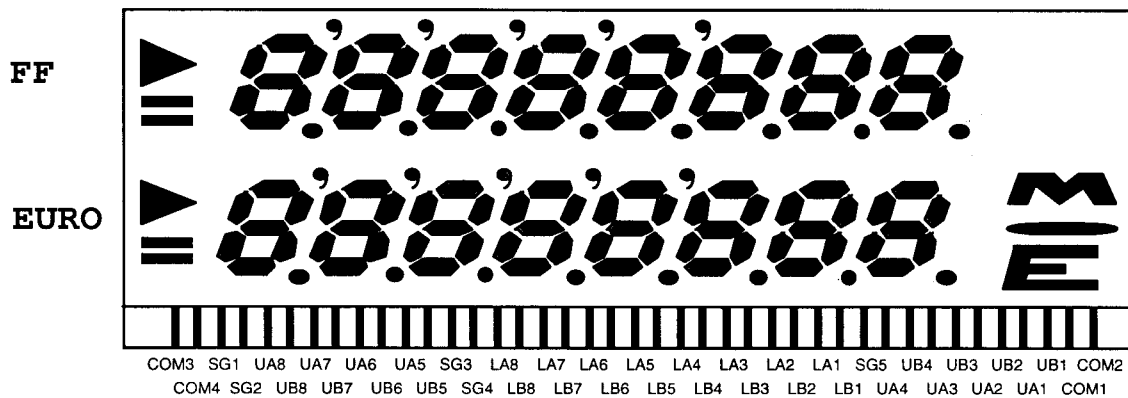
a. Numerical Font



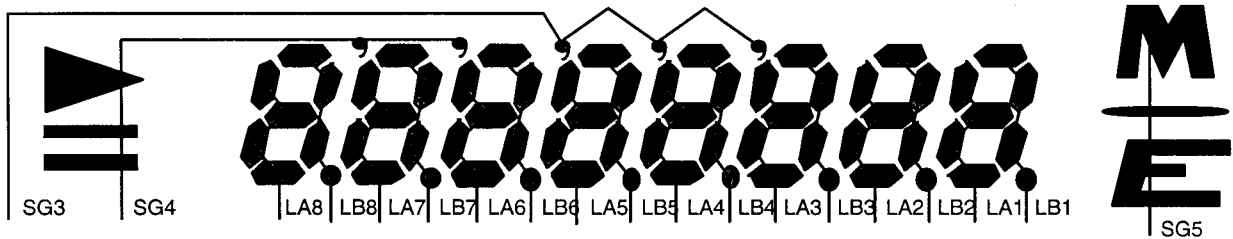
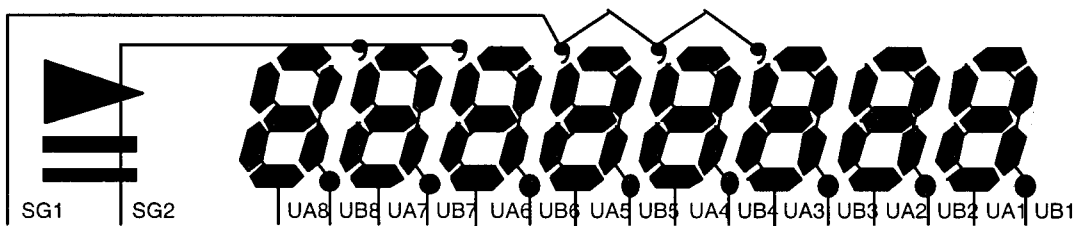
b. Sign Font



