Texas Instruments
electronic calculator with digital clock
TI-3510

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FEATURES

Convenient Size, Light Weight — Attractively styled for minimum desk-top area. Weighs less than 30 ounces and fits neatly in briefcase or suitcase.

Versatile Performance — Instantly performs addition, subtraction, multiplication and division including credit balance, chain and mixed calculations and utilization of a stored constant for multiplication or division. Full-floating or preset decimal point.

Easy to Operate — Keyboard allows entry of numbers and functions in the familiar sequence of standard business machines.

Digital Clock — Quickly converts to clock function with one switch. Correct time in hours and minutes appears on display in large, easy-to-read numerals.

Long Life — Solid-state components, a calculator-on-a-chip integrated circuit and long life display provide reliable, trouble-free operation.

Convenient AC Operation — Operates directly from household current via the 5½-foot ac cord.

Bright, Easy-to-Read Display — Large 10-digit display allows hours of fatigue-free operation. The display shows all numbers, fixed and floating decimal, negative sign, entry overflow indication, and calculation overflow indication.

OPERATIONAL FUNCTIONS

Calculator/Time Switch – Located on keyboard. Selects CALCULATOR (C) or CLOCK (T) operation.

Time Set Switches – Located on rear of calculator, these two pushbutton switches are used to set the clock to the correct time. To set the clock, push the red button (fast) to advance the clock forward at the rate of 60 minutes per second, and release the button when the display shows approximately 10 minutes before the desired time. Then push the black button (slow) to advance the clock one minute per second. Release the button when clock is at the correct time. Upon initial operation and every time a power interrupt occurs (such as when calculator is unplugged), push the red button for 15 seconds to clear the clock circuitry before setting the time.

Chain/Constant Switch – Located on keyboard. Selects CHAIN mode for normal calculations or CONSTANT mode for convenient multiplication or division by a constant.

Decimal Position Switch – Located on keyboard. Allows a choice of full-floating decimal, or two or four digits to the right of the decimal.

[0] – [9] **Keys** – Enters NUMBERS (limit 10 digits).

[•] **Key** – Enters a DECIMAL point.

[±] **Key** – The [±] key instructs the calculator to add the keyboard entry to the previous number on the display *unless* the entry was preceded by a [X] or [÷] instruction. In this case, the [±] key instructs the calculator to enter the keyboard data as a positive number and to perform the [X] or [÷] operation.

[−] **Key** – Instructs the calculator to subtract the keyboard entry from the previous number on the display, *unless* the entry was preceded by a [X] or [÷] instruction. In this case, the [−] key instructs the calculator to enter the keyboard data as a negative number and then to perform the [X] or [÷] operation. The [−] key also changes a positive display number to a negative number and vice-versa.

[X] Key – Instructs the calculator to MULTIPLY the previous number or result by the following number.

[÷] Key – Instructs the calculator to DIVIDE the previous number or result by the following number.

[C] Key – The [C] key clears (erases) information in calculator and display and sets calculator to zero for start of new problem.

[CE] Key – The [CE] key clears the calculator and display of a previous keyboard entry. If a keyboard entry error is made in the middle of a problem the [CE] key is used to clear that mistake (the last entry *only*), thereby allowing the continuation of the problem. The [CE] will not clear a calculated result. The [C] key must be used to clear the calculator after a [±] , [=] , [X] or [÷] .

Calculator On Indication – A zero appears in the extreme right digit position of the display when calculator/time switch is in C position. No other numbers are displayed. (Press [C] key if necessary.)

Minus Sign – Appears on display to indicate negative numbers.

Decimal Point – Automatically appears to the right of any number entered unless positioned in another sequence by use of [•] key. A zero will precede the decimal for fractional numbers.

Entry Overflow – A E sign appears at far left of display to indicate entry of more than 10 digits. (E indicates a **negative** entry overflow.)

Calculation Overflow – A U sign appears at far left of display to indicate a result with more than 10 digits before the decimal point. (U indicates a **negative** calculation overflow.)

