User Manual

Platon

Speaking Scientific Calculator

EN - US

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1 INTRODUCTION

Platon is a professional scientific calculator with integrated speech output, designed to combine intuitive ease of use with advanced mathematical functionality. In addition to standard arithmetic operations, it offers a comprehensive range of scientific, statistical, financial, and unit conversion functions—all within a single, compact, and convenient device.

⚠ Important Safety Notice

Please read this instruction manual carefully before using your Platon calculator. Do not operate the device until you have become fully familiar with its functions and accessories. Keep this manual for future reference and ensure it is included if the device is passed on to another user.

2 DESCRIPTION OF THE DEVICE

The device features a long, flat housing, similar in shape to a remote control. The top surface contains the keys and a prominent flat display. Place the device in front of you so that the display end is furthest away from you.

Top Surface

All keys are located on the top surface and are divided into two distinct groups:

- **Lower Group (Closest to you):** Consists of 16 small square keys arranged in a **4×4 grid**. The **number 5 key** (middle of the block) features a tactile dot for easy orientation.
- **Upper Group (Closer to the display):** Consists of 9 larger rectangular keys arranged in a **3×3 grid**. The **middle key (Menu)** also features a distinct tactile mark.

Right Side

There are two ports located on the right side of the device:

- **Charging/Service Port (Further from you):** A USB-C port used for charging and technical maintenance.
- Earphone Jack (Closer to you): A standard 3.5 mm socket for earphones (earphones are optional and not included).

Underside

The underside of the device features four rubber feet, the speaker grille, and the battery compartment.

3 POWER SUPPLY

Batteries

Platon is powered by two **AAA NiMH rechargeable batteries**. The battery compartment is located on the underside of the device.

Inserting the Batteries:

1. Turn the device over so the display ends away from you.
2. Locate the small notch between the two upper rubber feet; this is the latch for the battery compartment.
3. Open the compartment lid. The lid is hinged and does not detach completely.
4. Insert two AAA NiMH rechargeable batteries. In each slot, place the **flat (negative) end** against the metallic coil spring.
5. Close the lid firmly until it clicks into place.

Battery Safety Notes:

- **Use only NiMH rechargeable batteries.**
- Do not mix old and new batteries.
- Always observe the correct polarity (+/-) during installation.
- If the device will not be used for an extended period, remove the batteries to prevent damage from potential leakage.

USB-C Power and Charging

Platon can be powered and charged via a standard USB-C power supply (not included).

- The USB-C port is located on the right side of the device (the port further from you).
- When connected to power, any installed NiMH batteries will charge automatically.

⚠ CRITICAL WARNING

- **Do not use non-rechargeable (alkaline) batteries when the device is connected to USB-C power.**
- Connecting external power while alkaline batteries are installed can cause the batteries to leak or explode, leading to permanent damage to the device.

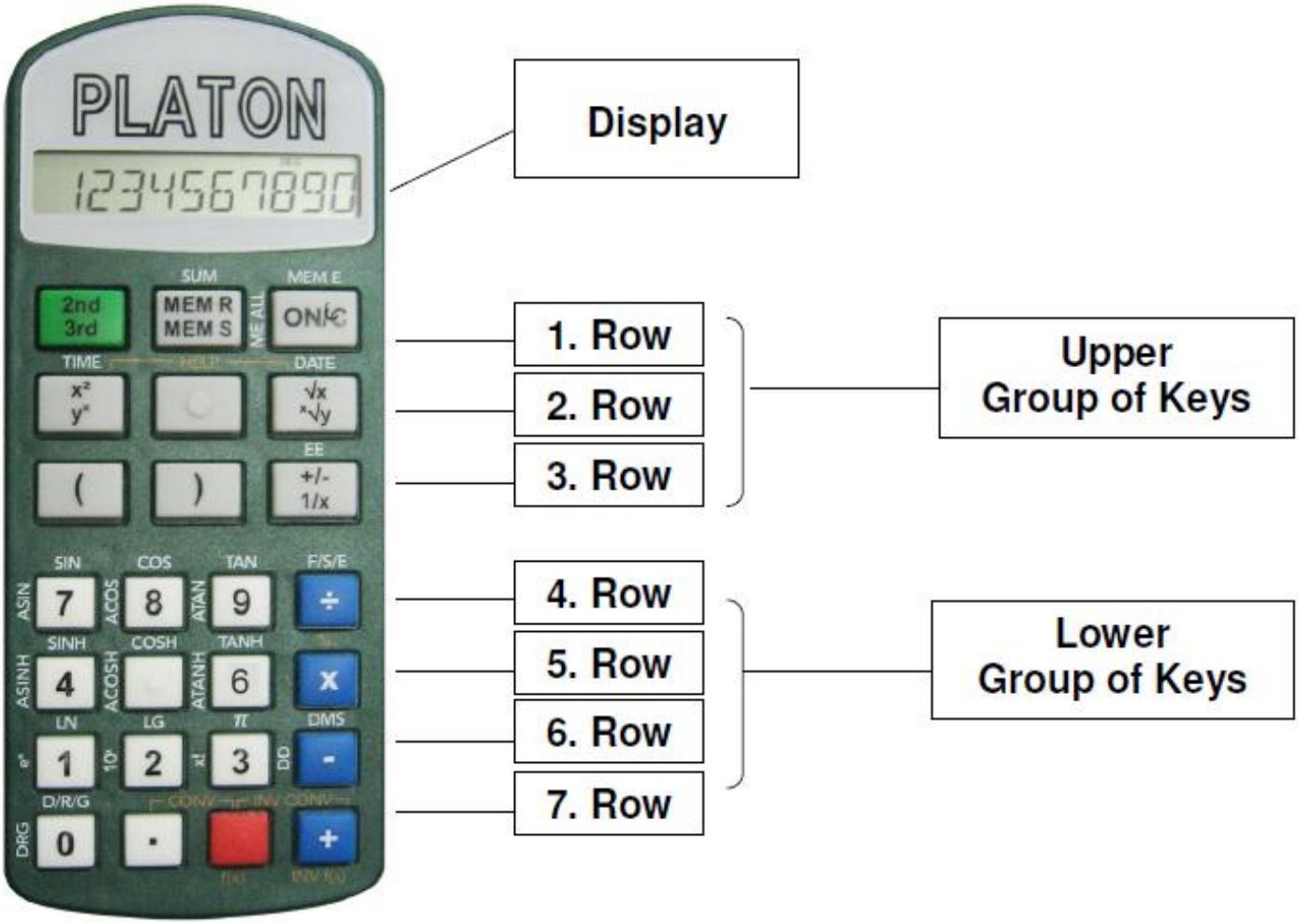
4 KEYBOARD LAYOUT AND FUNCTION LAYERS

The keyboard is divided into two distinct functional groups. Each key can perform up to four different functions depending on the "layer" currently active.

