OAKTON®

Tech Board™ plus

Operating Instructions

Thank you for purchasing a WD-35001-85 Tech Board™ Plus — the ultimate technical organizer! It features:

- *Full-function scientific calculator*
- *A 24-hour count-up stopwatch*
- *Real-time clock with time of day and calendar*
- *Selectable audible alarm clock*
- *Common conversion tables and a Periodic Table of the Elements for quick reference*
- *Sturdy clipboard that tightly holds your papers*
- *Paper guide that keeps your papers neatly aligned*
- *Handy 30-cm ruler*

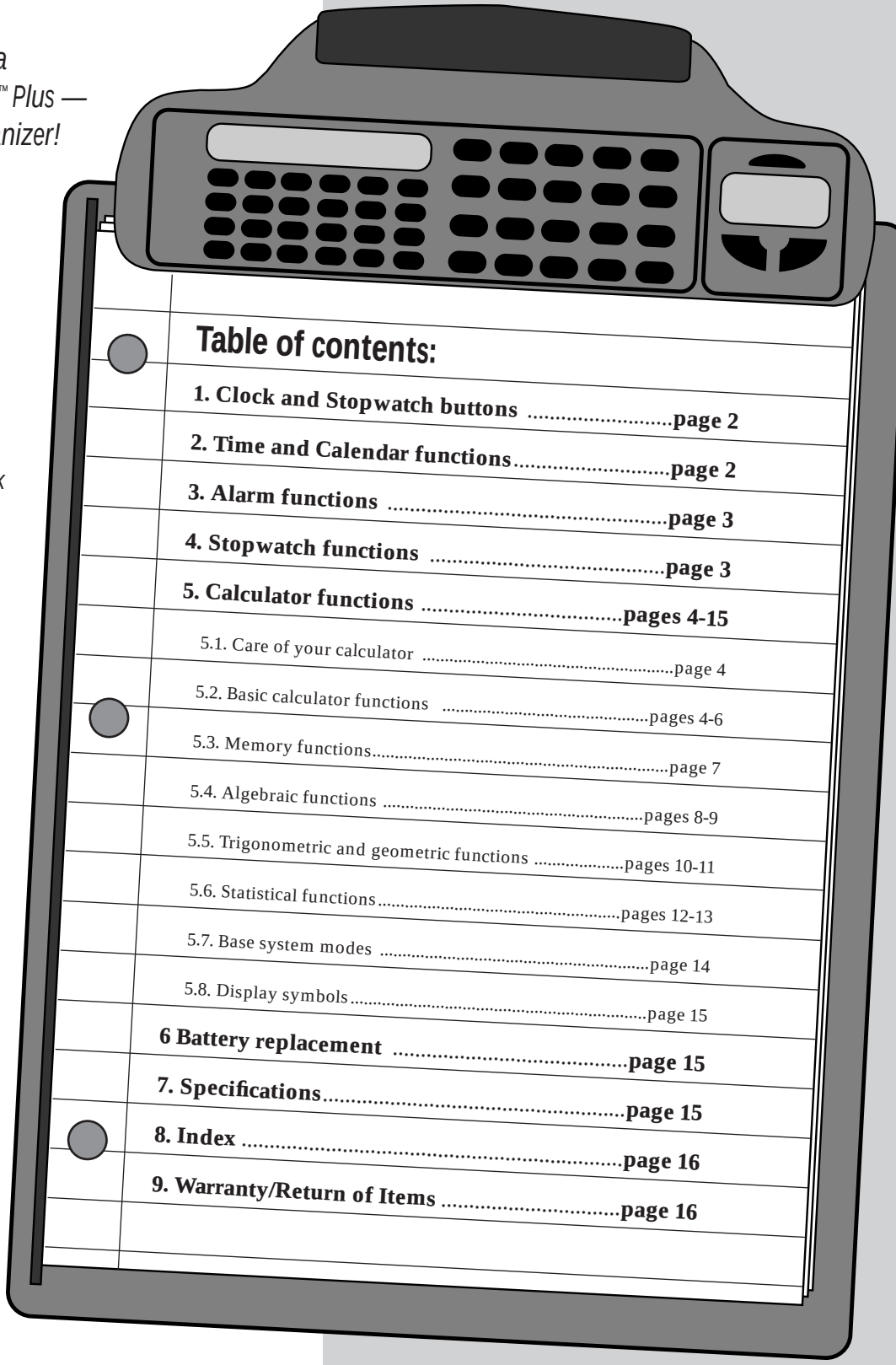


Table of contents:

1. Clock and Stopwatch Buttons

The clock and stopwatch are located on the right hand side of the TECH BOARD PLUS clip.
The power for the clock / stopwatch is always on.

