Programmable Tl59

Solid State Software libraries and other accessories.

Solid State Software module.

Texas Instruments Incorporated
Solid State Software libraries... up to 5,000 program steps each!

TI's state-of-the-art technology reduces the contents of up to 25 magnetic cards to one tiny plug-in Solid State Software module.

New programming versatility and power!

You'll be amazed at the convenience. The equivalent of a 25-card library can be contained in one small module. Drop in a tough, durable Solid State Software module in seconds and quickly access a program with a few keystrokes. The Library Module provided with the TI-59 calculator provides extended power in solving mathematical, statistical, financial and other problems. Optional plug-in modules allow you to customize your TI-59 into a specialty calculator. For statistics, real estate and investment, surveying, aviation, marine navigation. Each library module includes a self-teaching, easy-to-understand manual, and a handy pocket-size quick reference guide.

Use the pre-programmed library module by itself. Use the 5,000 step module as a base and call subroutines from your key-in program. Use your key-in program as a base and call subroutines from your 5,000 step library modules. Perform chaining by calling subroutines both ways. And much more.

These optional, Solid State Software libraries each consist of one plug-in module and disc. Software libraries and accessories are available from your TI retail dealer or, if he is temporarily out of stock, they may be ordered directly from Texas Instruments.

Applied Statistics Library

This branch of applied mathematics is useful in many fields: from medicine to political science and quality control to mechanical design. Yet few of the professionals who could benefit from statistical analyses know how to perform them. The field-tested programs in this library help close that gap.

Random Number Generator. Develops uniform and standard normal deviates for use in sample selection and Monte Carlo simulations.

Data Entry Programs. Creates univariate, bivariate, trivariate, analysis of variance, and histogram data bases for future analysis by later programs. Also stores data bases on magnetic cards.

Means and Moments. The arithmetic, geometric, harmonic, and generalized means, the first four moments, and the curvature and skewness of distribution are calculated for grouped or ungrouped data.

Histogram Construction. Constructs a histogram over a given range and given observed data points. The frequencies are calculated for each cell and the mean and variance are calculated for the entire range.

Theoretical Histogram. Constructs a histogram from a user designed theoretical frequency function. Converts the resulting counts to observed histogram counts and computes a chi-square goodness of fit measure.

Real Estate/Investment Library

For those interested in capital investments such as real estate, this library contains cash flow, return on investment, depreciation, tax audit, and other calculations that can make the difference between profitable ventures and expensive mistakes. The programs feature complete treatment of important practical details like the tax laws on excess depreciation.

Annuities. Given the required variables as input data, this program will calculate the remaining variable in any of the following situations:

a. Sinking Fund
b. Annuity Due/FV

Ordinary Annuity/PV (with or without balloon payment)

Annuity Due/FV (with or without balloon payment)

Remaining Balance/Accumulated Interest. Calculates the remaining balance on an ordinary annuity and calculates the accumulated interest between any two payments.

Compound Interest. Given any three of the four variables, solves for fourth variable in compound interest equation.

Straight Line Depreciation. Calculates depreciation, remaining depreciable value, remaining book value, and depreciation to date using straight line method.

Declining Balance Depreciation. (Same as above for Declining Balance Method.)

Sum of the Years Digits Depreciation. (Same as above for sum of the years digits method.)

Composite Depreciation. Calculates component depreciation by using the straight line, declining balance, or sum of the years digits methods. Calculates accumulated depreciation for each component, remaining depreciable value for each component, the composite depreciation for each year, total remaining depreciable value for the year, and the accumulated composite depreciation.

Excess Depreciation. Calculates the excess depreciation of the accelerated method over the straight line method.

Curve Fit (Regression Analysis). Fits curves to data like land prices, construction cost per square foot. Improves accuracy of forecasts, bids, estimates, and other important calculations.

Optimal Regression. Helps select which curve fit will produce best results. Used with curve fit program.

