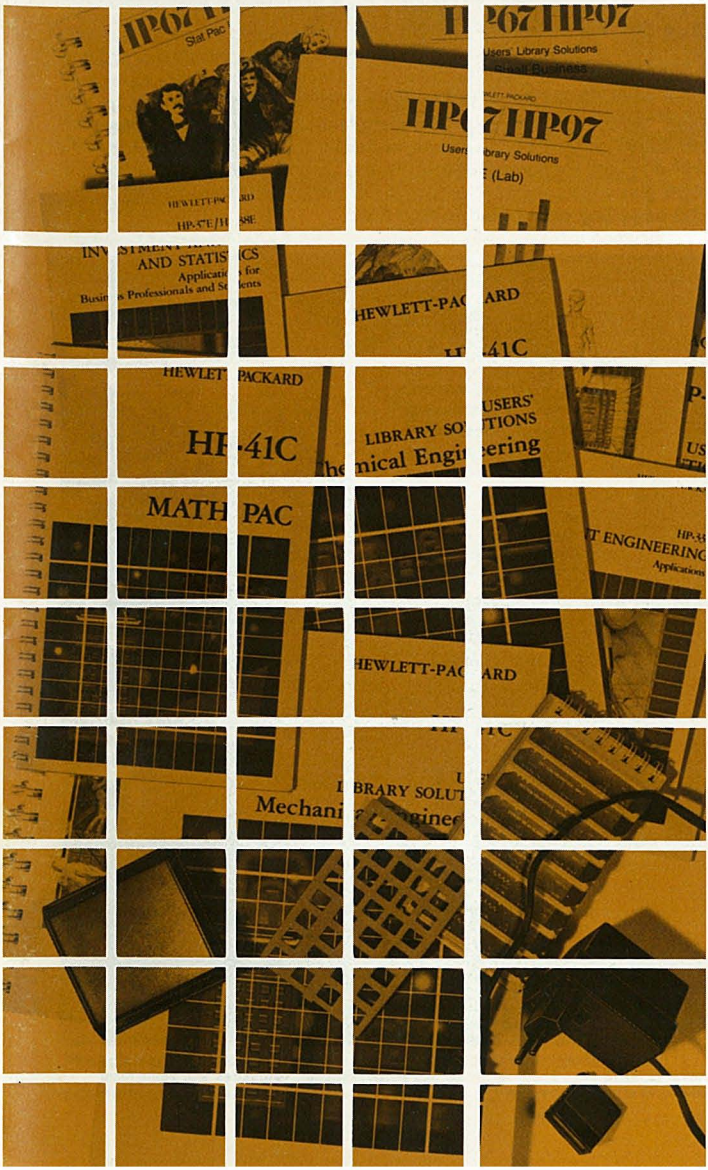
HEWLETT PACKARD

HP SOFTWARE ACCESSORIES



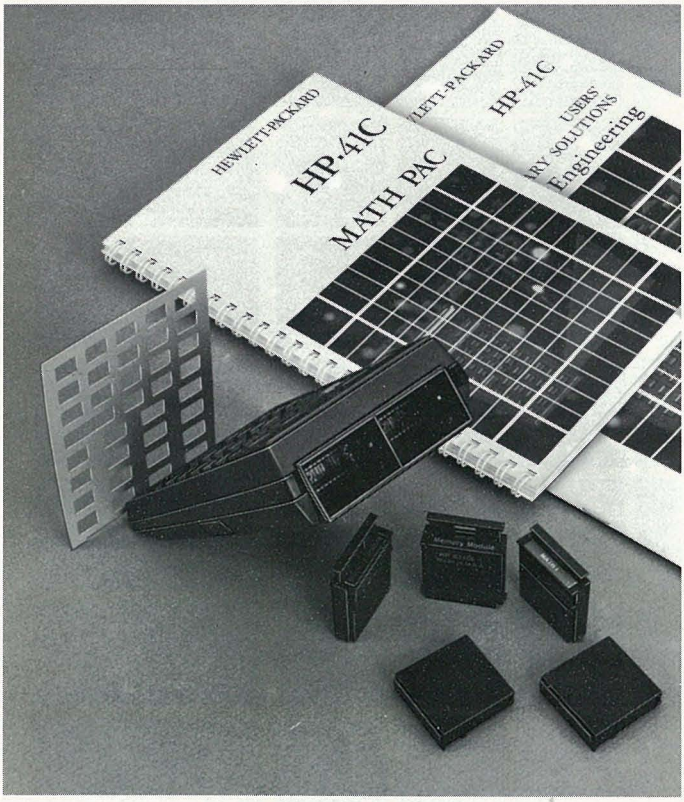
From Hewlett-Packard you get MORE comprehensive software support and accessories to make you MORE productive