The TECH BOARD PLUS clock / stopwatch features 3 main function buttons:

1. **the MODE button**
2. **the START/STOP button**
3. **the LAP/RESET button**

The MODE button lets you scroll through 4 operating modes:

1. **Time/calendar mode**
2. **Stopwatch mode**
3. **Alarm set mode**
4. **Time/calendar set mode**

The three buttons have different functions depending on the operating mode.
See the table below for a description of each button's different functions per operating mode.

Operating mode:		Time/Calendar mode	Stopwatch mode	Alarm Set mode	Time/Calendar Set mode
MODE button	Press to: You see:	view time, date and alarm set time upper display shows current day	perform all stopwatch functions upper display flashes "SU FR SA"	set or deactivate alarm upper display flashes "MO"	set time and date upper display flashes "TU"
START/STOP button	Press to:	view the current date	start and stop the stopwatch	change the alarm set time	change the time and date
LAP/RESET button	Press to:	view the alarm set time	time split laps and reset stopwatch	scroll through alarm set parameters	scroll through time / date parameters

2. Time and Calendar Functions

2.1 How to enter time/calendar mode

1. Press MODE until the display scrolls to the time / calendar mode (upper display will show one nonflashing day of the week).
2. To see the date, press START / STOP.
3. To see the alarm set time, press LAP / RESET.
   NOTE: Unless the alarm indicator is on (upper right corner of the display), the alarm will not sound at the shown time.

2.2 How to set time and calendar

1. Push MODE to scroll to time / calendar set mode (upper display will flash "TU").
2. Press LAP / RESET to scroll between clock parameters.
   The display scrolls through seconds, minutes, hours, day, month, day of week, then back to seconds.
3. When you have selected the parameter you want to change, hold START / STOP to adjust the clock or calendar.
4. Repeat step 3 until you have selected the correct time and date.
   NOTE: You can also select a 12-hour clock (a.m. and p.m.) or a 24-hour clock. To select 12 or 24 hour time:
   a. Scroll to the hours parameter.
   b. Hold START / STOP until you reach the appropriate time scale. The a.m. / p.m. clock will display "A" or "P" in the seconds place; the 24 hour clock will display "H" in the seconds place.
5. When you have selected the correct time and date, press MODE to return to the time / calendar display.

3. Alarm Functions

You can set alarm to sound for one minute at a specific time, and / or for a brief time once every hour. If the alarm set for a specific time is switched on, you will see the alarm indicator in the upper right corner of the display.

3.1 How to set alarm to sound at a specific time

1. Press MODE until the display scrolls to alarm set mode (upper display flashes “MO”).
2. Press LAP / RESET to select hours or minutes.
3. When you have selected the parameter you want to change, hold START / STOP to adjust the clock.
4. When you have selected the correct alarm time, push MODE to return to time display.
   The alarm indicator should now be on.

3.2 How to switch off alarm set for a specific time

1. Scroll to time / calendar mode (upper display shows 1 nonflashing day).
2. Press LAP / RESET to see the alarm set time.
3. While holding LAP / RESET, press START / STOP .
4. The alarm indicator will switch off.
   NOTE: If the alarm was already off, this same action will switch alarm on.

3.3 How to switch on and switch off hourly alarm

1. Scroll to time / calendar mode (upper display shows 1 nonflashing day).
2. Press LAP / RESET.
3. While holding LAP / RESET, press MODE.
4. If the hourly alarm was on, the entire upper display disappears briefly, and the hourly alarm is now off.
   If the hourly alarm was off, the entire upper display flashes briefly, and the hourly alarm is now on.

NOTE: to stop alarm tone while it is chiming, press any button.