Internal Rate of Return. Uses sophisticated numerical techniques to calculate the rate of return on a capital investment based on the resulting cash flows generated.

Cash Flow Analysis. Calculates reductions to mortgage principals per year. Can handle up to three mortgages. Types of mortgages that can be handled are:

a. Amortized
b. Amortized with balloon
c. Constant payment to principal d. Standing
Calculates cash flows before and after taxes for each year.

**Yearly Amortization Schedule.** Calculates annual debt service, mortgage constant, remaining balance, payment to principal, payment to interest, accumulated principal, and accumulated interest for each year.

**Investment Feasibility.** Evaluates an investment in any income producing property where the majority of the purchase price must be financed.

**Residential Purchase Analysis.** Calculates the total cost of a property, the income tax deductions, and the equity buildup resulting from the purchase of a home. Also calculates any of the mortgage variables, permitting comparisons of homes and mortgages.

**Diagnostic.** Verifies proper operation of calculator and calculator-library interface.

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### Aviation Library

A collection of programs for the private or business pilot. Flight planning, including full schedules. Expanded way point capacity makes coast to coast flight planning feasible. Generates in-flight checklists, printed on PC-100A, before you leave the ground. In flight radio fixes with both VOR and DME gear. You need thousands of dollars worth of avionics to match the RNAV capability of this library.

**Flight Plan With Wind.** Calculates heading, course, and time on a trip of multiple legs, allowing for windage.

**Flight Plan and Verification.** Like Flight Plan With Wind, but may be updated in-flight.

**Long Range Flight Plan.** Calculates for great circle routes: distance, time, fuel, course. Covers overall flight plan and details each leg.

**Atmosphere, Speed, Temperature, and Altitude.** From pressure altitude, calculates speed of sound, temperature, pressure, etc., relative to standard sea level; each number, true air temperature, true airspeed, and density altitude.

**Predicting Freezing Level; Lowest Usable Flight Level.** Wet and dry freezing levels.

**Wind Components and Average Vector.** Crosswind and tail/headwind components of a single wind vector; average wind vector of several single vectors.

**The Wind Triangle.** Heading, course, speed, windage. Can be used with Dead Reckoning.

**Dead Reckoning.** Dead reckoning position is derived from present position, speed, time. Allows for wind if used with The Wind Triangle.

**Rhumbline Navigation.** Course and distance along great circle between positions (latitude, longitude); cumulative distance from several legs.

**Great Circle Flying.** Initial course and distance along great circle between positions (latitude, longitude); intermediate positions and vertex.

**Line of Sight Distance and Altitude.** DME Range and Altimeter to clear horizon and distance at that point; corrected speed from DME readout.

**Position and Navigation by one VOR.** Computes magnetic course, distance, and ETA to destination given either two readings from a VOR, or a VOR and DME.

**VOR Area Navigation.** Designed to be compatible with VOR Area Navigation program. Operation identical except position determined by radial and DME distance from a single VORTAC station.

**VOR Area Navigation.** Powerful program set to navigate VOR network; course, speed, distance, ETA; constant position check VOR or IFR.

**Course Correction.** Course and distance to fly to correct deviation by Rate of Turn; Turn Performance. Climb or descent, altitude change, distance.

**General Weight and Balance.** Computes total weight, total moment of gravity for an aircraft with several items aboard. Conventional conversions.

**Customized Weight and Balance.** Like General Weight and Balance, but provides a program to allow user to tailor calculations to his particular aircraft.

**Pilot Unit Conversions.** Length, volume, weight, English and metric temperature conversions of interest to flyers.

**RNAV Flight Plan.** Facilitates planning flights for RNAV equipped aircraft that require radial/DME distance to establish way points.

