
EMPCD081A

**8-Digit Calculator With
Tax / Euro Function
(Battery / Solar / Dual
Power Type)**

Product Specification

DOC. VERSION 0.3

ELAN MICROELECTRONICS CORP.


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Specification Revision History

Doc. Version	Revision Description	Date
0.1	Initial version	2004/05/04
0.2	a. Modify PIN DESCRIPTIONS in page4. b. Delete K11 and K12 in page6. c. Modify LCD display S1A9 and S2B9 in page11.	2004/05/10
0.3	a. Modify DC spec. of IDDOP as page14.	2004/09/15



1 General Description

The EMPCD081A is a single-chip LS1 CMOS calculator for 8-digit 1 memory. Besides, the EMPCD081A is an arithmetic four standard types of general function (+, -, ×, ÷), TAX / EURO function, percentage calculation functions, leading zero and trailing zero suppression, chain calculations, MU calculation, Auto Power OFF available. Dual power supply operation, wide operating voltage, and lower power consumption make it suitable for 1.5 solar battery operated calculator.

2 Features

- Display : 8-digit of data, 1-digits of sign, error, memory load symbol.
- TAX / EURO function available.
- Algebraic mode.
- Standard 4 function (addition, subtraction, multiplication, division).
- Memory calculation.
- Automatic percentage operation with add-on discount.
- Constant calculation.
- Chain calculation.
- Change sign.
- Trailing zero suppression.
- Punction on display, commas for thousands.
- Memory contents indicator, turned on with nonzero in the memory.
- Result overflow, indicating during calculation (most function key are locked as it happened).
- Memory overflow indicating.
- Complementary output buffer for direct driving of liquid crystal display.
- Oscillator/clock generator internal to chip.
- Keyboard encoding internal to chip.
- Automatic power on clear.
- Wide supply voltage range (1.2 to 1.8V)
- Very low power consumption.
- Floating minus.
- Two key roll over available.



3 Pin Descriptions

Symbol	I/O	Function
COM1~3	O	LCD Common signal output.
A1 ~ A3	O	LCD Segment signal output and strobe output for switch status.
A4 ~ A13	O	LCD Segment signal output.
B1 ~ B3	O	LCD Segment signal output and strobe output for switch status.
B4 ~ B13	O	LCD Segment signal output.
C1 ~ C2	O	LCD Segment signal output and strobe output for switch status.
C3 ~ C13	O	LCD Segment signal output.
VDD,VSS	---	Positive and negative power supply pin.
VA,VB	---	Voltage doubler for LCD, connects a capacitor (0.1uF) between both pins.
VEE	---	LCD voltage from voltage doubler, connects a capacitor (0.1uF) to pin VDD.
TS1	I	Test pin input, be opened.
RESET	I	System reset / AC key input. (built-in schmitt trigger for debouncing)
K0 ~ K2	O	Keyboard polling signal output pins.
K3 ~ K7	I/O	Keyboard polling signal output and strobe input pins.
K8 ~ K10	I	Keyboard strobe input pins.
K11~K14	I	Switch status strobe input pins.

4 Function Descriptions

A) Operation Characteristics

CONSTANT OPERATION

The EM34011 has implied constant mode on +, -, X, ÷ and % operations. The constant is performed automatically by the "=" key, "% " key, or "% " key without a constant for addition, subtraction and division while the first operand is the constant for multiplication.

NUMBER ENTRY

Numericals can be entered up to 8-digit.

MEMORY PROTECTION

In any error detection, the memory contents present before the error detection are protected.