4. Stopwatch functions

4.1 How to enter stopwatch mode

1. Press MODE until display scrolls to the stopwatch mode (upper display flashes “SU FR SA”).
2. If the stopwatch is not at 0:00:00, press LAP / RESET to clear stopwatch.

4.2 Start/stop timing

1. To start stopwatch, press START / STOP.
2. To stop stopwatch, press START / STOP again.
   NOTE: For time in / time out timing, continue to press START / STOP each time you want to restart timing.
3. To clear stopwatch, press LAP / RESET.

4.3 Split timing

1. To start stopwatch, press START / STOP.
2. To pause stopwatch, press LAP / RESET. Record the split time shown on display.
   NOTE: The paused time will hold on the display, but the stopwatch is still timing.
3. To view count up again, press LAP / RESET again.
4. Continue to press LAP / RESET each time you want to acquire more split times.
5. To stop stopwatch, press START / STOP.
6. To clear stopwatch, press LAP / RESET twice.

4.4 Fast finish (1-2) timing

1. To start stopwatch, press START / STOP .
2. To hold stop #1, press LAP / RESET.
   NOTE: The paused time for stop #1 will hold on the display, but the stopwatch is still timing.
3. To hold stop #2, press START / STOP.
4. Record the time for stop #1 (currently on display).
5. To display stop #2, press LAP / RESET. Record the time for stop #2.
6. To clear stopwatch, press LAP / RESET a second time.

5. Calculator functions

5.1 Care of your calculator

To help ensure calculator longevity, do not touch the inside of the calculator. Avoid hard knocks and overly strong key pressing. Extreme cold (Below 32°F or 0°C), heat (above 104°F or 40°C) and humidity may also affect calculator functions. Never use volatile fluids such as lacquer thinner, benzene, etc., when cleaning the unit. For servicing, contact your OAKTON distributor.

Before starting calculation, press the ON / C key to confirm that "0"is shown in the display.

5.2 Basic calculator functions

2ndF

Secondary Function Key

Push this key first to access the secondary function of each key (the function listed above each key).

ON/C

Power on/clear

Push this key to turn the calculator on. The calculator is ready for operation.
When this key is pushed during operation, it clears the calculator except for the memory.

OFF

Power off key

When this key is depressed, the calculator is turned off.

POWER

2ndF OFF

Automatic Power off function

This function automatically shuts the calculator off approximately 8 minutes after the last key operation. This conserves the batteries.

---

1 2

3 4

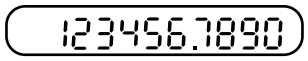
5 6

7 8

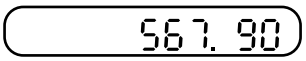
9 0

Numeral keys

Used to enter numbers on the display. You can display numbers in two ways:
with the floating decimal system (standard view) or with the scientific notation system.



floating decimal system display



scientific notation system display

(Use the F↔E key or the EXP key to enter scientific notation system; see page 6 for directions.)

.

Decimal point key

Enters a decimal point.

Ex: To obtain 12.3, press 1 2 . 3

Plus key

Press for addition.

Ex: To calculate 3 + 2, perform: 3 (+) 2 (=) 5

Minus key

Press for subtraction.

Ex: To calculate 3 – 2, perform: 3 (–) 2 (=) 1

Also use this key to create negative numbers.

Ex. 12 (–) 28 (=) –16

Division key

Press for division.

Ex: To calculate 6 ÷ 2, perform: 6 (÷) 2 (=) 3

Multiplication key

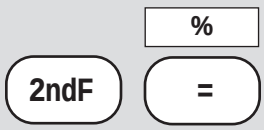
Press for multiplication.

Ex: To calculate 6 x 2, perform: 6 (x) 2 (=) 12

Equals key

Completes arithmetic calculations and complex number calculations.

Ex: 3 (–) 2 (=) 1



Percent key

Use for percentage calculation and discount calculation.

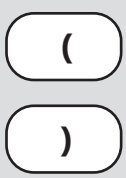
Ex: To calculate 25% of 80, perform: 80 (x) 25 (2ndF) [%] 0.25 (=) 20

Clear entry key

Use to clear an incorrectly entered number.