**Customized Unit Conversions.** User programs his own conversions by use of master program.

**Time Zone Conversions.** Converts time from one time zone to another.

**Diagnostic.** Verifies proper operation of calculator and calculator-library interface.

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### Marine Navigation Library

A comprehensive library which meets the needs of the racing sailor or ocean-crossing navigator. With coastal navigation programs you can compute relative or absolute position, speed made good, and true course. Or use the celestial navigation programs for the least complicated star sight reduction and position plotting system available. The section on racing tactics gives you a competitive edge.

**Coastal Navigation.** Time-Speed-Distance With Current Sailing. Solves time-speed-distance equations and considers the current in determining the proper course to steer and speed through the water necessary to reach a given destination in a specified length of time.

**Distance Short of; Beyond, or to Horizon.** Computes the distance to the apparent horizon as well as the distance to and visibility of an object of known height. Determines course and speed necessary to change position relative to a guide vessel whose course and speed are known.

**Velocity, VMG, and Current Vectors.** Given two of the following, (1) drift and set of the current, (2) speed and course through the water, (3) speed and course made good, the third is found.

**Course to Steer and SMG (Planning).** Calculates the course to steer and resulting speed, allowing you to select the point at which you wish to be at a given speed, and distance desired.

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### Celestial Navigation

**Time of Sunrise/Sunset/Twilight.** Estimates the expected times of sunrise, sunset, and a.m. and p.m. twilight from a dead reckoning position and data from the Nautical Almanac.

**Planet Location.** Predicts the approximate altitude and azimuth of the four navigational planets. The GMT of twilight may be entered manually or by using Time of Sunrise/Sunset/Twilight.

**Star Identification.** Calculates the approximate SHA and declination of an observed star so that it may be identified from tables found in the Nautical Almanac.

**Sextant Correction.** Computes the observed altitude of a body by adding the sextant altitude for various errors.

**Sight Reduction (Sun, Moon, Planet, Star).** Determines the computed altitude, azimuth, and intercept of a body from the observed altitude, DR position, GMT time and date, and information extracted from the Nautical Almanac.

**Fix by Two Observations.** Computes a fix from any of two of six sights stored in the calculator memories.

**Time of Local Apparent Noon and Sun Lines.** Predicts the optimum times to take a.m. and p.m. sun lines and determines the expected time of local apparent noon passage.

**Noon Sight Fix.** Determines a fix from the observation of the sun at meridian passage and data obtained from the Nautical Almanac.

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### Ocean Sailing

**Great Circle Sailing.** Calculates the initial great circle course and distance given the coordinates of the starting and destination positions. Also determines intermediate points of latitude for specified longitudes.

**Dead Reckoning.** Determines the dead reckoning position when given the speed, course, and time sailed since departing from a known position.

**Rhumbline Navigation.** Calculates the rhumbline distance and true course between two points on the globe.

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### Sailing and Tactics

**Modified Wind.** Computes and loads various wind factors for use in the
remaining sailing programs in this section.

SMG, CMG, and Time to Lay-Line. Determines the time required to reach a specified destination. Also calculates the speed and course made good on each tack.

Distance and Bearing to the Mark. Given the distance and bearing to a specified mark, this program calculates the distance and bearing at any later time may be found.

Diagnostics. Verifies proper operation of calculator and an interface.

Surveying Library

Programs for surveys, civil engineers, architects and other professionals involved in land measurement and earthwork. Whether you're working in vertical or horizontal design or electronic distance measurement, this library contains programs to solve the problems you find most time-consuming. The software makes field work much easier by eliminating program card juggling.

Azimuth/Bearing Traverse. Given reference and endpoint coordinates, distance, elevation, and angle, this program calculates distance and bearing to the point of intersection for a closed traverse.

Circle Arc Traverse. After using one of the above traverse programs to establish coordinates, and given the central angle, this program calculates the distance and bearing from the point of intersection to the point of interest.

Compass Rule Balance. Computes adjusted coordinates by compass rule.

Curve Solution. Solves for unknown elements of a curve segment: arc and chord lengths, radius, central angle.