MEMORY INDICATION

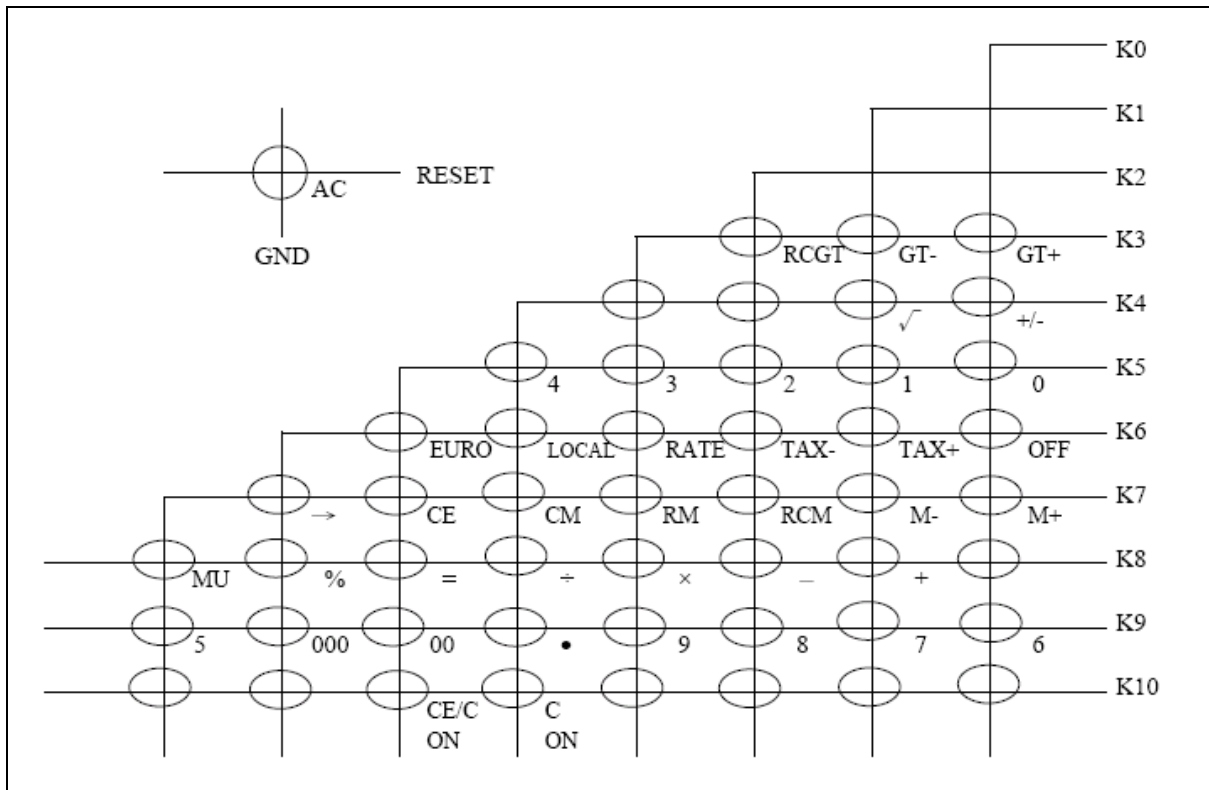
If the memory contents are a number other than zero, "M" is indicated in the sign-digit position.

AUTO POWER OFF

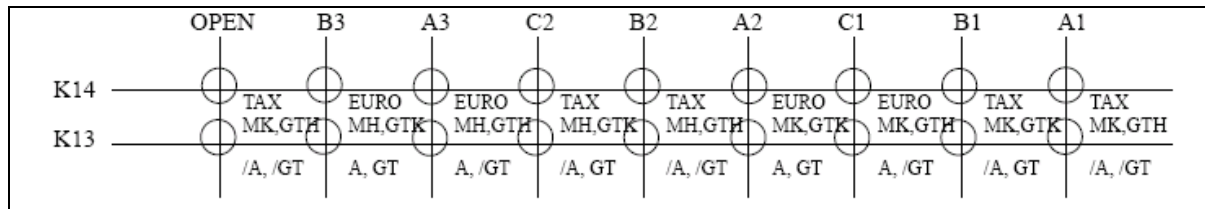
If no key is depressed for a specific period of time, the power supply will automatically turn off .

KEY DEFINITION

■ Touch Key Constitution



■ Lock Key Constitution



K14 : Select with TAX / EURO function and Memory Hold Status, MH (Memory Hold), MK (Memory Kill), GTH (GT Memory Hold) and GTK (GT Memory Kill) at Auto Power OFF or OFF key.

K13 : Select with Auto Power OFF mode (A) and Grand total function (GT).



B) Keyboard Description

EQUAL KEY (=)

- Performs Keyed-in operation and maintains that operation for possible use.
- Establishes power/reciprocation calculation.

MULTIPLICATION KEY (X)

- Enters multiplicand.
- Performs previous operation and displays result.

DIVISION KEY (\div)

- Enters dividend.
- Performs previous operation and displays result.

ADDITION KEY (+)

- Conditions machine for an addition.
- Performs previous operation and displays result.

SUBTRACTION KEY (-)

- Conditions machine for a subtraction.
- Performs previous operation and displays result.

PERCENT KEY (%)

The purpose of the percent key is to allow for calculation of add-on and discount.

Determination of add-on requires the principal amount to be the first entry followed by the "+" or "X" key, with the percentage being the second entry. Depression of the percent key yields the amount to add on, such as tax or interest. Depression of the "=" key adds this amount to the principal.

CHANGE SIGN KEY (+/-)

Pushing the "+/-" key twice in succession causes the corresponding sign to appear and disappear. During digit entry, this function changes the sign of the entered factor.