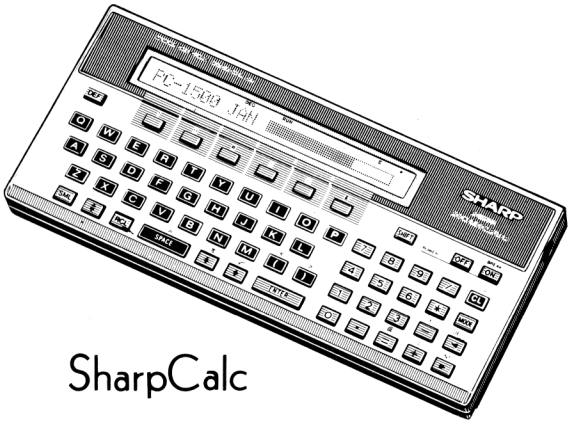
SHARP®

PC-1500

Pocket Computer



SharpCalc

Finance

Math

Electrical Engineering

Circuit Analysis

Business Graphics

General Statistics

Statistical Distribution

Graphics Development

SOFTWARE

SHARPCALC

SPREADSHEET: An electronic spreadsheet is a forecasting tool used for describing detailed financial systems. The SharpCalc program is an electronic spreadsheet designed especially for the Sharp PC-1500.

OPERATIONS: The spreadsheet is composed of *cells* making up a matrix, each cell containing a value or an operation defining a value (addition, subtraction, multiplication, division and exponentiation).

Operations may be performed using entire rows or columns at a time.

REVIEW: After the spreadsheet has been set up and the values and relationships have been entered, the user can review his original inputs as well as the calculated results.

OUTPUT: The spreadsheet may be printed out and may also be saved on a cassette tape for future use.

KEYBOARD OVERLAY: A specially designed keyboard overlay identifying defined keys and functions provides fast and efficient data entry and manipulation.

SIZE: The user may specify up to 225 locations on the electronic spreadsheet, with a maximum of 26 rows and 26 columns.

The CE-150 printer is optional.

FINANCE

ANNUITIES/ANNUITIES DUE: This program calculates any of the following items given the other four: payment amount, total number of payments, annual interest rate, present value, and future value. The program will also calculate an amortization schedule and allow the user to specify whether interest is calculated at the beginning or end of the period.

RENT OR BUY DECISION: This program provides an analysis of the financial aspects of a rent-versus-buy decision.

CASH FLOW ANALYSIS: This program calculates the financial management rate of return for a series of cash flows. The three cash flow approaches allowed are grouped flows, graduated flows, and variable flows.

BOND ANALYSIS: This program will compute the after and before tax price or yield for a semiannual or annual coupon schedule.

MACHINERY ANALYSIS: This program compares the expenses of an old unit versus the expenses of purchasing a new unit.

DAYS BETWEEN DATES: This program computes the number of days between dates as well as the day of the week for a date. The program also utilizes the 365 or 360 day calendar.

DEPRECIATION: This program will compute a depreciation schedule using straight line, declining balance, or sum-of-the-years' digit method.

The CE-150 printer is optional.

GRAPHICS DEVELOPMENT LIBRARY

LOCATE: Defines the plotting area boundaries.

SCALE: Scales the plotting area.

FXD: Defines how many numbers follow the decimal point on numerical labels.

XAXIS: Draws a horizontal axis at a specified y-intercept with optional tic marks.

YAXIS: Draws a vertical axis at a specified x-intercept with optional tic marks.

AXES: Draws a horizontal and vertical axis with optional tic-marks.

LAXES: Draws and labels a set of horizontal and vertical axes. The frequency of labeling is determined by the user.

GRID: Draws a full scale grid with optional tic marks on the specified grid lines.

LGRID: Draws and labels a full scale grid. The frequency of labeling is determined by the user.

FRAME: Draws a frame around the current plotting area.

MPLOT: Plots one or more equations in such a fashion that several strips of paper may be pieced together to form an expanded plot.

PLOT: Given the minimum and maximum x and y values, this program automatically scales the plotting area and plots one or more equations within that plotting area. Parts of the plot may be windowed to form an expanded picture of that particular area. The windows may then, in turn, be windowed indefinitely.

CURSOR: Determines, and stores for retrieval, the actual plotting pen location.

The CE-150 printer is required to operate this program.