Diagnostics. Verifies proper operation of calculator and library-calculator interface.

Master Library

A collection of useful programs designed to provide the professional with a "tool kit" of pre-programmed solutions to a wide variety of problems. Familiarity with library programs is gained through use of calculations of daily interest like checking accounts and calculator games. Coverage includes mathematical operations like function solution and matrix manipulation, financial calculations like compound interest.

Matrix Inversion, Determinants and Simultaneous Equations. Finds the determinant and inverse of an nxn matrix. Also solves a system of n linear equations with n unknowns.

Matrix Addition and Multiplication. Performs addition of two mxn matrices. Also computes the product of an mxn matrix and a vector.

Complex Arithmetic. Computes sum, difference, product and quotient of two complex numbers. Also calculates the magnitude and angle of a complex number.

EDM Slope Reduction – Slope Angle. Converts slope distance measured by EDM to horizontal distance and elevation at the elevation of the EDM unit. Corrects for instrument height, earth's curvature, and refraction of light. Computes delta elevation and EDM Slope Reduction – Delta Elevation. Like EDM Slope Reduction – Slope Angle, but given delta elevation instead of slope angle, will also compute the horizontal distance at any specified elevation.

Stadia Reductions and Traverse. Calculates the horizontal distance and vertical distance elevation between two stations by stadia methods. Also determines elevation, closure error and balances error among stations.

Intersection – Bearing/Bearing. Calculates the point of intersection of two lines given a point on, and the bearing of, each line.

Intersection – Distance/Distance. Calculates the point of intersection of two lines given a point on each line and the distance from the point to the intersection.

Intersection – Bearing/Distance. Calculates the point of intersection of two lines given a point on each line, the distance from the point to the intersection of one line, and the bearing of the other.

Three Point Resection. Calculates location of unknown point from three known points and angles.

Intersection – Bearing/Perpendicular. Given the bearing of, and a point on, the base line, and an offset point, this program calculates the point of intersection of a perpendicular to a perpendicular to the offset point, as well as the distances from the intersection to the offset point, and from intersection to base point.

Borrow Pit Volume. Calculates volume by truncated prism method.

Earthwork Volume. Calculates volume by average end area method.

Triangle Solution (1). Given three elements of a triangle (SSS, SAS, or SSA), remaining angles and sides are calculated.

Triangle Solution (2). Given three elements of a triangle (ASA or SAA), remaining angle and sides are calculated. Also calculates area of a triangle.

Curve Solution. Solves for unknown elements of a curve segment: arc and chord length, radius, central angle.

Diagnostics. Verifies proper operation of calculator and library-calculator interface.

Unit Conversions (1). Calculates length conversions.

Unit Conversions (2). Calculates volume, weight, and temperature conversions.

Diagnostics. Checks operation of calculator and library module. Initializes calculator for linear regression. Provides universal print routine for user-defined keys.

Complex Trig Functions. Calculates sin X, cos X, tan X, sin° X, cos° X, and tan° X for a complex number.

Polynomial Evaluation. Evaluates a polynomial at any real number if the coefficients of the polynomial are known real numbers.

Zeros of Functions. Calculates the roots of a function defined by the user.

Simpson's Approximation (Continuous). Approximates the integral of a function defined by the user, over an interval x1 to x2.

Simpson's Approximation (Discrete). Approximates the integral of a function over an interval x1 to x2 if the value of the function is known at n + 1 equally spaced points in this interval.

Triangle Solution (1). Given three elements of a triangle (SSS, SAS, or SSA), the remaining angles and sides are calculated. Also calculates area of a triangle.

Curve Solution. Solves for unknown elements of a curve segment: arc and chord length, radius, central angle.

Diagnostics. Verifies proper operation of calculator and library-calculator interface.

Random Number Generator. Generates sequences of uniformly or normally distributed random numbers.