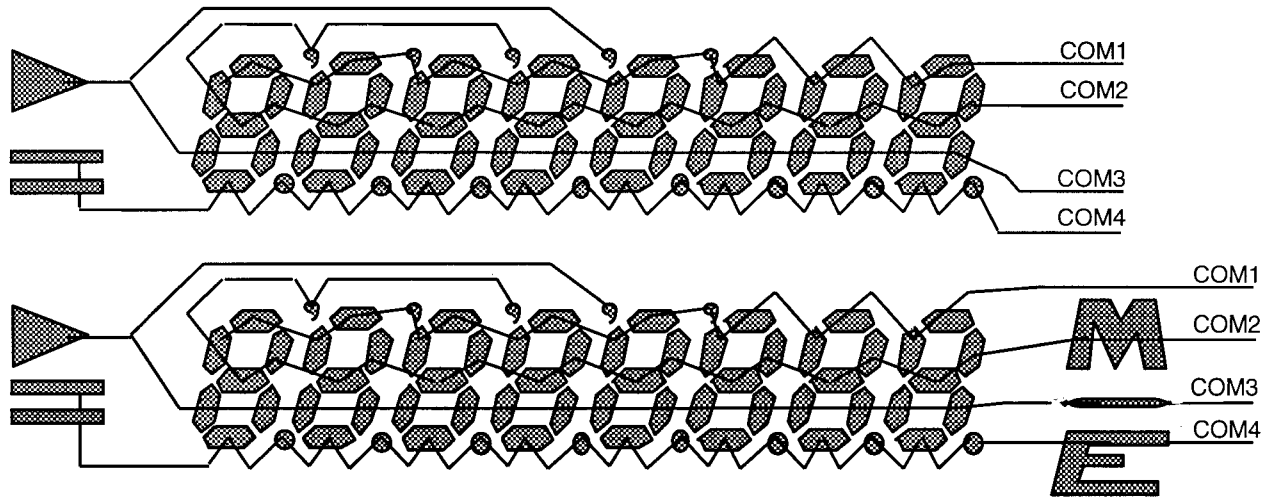
LCD CONNECTOR



LCD Panel

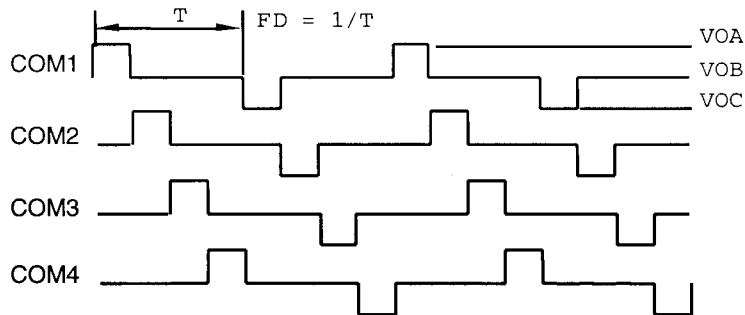


Segment Connection

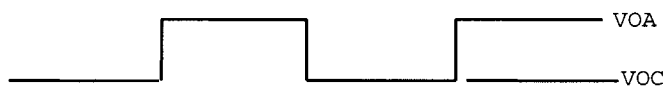


Backplanes Connection

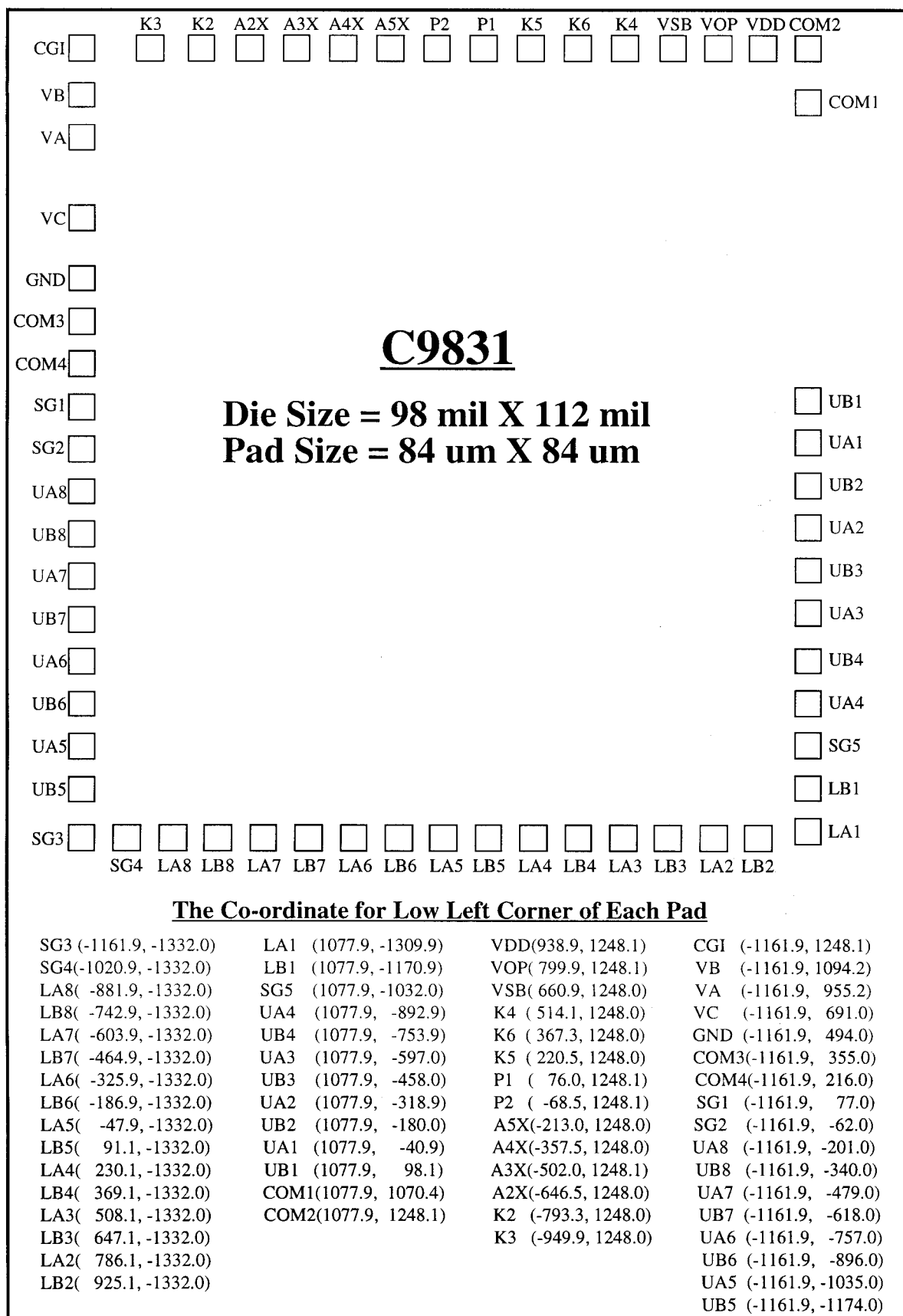
BACKPLANE OUTPUT WAVEFORM 1; COMi (i=1~4)