Hewlett-Packard goes a lot further with its series of advanced programmable calculators. You get an unparalleled array of software support and accessories to give you more muscle, make you even more productive. No matter which HP calculator you possess, or which discipline interests you most, Hewlett-Packard has produced comprehensive back-up for general and specialised applications. With Hewlett-Packard, you save more time and energy.

HP-41

For the HP-41:

choose from 29 Application Modules and 62 Solution Books in English** to find the ready-programmed solutions you need. Then, all HP-67/97 magnetic cards are instantly translatable through the HP-41 Card Reader. Better still, the Users' Program Library Europe gives you access to over 5,000 user-contributed programs covering every imaginable field.



** Several of these have been translated into other European languages and some local books have also been created.

HP-41 Application Modules are miniature plug-in solutions that provide instant access to sets of programs covering diverse ranges of subject matter: Mathematics, Electrical Engineering, Business Decisions, Games, and lots more. Each Module comes in a Pac with a detailed manuel containing descriptions and examples plus helpful programming techniques.

Choose from:

Aviation (00041-15018)
Flight Management
General Aircraft Weight and Balance
Determining In-Flight Winds
Position by One or Two VORS
Mach Number and True Airspeed
Flight Plan

Clinical Lab and Nuclear Medicine (00041-15024)
Clinical Chemistry
Beer's Law
Body Surface Area
Creatinine Clearance
Blood Acid-Base Status
Oxygen Saturation and Content
Red Cell Indices

Nuclear Medicine
Total Blood Volume
Thyroid Uptake
Radioactive Decay Corrections

Radioimmunoassay

Statistics
Basic Statistics
Chi-square Evaluation and Distribution
t Statistics
t Distribution

Circuit Analysis (00041-15006)
General Network Analysis
Ladder Network Analysis

Financial Decisions (00041-15004)†
German version (00041-15014)
French version (00041-15013)
Spanish version (00041-15030)
Italian version (00041-15015)
Compound Interest Solutions
Internal Rate of Return
Modified Internal Rate of Return (FMRR)
Net Present Value
Loan Amortization Schedules
Depreciation Schedules
Bond Price and Yield
Days Between Dates

Mathematics (00041-15003)
German version (00041-15011)
French version (00041-15010)
Spanish version (00041-15029)
Italian version (00041-15012)
Matrix Operations
Solution to f(x) = 0 on an Interval
Polynomial Solutions/Evaluation
Numerical Integration
Differential Equations
Fourier Series
Complex Operations
Hyperbolics
Triangle Solutions
Coordinate Transformations

Securities (00041-15026)†
Bond/Note Price and Yield
Routines for Option Writers Using the Black-Scholes Evaluation Method
Warrant and Option Hedging
Yield on Call Option Sales
Butterfly Options
Bull Spread Option Strategy
Convertible Security Analysis
Convert. Bond Investment-Analysis
Stock Portfolio Valuation
Portfolio Selection and Timing
Bond Speculation Using Margin