Ex: If you want to calculate 123 + 456 and you incorrectly enter 123 + 455, press:

123 (+) 455 (CE) 456 (=) 579



Open parenthesis and Close parenthesis keys

Use to open and close parenthesis in a more complicated arithmetic or complex number calculation.

Ex: To calculate 6 x (5+6) perform: 6 (x) (5 (+) 6) (=) 66

You can also use these keys to enter a negative value—no calculation required.

Ex. 4 (x) ((–) 3) (=) –12

5. Calculator functions, continued

5.2 Basic Calculator Functions, continued

EXP

Entering scientific notation key

Press to enter a number in scientific notation.

Ex: To enter $12^{40,}$ press 12 (EXP) 40. The display will show 12. 40

F↔E

Display format exchange key

Press this key once to display the result of a calculation in the scientific notation system.

Ex: 10 (x) 3000 (=) 30000 (F↔E) → 3. 04

Pushing the (F↔E) key once more displays the result of your calculation in the floating decimal point system again.

See page 4 for diagrams of the display in floating decimal point system and in scientific notation system.

TAB

2ndF F↔E

Tabulation key

Pressing these keys lets you specify the number of decimal digits displayed in the result of a calculation. You can specify from 0 to 9 decimal digits.

Ex: 11 (x) 0.12345 (=) 1.35795 (2ndF) [TAB] 3 → 1.358

The tabulation function will remain active until you deactivate it— even if you turn the calculator off. To deactivate this function, press the following keys: (2ndF) [TAB] (.)

π

2ndF EXP

Pi key

Press (2ndF) [π] to enter the constant π (π = 3.141592654).

RND

2ndF .

Random number key

Press these keys to generate uniform random numbers from 0.000 to 0.9999.

NOTE: Random number generation is not possible when binary / octal / hexadecimal base system mode is set. See page 14 for information on setting different base system modes.

5.3 Memory functions

x→M

Memory in key

Press to store a number in memory.

Ex: Press 50 (x→M) . “50” is now stored in memory.
When a number is stored in memory, the letter “M” appears on the left side of the display.

Memory holds only one number at a time. Whenever you press the (x→M) key,
the number that is on the display will replace the old number stored in memory.

Memory retains the number even if you turn off the calculator.
To clear the memory, depress the (ON/C) key followed by the (x→M) key.

RM

Recall memory key

Displays the contents of the memory. Pressing this key does not alter the memory contents.

M+

Memory plus key

Press to add the number on the display (i.e. a calculated result) to the contents of the memory.

Ex: If the number 50 is stored in memory, and you want to add the number 25 to the memory,
press: 25 (M+)

Then, press (RM) to recall memory. The memory will now contain the number 75.

X→Y

2ndF (

Exchange key

Press this key to exchange the number on the display with the number stored in the working register (the previously entered value). This lets you clear an incorrectly entered number that has already been entered into the calculator.

Ex: If you want to calculate 26 + 40 and you incorrectly enter 25 + 40, press:

25 (+) 40 (2ndF) [X→Y] 25 26 (=) 66

5. Calculator functions, continued

5.4 Algebraic functions

log

Common logarithm key

Calculates the logarithm with a base of 10.

Ex: 3 (log) → 0.477121254

10^x

2ndF log

Antilogarithm key

Calculates the antilogarithm with a base of 10.

Ex: 3 (2ndF) [10^x] → 1000

---

ln

Natural logarithm key

Calculates the logarithm base e (e = 2.718281828).

Ex: 3 (ln) → 1.098612289

---

e^x

2ndF ln

Natural antilogarithm key

Calculates the antilogarithm base e of the displayed number.

Ex: 3 (2ndF) [e^x] → 20.08553692

---

x²

Square (x^2) key

Calculates a square of the number displayed.

Ex: To calculate 3^2, press: 3 (x^2) → 9

1/x

2ndF log

Reciprocal (1/x) key

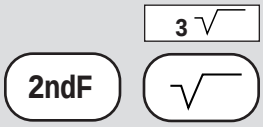
Calculates the reciprocal of the number displayed.

Ex: to calculate 1/8, press: 8 (2ndF) [1/x] → 0.125

Square root key

Calculates the square root of the number displayed.