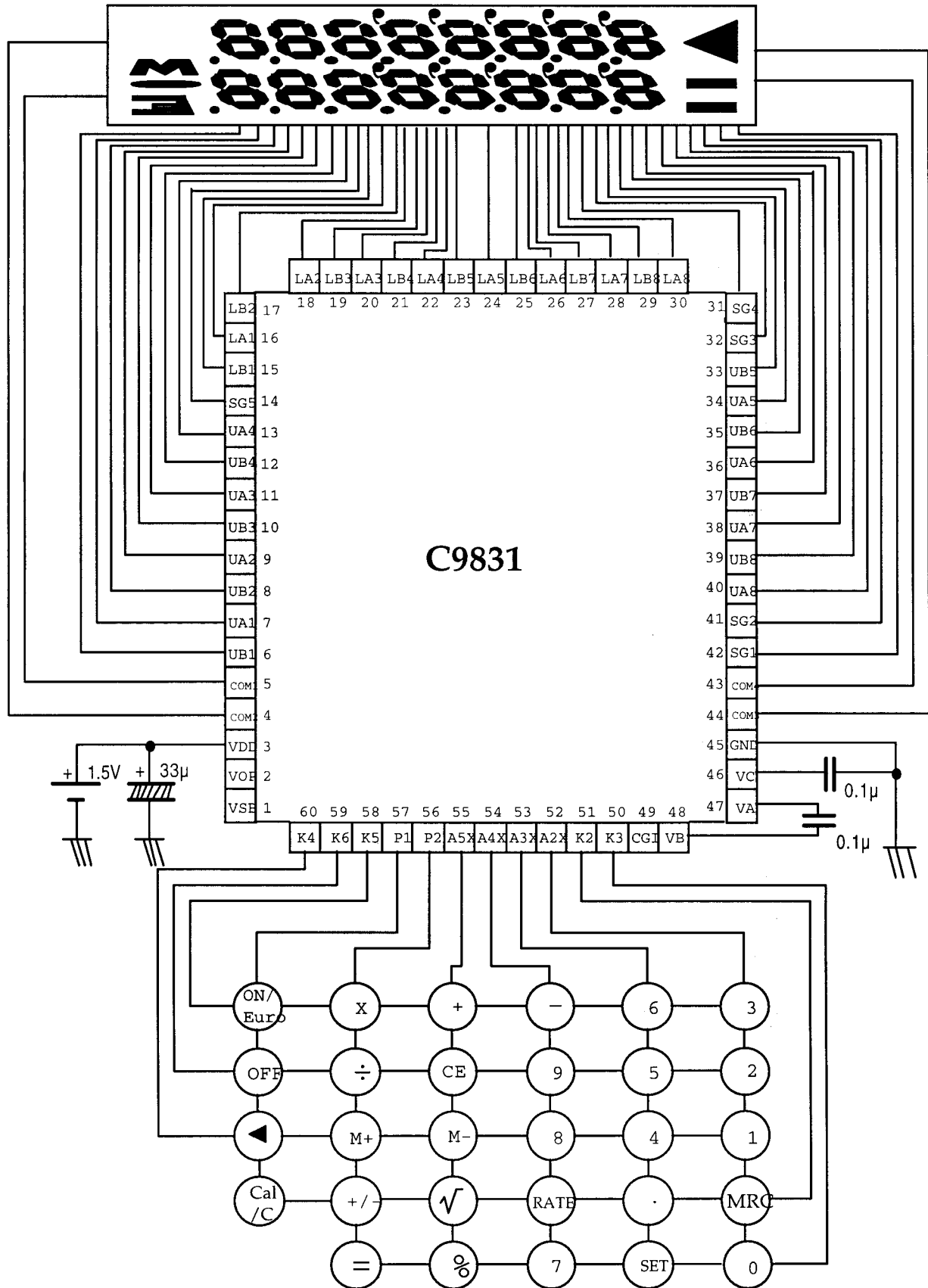
LCD SEGMENT OUTPUT WAVEFORM 2; Lai, Lbi, Uai, Ubi (i=1~8)