Statistics (00041-15002)
German version (00041-15008)
French version (00041-15007)
Spanish version (00041-15028
Italian version (00041-15009)
Basic Statistics for Two Variables
Moments, Skewness and Kurtosis
Analysis of Variance (One Way)
Analysis of Variance (Two Way, No Replications)
Analysis of Covariance (One Way)
Curve Fitting (Linear, Exponential, Logarithmic, and Power Curve)
Multiple Linear Regression
Polynomial Regression
t Statistics
Chi-Square Evaluation
Contingency Table
Spearman's Rank Correlation Coefficient
Normal and Inverse Normal Distribution
Chi-Square Distribution

Stress Analysis for Mechanicals Engineers (00041-15027)
Section Properties
Beams
Simply Supported Continuous Beams
Columns
Mohr Circle Analysis
Strain Gage Data Reduction
Soderberg's Equation for Fatigue
RPN Vector Calculator

†Conform to U.S.A. practice

Structural Analysis for Civil Engineering (00041-15021)†

Section Properties
Beams
Simply Supported Continuous Beams
Settling of Continuous Beams
Continuous Frame Analysis
Steel Column Formula
RPN Vector Calculator
Reinforced Concrete Beam
Concrete Columns
Effective Moment of Inertia for Concrete Sections

Surveying (00041-15005)†

Traverse, Inverse and Sideshots
Compass Rule Adjustment
Transit Rule Adjustment
Intersections
Curve Solutions
Horizontal Curve Layout
Vertical Curves and Grades
Resection
Predetermined Area
Volume by Average End Area
Volume of a Borrow Pit
Coordinate Transformation

Games (00041-15022)

Programs include calculator games such as Super Bagels, Space War, Submarine Hunt, and Biorhythms.

Home Management (00041-15023)†

Contains programs to assist in managing home budgets and personal finance. Programs include Home Budget, Annuities and Compound Amounts, Retirement (IRA or Keogh) Planning, and Stock Portfolio Valuation.

Machine Design (00041-15020)

Programs for the Mechanical Engineer involved in design and analysis. Topics include Cams, Linkages, Gears, Springs, Vibrations, Machine Geometry, and Unit Conversions.

Navigation (00041-15017)

Provides an integrated set of programs to solve the classic navigation problems of dead reckoning and celestial navigation.

Real Estate (00041-15016)†

Programs for the real estate investor including Internal Rate of Return, Depreciation, Compound Interest Solutions, and Income Property Analysis.

Thermal and Transport Science (00041-15019)

Programs intended for Mechanical and Chemical Engineers. Topics include Gas Properties, Compression Flow, Incompressible Flow and Heat Transfer.

Petroleum Fluids (00041-15039)

The HP-41 Petroleum Fluids Pac is designed to aid in the rapid estimation of petroleum reservoir fluid properties. It also contains a unique Petroleum Engineering Unit Management System.

Z Factor
Gas Isothermal Compressibility
Gas Formation Volume Factor
Gas Viscosity
Pseudo critical Temperature and Pressure from Gas Gravity
Gas Properties from Composition
Oil Isothermal Compressibility
Oil Formation Volume Factor
Oil Viscosity
Gas – Oil Ratio
Bubble Point Pressure
Two Phase Formation Volume Factor
Water Isothermal Compressibility
Water Formation Volume Factor
Water Viscosity
Gas – Water Ratio
Rock Compressibility
Total Isothermal Compressibility
General Purpose, Input, and I/O subroutines for programmers.

(Application Pac titles and program listings subject to change without notice.)

†Conform to U.S.A. practice

HP-41 Solution Books

Each have collections of up to 15 programs that provide answers to general and specialised problems. Drawn from among the best of more than 9,000 usersubmitted programs, HP Solution Books offer a diverse selection of program material covering a broad spectrum of application areas... *a low cost, highly defined source of software.* Each book comes with Bar Codes for an easy program entry.