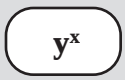
Ex: to obtain the square root of 4, press: 4 (√) 2



Cube root key

Calculates the cube root of the number displayed.

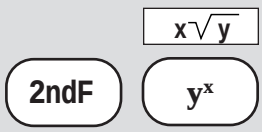
Ex. to obtain the cube root of 8, press: 8 (2ndF) [3√] 2



Universal power (y^x) key

Raises a number "y"to a power "x".

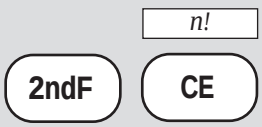
Ex: to raise 5 to the 4th power (5^4), press: 5 (y^x) 4 (=) 625



Universal square root ($x\sqrt{y}$) key

Calculates the xth root of Y.

Ex: to calculate the 6th root of 64, press: 64 (2ndF) [x√y] 6 (=) 2



Factorial key

The factorial key is useful in probability calculations. It calculates the factorial of the displayed number (multiplies a series of consecutive integers).

Factorial of 4: (4 x 3 x 2 x 1) = 24

Ex: 4 (2ndF) [n!] → 24

5. Calculator functions, continued

5.5 Trigonometric/Geometric functions

DRG

Degree / Radian / Grad selector key

Used to calculate trigonometric and coordinate conversions.
The DRG key changes the angular mode.

Ex. To enter GRAD mode, depress the (DRG) key twice.

"DEG" mode Entries and answers are in decimal degrees. One degree equals 1/360 of a circle.

"RAD" mode Entries and answers are in radians. One radian equals $1/2\pi$ of a circle.

"GRAD" mode Entries and answers are in grads. One grad equals 1/400 of a circle.

Right angle conversions: $90° = \pi/2 = 100g$

DRG▶
2ndF DRG

Angular unit conversion key

These keys convert the displayed number into an equivalent number of the next angular mode.

- If you are in Degrees mode, pressing these keys will convert the display into equivalent radians.
- If you are in Radians mode, pressing these keys will convert the display into equivalent grads.
- If you are in Grads mode, pressing these keys will convert the display into equivalent degrees.

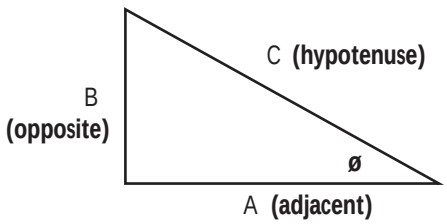
Ex: 180 (in DEG mode) (2ndF) [DRG▶] 3.141592654 (in RAD mode)

---

sin
cos
tan

Trigonometric function key

sin ø = B/C
cos ø = A/C
tan ø = B/A



sin key calculates the sine of angle ø.

cos key calculates the cosine of angle ø.

tan key calculates the tangent of angle ø.

NOTE: make sure your calculator is in the appropriate angle mode (DEG, RAD, or GRAD) before calculation. Select the angle mode with the (DRG) key (see above).

---

sin⁻¹
2ndF sin

cos⁻¹
2ndF cos

tan⁻¹
2ndF tan

Inverse trigonometric function key

sin key calculates the arcsine of angle ø.

cos key calculates the arccosine of the angle ø.

tan key calculates the arctangent of the angle ø.

NOTE: Make sure your calculator is in the appropriate angle mode (DEG, RAD, or GRAD) before calculation. Select the angle mode with the (DRG) key (see above).

hyp

Hyperbolic key

Press to use the trigonometric function keys (sin, cos, tan) as hyperbolic functions.

- sinh (z) = 1 / 2 ($e^z - e^{-z}$)
- cosh (z) = 1 / 2 ($e^z + e^{-z}$)
- tanh (z) = sinh (z) / cosh (z)

Press (hyp) (sin) to view hyperbolic sine (sinh).

Press (hyp) (cos) to view hyperbolic cosine (cosh).

Press (hyp) (tan) to view hyperbolic tangent (tanh).

---

arc hyp

2ndF hyp

Arc hyperbolic key

Press to use the trigonometric function keys (sin, cos, tan) as inverse hyperbolic functions.

Press (2ndF) [arc hyp] (sin) to view inverse hyperbolic sine ($\sinh^{-1}$).