PAD DIAGRAM

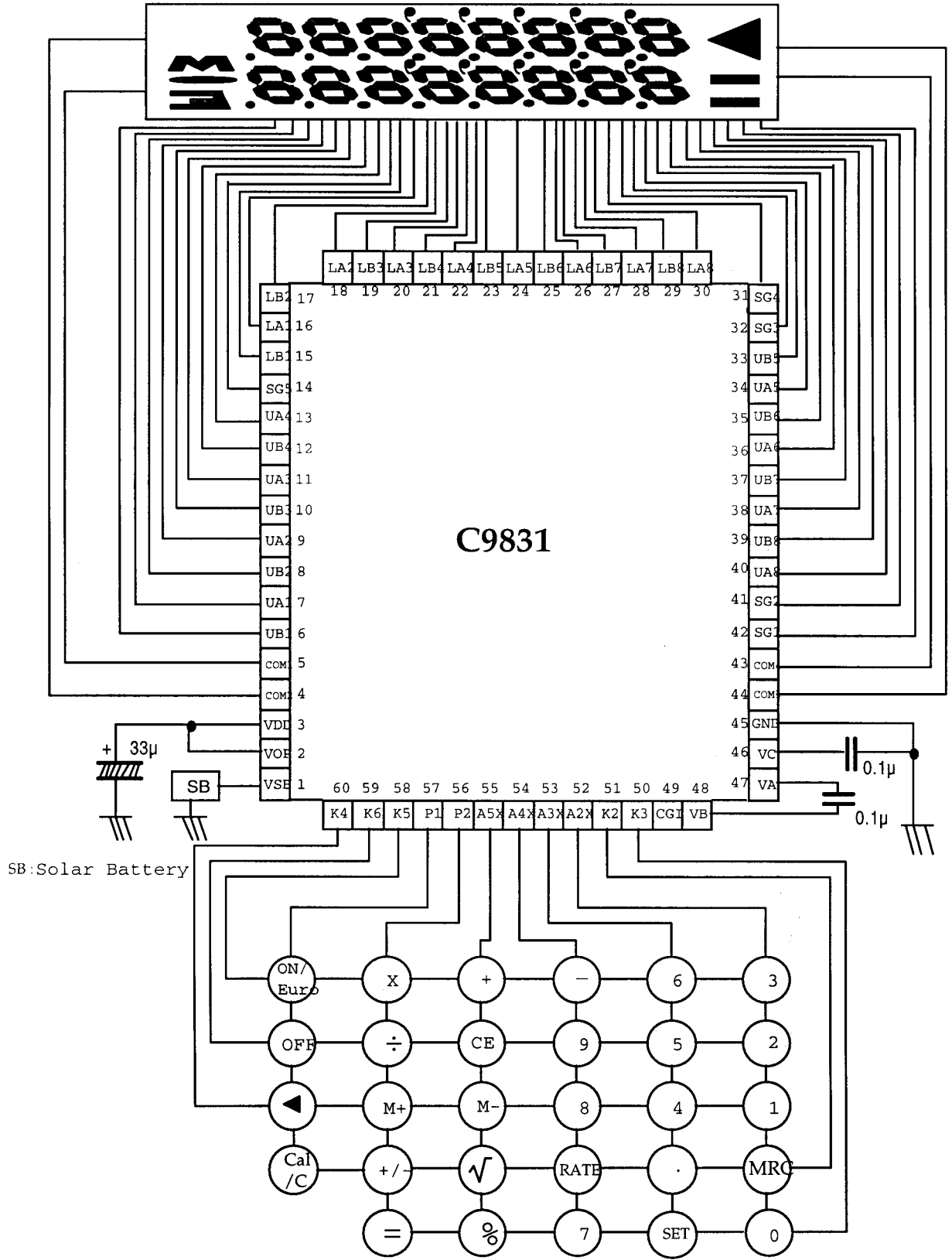


APPLCIATION DIAGRAM WITH BATTERY SUPPLY



Note : Chip substract must be floating or connected to GND.

APPLCIATION DIAGRAM WITH SOLAR CELL SUPPLY



Note : Chip substract must be floating or connected to GND.