OPERATION EXAMPLES

Calculator Operation

First plug the TI-3510 power cord into a standard household outlet.

Place the Calculator/Time switch in the C position. A zero will appear on the display. Press [C] if necessary.

Performing calculations with your new calculator is easy. Numbers and functions are entered in the same sequence as any standard business machine. *The important thing to remember is that the value of a number (either positive or negative) is always entered immediately after the number, when either adding, subtracting or performing mixed calculations.* The [±] key and the [=] key actually have dual purposes. They instruct the calculator to perform the previous operations *and* they also assign a positive or negative value to the previous input. For example, to perform the calculation five plus four, you press the keys [C] 5 [±] 4 [±] . The calculator says "five, plus, 4, plus, equals". The answer displayed is nine.

To perform the calculation five minus four, you press the keys [C] 5 [±] 4 [=] . The calculator says "five, plus (positive value), 4, minus (negative value), equals". The answer displayed is one.

When performing multiplication or division the value of a number is assumed to be positive. To assign a negative value simply press the [=] key immediately following the number.

The following examples will help you. In all of these examples you should place the CHAIN/CONST switch in the CHAIN position unless otherwise indicated. Also, the decimal selector switch should always be in the *floating position* (F) unless the example calls for another position.

Addition and Subtraction

Example: 4.23 + 4 = 8.23

Enter	Press	Display
	[C]	0.
4.23	[±]	4.23
4	[±]	8.23

Example: 6 – 1.854 = 4.146

Enter	Press	Display
	C	0.
6	±	6.
1.854	=	4.146

Example: 12.32 – 7 + 1.6 = 6.92

Enter	Press	Display
	C	0.
12.32	±	12.32
7	=	5.32
1.6	±	6.92

Multiplication and Division

Example: 27.2 X 18 = 489.6

Enter	Press	Display
	C	0.
27.2	X	27.2
18	±	489.6

Example: 12 ÷ 5.2 = 2.307692307

Enter	Press	Display
	C	0.
12	÷	12.
5.2	±	2.307692307

Example: (4 X 7.3) ÷ 2 = 14.6

Enter	Press	Display
	C	0.
4	X	4.
7.3	÷	29.2
2	±	14.6

Mixed Calculations Chain Mode

With the chain/constant switch in the CHAIN position, mathematical operations can be performed with combinations of addition, subtraction, multiplication and division.

Example: $\frac{(8.3 + 2)}{4} - 6.8 = -4.225$

Enter	Press	Display
	[C]	0.
8.3	[±]	8.3
2	[±] [÷]	10.3
4	[±]	2.575
6.8	[=]	−4.225

Example: 4 X 5 = 20 and 20 ÷ 8 = 2.5

Enter	Press	Display
	[C]	0.
4	[X]	4.
5	[±] [÷]	20.
8	[±]	2.5

Note: Entry of a number into the keyboard followed by a [X] or [÷] operation Automatically clears the calculator of a previous result. Though it is a good idea to form the habit of clearing before each problem, it is not necessary before a [X] or [÷] function.

Example: 6 X 3 = 18 (First Answer)
3 ÷ 8 = 0.375 (Second Answer)

Enter	Press	Display	Remarks
	[C]	0.	
6	[X]	6.	
3	[±]	18.	First Answer
3	[÷]	3.	
8	[±]	0.375	Second Answer

Multiplication and Division by a Constant

This convenience feature increases the flexibility of the TI-3510 calculator by allowing the user to multiply or divide a series of numbers by a constant number. When the chain-constant switch is in the CONST position, a number entered directly *before* a [X] or directly *after* a [÷] function is retained as a constant multiplier or divisor. This constant is erased by subsequent entry of another constant or by pressing the [C] key.

Example: 4 X 5 = 20, 4 X 6 = 24, 4 X (−7) = −28

CHAIN/CONST switch to CONST

Enter	Press	Display
	[C]	0.
4	[X]	4.
5	[=]	20.
6	[=]	24.
7	[=]	−28.