Choose from:

BUSINESS

Business Statistics/ Marketing/Sales (00041-90094)

French version (00041-90248)
Spanish version (00041-90255)
Italian version (00041-90391)*
Forecasting using Exponential Smoothing
Seasonal Variation Factors (SEVAR)
Multiple Linear Regression
Normal, t and f Distributions
Grouped Statistics
Moving Average
Price Elasticity of Demand
Experience (learning) Curve for Manufacturing Cost
Sales Force Requirements
Breakeven Analysis
Gompertz Curve

Home Construction Estimating (00041-90096)†

Concrete Volume
Linear to Board Feet Conversions and Costing
Framing Board Feet
Lumber Estimate
Shingle Estimate
Wall and Ceiling Areas Estimate
Wallpaper Estimate
Drywall and Insulation Estimate
Sheathing and Subfloor Estimate
Painting Estimate
Wood Floor Estimate

Lending, Saving and Leasing (00041-90086)†

Constant Payment to Principal Loan
APR with Fees/Discount
Rules of 78's
Compound Interest Solutions
Amortization Schedule
Add-on to APR with Odd Days
Savings Plan
Interest Conversions
Lease with Additional Payments in Advance
Skipped Payments
Compounding Periods Different from Payment Periods

Real Estate (00041-90136)†

Ellwood Analysis
Analysis of Income Property
Wrap-Around Mortgage
Amount of Equity at Any Time
Mortgage Yield
Mortgage Pricing
Investment Analysis for Property and Land
Residential Analysis (Rent or Buy)
Variable Analysis of Real Estate Investment
IRR
Shopping Center Rent Projections

Small Business (00041-90137)†

Hourly Payroll
Invoicing
Account Posting
Percentages and Proportions with Tabulator
Retail Inventory Monitor
Estimating Inventory
Inventory Ordering
Order Point Calculations
Working Capital Needs – Bardahl Formula
Depreciation Schedules
Breakeven Analysis

COMPUTATION

Geometry (00041-90084)

Sine Plate Solutions
V Notches and Long Radii
Internal and External Tapers
Points of Tangency with Circles and Arcs
Line-Line Intersection/Grid Points
Points on a Straight Line
Grid of Points: Calculates All Points
Grid of Points: Calculates Discrete Points
Tangent circle to Two Straight Lines with a Given Radius
Distance Between Lines in Space

High Level Maths (00041-90083)

German version (00041-90278)
French version (00041-90243)
Spanish version (00041-90177)
Sine, Cosine, Exponential Integrals
Eigen Values/Vectors of 3rd Order Systems
Eigen Values for 3rd Order System
Chebyshev, Legendre, Hermite, and Laguerre Polynomials
Sixteen-Point Gaussian Quadrature
Gamma Function
Bessel Functions, Error Function
Characteristic Equation of a 4 x 4 Matrix
4 x 4 Matrix Operations

† Conform to U.S.A. practice

* In preparation

Test Statistics (00041-90082)

German version (00041-90165)
Spanish Version (00041-90253)
One Sample Test Statistics for the Mean
Test Statistics for the Correlation Coefficient
Differences Among Proportions
Behrens-Fisher Statistic
Kruskal-Wallis Statistic
Mean-Square Successive
The Run Test for Randomness
Intraclass Correlation Coefficient
Fisher's Exact Test for a 2 x 2 Contigency Table
Bartlett's Chi-Square Statistic
Mann-Whitney Statistic
Kendall's Coefficient of Concordance

ENGINEERING

Antennas (00041-90093)

French version (00041-90244)
Loaded Vertical Antennas
Loaded Dipole Antennas
Gain of a Horizontal Rhombic Antenna at Zero Azimuth
Azimuth Pattern of Cylindrical Array of Antennas
Colinear Antenna Gain and Pattern
Beam Pattern for Uniform Array
Radar Antenna Beamwidth and Gain
Antennas
Parabolic Antenna Calculations
RF Path Loss, dB
Antenna Gain or Power of a Remote Transmitter
Planar Phased Array Radar Beam Positions
Radar Parameter Unit Conversions
(Television) Antenna Length and Channel Frequency

