

SCIENTIFIC CALCULATOR

WriteView EL-W506X MODEL EL-W516X OPERATION MANUAL

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INTRODUCTION

Thank you for purchasing the SHARP Scientific Calculator Model EL-W506X/W516X. About the calculation examples (including some formulas and tables), refer to the calculation example sheet. Refer to the manual on the right of the title in the manual for use.

- Some of the models described in this manual may not be available in some countries. This product uses a period as a decimal point. Operational Notes: Do not carry the calculator around in your pocket... Keep the calculator away from extreme heat...

- Do not drop it or apply excessive force. Never dispose of batteries in a fire. Keep batteries out of the reach of children. For the sake of your health, do not use this product for long periods of time...

NOTICE

SHARP strongly recommends that separate permanent written records be kept of all important data. Data may be lost or altered in virtually any electronic memory product under certain circumstances.

- Press the RESET switch (on the back), with the tip of a ball-point pen or similar object... Do not use an object with a breaker or sharp tip. Note that pressing the RESET switch erases all data stored in memory.

The CATALOG Menu

Using the CATALOG Menu, you can select functions and variables that are available for what you are doing in the currently selected mode. To display the CATALOG menu, press (CAT) or (CAT) to move the cursor (C) and press (ENTR) to select.

Multi-Line Playback Function

This calculator is equipped with a function to recall previous equations and answers in NORMAL or CPLX modes. A maximum of 340 characters can be stored in memory. When the memory is full, stored equations will be deleted to make room, starting with the oldest.

Priority Levels in Calculation

This calculator performs operations according to the following priority: 1) Fractions (r, t, e, etc.) 2) Engineering prefixes 3) Functions depending on their argument...

SCIENTIFIC CALCULATIONS

Press (MODE) to select NORMAL mode. In each example, press (C) to clear the display first. Unless otherwise specified, calculation examples are performed in the WriteView editor (WRITE, EDIT, or EQN) with the default display settings (WRITE, EDIT, or EQN).

Arithmetic Operations

The closing parenthesis () just before () or (M) may be omitted. In constant calculations, the added becomes a constant. Subtraction and division are performed in the same manner.

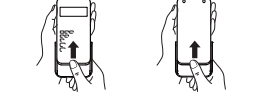
Constant Calculations

In constant calculations, the added becomes a constant. Subtraction and division are performed in the same manner. For multiplication, the multiplied becomes a constant.

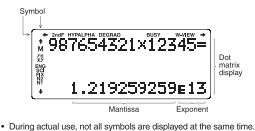
Functions

Refer to the calculation examples for each function. In the Line editor, the following symbols are used: X1 to indicate an expression's power, X2 to indicate a subscript, P to separate integers, numerators, and denominators.

Hard Case



DISPLAY



- During actual use, not all symbols are displayed at the same time. Only the symbols required for the usage currently being explained are shown in the display and calculation examples in this manual.

2ND F

Indicates that some contents are hidden in the directions shown. Appears when (2ND F) is pressed, indicating that the functions shown in orange are enabled.

YHP

Indicates that (YHP) has been pressed and the hyperbolic functions are enabled. If (YHP) is pressed, the symbols 2ndF YHP appear, indicating that inverse hyperbolic functions are enabled.

ALPHA

Indicates that (ALPHA) or (ALPHA) has been pressed, and entry (recall) of memory contents and recall of statistics can be performed.

DEG/RAD/GRAD

Indicates angular units. BUSY: Appears during the execution of a calculation. W-VIEW: Indicates that the WriteView editor is selected. M: Indicates that a numerical value is stored in the independent memory (M).

78/2X

Indicates the mode of expansion for results in CPLX mode. ENG/SCIFIX/KNZM: Indicates the notation used to display a value and changes by SET UP menu. N1 is displayed on-screen as "NORM1", and N2 as "NORM2".

BEFORE USING THE CALCULATOR

When using for the first time, press the RESET switch (on the back), with the tip of a ball-point pen or similar object.