Combinations, Permutations, Factorials. Calculates the number of possible combinations and permutations of n items taken r at a time. Also calculates the factorials of positive integers.

Moving Averages. Calculates the moving average of the n most recent values in a sequence of numbers.

Compound Interest. Calculates any of the four factors in the compound interest equation when the other three are known.

Annuities. Solves for any of the factors in annuity situations when the remaining factors are known. Includes sinking fund, annuity due/FV, ordinary annuity/PV, annuity due/PV.

Day of the Week, Days Between Dates. Calculates number of days between any two dates. Determines day of the week for any date. Uses Gregorian calendar.

Hi-Lo Game. Deduces a mystery number between 1 and 1023 using a high or low response to each guess. Or the calculator will guess a number that you have chosen.

Checking/Savings Account Management. Enables you to maintain a current balance on your checking and savings accounts. In addition to deposits and withdrawals, the program will also calculate and add interest credits.

DMS Operations. Performs direct entry of numbers in degree-minute-second format for addition and subtraction. Also a number in DMS format can be multiplied or divided by a number in decimal format. Also can be used for hours, minutes, seconds.

Unit Conversions (1). Calculates length conversions.

Unit Conversions (2). Calculates volume, weight, and temperature conversions.

Diagnostics. Checks operation of calculator and library module. Initializes calculator for linear regression. Provides universal print routine for user-defined keys.
The PC-100A turns your TI Programmable 59 into a high speed alphanumeric printer...plotter.

PC-100A printer, plotter.
The PC-100A printer, plotter expands the versatility of your TI Programmable 59 by turning it into a quiet, high-speed printing calculator. Featuring TI's reliable thermal printhead, the PC-100A provides a hard copy record of your data. Print, list, or trace your program each step of the way for easy editing and debugging of your program listings. You can print audit trails, as needed, and on command. The printout shows the actual keystroke symbol as well as the key number. Alphanumeric capability allows you to print headings, label outputs, or program-in prompting messages. You can even plot curves and histograms. A handy, built-in battery charger keeps your TI Programmable 59 fully charged while you are operating the PC-100A* from a standard 115V/60Hz power source.

*The TI programmable 59 will not operate with the PC-100 printer.

Alphanumeric printing.
The PC-100A provides print capability for 64 characters (including blank space). Each character is entered by means of a 2-digit address code directly from the keyboard of the TI Programmable 59. Maximum line length is 20 characters. Headings, data labels, and user instructions may all be recorded on 2½-inch wide thermal printing paper.

Data plotting.
The PC-100A allows you to input data from your TI Programmable 59 to plot curves or histograms. You can make a plot of data from the calculator keyboard, or directly from a program. See your Texas Instruments retail dealer for additional information on this product.

PC-100A thermal tape.
Special heat-activated paper tape for use with the PC-100A thermal printer, plotter. Provides clear, sharp character images. Each roll contains 250-feet of 2½-inch wide tape, three rolls per package.
Program record forms
Pad of 50 numbered and sequenced coding forms to facilitate program writing and editing.

Rechargeable battery pack
Three nickel-cadmium batteries enclosed in a shock proof, high-impact plastic case. Fast charging, high capacity power cells can be fully recharged in the calculator in 4-6 hours. Keep a spare battery pack on hand for those long sessions away from an AC outlet.

AC adapter/charger
Standard AC110-120V adapter/charger. Provides fast 4-6 hour recharging for rechargeable battery pack, or permits calculator operation directly from an AC outlet. Line cord has built-in strain relief, short circuit proof connector to calculator. UL/CSA approved. Input: 6W, 60 Hz, 120VAC. Output: 3.3VAC, 500 milliamps.

AC Switchable adapter/charger, 120-240V.
Convenient adapter/charger for students, businessmen, others who travel or live in countries where 220-240 VAC power is used. A flick of the switch converts unit from standard 110-120V to 220-240VAC, UL/CSA approved. Input: 60 Hz, 120VAC, 50 Hz, 240VAC. Output: 3.3VAC, 500 milliamps.