Chemical Engineering (00041-90100)

German version (00041-90171)
French version (00041-90172)
Spanish version (00041-90173)
Straight Fin Efficiency
Conservation of Energy
Hydrocarbon Combustion
Heat Transfer through Composite Cylinders and Walls
Von Ka'rman Analogy for Heat and Mass Transfer
Equations of State
Reversible Polytropic Process for an Ideal Gas
Fanning Friction Factor and Conduit Flow
Fluid Transport Numbers
Single Stage Equilibrium Flash Calculation
Weak Acid/Base Titration Curve

Civil Engineering (00041-90089)†

Italian version (00041-90252)
Steel Column Formula
Reinforced Concrete Beams
Stress in Thick-Walled Cylinders
Properties of Special Sections
Compressive Buckling
Vectors
Beams Fixed at Both Ends
Simply Supported Beams
Cantilever Beams
Bolt Torque

Control Systems (00041-90092)

Frequency Response of a Transfer Function
Bode of Transfer Function that has Each Pole and Zero Given
Bode of Second-Order Over Third-Order Transfer Function
Bode of Second-Order Over Second-Order Times S**N Transfer Function
Pole-Zero to Group Delay
Routh Test for Continuous and Discrete Time System Stability
Convert Frequency Response-Open Loop, Closed Loop
Aid to Root Locus Plots I-Real Poles
Aid to Root Locus Plots II-Complex Poles
Classical Control Gains
First Order Regulator
Second Order Regulator

Electrical Engineering (00041-90088)

German version (00041-90379)
Spanish Version (00041-90254)
RC Timing
Frequency Response of a Transfer Function
Transistor Amplifier Performance
Class A Transistor Amplifier Bias Optimization
Active Filter Design
Butterworth Filter Design
Chebyshev Filter Design
Bode Plot of Butterworth and Chebyshev Filters
Transmission Line Calculations
Transmission Line Impedance

Fluid Dynamics and Hydraulics (00041-90139)

Force a. Momentum of a Spillway Door
Conduit Flow
Flow with a Free Surface
Pipe Slide Rule
Forces at Bends and Fittings
Valve Sizing
Pipe Network Analysis
Restriction Metering Orifice Calculation
Energy Equation for Steady Flow
Compressible Flow in Ducts
Flood Routing and Hydrographs

†Conform to U.S.A. practice

*In preparation

Heating, Ventilating, and Air Conditioning (00041-90140)

Air Cooling System Design
Steady State Heat Transfer
Economic Insulation Thickness
Black Body Thermal Radiation
Psychrometry
Equations of State
Conduit Flow
Heat Exchangers
Addition of Sound Pressure Levels in Decibels
Unit Conversions

Mechanical Engineering (00041-90090)

French version (00041-90169)
German version (00041-90168)
Gear Forces
Stress on an Element
Equations of State
Soderberg's Equation for Fatigue
Spring Constant
Progression of a Slider Crank
Free Vibrations
Interference Fits
Linear or Angular Deformation
Constant Acceleration-Time

Solar Engineering (00041-90138)

Spanish version (00041-90256)
Solar-Beam Irradiation
Sun Altitude, Azimuth, Solar Pond Absorbtion
Energy Equivalents – Fuels and Prices
Solar Shading Angles
Heat Exchangers

OTHER

Calendars (00041-90145)

French version (00041-90247)
Calendar Date/Julian Date Conversion
Day of Year – Day of Week
Number of Weekdays between Two Dates
In What Year is a given Date an M-Day
Number of M-Days between Two Dates and Nth M-Day of Month
Holidays
Easter-Ash Wednesday – Religious Holidays
Chinese Years to/from Gregorian Years
New Moon and Full Moon Day of Month
Calendar Printout