Example: 12 ÷ 2 = 6, 20 ÷ 2 = 10, −44 ÷ 2 = −22

Enter	Press	Display
	[C]	0.
12	[÷]	12.
2	[=]	6.
20	[=]	10.
44	[=]	−22.

Calculation Round Off

With Decimal Position Switch in either 2 or 4 position, the excess digits to the right of the decimal are rounded off. With the Decimal Position Switch in the F (or floating) position, the excess digits are dropped regardless of the value.

Example: 0.596 X 0.458 = 0.272968

Enter	Press	Display	Remarks
	C	0.	
.596	X	0.596	
.458	±	0.272968	Decimal at F
	C	0.	
.596	X	0.596	
.458	±	0.27	Decimal at 2
	C	0.	
.596	X	0.596	
.458	±	0.2730	Decimal at 4

Calculations With Positive and Negative Numbers

When performing multiplication or division, either chain or constant mode, a negative value is assigned to a number by pressing the ± key directly *after* entering the number.

Example: $\left(\frac{-125}{5}\right)$ X (−4) = 100

Enter	Press	Display
	C	0.
125	± ÷	−125.
5	X	−25.
4	=	100.

Mark-Up

Example: Determine the sales price of an item with original cost of $47.03 and mark-up of 24%.

Calculating formula: 47.03 X 1.24

Set decimal selector at "2" position.

Enter	Press	Display
	C	0.
47.03	X	47.03
1.24	±	58.32

Discount

Example: Determine the sale price of a $35.50 item with 12% discount and 6% tax on the discounted price.

Calculating formula: (1 – .12) X 35.50 X 1.06 = 33.11

Set decimal selector at "2" position.

Enter	Press	Display
	C	0.
1	±	1.
.12	≡ X	0.88
35.5	X	31.24
1.06	±	33.11

Interest Rates

Example: Determine the total value of a $1250 investment at 5½% yearly interest after three years.

Calculating formula: 1250 X 1.055 X 1.055 X 1.055 = 1467.80

Set CHAIN/CONST switch to CONST. Set decimal selector switch at "2" position.

Enter	Press	Display
	C	0.
1.055	X	1.055
1250	± ± ±	1467.80

Remember constant is *first* entry during multiplication.

Entry Overflow

The calculator will accept any number up to 10 digits. If an entry exceeds 10 digits, the signal E (-E if a minus number) will appear when the eleventh digit key is pressed. The error condition can be removed by pressing the C key.

Calculation Overflow

If a calculation result is more than ten digits before the decimal, the signal ⊔ (⊓ if a minus number) will be displayed with the answer. To determine the correct answer, mentally move the decimal ten digits to right.

Example: −13,625 X 1,000,000 = −13,625,000,000

Enter	Press	Display
	[C]	0.
13625	[=] [X]	−13625.
1000000	[±]	⊓ 1.362500000

Move decimal ten digits to right. Answer is −13,625,000,000.

After a calculation overflow, the calculator must be cleared with the [C] key before additional operations can be performed.

Although designed as a general business machine, the TI-3510 can be used for a number of more technical applications.

Reciprocals

The reciprocals of the number displayed (that is, the quotient of the number divided into 1) can be calculated *without* re-entering the number. Just slide the CHAIN/CONST switch to CONST, press the [÷] key, and then press the [±] key twice.

Decimal at F; CHAIN/CONST at CHAIN

Example: $\frac{1}{(2 \times 3) + 14} = 0.05$

Enter	Press	Display
	[C]	0.
2	[X]	2.
3	[±]	6.
14	[±]	20.
Switch CHAIN/CONST to CONST		
	[÷] [±] [±]	0.05

Squares

The square of the number displayed (that is, the product of that number multiplied by itself) can be determined *without* re-entering the number. Just press the [X] and [±] keys in sequence.

Decimal at F; CHAIN/CONST at CONST

Example: $26^2 = 26 \times 26 = 676$

Enter	Press	Display
	[C]	0.
26	[X] [±]	676.