Personal Programming
Much more than an owner's manual, Personal Programming shows you how easy and useful programming can be. Over 240 pages take you through the basic operations of your TI Programmable 59. You'll find plenty of illustrated examples. And, when you're ready, a complete section on advanced applications.

Carrying Case
Protective carrying case for your TI Programmable 59. Vinyl case has pockets for Quick Reference Guide and magnetic card carrying case.

Magnetic cards
Package of 40 blank magnetic cards for writing, labeling, and storing your own programs. Includes compact vinyl carrying case.

Share programs with your colleagues through PPX-59.
There may be times when you need a complex speciality program, but you'd like the convenience of having a ready-made program that's not a bother to obtain. This is where TI's Professional Program Exchange (PPX) can be of enormous help.

Your yearly PPX-59 membership will open the door to discovery of the many interesting programs being written by others in your profession. As an active member, you become part of a network designed to exchange TI Programmable 59 programs within all professions. Using PPX-59 as a vehicle to contribute and obtain programs, you will be able to broaden your professional base while you increase your productivity.

Here is what your yearly membership provides:
Source Catalog. Describes the wide selection of programs available to you in dozens of categories: Business, Mathematics, Astrology, Engineering, Games, Air and Marine Navigation. And much more.
Three free programs. As a new member, you select three programs from your source catalog. These programs are sent to you at no charge (postage prepaid) as an introduction to the Professional Program Exchange. Order additional programs for only $3.00 each. (Programs are furnished with documentation only.)
Newsletter. The bi-monthly PPX Exchange contains helpful TI Programmable 59 programming hints, unusual applications, new product and software announcements, and feature articles. Special software sales, available to members only, are also offered via the newsletter.
Member's guide and program submission forms. These materials tell you how to submit your programs for acceptance into PPX-59. A description and author credit for each program is presented in the latest PPX-59 Source Catalog.
Programs in dozens of professional categories are available to you through your PPX-59 membership. Business, Finance, Statistics and Probability, Mathematics, Natural Sciences, Life Sciences, Engineering, Technical, Social and Behavioral Sciences, Natural Resources, General. You can open the door to program sharing by becoming a member of PPX-59.

PPX-59 Professional Categories

JOIN NOW!
Should your TI retailer be temporarily out of stock, you may order software libraries and other accessories directly from Texas Instruments.

**Order Form**

Texas Instruments Service Facility  
P.O. Box 53  
Lubbock, Texas 79408

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| Accessories/Replacements           |          |             |          |             |
| PC-100A thermal tape, 3 rolls      | TP-30250 | 10.20       |          |             |
| Program record forms               | Pad-5859 | 2.00        |          |             |
| Rechargeable battery pack          | BP-1A    | 9.95        |          |             |
| AC adapter/charger 120VAC          | AC9131   | 4.95        |          |             |
| AC switchable adapter/charger, 120-240V | AC9130SW | 12.95     |          |             |
| Personal Programming               | MAN-5859 | 12.95       |          |             |
| Carrying case                      | CC-5859  | 7.95        |          |             |
| Magnetic cards, 40 blank magnetic cards and card case | BC-59 | 15.00   |          |             |

**Tax**  
Postage and handling $1.50
Total
PPX-59 Membership $15.00/year

Please allow 3 weeks for delivery.  
Please send me the indicated TI Programmable 59 libraries, accessories, and/or replacement parts.  
Make check or money order payable to Texas Instruments.

I have enclosed a [ ] check [ ] money order for $_____________ (Please do not send cash.)

Mr.  
Ms.  
Dr.

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*U.S. prices, subject to change without notice  
*State and local taxes required by every state except AK, DE, HI, MT, NH, OR.

**Limited Warranty**  
Program materials and accessories are covered by a one-year limited warranty against defects in materials and workmanship.

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