Cardiac/Pulmonary (00041-90097)

Pulmonary Functions
Body Surface Area
Blood Chem I
Blood Chem II
Cardiac Outputs
Cardiac Shunts
Contractility and Stroke Work
Respiretory and Ventilator Calculations
Lung Diffusion
Valve Area

Chemistry (00041-90102)

pH of Weak Acid/Base Solutions
Acid-Base Equilibrium (Diproctic)
Weak Acid/Base Titration Curve
Equations of State
Van Der Waals Gas Law
Beer's Law and Absorbtivity Calculations
Activity Coefficients from Potentiometric Data
Crystallographic to Cartesian Coordinate Transformations
Kinetics using Lineweaver-Burk or Hofstee Plots
Mixture Viscosities
Vapor Pressure, Bubble and Dew Point Calculation
Single-Stage Equilibrium Calculation

Games (00041-90099)

Hexapawn
Wari
Nim_k
Dice
Others

Optometry I (General) (00041-90143)†

Aniseikonia
Crossed Prism Resultant
Obique Cylinder Sum
Low Vision; Determination of Activity Demand from Letter Size and Working Distance
Contact Lens, Telescope Calculations
Calculation of Needed Magnification, Add, and Working Distance
Effective, Equivalent and Neutralizing Power
Lens Power Needed at New Vertex Distance
Positional Effective Power
Minimum Blank Size
Pratt, Sheard, Percival Methods of Near R_x
Four Accommodative R_x's and their Average

Optometry II (Contact Lens) (00041-90144)†

Back Vertex Power of PMMP Contact Lens
Effective Power of Spectacle Lenses at Corneal Plane

†Conform to U.S.A. practice

*In preparation

Residual Cylinder Induced at Tear/Cornea Interface by Contact Lens
Cylinder Induced by Toric Contact Lens
Contact Lens Power Necessary to Correct Ametropia
Toric Contact Lens Parameters
Tabb Contact Lens of 1st Approximation
May-Grant Contact Lens of 1st Approximation
Roggenkamp Specifications for Prism Ballast Front Toric or Prism Ballast Contact Lens
Brungardt I
Brungardt II

Applied Stats I (00041-90246)
French version (00041-90166)

Applied Stats II (00041-90292)
French version (00041-90293)

StructuralAnalysis(00041-90384)

Available in French only:

Topographie I (00041-90383)

Topographie II (00041-90291)

Contrôle Qualité (00041-90258)

Available in Italian only:

Meccanica I (00041-90274)

Meccanica II (00041-90393)*

Prestiti, Depositi, Leasing (00041-90392)*

Topografia I (00041-90191)

Topografia II (00041-90311)

Curve Stradali (00041-90192)

Progetti Stradali (00041-90312)

Isolamento Termico Degli Edifici-Ledge 373 (00041-90400)*

Available in Dutch only:

Toegebaste Landmeetkunde* (00041-90337)

Statistiek I (00041-90349)*

Surveying (00041-90141)†
Spiral Curve Layout
Two Instrument Radial Survey
EDM Slope Reduction
Stadia Reduction
Three Wire Leveling
Azimuth of the Sun
Earthwork Cut and Fill
Taping Reduction
Field Angle Check
Triangle Solutions
Traverse for Auto Adjust Routines
Auto Adjust for Compass Rule
Auto Adjust for Crandall's Rule

Physics (00041-90142)
Black Body Thermal Radiation
Black Hole Characteristics
Special Relativity Conversions
Three- Dimensional Special Relativity
Einstein's Twin Paradox
Delta-V Orbit Simulator
Equations of Motion
Ballistics Trajectory Computations
Isotope Overlap Corrections
Critical Reactor Code
Semi- Empirical Nuclear Mass Formula
Clebsch- Gordon Coefficients and 3j Symbols Evaluation
32- P Remaining on MM.DDYYY Given
MCI on Earlier MM.DDYYYY

Tax (00041-90338)†

(Solutions Book titles and program listings subject to change without notice).