4.1 Key Groups

- **Upper Group (3 rows × 3 large rectangular keys):** These keys primarily control menu navigation, memory functions, and device settings. The **middle key (Menu)** features a tactile mark.
- **Lower Group (4 rows × 4 small square keys):** This group contains the numeric keypad and primary mathematical operators. The **number 5 key** (middle of the numeric block) features a tactile mark.

Note on Reading Order: Throughout this manual, rows are numbered from top to bottom (Row 1 is closest to the display), and columns are numbered from left to right.



4.2 Accessing Function Layers (2nd and 3rd Functions)

Most keys have secondary and tertiary functions printed above or around them on the casing. To access these functions, you must use the **[2nd/3rd] modifier key** (located in the Lower Group, **Row 1, Column 1**).

The Normal (First) Layer

Simply press the desired key.

1. *Example*: Pressing the key in Row 2, Column 1 of the Lower Group enters the number **[7]**.

The 2nd Layer (Secondary Functions)

1. **Short-press** the **[2nd/3rd]** key. The calculator will announce: "Second Function".
2. Press the desired function key.

2. *Example:* Press **[2nd/3rd]** then **[7]** to calculate the **Sine (SIN)** of a number.

The 3rd Layer (Tertiary Functions)

You can activate the 3rd layer in two ways:

1. **Double short-press** the **[2nd/3rd]** key OR **Long-press** the **[2nd/3rd]** key.
2. The calculator will announce: "Third Function".
3. Press the desired function key.

3. *Example:* Activate the 3rd layer and press **[7]** to calculate the **Arcsine (ASIN)**.

4.3 Description of Keys in Calculator Mode

Upper Group:

Key		Layer 1		Layer 2	Layer 3
Row	Column	Short-press *quick tap*	Long-press *press and hold*	Short-press	Short-press
1	**1**	2^{nd} functions [**2^{nd}/3^{rd}**]	3^{rd} functions [**2^{nd}/3^{rd}**]	-	-
	2	Recall Memory [**MEM R**]	Save value [**MEM S**]	Add value [**SUM**]	-
	3	Clears display [**ON/C**]	Backspace / Turn on	Delete Memory Position [**MEM E**]	Delete All Memories [**ME ALL**]
2	**1**	Square [**x^2**]	To the Power of [**y^x**]	Announce Time [**TIME**]	-
	2	Read Display *(with tactile mark)*	Menu *(with tactile mark)* [**MENU**]	Statistic Mode	-
	3	Square Root [**√x**]	Roots [**$\sqrt[x]{y}$**]	Announce Date	-
3	**1**	Left Parenthesis [**(**]	-	-	-
	2	Right Parenthesis [**)**]	-	-	-
	3	Algebraic Sign [**+/-**]	Reciprocal value [**1/x**]	Exponent [**EE**]	-

Lower Group:

Key		Layer 1		Layer 2	Layer 3
Row	Column	Short-press *quick tap*	Long-press *press and hold*	Short-press	Short-press
1	**1**	Digit 7 [**7**]	Digit 7 [**7**]	Sinus [**SIN**]	Arcus Sinus [**ASIN**]
	2	Digit 8 [**8**]	Digit 8 [**8**]	Cosine [**COS**]	Arcus Cosine [**ACOS**]
	3	Digit 9 [**9**]	Digit 9 [**9**]	Tangent [**TAN**]	Arcus Tangent [**ATAN**]
	4	Division [**÷**]	Modulo	Change Display [**F/S/E**]	-
2	**1**	Digit 4 [**4**]	Digit 4 [**4**]	Hyperbolic Sine [**SINH**]	Area Hyperbolic Sine [**ASINH**]
	2	Digit 5 *(with tactile mark)* [**5**]	Digit 5 *(with tactile mark)* [**5**]	Hyperbolic Cosine [**COSH**]	Area Hyperbolic Cosine [**ACOSH**]
	3	Digit 6 [**6**]	Digit 6 [**6**]	Hyperbolic Tangent [**TANH**]	Area Hyperbolic Tangent [**ATANH**]
	4	Times [**×**]	Percent [**%**]	-	-
3	**1**	Digit 1 [**1**]	Digit 1 [**1**]	Natural Logarithm [**LN**]	e to the power of [$\mathbf{e^x}$]
	2	Digit 2 [**2**]	Digit 2 [**2**]	Common logarithm [**LG**]	10 to the power of [$\mathbf{10^x}$]
	3	Digit 3 [**3**]	Digit 3 [**3**]	Pi [**π**]	Factorial [**x!**]
	4	Minus [**-**]	Algebraic sign (in front of Digit)	DD to DMS [**DMS**]	DMS to DD [**DD**]
4	**1**	Digit 0 [**0**]	Triple 0 [**000**]	Angle Units [**D/R/G**]	Convert Degree
	2	Point [**.**]	Negate	-	-
	3	Equals, execute calculation		-	-
	4	Plus [**+**]		-	-

4.4 General Key Combinations

These combinations work in all modes (Calculator and Statistic Mode). To perform these actions, **press the keys simultaneously.**

- **Short press** = A quick tap and release.
- **Long press** = Press and hold for approximately 1 second.

System Functions

- Square [x²] + Square Root [√] (Short press): Enter **Help Mode** (see Chapter 6.3 "Help Mode").
    - *Tactile: The two outer keys in the middle row of the Upper Group.*
- Square [x²] + Square Root [√] (Long press): Announce the **software version**.