Adjusting the Display Contrast

Press (DISP) to enter the display contrast adjustment menu. Press (DISP) to exit.

Power On and Off

Press (ON/OFF) to turn the calculator on. The data that was on-screen when the power was turned off will appear on the display. Press (ON/OFF) to turn the calculator off.

Key Notations Used in This Manual

In this manual, key operations are described as follows: Functions that are primed in orange above the key require (2ND F) to be pressed first before the key. When you specify the memory, press (M) for memory; numbers for input values are not shown as keys, but all Ordinary numbers are.

Functions that are primed in gray adjacent to the keys are affected by the (2ND F) key. The multiplication operator "X" is differentiated from the letter "X" in this manual as follows: To specify the multiplication operator: (X) To specify the letter "X": (X)

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The WriteView and Line Editors

This calculator has the following two editors in NORMAL mode: WriteView and Line. You can select between them in the SET UP menu.



- Notes: The WriteView Editor is only available in NORMAL mode. In certain calculation examples, where you see the (LINE) symbol, the key operations and calculation results are shown as they would appear in the Line Editor.

Clearing the Entry and Memories

Table with columns: Operation, Entry A-F, FI-F4, ANS, STA 1-9, mA-D, 0. Rows include (C), (MSEL), (2ND F), (2ND F), (2ND F), (2ND F), (2ND F), (2ND F), (2ND F), (2ND F), (2ND F).

1. Clear X or Retain. Press (C) and then choose a memory to clear one variable memory.

2. Formula memories and definable memories. See "Memory Calculations".

3. Statistical data (entered data).

4. Matrix memories (matA, matB, matC, and matD).

5. List memories (L1, L2, L3, and L4).

6. Cleared when changing between sub-modes in STAT mode. See "Memory clear key".

7. The username you stored using the name display function will be cleared as well.

Memory clear key

Press (2ND F) (C) to display the menu. To initialize the display settings, press (C) (C). The parameters are set as follows:

- Angular unit: DEG
- Display notation: NORM1
- N-base: DEC

To clear all variables and memories (A-F, M, X, Y, F1-F4, D1-D4, ANS, STAT, matA-D, and L1-L4) at once, press (C) (C).

To RESET the calculator, press (C) (C). The RESET operation will erase all data stored in memory and restore the calculator's default settings. You can do the same thing by pressing the RESET switch on the back of the calculator.

Mode Selection

NORMAL mode: (MODE) (1) (default)

Use to perform arithmetic operations and function calculations.

STAT mode: (MODE) (2)

Use to perform statistical operations.

DRILL mode: (MODE) (3)

Use to practice math and multiplication table drills.

CPLX mode: (MODE) (4)

Use to perform complex number calculations.

MATRIX mode: (MODE) (5)

Use to perform matrix calculations.

LIST mode: (MODE) (6)

Use to perform list calculations.

EQUATION mode: (MODE) (7)

Use to solve equations.

Use to solve equations.

Use to solve equations.

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Use to solve equations.

SET UP Menu

Press (2ND F) (SETUP) to display the SET UP menu. Press (2ND F) (EXIT) to exit the SET UP menu.

Determination of the angular unit. The following three angular units (degrees, radians, and grads) can be specified.

DEG (r): (2ND F) (SETUP) (1) (0) (default)

RAD (rad): (2ND F) (SETUP) (1) (1)

GRAD (g): (2ND F) (SETUP) (1) (2)

Selecting the display notation and decimal places

Five display notation systems are used to display calculation results. Two settings of floating point (NORMAL and NORM2), Fixed decimal point (FIX), Scientific notation (SCI), and Engineering notation (ENG).

When (2ND F) (SETUP) (1) (3) (FIX) or (2ND F) (SETUP) (1) (4) (SCI) is pressed, "SIGD-01?" will be displayed and the number of significant digits can be set to any value between 1 and 9. Entering 0 will set a 10-digit display.