Press (2ndF) [arc hyp] (cos) to view inverse hyperbolic cosine ($\cosh^{-1}$).

Press (2ndF) [arc hyp] (tan) to view inverse hyperbolic tangent ($\tanh^{-1}$).

→DEG

▶D.MS

2ndF →DEG

Decimal degrees (decimal hours) key
Degrees/minutes/seconds (Hours/minutes/seconds) key

Press (→DEG) to convert a number to:

- decimal degrees or to
- decimal hours

Press (2ndF) [▶D.MS] to convert a number to:

- degrees / minutes / seconds or to
- hours / minutes / seconds

To enter Degrees/minutes/seconds:
D.MMSSsss where: D = Degrees (°)
M = Minutes (')
S = Seconds (")
s = Fractional seconds

Ex: Enter 8°9'20.123" as 8.0920123

Ex: To convert 8°9'20.123"
to decimal degrees, press:
8.0920123 (→DEG) 8.155589722

To convert 8.053124 back to
degrees / minutes / seconds, press:
8.155589722 (2ndF) [▶D.MS] 8.0920123

To enter Hours/Minutes/Seconds:
H.MMSSsss where: H = hours
M = Minutes
S = Seconds
s = Fractional seconds

Ex: Enter the time 9 hours and 90 minutes as 9.90

Ex: To convert 9 hours and 90 minutes
to decimal hours, press:
9.90 (→DEG) 10.5

To convert 10.5 hours to
hours / minutes / seconds, press:
10.5 (2ndF) [▶D.MS] 10.300000

5. Calculator functions, continued

5.6 Statistical functions

STAT
2ndF ON/C

Statistical Mode key

Pressing these keys activates the statistical mode.

NOTE: The keys on pages 12 and 13 only work when the Statistical Mode is selected!

When the calculator is set to the statistical mode, the symbol "STAT" appears in the upper right corner of the display. At the same time, all numerical values and calculation commands are cleared (except for memory contents).

In the statistical calculation mode, these keys function as the following:

M+	"DATA"	2ndF M+	"CD"
)	"n"	2ndF)	"$\sum x$"
x→M	"$\bar{x}$"	2ndF x→M	"$\sum x^2$"
RM	"S"	2ndF RM	"s"

DATA
M+

Data key

Press to enter statistical data into memory. Each time you press the DATA key, another statistical sample is entered into memory. The display then shows the total number of samples stored in statistical memory.

Ex. Enter 12 DATA 1 → Enter 14 DATA 2 → Enter 18 DATA 3 → ...and so on.

CD
2ndF M+

Clear data key

Press to remove the previously entered statistical data from memory. Each time you press the CD key, another statistical sample is removed from memory in "last in, first out" order. The display shows the total number of samples remaining in statistical memory.

n
)

Sample number key

Press to show the total number of samples stored in memory.

$\sum x$
2ndF)

Data sum key

Press to obtain the sum of all the stored data.

$\overline{x}$

x→M

Data mean value key

Press to obtain the mean (average) value of all the stored data.

$\sum x^2$

2ndF x→M

Sum of squares of data key

Press to obtain the sum of the squares of all the stored data.

---

s

RM

Sample standard deviation key

Press to obtain the standard deviation of the sample of data.
Use when data is taken from a sample of members of a population.

σ

2ndF RM

Population standard deviation key

Press to obtain the standard deviation of the population of data.
Use when data is taken from all members of a population.

5. Calculator functions, continued

5.7 Base system modes

2ndF → ÷ (→BIN)

Binary number mode key

Press to set the binary system mode—converts the number displayed into a number in base 2.

You cannot enter the digits 2, 3, 4, 5, 6, 7, 8, or 9 in this mode.

This mode lets you add, subtract, multiply, and divide.

2ndF → x (→OCT)

Octal number mode key

Press to set the octal system mode—converts the number displayed into a number in base 8.

You cannot enter the digits 8 and 9 in this mode.

This mode lets you add, subtract, multiply, and divide.

2ndF → − (→HEX)

Hexadecimal number mode key

Press to set the hexadecimal system mode—converts the number displayed into a number in base 16.