Volume Control

- Menu + Square [x²] (Short press): **Decrease volume.**
- Menu + Square Root [√] (Short press): **Increase volume.**
    - *Tactile: The middle key plus the left or right key in the same row (Upper Group, Row 2).*

Speech Rate (Tempo)

- Open Bracket [(] + Close Bracket [)] **(Short press)**: **Slower** speech rate.
    - *Tactile: Row 3, Columns 1 and 2 of the Upper Group.*
- Close Bracket [)] + Plus/Minus [±] **(Short press)**: **Faster** speech rate.
    - *Tactile: Row 3, Columns 2 and 3 of the Upper Group.*
- Open Bracket [(] + Plus/Minus [±] **(Short press):** Restore speech rate to **Default (0%)**.

4.5 Turn Platon ON and OFF

- **Power ON:** Press and hold the **[ON/C]** key (Upper Group, Row 1, Column 3) until you hear the startup melody.
- **Automatic Standby (Auto-OFF):** To save power, Platon automatically enters standby mode after a period of inactivity. In standby, the device will display and can announce the current time.
- **Manual Standby (Power OFF):** Press and hold all **three keys in the top row** of the Upper Group simultaneously (**[2nd/3rd]**, **[MEM R]**, and **[ON/C]**) until the shutdown melody plays.

4.6 Help Mode

If you are unsure of a key's function, you can use **Help Mode**.

- **Activate:** Simultaneously press the **Square [x^2]** and **Square Root [√x]** keys (Upper Group, Row 2, Columns 1 and 3).
- **Function:** While Help Mode is active, pressing any key will cause Platon to describe that key's current function without actually performing the calculation.
- **Deactivate:** Press the same two keys (**[x2]** + **[√x]**) simultaneously again.

Tip: A **Long-press** on these two keys (**[x2]** + **[√x]**) will cause Platon to announce the current **Software Version**.

4.7 Exiting a Menu Manually

To leave any menu or sub-menu and return to standard calculation mode:

- **Short-press [ON/C]** (Upper Group, Row 1, Column 3).
- This acts as an "Escape" key, cancelling the current menu action without saving changes (unless previously confirmed).

4.8 Volume

You can adjust the volume at any time using the keys in the **second row of the Upper Group**:

- **Increase Volume:** Short-press the **Menu key [MENU]** and the **Square Root [√]** simultaneously.
  Tactile: (2nd row: center + right key of the Upper Group)
- **Decrease Volume:** Short-press the **Square [x^2] + Menu key [MENU]** simultaneously.
  Tactile: (2nd row: left + center of the Upper Group)
- **Feedback:** Each change is immediately announced by the calculator, allowing you to hear the new volume level.

4.9 Speech Rate (Tempo)

You can adjust how fast the calculator speaks using combinations in the Upper Group:

- **Slower Speech:** Short press **[( ] + [ )]** simultaneously.
  Tactile: 3rd row: left + center of the Upper Group.
- **Faster Speech**: Short press **[ )] + [±]** simultaneously.
  Tactile: 3rd row: center + right of the Upper Group.

- **Reset to Default:** Short-press **[( ] + [±]** simultaneously. This returns the speech rate to the standard 0% setting.
  Tactile: 3rd row: left + right of the Upper Group.

Note: The speech rate changes in steps of **25%**, ranging from **–50%** (slowest) to **+200%** (fastest).

5 CALCULATIONS

Platon is a powerful scientific tool capable of:

- Basic arithmetic operations (Addition, Subtraction, Multiplication, Division)
- Percentage calculations, squares and root extractions
- Trigonometric and hyperbolic functions.
- Natural and common logarithms.

Entering calculations

Platon uses **line-oriented input**. This means you enter the entire mathematical expression first, and then press the **Equals [=]** key to calculate the result.

- **Order of Operations:** Platon follows standard algebraic rules (multiplication and division are performed before addition and subtraction). You can use parentheses **[( ]** and **[ )]** to group complex expressions.
- **Correcting Mistakes:** If you enter a wrong digit, long-press the [ON/C] key (Upper Group, Row 1, Column 3) to delete the last entry.

Audio Feedback & Display Review

- **Full Speech Support:** Every keypress, menu item, and calculation result is announced aloud to ensure total accessibility.
- **Repeat the Result:** If you need to hear the current value on the display again:
  - Short-press the **[Menu]** key (Upper Group, Row 2, center key). This button functions as the "**Read Display**" command.
  - Alternatively, you can press the **Equals [=]** key (Lower Group, Row 4, Column 3) repeatedly to hear the result again.

5.1 Basic Arithmetic

The four basic operators are located on the **right side** of the **Lower Group**:

1. Enter the first number.
2. Press an operator: **[+]**, **[-]**, **[×]**, or **[÷]**.
3. Enter the second number.

4. Press **Equals [=]** (Lower Group, Row 4, Column 3) to hear the result.

5.2 Memory Functions

Platon features **10 independent memory locations** (indexed 0–9) for storing numbers and calculation results.

5.2.1 Storing a Value (Save)

1. Perform your calculation or ensure the desired value is on the display.
2. **Long-press** the middle key in the top row of the Upper Group **[MEM S]**.
   - *Voice:* "Memory Set."
3. Press a number key **[0] through [9]** to choose the storage cell.
   - The value is now stored, and any previously stored value in that cell is over-written.

5.2.2 Recalling a Value (Recall)

1. **Short-press** the middle key in the top row of the Upper Group (**[MEM R]**).
   - Voice: *"Memory Read."*
2. Press the number key **[0] through [9]** corresponding to the cell you wish to load.
   - The stored value will appear on the display and be announced.

5.2.3 Deleting Stored Values

Deleting memory is done using the [ON/C] key (Upper Group, Row 1, Column 3) in combination with the function layers.

To Clear a Single Memory Cell:

1. **Short-press** the **[2nd/3rd]** modifier key. (Voice: *"Second Function"*)
2. **Short-press** the **[ON/C]** key.
3. Press the number key **[0] through [9]** for the cell you want to clear.
   - Voice: "[number] Memory slot has been cleared."