Setting the floating point number system in scientific notation. Two settings are used to display a floating-point number: NORM1 (the default) and NORM2. A number is automatically displayed in scientific notation under a preset range:

NORM1 (2ND F) (SETUP) (1) (3): 0.00000001 to 9.999999999

NORM2 (2ND F) (SETUP) (1) (4): 0.01 to 9.999999999

Selecting the editor

The WriteView editor is selected in NORMAL mode. The WriteView editor (W-VIEW): (2ND F) (SETUP) (2) (default)

The Line editor (LINE): (2ND F) (SETUP) (2) (1)

Note: Any entries will be cleared when you change the editor.

Adjusting the display contrast

Press (DISP) (DISP), then (C) or (C) to adjust the contrast. Press (DISP) to exit.

Insert and overwrite entry methods

When using the Line editor, you can change the entry method from "INSERT" to the "OVERWRITE" method.

After you switch to the overwrite method by pressing (2ND F) (DISP) (C), the triangular cursor will change to a rectangular one, and the number or function underneath it will be overwritten as you make entries.

Name display function

You can save a username in this calculator. When you turn the power off, the saved username is displayed momentarily. Up to 32 characters may be saved, split over two lines.

Entering and editing the username: 1. Press (2ND F) (SETUP) (3) (NAME) to enter the name display menu. The editing screen appears with a flashing cursor.

2. Use (C) and (C) to scroll through the available characters. The following characters can be entered (letters, uppercase only, numbers 0 to 9, slash (/), hyphen (-), colon (:), apostrophe ('), comma (,), period (.), and space ()).

3. Pressing (C) or (C) moves the cursor to the left or right. To modify a character, use (C) or (C) to move to the character, then select another character using (C) or (C).

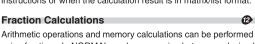
4. Repeat steps 2 and 3 above to continue entering characters.

5. Press (2ND F) (EXIT) to save the name. Note: Press (2ND F) (EXIT) in the editing screen to clear all the characters.

ENTERING, DISPLAYING, AND EDITING THE EQUATION

The WriteView Editor

Entry and display. In the WriteView editor, you can enter and display fractions or certain functions as they would write them.



Definable memories (D1-D4). You can store functions or operations in definable memories (D1-D4).

To store a function or operation, press (MENU) followed by the number of the memory (D1-D4) you want to use, followed by the operator you want to store. Menu-related operations, such as (2ND F) (C), cannot be stored. Press (2ND F) (RETURN) to return to the previous display.

To call a stored function or operation, press the corresponding memory key. Calling a stored function will not work if the function that is called would be unusable in the current context.

Any functions or operations that are stored in a definable memory will be replaced when you save a new one into that memory. You cannot store functions or operations in definable memories when entering values or items in STAT, MATRIX, LIST, or EQUATION modes, or into solver functions or simulation calculations.

Chain Calculations

The previous calculation result can be used in the subsequent calculation. However, it cannot be recalled after entering multiple instructions or when the calculation result is in matrix/list format.

Fraction Calculations

Arithmetic operations and memory calculations can be performed using fractions. In NORMAL mode, conversion between a decimal number and a fraction can be performed by pressing (2ND F) (Frac) (C).

Note: Improper/complex fractions will be converted to and displayed as decimal numbers if the number of digits used in their expression is greater than nine. In the case of mixed fractions, the maximum number of displayable digits (including integers) is eight.

To convert a sexagesimal value to a fraction, first convert it by pressing (2ND F) (Frac) (C).

Binary, Pentad, Octal, Decimal, and Hexadecimal Operations (N-base)

Conversions can be performed between N-base numbers in NORMAL mode. The four basic arithmetic operations, calculations with parentheses, and memory calculations are also performed, along with the logical operations AND, OR, NOT, NEG, XOR, and XNOR in binary, pentad, octal, and hexadecimal numbers.

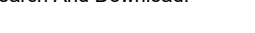
Conversion to each system is performed with the following keys: (2ND F) (BIN) (APP) appears, (2ND F) (DEC) (APP) appears, (2ND F) (OCT) (APP) appears, (2ND F) (HEX) (APP) appears.