†Conform to U.S.A. practice

*In preparation

HP-67/97

For the HP-67/97:

Choose from 10 Application Pacs and the 2,000 plus programs in the Users' Program Library Europe.

HP-67/97 Application Pacs each contain 19 to 26 pre-printed, pre-recorded program cards holding programs covering a discipline or sub-discipline. Pacs come complete with a program card holder and a complete documentation manual with instructions, examples, limits, warnings and programming hints.

Choose from:

STAT PAC I
No. 00097–13111

French version No. 00097–13112
German version No. 00097–13113
Italian version No. 00097–13114

21 programs on 24 magnetic cards

General Statistics

- Basic Statistics for Two Variables.
  Basic statistics for two variables, grouped or ungrouped.
- Factorial, Permutation and Combination.
  Calculate factorial (extended range), permutation, and combination.
- Moments, Skewness and Kurtosis for Grouped or Ungrouped Data.
  Moments, Skewness, and Kurtosis are calculated for general (geometrical) description of a distribution; symmetry, relative peakness or flatness, etc.
- Random Number Generator.
  Generate up to 500000 different numbers.
- Histogram.
  A histogram program for 24 intervals of equal width between specified upper and lower limits.

Analysis of Variance

- Analysis of Variance (One Way).
  This program is used to test the observed differences among sample means.
- Two Way Analysis of Variance.
  The row effects and the column effects are tested independently in the analysis of the total variability of a set of data.
- Analysis of Covariance (One Way).
  This program tests the effect of one variable separately from the effect of the second variable.

Distribution Functions

- Normal and Inverse Normal Distribution.
  Polynomial approximation is used to calculate normal and inverse normal distribution.
- Chi-Square Distribution.
  This program evaluates the chi-square density. A series approximation is used to evaluate the cumulative distribution.
- t Distribution.
  This program evaluates the t density function and the cumulative distribution for a given x and degrees of freedom υ.
- F Distribution.
  This program evaluates the integral of the F distribution for given values of $x (> 0)$, degrees of freedom υ_1, υ_2, provided either υ_1 or υ_2 is even.

Curve Fitting

- Multiple Linear Regression.
  Linear regression for two independent variables, using least squares method.
- Polynomial Approximation.
  This program approximates in the least square sense the function $(f(x)$ by a polynomial of degree m, where $2 \leq m \leq 4$. Data from equally spaced points are required.

Test Statistics

- t Statistics.
  Paired t statistic tests the null hypothesis Ho: $\mu_1 = \mu_2$ for two observations. t statistic for two means tests the null hypothesis Ho: $\mu_1 - \mu_2 = d$ for two independent random samples.
- Chi-Square Evaluation.
  This program calculates the value of χ^2 statistics for the goodness of fit test.
- Contingency Table.
  $2 \times k$ and $3 \times k$ contingency tables test the null hypothesis that two variables are independent.
- Spearman's Rank Correlation Coefficient.
  This program tests whether 2 rankings are substantially in agreement with one another.

Quality Control

- $\bar{x}$ and R Control Chart.
  $\bar{x}$ (mean) and R (range) are used to decide periodically whether a process is in statistical control.
- Operating Characteristic Curves.
  This program evaluates the probability P_a of acceptance for a single sampling plan with finite or infinite lot size.

Queueing Theory

- Single- and Multi-Server Queues.
  Queueing theory for infinite customers and finite customers.