To Clear All Memory Cells:

1. **Double short-press** (or long-press) the **[2nd/3rd]** modifier key. (*Voice: "Third Function"*)
2. **Short-press** the **[ON/C]** key to confirm the deletion of all cells.
   - *Voice: “Complete memory erased.”*

⚠ **Caution**: Once a memory cell is cleared, the data cannot be recovered.

5.3 Extended Arithmetic Operations

5.3.1 Percentages [%]

The percent function is accessed by long-pressing the Multiplication [×] key.

- **To find a percentage:** 250 [×] 5 [Long-press ×] → (How much is 5% of 250?)
- **To find the total (Percentage):** 250 [÷] 5 [Long-press ×] → (250 is 5% of what number?)
- **Surcharge:** 250 [+] 5 [Long-press ×] → (250 plus a 5% increase)
- **Discount:** 250 [-] 5 [Long-press ×] → (250 minus a 5% discount)

Example:

To calculate: *How much is 5% of 250?*

1. Enter **250**
2. Short-press the **times** key [**×**](5th row, right key)
3. Enter **5**
4. Press the **percent** key [**%**] (Long-press ×)
5. Press **Equals [=]** to hear the result.

5.3.2 Squares [x^2]

To square a number (multiply it by itself):

1. Enter the number.
2. Press the **Square [x^2]** (Upper Group, Row 2, Column 1).
3. Press **Equals [=]** to display and hear the result.

5.3.3 Square Roots [$\sqrt{x}$]

To find the square root:

1. Enter the number.
2. Press the **Square Root [√x]** key (Upper Group, Row 2, Column 3).
3. Press **Equals [=]**.

5.3.4 Reciprocal Value [1/x]

To calculate the reciprocal (1 divided by the number):

1. Enter the number.

2. Long-press the **Plus/Minus [±]** key (Upper Group, Row 3, Column 3).
3. Press **Equals [=]**.

5.3.5 Powers (Exponentiation) [y^x]

To raise a base to any power:

- Enter the base number.
- **Long-press** the **Square [x^2]** key (Upper Group, Row 2, Column 1).
- Enter the exponent (can be any number).
- Press **Equals [=]**.
    - Example: For 5^3, enter 5 → Long-press [x^2] → 3 → [=]. Result: 125.

5.3.6 Custom Roots [$\sqrt[x]{y}$]

To calculate a root of any degree (e.g., a cube root):

- Enter the number from which you want to extract the root.
- **Long-press** the **Square root [√x]** key (Upper Group, Row 2, Column 3).
- Enter the degree of the root (the exponent). The degree of the root can be any number.
- Press **Equals [=]**.
    - *Example:* For $\sqrt[3]{27}$, enter 27 → Long-press [√x] → 3 → [=]. Result: 3.

5.3.7 Pi [π]

To use the constant π (approx. 3.14159):

1. Short-press the **2nd function** key [**2nd/3rd**] (Upper Group, 1st row, left key).
2. Press the **3** key (Lower Group, Row 3, 3rd column).

The value of π will be entered and can be used in your calculation.

5.4 Scientific Functions

Scientific functions like Trigonometry and Logarithms are mapped to the numeric keys using the 2nd and 3rd layers.

Platon provides a wide range of **scientific functions**, including:

- **Trigonometric functions** (e.g., sine, cosine, tangent)
- **Logarithms** (natural and common)
- **Hyperbolic functions**

Each of these also has its **reciprocal (inverse) function**.

Example: Natural logarithm [ln]

1. Enter the number (e.g., 22).
2. Press the **[2nd/3rd]** function key (Upper Group, row 1, left key)
3. Press **[1]** key (Lower Group, row 3, column 1)
4. Press **Equals [=]**
5. Result: **3.091042453**

Example: Exponential Function [e^x]

1. Enter the exponent (e.g., 1.8).
2. **Long-press** (or double-press) **[2nd/3rd]** to reach the 3rd layer.
3. Press **[1]** key (Lower Group, row 3, column 1)
4. Press **Equals [=].**
5. Result: **6.049647464**

5.5 Unit Conversions

The conversion function allows you to switch between physical units instantly. Once a conversion type is selected in the menu, you can perform calculations and convert the results with a single key combination.

5.5.1 Selecting a Conversion Category

To choose which units you want to work with, follow these steps:

1. **Open the Menu:** Long-press the **[Menu]** key (Upper Group, Row 2, center).
2. **Find "Conversions"**: Navigate using the **[x^2]** (left) or **[√]** (right) keys until you hear "**Conversions**". (Note: This is usually the first item in the menu).
3. **Enter Category Selection:** Long-press the **[Menu]** key to confirm.
4. **Select Type:** Use the **[x^2]** or **[√]** keys to scroll through the available categories (Length, Weight, etc.).
5. **Confirm Selection:** Long-press the **[Menu]** key once more. Platon will announce the selected category and return to calculation mode.

Available Conversion Categories:

- **Custom Conversion:** Allows you to define your own multiplier. After selecting this, enter your factor (e.g., 2.54 for inches to cm) and confirm by long-pressing **[Menu]**.
- **Currency:** Functions like the Custom Conversion. Since exchange rates fluctuate, you must enter the current rate manually as the factor.
- **Temperature:** Celsius (°C) ↔ Fahrenheit (°F)
  - °C = (°F – 32) ÷ 1.8
  - °F = (°C × 1.8) + 32

- **Volume**: Liters ↔ US gallons
  - 1 L = 0.264172052 US gal
  - 1 US gal = 3.785411789 L
- **Length**: Kilometers ↔ Miles
  - 1 km = 0.621371192 mi
  - 1 mi = 1.609344001 km
- **Weight**: Kilograms ↔ Pounds
  - 1 kg = 2.204622622 lb
  - 1 lb = 0.453592370 kg

5.5.2 Executing a Conversion

Once you have selected a category in the menu, you can convert any number on the display using these shortcuts:

To convert "Forward" (e.g., km to miles or Celsius to Fahrenheit):

- **Preset the Conversion Category** as described in the previous paragraph.
- Enter the value you wish to convert.
- Press the **Decimal Point [.]** and the **Equals [=]** keys **simultaneously**.
  - *Tactile: Lower Group, Row 4, Columns 2 and 3.*

To convert "Backward" (e.g., miles to km or Fahrenheit to Celsius):

- With the result on the display, press the **Equals [=]** and the **Plus [+]** keys simultaneously.
  - *Tactile: Lower Group, Row 4, Columns 3 and 4.*

5.6 Financial Calculator

Platon includes a specialized financial mode to calculate compound interest, investment values, and mortgage payments.