Note: The hexadecimal numbers A-F are entered by pressing (2ND F) (HEX) (A) through (2ND F) (HEX) (F).

In the binary, pentad, octal, and hexadecimal systems, fractional parts cannot be entered. When a decimal number having a fractional part is converted into a binary, pentad, octal, or hexadecimal number, the fractional part will be truncated. Likewise, when the result of a binary, pentad, octal, or hexadecimal calculation includes a fractional part, the fractional part will be truncated. In the binary, pentad, octal, and hexadecimal systems, negative numbers are displayed as a complement.

Time, Decimal, and Sexagesimal Calculations

You can convert between decimal and sexagesimal numbers, and from sexagesimal numbers to seconds or minutes. In addition, the four basic arithmetic operations and memory calculations can be performed using the sexagesimal system. Notation for sexagesimal is as follows:



Notes

The WriteView editor can only be used in NORMAL mode. If the equation grows too large, it may extend the edge of the display after the result. If you want to see the entire equation, press (C) or (C) to return to the editing screen.

Displaying calculation results

When possible, calculation results will be displayed using fractions, r, and t. When you press (2ND F) (Frac), the display will cycle through the following display options:

- Mixed fractions (with or without r) = improper fractions (with or without t) = decimal numbers
- Proper fractions (with or without t) = decimal numbers
- Irrational numbers (square roots, fractions made using square roots) = decimal numbers

Note: In the following cases, calculation results may be displayed using: Arithmetic operations and memory calculations

- Trigonometric calculations

- In trigonometric calculations, DEG, RAD, multiples of 15, results may be shown using r, RAD, multiples of pi, results may be shown using r, RAD, multiples of pi

- Calculation results may extend off the edges of the screen. You can see those parts by pressing (C) or (C) (depending on whether the left or right portion is hidden).

- Improper/greater fractions will be converted to and displayed as decimal numbers. If the number of digits used in their expression is greater than nine, in the case of mixed fractions, the maximum number of displayable digits (including integers) is eight.

- If the number of digits in the denominator of a fractional result is used to be greater than three, the result is converted to and displayed as a decimal number.

The Line Editor

Entry and display. In the Line editor, you can enter and display equations line by line.

Up to three lines of text may be viewed on the screen at one time.

If the length of the equation exceeds three lines, parts of it may be hidden from view after calculation. If you want to see the rest of the equation, press (C) or (C) to return to the editing screen.

In the Line editor, calculation results are displayed in decimal form or in fraction notation if possible.

Editing the Equation

Just after obtaining an answer, pressing (C) brings you to the end of the equation and the cursor (C) moves to the beginning. Press (C) (C) or (C) (C) or (C) (C) to move the cursor. Press (2ND F) (C) or (2ND F) (C) to jump to the cursor to the beginning or the end of the equation.

In the WriteView editor, you can use (C) and (C) to move the cursor up and down between the numerator and denominator, and delete key.

To delete a number or function, move the cursor to the right of it, then press (C). You can also delete a number or function that the cursor directly over by pressing (C) (C).

The MATH Menu

Many functions may be available on this calculator besides those printed on the key pad. These functions are accessed using the MATH Menu. The MATH Menu has different contents for each mode.

Press (2ND F) (MATH) to display the MATH Menu. For example, in NORMAL mode, you can call the functions shown on the right.



Note: When the (F) or (F) symbols are displayed, you can use (C) or (C) to display any hidden menu items. (MATH) does not function when entering values or items in STAT, MATRIX, LIST, or EQUATION modes, or into solver functions or simulation calculations.

Calculations Constants and Metric Conversions

Physical constants and metric conversions are based on the 2006 CODATA recommended values, or on the 1995 Edition of the "Guide for the Use of the International System of Units (SI)" released by NIST (National Institute of Standards and Technology).

Table with columns: No., Constant, No., Constant. Rows include Speed of light in vacuum, Newton's constant of gravitation, Standard acceleration of gravity, etc.

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Note: Physical constants and metric conversions are based on the 20

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