Example: $(5 + 4)^2 = 81$

Enter	Press	Display
	[C]	0.
5	[±]	5.
4	[±] [X] [±]	81.

Square Roots

The TI-3510 can also be used to determine the square root of any given number (that is, the number which multiplied by itself equals the given number). The square root is calculated using an iterative process

$$\sqrt{N} \approx 1/2 \left(\frac{N}{Approx_1} + Approx_1 \right) = Approx_2$$

It *is* necessary to make an initial approximation, but the process rapidly converges on the correct answer. For example, to find the square root of 26, you begin with the approximation of 5.

Example: $\sqrt{26} \approx 5 = 5.0990$

Decimal at F; CHAIN/CONST at CHAIN

Enter	Press	Display	Remarks
	[C]	0.	
26	[÷]	26.	
5	[=]	5.2	
5	[=] [÷]	10.2	
2	[=]	5.1	Approx. 2
26	[÷]	26.	Re-enter Approx. 2
5.1	[=]	5.098039215	
5.1	[=] [÷]	10.19803921	
2	[=]	5.099019605	Answer
	[X] [=]	26.00000093	Check by Squaring Answer

Raising Numbers to a Power

Numbers to a power can be calculated – when the exponent is a whole number – by using the constant calculation mode and pressing the [=] key the same number of times as the power, less one.

Decimal at F; CHAIN/CONST at CONST

Example: $4^3 = 64$

Enter	Press	Display
	[C]	0.
4	[X] [=] [=]	64.

Example: $3^5 = 64$

Enter	Press	Display
	[C]	0.
3	[X] [=] [=] [=] [=]	243.

Specifications

Type – TI-3510 electronic calculator with digital clock.

Calculator Display – 10-digit with entry overflow, calculation overflow and negative sign.

Digital Clock – Displays hours and minutes when CALC/TIME switch is in T position.

Decimal Point – Complete floating decimal or preset at second or fourth position.

Types of Calculations – Addition, subtraction, multiplication and division. Credit balance. Chain multiplication and division. Multiplication and division by a constant, and mixed calculations.

Overflow – E (or E if a negative number) on display indicates entry overflow. u (or o if a negative number) sign on display indicates data calculation overflow.

Negative Sign – True value indication with minus sign on display.

Calculation Components – One MOS/LSI Integrated Circuit.

Power Requirements – Operates directly from AC line voltage – 108 to 130 V, 60 Hz.

In Case of Difficulty

1. Check to be sure the TI-3510 is correctly plugged into a proper outlet that has power. Press [C] key. A full-size [0] should appear in far right digit position on display when in calculator mode.

2. Review instructions to be certain calculations are performed correctly.

If none of these corrects the difficulty, return the unit prepaid for repair to your nearest Texas Instruments Consumer Service Facility listed on following page. Please include information on your difficulty as well as return information of name, address, city, state and zip code.

Warranty Registration
Owner's Copy

Record the serial number of your calculator below. Any correspondence concerning your calculator must include both model and serial number.

TI-3510		
Model No.	Serial No.	Purchase Date

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ONE YEAR WARRANTY

The TI-3510 electronic calculator from Texas Instruments is warranted to the original purchaser for a period of one year from the original purchase date — under normal use and service — against defective materials or workmanship.

Defective parts will be repaired, adjusted, and/or replaced at no charge when the calculator is returned prepaid to a Texas Instruments Consumer Service Facility listed below.

The warranty is void if the calculator has been visibly damaged by accident, misuse, or if the calculator has been serviced or modified by any person other than a Texas Instruments Consumer Service Facility.

This warranty contains the entire obligation of Texas Instruments Incorporated and no other warranties expressed, implied, or statutory are given.

The warranty is void unless the attached Warranty Registration Card has been properly completed and mailed to Texas Instruments Incorporated within 10 days of purchase.

Texas Instruments Consumer Service Facilities

Texas Instruments Service Facility
1245 Westfield Avenue
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