How to access the Financial Calculator:

1. **Open the Menu:** Long-press the **[Menu]** key (Upper Group, Row 2, center).
2. **Navigate:** Use the **[x²]** (left) or **[√]** (right) keys until you hear *"Financial Calculator"*.
3. **Confirm: Long-press** the **[Menu]** key to enter the financial sub-menu.
4. **Select a Formula:** Scroll through the options below using the navigation keys and **long-press [Menu]** to start the calculation.

5.6.1 Compound Interest

This function determines the future value of an investment after a specific period with a fixed interest rate.

- **The Question:** *"What will my final savings be after X years?"*

Steps:

1. **Initial Capital:** Enter the starting amount and confirm with a **long-press** on **[Menu]**.
2. **Interest Rate:** Enter the annual rate in percent (e.g., enter 5 for 5%) and confirm with a **long-press** on **[MENU]**.
3. **Duration:** Enter the number of years and confirm with a **long-press** on **[Menu]** to calculate.
4. **Result:** Platon announces the **final amount**.

Formula used:

$$\mathrm{FV} = \mathrm{PV} \times \left(1 + \frac{i}{100}\right)^{n}$$

Where:

- **FV** ..... Final Amount
- **PV** ..... Initial Capital
- **i** ..... Annual Interest Rate in percent
- **n** ..... Number of Years

5.6.2 Present Value

Present value calculates the current worth of a future sum of money. It helps you determine how much you need to invest today to reach a specific goal.

- **The Question:** *"How much money must I deposit now to have €10,000 in 5 years?"*

Steps:

1. **Final Capital:** Enter the target amount and confirm with a **long-press** on **[Menu]**.
2. **Interest Rate:** Enter the annual rate (%) and confirm with a **long-press**.
3. **Duration:** Enter the number of years and confirm with a **long-press** on **[Menu]**.
4. **Result:** Platon announces the required initial investment (Present Value).

Formula used:

$$PV = \frac{FV}{\left(1 + \frac{i}{100}\right)^{n}}$$

Where:

- **PV** ..... Present Value
- **FV** ..... Final Capital
- **i** ..... Annual Interest Rate in percent
- **n** ..... Number of Years

5.6.3 Monthly Mortgage Payment

This function calculates the fixed monthly installment needed to repay a loan or mortgage.

- **The Question:** *"What will my monthly bank payment be for a €100,000 loan?"*

Steps:

1. **Loan Amount:** Enter the total amount borrowed (principal) and confirm with a **long-press** on **[MENU]**.
2. **Annual Interest Rate:** Enter the interest rate in % and confirm with a **long-press**.
3. **Duration in Years:** Enter the total term in years and confirm with a **long-press** on **[Menu]**.
4. **Result:** Platon announces the fixed monthly payment.

Formula used:

$$PMT = PV \times \frac{r \times (1 + r)^n}{(1 + r)^n - 1}$$

Where:

- **PMT**..... Monthly Mortgage Payment
- **PV**..... Loan amount (principal)
- **r**..... Annual interest rate in percent
- **n**..... Number of Years

Example:
Loan amount: €100,000
Interest rate: 6% annually
Duration: 20 years

Result: **€716.43 monthly payment**

5.6.4 Mortgage Principal (Loan Capacity)

This function determines the maximum amount you can borrow based on the monthly payment you can afford.

- **The Question:** *"If I can pay €700 a month, how large of a loan can I take?"*

Steps:

1. **Monthly Payment:** Enter the amount you can pay each month and confirm with a **long-press** on **[MENU]**.
2. **Annual Interest:** Enter the interest rate (%) and confirm with a **long-press** on **[MENU]**.
3. **Duration:** Enter the term in years and confirm with a **long-press** on **[Menu]**.
4. **Result:** Platon announces the total loan principal you are eligible for.

Formula used:

$$P = PMT \times \frac{(1 + r)^n - 1}{r(1 + r)^n}$$

Where:

- **P**..... Loan principal (amount borrowed)
- **PMT**..... Monthly Payment
- **r**..... Annual interest rate in percent
- **n**..... Total number of years

Example:

Monthly payment..... €716.43
Interest rate ..... 6% annually
Duration ..... 20 years
Result..... **€100,000 loan principal**

6 STATISTICS FUNCTIONS

To perform statistical analysis, you must first switch Platon from Calculator Mode to **Statistics Mode**.

6.1 Entering and Exiting Statistics Mode

- **To Enter:** Press the **[2nd/3rd]** key (Row 4, Column 1), followed by the **[Menu]** key (Row 2, Column 2).
    - *Voice:* "Statistics Mode."
    - *Visual:* The display will show indicators (DEG/RAD/GRAD) to signal the mode is active.
- **To Exit:** You can return to standard calculation in two ways:
    - Repeat the entry command: **[2nd/3rd]** then **[Menu]**.
    - Press the **[ON/C]** key (Row 1, Column 3).

Note: In Statistics Mode, standard arithmetic (like 5 × 5) is disabled. The keypad is dedicated to data entry and statistical results.

6.2 Keyboard Layout in Statistics Mode

In this mode, the keys are reassigned as follows. Row 1 is the top-most row (near the display).

Upper Group (3 × 3 Grid)

Key		Short-press	Long-press
Row	**Column**		
1	**1**	2^{nd} function	3^{rd} function
	3	**Exit** Statistics mode	**Backspace**
2	**1**	Arithmetical Mean ($\bar{x}$)	Geometric Mean
	2	2^{nd} function: Statistics mode Cancel	
	3	**Root Mean Square**	Harmonic Mean
3	**1**	**Sum of values** ($\sum x$)	Product of values
	2	**Standard deviation** (σ)	Number of values
	3	**Sum of squares** ($\sum x^2$)	Sum of reciprocal values

Lower Group (4 × 4 Grid)
The numeric keys (0–9) and decimal point function normally for data entry. The operators on the right are used to manage the data set:

Key		Short-press	Long-press
Row	Column		
3	**4**	Subtract a number [**-**]	
4	**4**	Add a number [**+**]	

6.3 Application of Statistics Functions

In **Statistics Mode**, you can enter values and perform a wide range of statistical calculations. Values can be **added** or **subtracted**, and Platon provides the following functions:

Statistical Functions:

- Arithmetic Mean
- Geometric Mean
- Quadratic (Square) Mean
- Harmonic Mean
- Standard Deviation

Calculated Parameters:

- Number of entered values
- Sum of values
- Sum of squares of values
- Sum of reciprocals of values
- Product of values

6.4 Application Example: Basic Analysis

Suppose you want to analyze the set of numbers: **3, 4, and 5**.