MATHEMATICS LIBRARY

PRIME FACTORS: Given any integer, the prime factors of that integer are determined.

GAMMA FUNCTION: Calculates the gamma function of a number.

POLYNOMIAL MULTIPLICATION: Provides for the multiplication of two polynomials.

HYPERBOLIC FUNCTIONS: Calculates hyperbolic sines, cosines, tangents, arcsines,
arccosines, and arctangents.

MINIMUM/MAXIMUM: Will find a relative minimum or maximum of a given equation.

MATRICES: Real matrix arithmetic by addition, subtraction, multiplication, and scalar multiplication. Also calculates the determinant and inverse of a matrix.

DIFFERENTIAL EQUATIONS: Solution of a system of *n* first and second order differential equations using Runge-Kutta method.

ROOTS OF AN EQUATION: Single equation solution using Newton's Method of Approximation.

LINEAR EQUATIONS: Solves a system of *n* linearly independent equations using a Crout reduction.

NONLINEAR SYSTEMS: Solves a system of nonlinear equations using Newton's method.

CUBIC SPLINE INTERPOLATION: Uses the Cubic Spline method to interpolate.

The CE-150 printer is optional.

STATISTICAL DISTRIBUTION ANALYSIS

MULTIPLE LINEAR REGRESSION: Calculates the statistical relationship between the independent variables and the dependent variable.

HISTOGRAM: Constructs a histogram from entered data, provides means and moments of histogram, and will apply goodness-of-fit test to library distributions.

NORMAL DISTRIBUTION: Calculates Q (u) and P (u), f (u), and u given u, u, and Q (u) respectively.

STUDENT'S-t DISTRIBUTION: Calculates P (t) given the t-statistic and degrees of freedom.

F DISTRIBUTION: Calculates Q (F) given degrees of freedom in the numerator and denominator and F statistic.

CHI SQUARE DISTRIBUTION: Calculates Q (Chi^2) given the Chi^2 statistic and degrees of freedom.

WEIBULL DISTRIBUTION: Calculates Q (z), f (z), and z given m and n parameters along with z, z, and Q (z) respectively.

EXPONENTIAL DISTRIBUTION: Calculates Q (z), f (z), and z given m parameter along with z, z, and Q (z) respectively.

BINOMIAL DISTRIBUTION: Calculates mean, standard deviation, f (k), P (k), and Q (k) given n, p, and k.

POISSON DISTRIBUTION: Calculates f (k) and P (k) given m and k.

The CE-150 printer is optional.

GENERAL STATISTICS

MEANS AND MOMENTS: Calculates different means where possible and provides the 2nd, 3rd, and 4th moments of the entered data.

***t*-TEST FOR PAIRED OBSERVATIONS:** Calculates *t*-statistic for paired entries.

***t*-TEST FOR UNPAIRED OBSERVATIONS:** Calculates *t*-statistic for unpaired entries.

ONE-WAY ANOVA: Calculates the F-statistic for a one-way analysis of variance.

TWO-WAY ANOVA: Calculates the F-statistic for a two-way analysis of variance with or without replication.

CONTINGENCY TABLE: Calculates the Chi^2 statistic for a row by column contingency table.

MANN-WHITNEY RANKED SUM TEST: Calculates the rank statistics for a two sample test.

The CE-150 printer is optional.

BUSINESS GRAPHICS LIBRARY

PIE CHART: This program plots a pie chart in 4 colors providing exploded sections, 6 hatch schemes, and a maximum of 26 sections.

BAR CHART: This program draws bar charts in 4 colors providing normal, stacked, or grouped bars which may be drawn in one of 6 hatch schemes. The charts, y-axis, and x-axis as well as the individual bars may be labeled. The data, once entered and plotted, may be plotted using other types of bar charts as well as in line chart form.

LINE CHART: This program will draw a line chart in 4 colors with 9 line types. The data entered in this program may be transformed into bar charts automatically without the re-keying in of data.

POINT CHART: Raw data entered may be displayed in scatter plot fashion. The charts may be completely labeled and all 4 colors are available.

CURVE FITTING: Raw data may be loaded and saved to or from cassette. Linear, logarithmic, power, and exponential curves may be fitted. Program provides appropriate equations, statistics, and graph of fitted curves and points.

The CE-150 printer is required to operate this program.