This mode lets you enter 16 digits: digits 0 to 9 and digits A, B, C, D, E, and F.

This mode lets you add, subtract, multiply, and divide.

The following keys act as A, B, C, D, E, and F in hexidecimal number:

D (→DEG) E (ln) F (log)

A (2ndF) B (y^x) C ($\sqrt{\ }$)

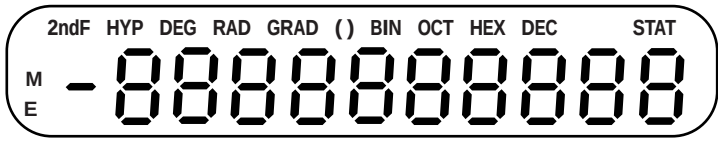
2ndF → + (→DEC)

Decimal number mode key

Press to set the decimal system mode. This is the normal (base 10) operating mode.
This mode lets you enter all digits from 0 to 9.

5. Calculator functions, continued

5.8 Display Symbols



Error symbol (E): Appears when a overflow or an error is detected.

Memory symbol (M) Appears when a number is stored in the memory.

Minus symbol (–): Indicates that the number in the display is negative.

2nd function designation symbol (2ndF): Appears when the secondary function of a key is designated

Hyperbolic function designation symbol (HYP): Appears when hyperbolic function is designated.

Degree mode symbol (DEG): Appears when the degree mode is designated, or shows that the angular mode of the converted result is in degrees.

Radian mode symbol (RAD): Appears when the radian mode is designated, or shows that the angular mode of the converted result is in radians.

Grad mode symbol (GRAD): Appears when the grad mode is designated, or shows that the angular mode of the converted result is in grads.

Parenthesis symbol "( )": Appears when a calculation with parenthesis is performed (when the "(" key is pressed).

Binary mode symbol (BIN): Appears when the binary system mode is set.

Octal mode symbol (OCT): Appears when the octal system mode is set.

Hexidecimal mode symbol (HEX): Appears when the hexadecimal system mode is set.

Decimal mode symbol (DEC): Appears when the standard, decimal system mode is set.

Statistical mode symbol (STAT): Appears when the statistical calculation mode is set.

6. Battery Replacement

6. Battery replacement

When the display appears dim, it is time to replace batteries.

To change batteries:

1. Carefully pry out the calculator or the stopwatch / clock from the Tech Board Plus clip.
2. Remove the battery cover on the back side of the calculator or the stopwatch / clock.
   - The calculator uses two 357 batteries or equivalent.
   - The stopwatch / clock uses one LR41 battery or equivalent.
3. Remove the old batteries and replace with fresh ones, noting correct polarity.
4. Carefully place the calculator or the stopwatch / clock back into the Tech Board Plus clip.

7. Specifications

7. Tech Board Plus Specifications

STOPWATCH SPECIFICATIONS:

Timing modes:
single event, start / stop or split timing

Timing capacity: 24 hours

Resolution: 0.01 sec up to 30 min, then 1 sec afterwards

Accuracy: ±8 seconds / day

Direction: up

Alarm: 1 min

GENERAL SPECIFICATIONS:

Display:
Stopwatch:10½-digit LCD, 5⁄16"H
Calculator: 5-digit LCD, ¼" H

Power:
Stopwatch: one LR41 battery or equivalent
Calculator: two 357 batteries or equivalent

Dimensions: 9"W x 13¾"H x 1"D (22.8 34.9 x 2.5 cm)

Shpg wt: 1 lb (0.45 kg)

8. Index

8. Index

9. Warranty/ Return of Items

9.1 Warranty

This OAKTON® TECH BOARD™ PLUS is warrantied to be free from significant deviations in material and workmanship for a period of six months from date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse within the six month period, please return—freight pre-paid—and correction will be made without charge. We alone will determine if the product problem is due to deviations or customer misuse. Out of warranty products will be repaired on a charge basis.

9.2 Return of Items

Authorization must be obtained from your OAKTON® distributor before returning items for any reason. When applying for authorization, please include data regarding the reason the items are to be returned.

NOTE: We reserve the right to make improvements in design, construction, and appearance of products without notice.

For more information, contact your OAKTON distributor.