1. **Enter Statistics Mode:** Press **[2nd/3rd]** then **[Menu].** (Voice: "Statistics")
2. **Enter Data:**
    - Type **3**, press **[+]**. (*Voice: "Value added"*)
    - Type **4**, press **[+]**. (*Voice: "Value added"*)

- Type 5, press **[+]**. (*Voice: "Value added"*)

3. **Calculate Mean:** Press the Square **[x^2]** key (Upper Group, Row 2, Col 1).
   - *Voice: "Arithmetic Mean. Result: 4."*
4. **Calculate Standard Deviation:** Press the Close Bracket **[ )]** key (Row 3, Col 2).
   - *Voice: "Standard Deviation. Result: 0.816..."*
5. **Check Sample Size: Long-press** the Close Bracket **[ )]** key (Row 3, Col 2).
   - *Voice: "Number of values. Result: 3."*
6. **Exit:** Press **[ON/C]** to return to normal mode.

ⓘ	**Note:** • Please note that in Statistics Mode no other calculations are possible.

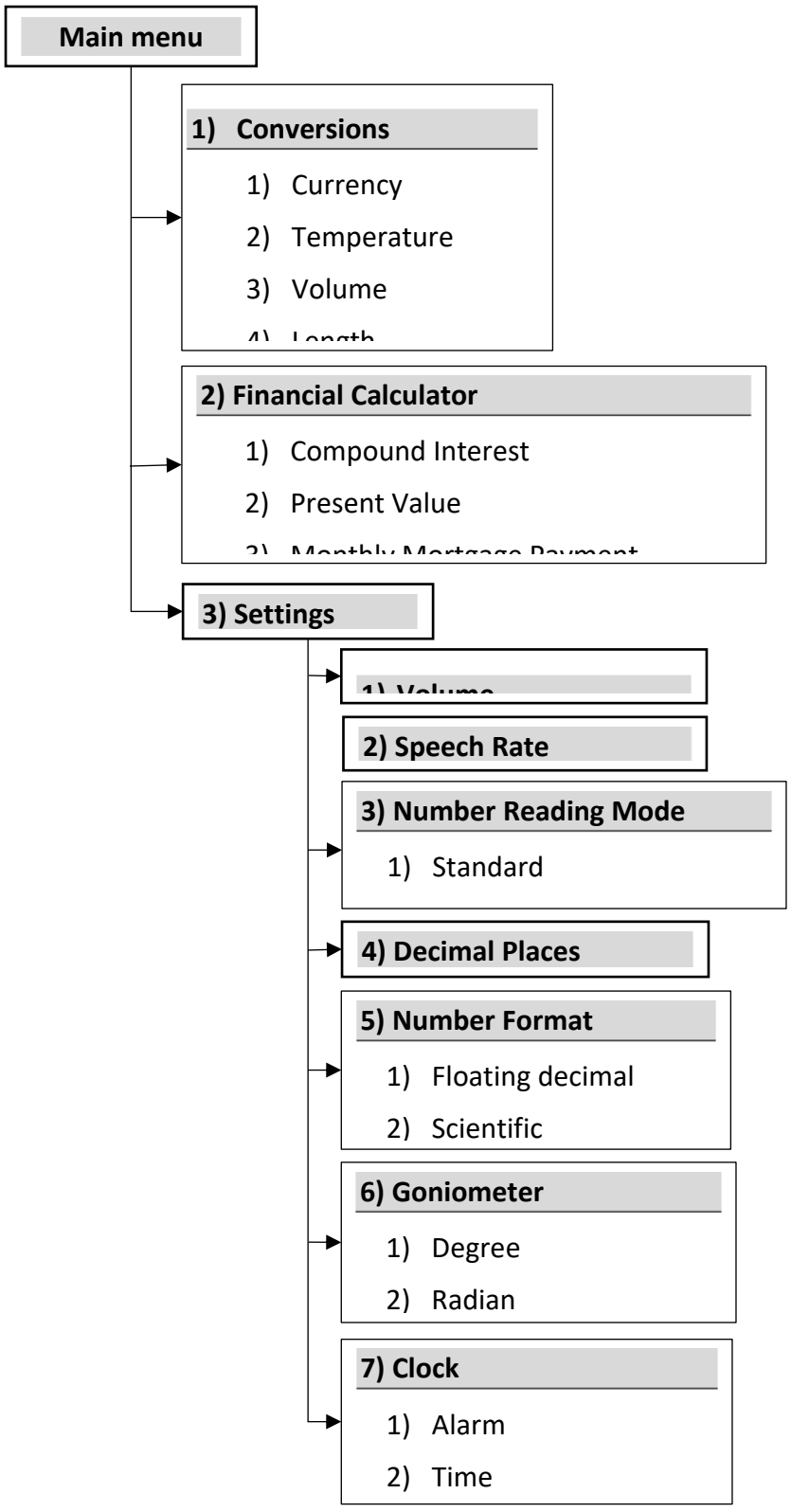
7 THE MAIN MENU

The Menu system is designed for easy tactile navigation. It uses a "circular" list—when you reach the end of the menu, it cycles back to the beginning.

7.1 Navigating the Menu

1. **Open the Menu: Long-press** the **[Menu]** key (Upper Group, Row 2, center key with the tactile dot).
   - *Voice: "Conversion" (first menu item)*.
2. **Browse Items:** Use the **[x^2]** (left) and **[√x]** (right) keys in the same row to move through the options.
   - *Voice: Platon will announce each menu item as you scroll (e.g., "Conversions," "Settings").*
3. **Enter / Confirm: Long-press** the **[Menu]** key to enter a sub-menu or confirm a setting.
4. **Exit / Go Back: Short-press** the **[ON/C]** key (Upper Group, Row 1, Column 3) to leave the menu and return to calculation mode.