ELECTRICAL ENGINEERING

TRANSISTOR PARAMETER CONVERSIONS: Converts S to Y or vice versa.

COMPLEX FUNCTIONS: Provides addition, subtraction, multiplication, division, roots, exponentiation, logarithms, and reciprocals for complex numbers.

FOURIER ANALYSIS: Provides a Discrete Fourier Transformation.

NETWORK ANALYSIS: Node Admittance Matrix Analysis with complex matrix reduction algorithm. Computes frequency response of a general linear network made up of resistors, capacitors, inductors, and voltage controlled dependent current sources given the total number of nodes (excluding ground), starting frequency, and increment in hertz.

BODE/NYQUIST CALCULATIONS: Provides frequency response using complex division of transfer function polynomials.

MULTIPLICATION OF POLYNOMIALS: Performs chain multiplication of polynomial functions in one variable with the ability of displaying intermediate products at any time. Direct multiplication of polynomials affords easy computation of system transfer functions.

REACTANCE CHART: Simulates a standard reactance chart by computing the capacitance, capacitive reactance, inductance, and inductive reactance at an applied frequency. An unknown quantity listed above may also be calculated given the other necessary data.

COORDINATE TRANSFORMATION: Performs coordinate transformations of the 3-D and 2-D type. The 3-D transforms include spherical, cylindrical, and cartesian. The 2-D transforms include polar and cartesian.

CONVOLUTION: Direct implementation of the convolution integral.

The CE-150 printer is optional.

CIRCUIT ANALYSIS

ACTIVE FILTER DESIGN: Design aid for Active Lowpass, Highpass, and Bandpass Filters. Draws the designed Active Filter along with frequency or w/w_o curves.

PASSIVE LOWPASS FILTER DESIGN: Provides design aid for Passive Lowpass Filter. Draws the designed passive filter.

PHASE-LOCKED LOOP ANALYSIS: Calculations provided for either passive or active phase-locked loop filters.

SERIES-TO-PARALLEL CONVERSIONS: Converts a parallel resistance and reactance to series and vice versa. Program also draws the applicable circuit.

SMITH CHART CALCULATIONS: Performs various transmission line calculations equivalent to graphic constructions on the Smith Chart.

SIGNAL DETECTION: Given any two of the following quantities, signal-to-noise ratio, probability of detection, probability of false alarm, the remaining quantity is computed assuming the target signal is embedded in noise which is normally distributed.

DECIBELS, NEPERS, POWER, VOLTAGE, CURRENT RATIO CONVERSIONS: Given any one of the above quantities, the remaining values are calculated.

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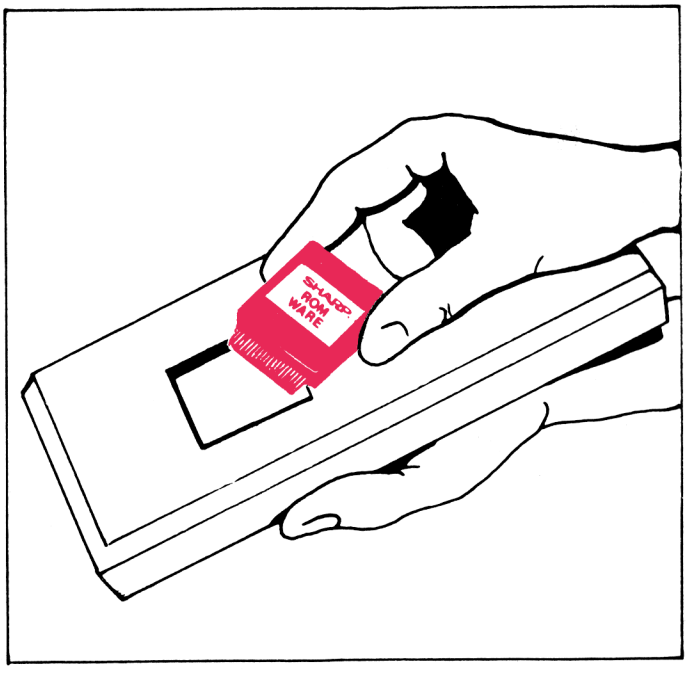

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Electrical Engineering

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Business Graphics

General Statistics

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Graphics Development

SHARP®

SHARP ELECTRONICS CORPORATION