7.2 Menu Structure



7.3 Menu Quick Selection

Experienced users can navigate the menu rapidly by pressing the corresponding number keys on the 4×4 keypad.

How to use:

1. Hold down the **Menu** key (Upper Group, row 2, middle key with a tactile dot).
    - Platon will announce: *"Conversion"*.
2. Press the corresponding **number key** to select a main submenu (see Chapter 7.2, Menu Structure, for the number assignments).
3. Continue pressing the corresponding **number keys** to reach the desired menu item.

Example: Changing Volume to Level 7

1. Long-press the **Menu** key until Platon announces "*Conversion*".
2. Press **[3]**, to select **Settings**. *Voice: "Volume"* (first item in "Settings" submenu).
3. Press **[1]** to select **Volume**. Platon announces current volume settings, e.g., "*Volume 3*"
4. Press **[7]** to select volume level 7. Platon announces "*Volume 7*"
5. **Long-press** the **Menu** key to confirm.

7.4 Volume

This menu item allows you to adjust the **speaker volume**.

- There are **10 levels** available: **1–10**.
- **Levels 1–10**: Increasing volume from quiet to maximum.
- To set a level directly, use keys **[1]** through **[9]**. To select the maximum level (10), press **[0]**.
- Alternatively, use the **[x^2]** (left) or **[$\sqrt{x}$]** (right) keys to adjust the volume step-by-step.

7.5 Speech Rate

Customize the tempo of the voice output to your preference.

- The rate is adjustable in **25% steps**.
- The range extends from **–50%** (slowest) to **+200%** (fastest).

7.6 Number Reading Mode

Choose how Platon announces multi-digit numbers:

- **Whole Numbers:** *305 is read as "Three hundred five."*
- **Digit-by-digit:** *305 is read as "Three zero five."*
- Use the navigation keys to select your preference and **long-press [Menu]** to confirm.

7.7 Decimal place

This menu item determines how the calculator rounds and announces the decimal portion of a result. You can choose between a dynamic "Flexible" mode or a fixed number of decimal places.

Flexible Mode

This is the recommended setting for most calculations. It provides maximum precision without announcing unnecessary information.

- **Integers:** If the result is a whole number (e.g., 15.00), Platon will announce it as *"fifteen"*.
- **Decimals:** If the result contains decimals, Platon will announce them up to the device's maximum capacity, automatically omitting any trailing zeros.
- *Benefit:* You hear the most accurate result without being bothered by redundant "point zero zero" announcements.

Fixed Settings (0–9)

If your work requires a specific level of precision (e.g., financial calculations or engineering), you can lock the rounding:

- **Setting "0":** Results are rounded to the nearest whole number and announced as integers.
- **Settings "1" through "9":** Results are consistently rounded to the specified number of decimal places.

7.8 Display mode

This menu item allows you to choose how numbers are formatted on the display and how they are announced by the voice output. Platon offers three distinct modes:

- **Floating Decimal (Default)**

  Numbers are announced and displayed as standard decimals.
  - **Example: 12,365.886** → Platon announces: "T*welve thousand, three hundred sixty-five point eight eight six.*").
  - **Automatic Switching:** If a result is too large or too small to fit within the 10-digit display limit, Platon automatically switches to Scientific format for that specific result.

- **Scientific**

Numbers are always displayed and announced in exponential notation (powers of 10).
  - **Example: *345.22E–65*** (which is 345.22×10^{-65})
    Voice Output: "three hundred forty-five point two, times ten to the power of minus sixty-five."

- **Technical**

Similar to Scientific mode, but the exponent is always a **multiple of 3** (10^3, 10^6, 10^{-3}, etc.). This format is designed to align with standard **SI Prefixes** used in engineering and science.

Name	Abbreviation	Value	Exponential
kilo	k	1,000	10^3
mega	M	1,000,000	10^6
giga	G	1,000,000,000	10^9
milli	m	0.001	10^{-3}
micro	µ	0.000001	10^{-6}
nano	n	0.000000001	10^{-9}

Quick Shortcut:
You can cycle through Display Modes instantly without entering the menu:

- Press **[2nd/3rd]** and then the **Division key [÷]**.
- *(Tactile: Upper Group, Row 1, Column 1 + Lower Group, Row 1, Column 4).*

7.9 Angle Units

This menu item allows you to select the unit of measurement for trigonometric functions (Sine, Cosine, Tangent, etc.).

- **Degree (°):** The most common unit for general geometry. A full circle is **360°**.
- **Radian (rad):** The standard unit for higher mathematics and physics. A full circle is **2π radians**.
    - *Relation:* 180° = π rad.
- **Gon (grad):** Also known as gradians, commonly used in surveying and civil engineering. A full circle is divided into **400 gons**.
    - *Relation:* 1 gon = 0.9°.

How to Change the Angle Unit:

1. **Via Menu:** Open the **Menu** → **Settings** → **Angle Units**. Use the navigation keys to select and long-press **[Menu]** to save.
2. **Via Shortcut:** You can quickly toggle between Degrees, Radians, and Gons by pressing:
    - **[2nd/3rd]** and then the **[0]** key.
    - Platon will immediately announce the newly selected unit (e.g., *"Radians"*).

7.10 Clock and Alarm

These settings are located in the **Settings (3)** sub-menu. You can navigate there manually or use the Quick Key sequence **[Menu]** → **[3]** → **[7]**.

7.10.1 Alarm Clock

The alarm functions even when the device is in standby mode. You can set a specific time and choose from several ringtones.

Setting the Alarm:

1. **Select Alarm:** Navigate to **"Alarm" (**Menu → Settings → Clock Settings → Alarm) in the menu and **long-press** the **[Menu]** key (Upper Group, Row 2, center).
2. **Enable/Disable:** Use the **[x²]** (left) or **[√]** (right) keys to toggle the alarm **ON** or **OFF**. Confirm with a **long-press** on **[Menu]**.
3. **Set Hour:** Use the navigation keys to reach the desired hour. Confirm with a **long-press** on **[Menu]**.
4. **Set Minutes:** Use the navigation keys to set the minutes. Confirm with a **long-press** on **[Menu]**.
5. **Choose Ringtone:** Scroll through the available melodies.
6. **Save: Long-press** the **[Menu]** key to save all settings and exit.
    - *Voice: "Alarm set for [Time]."*

Snooze Function:

When the alarm sounds, you do not need to turn it off immediately. You can use the numeric keypad to "snooze":

- **Keys [1] through [9]:** Pressing any of these keys postpones the alarm for **1 to 9 minutes,** respectively.
- **Key [0]:** Postpones the alarm for **10 minutes**.
- **Note:** You can repeat the snooze process as many times as you like.

Stopping the Alarm:

1. To stop the alarm completely, **long-press** the **[Menu]** key.
2. If no key is pressed, the alarm will ring for **3 minutes** and then stop automatically to preserve battery life.

7.10.2 Time

Setting the correct time is essential for the alarm feature.

1. Select Time: Navigate to "Set Time" **(**Menu → Settings → Clock Settings → Set Time) in the menu and **long-press** the **[Menu]**.

2. **Set Hour:** Use the **[x²]** or **[√x]** keys to adjust the hour. Confirm with a **long-press** on **[Menu]**.
3. **Set Minutes:** Adjust the minutes using the same keys.
4. **Save:** Confirm the final setting with a **long-press** on **[Menu]**.

7.10.3 Date

1. **Select Date:** Navigate to "Set Date" **(**Menu → Settings → Clock Settings → Set Date) in the menu and **long-press** the **[Menu]**.
2. **Set Year:** Use the navigation keys to select the current year. Confirm with a long-press on **[Menu]**.
3. **Set Month:** Select the month and confirm with a **long-press**.
4. **Set Day:** Select the day and confirm with a final **long-press** on **[Menu]**.

8 SAFETY INSTRUCTIONS

To ensure the safe operation and long-term reliability of your Platon calculator, please observe the following guidelines:

1. **Operational Environment:** Avoid exposing the device to extreme humidity, intense heat (such as direct sunlight on a car dashboard), freezing temperatures, heavy dust, or dirt.
2. **Water Exposure:** If the device is splashed with water, wipe it dry immediately with a soft cloth. If liquid enters the interior of the device:
    1. **Immediately remove the batteries.**
    2. Allow the unit to dry completely in a warm, ventilated area for at least 24 hours before attempting to use it again.
3. **Battery Maintenance:** If you do not intend to use the device for several weeks or months, remove the batteries. This prevents permanent damage to the internal electronics caused by battery acid leakage.
4. **Correct Installation:** When replacing batteries, always verify the correct polarity (+ and -). Remember that the flat (negative) end of the battery always rests against the metallic coil spring.

9 CLEANING AND MAINTENANCE

Regular cleaning helps maintain the tactile feel of the buttons and the clarity of the voice output.

- **Exterior Surfaces:** Use only a soft, lint-free cloth that is **lightly moistened** with water.

- **Drying:** After cleaning with a damp cloth, wipe the device again with a dry, soft cloth to remove any residual moisture.

⚠ **Caution:**

- **No Liquid Entry:** Ensure that no liquid or moisture enters the device through the speaker grille, the USB-C port, or the gaps around the keys.
- **Avoid Chemicals:** Never use strong acids, solvents, or chemical cleansers. These can dissolve the plastic casing or erase the tactile markings on the keys.
- **Avoid Abrasives:** Do not use scrubbing pads, rough sponges, or brushes. These will scratch the display and the protective coating of the housing.

10 TECHNICAL SPECIFICATIONS

Dimensions (L × W × H)	Approx. 154 mm × 64 mm × (13–21 mm)
Weight	130 g (including batteries)
Power supply	2 × 1.5V AAA (Micro) batteries
External Power	DC Power Adapter (Optional, not included)
Operating Temp.	0°C to 40°C

Scope of Delivery

Your Platon package includes the following items:

- Platon Speaking Scientific Calculator
- Protective Flip Case
- 2 × 1.5V AAA Batteries
- Printed User Manual

11 WARRANTY AND SERVICE

CareTec provides a comprehensive warranty to the original purchaser from the date of purchase.

Warranty Periods

- **24 Months:** The main calculator unit.
- **12 Months:** Included accessories (e.g., power supply, earphones).

- **6 Months:** Wearable parts (e.g., carrying case).
- **Exclusion:** No warranty is provided for the batteries themselves.

Terms of Service

During the warranty period, the product will be either repaired or replaced free of charge. CareTec is not liable for indirect, special, or consequential damages.

The warranty is immediately void if:

- The device has been exposed to liquids.
- The device has been subjected to strong electromagnetic fields or extreme heat.
- The device has been dropped or shows signs of physical impact.
- The housing has been opened by anyone other than an authorized technician.

What to do in case of a defect:

If you experience technical issues, please contact **your local distributor** or CareTec before returning the device. We will provide you with the necessary instructions and a return authorization if required.

Warning: Do not attempt to open the device. It contains no user-serviceable parts inside. Opening the case will void your warranty.

12 LEGAL INFORMATION AND DISPOSAL

12.1 Disposal of used Electronic Devices

	This product must be disposed of separately from household waste at specially designated collection and recycling points. For further information please contact your local authorities.

12.2 Recycling Batteries

	Batteries must not be disposed of in household waste. As a consumer you are legally obligated to bring your old batteries to public collecting points (in your community or any shop that provides these batteries).

Pb-Cd-Hg These signs can be found on contaminant-laden batteries.
Pb = containing lead

Cd = containing cadmium
Hg = containing mercury

13 SYMBOLS USED

	Caution
	Note
	Dispose of separately from household waste
	Manufacturer

14 MANUFACTURER

	CareTec GmbH, Stubenbastei 1, A-1010 Vienna, Austria is the manufacturer of this product. Phone (+43 1) 513 80 81 0 Fax (+43 1) 513 80 81 9 E-mail: office@caretec.at Web: www.caretec.at