MATH PAC I
No. 00097–13121

French version No. 00097–13122
German version No. 00097–13123
Italian version No. 00097–13124

19 programs on 20 magnetic cards

- Factors and Primes.
  Finds prime factors of an integer; finds all primes between two numbers.
- GCD, LCM, Decimal to Fraction.
  Finds greatest common divisor and least common multiple of two integers; finds nearest fractional approximation for a decimal number.
- Base Conversions.
  Converts a number in base b to its equivalent in base B (b, $B < 100$).
- Optimal Scale for a Graph; Plotting.
  Finds a "nice" scale for graphing a function; generates ordered pairs for a graph.
- Complex Operations.
  Arithmetic and several functions for complex numbers.
- Polynomial Solutions.
  Solves polynomial equations up to 5th degree.
- 4×4 Matrix Operations (2 Cards).
  Computes determinant and inverse of 4×4 matrix, solves 4 simultaneous equations in 4 unknowns, by Gaussian elimination.
- Solution to $f(x) = 0$ on an Interval.
  Uses combination of bisection and secant method to guarantee rapid convergence to a root.
- Numerical Integration.
  Trapezoidal rule and Simpson's rule for discrete case; Simpson's rule for functions known explicitly.
- Gaussian Quadrature.
  Uses the six-point Gauss-Legendre quadrature method to find integrals over finite or infinite intervals.
- Differential Equations.
  Solves first- and second-order differential equations by the fourth-order Runge-Kutta method.
- Interpolations.
  Linear, Lagrangian, and finite difference.
- Coordinate Transformations.
  Two- and three-dimensional translation and rotation of axes.
- Intersections.
  Line-line, line-circle, circle-circle.

- Circles.
  Circle determined by three points; equally spaced points on a circle.
- Spherical Triangles.
  Solutions to six cases of spherical triangles.
- Gamma Function.
  Computes $\Gamma(x)$ for $1 \leq x \leq 70$.
- Bessel Functions, Error Function.
  Computes the value of the Bessel functions $J_n(x)$ and $I_n(x)$; computes error function and complementary error function.
- Hyperbolics.
  Finds hyperbolic functions and their inverses.

EE PAC I
No. 00097–13131

French version No. 00097–13132
German version No. 00097–13133

18 programs on 20 magnetic cards

- Network Transfer Functions.
  This program computes various transfer functions of a ladder network composed of any number of standard elements.
- Reactive L-Network Impedance Matching.
  This program computes networks which will match any two complex impedances.
- Class A Transistor Amplifier Bias Optimization.
  This program simplifies the design of a class A transistor amplifier.
- Transistor Amplifier Performance.
  This program computes the small-signal properties of a transistor amplifier given the h-parameter matrix and the source and load impedances.
- Transistor Configuration Conversion.
  This program permits conversion among h-parameter matrices for CB, CE, or CC transistor configurations.
- Parameter Conversions: S⇄Y, Z, G, H.
  This program allows conversion among various commonly used parameter sets.
- Fourier Series.
  This program computes Fourier coefficients from samples of a periodic function.
- Active Filter Design.
  This program computes element values for a standard filter circuit.
- Butterworth or Chebyshev Filter Design.
  This program computes component values for Butterworth or Chebyshev filters between equal terminations. The user may select various filter characteristics.
- Bode Plot of Butterworth and Chebyshev Filters.
  This program provides gain, phase, and group delay information for Bode plots of n-pole Butterworth or Chebyshev filters.
- Resistive Attenuator Design.
  This program computes values for the resistors which yield an attenuator having any desired loss.
- Smith Chart Conversions.
  This program converts among various radially scaled parameters (σ, ρ, SWR, R.L.) and also interconverts impedance and reflection coefficient.
- Transmission Line Impedance.
  This program computes high frequency characteristic impedance for five types of transmission lines.
- Microstrip Transmission Line Calculations.
  This program computes relative phase velocity and characteristic impedance for lossless microstrip. It also computes copper loss and resistance per unit length.
- Transmission Line Calculations.
  This program computes the input impedance of lossy transmission line terminated in Z_L.
- Unilateral Design: Figure of Merit, Maximum Unilateral Gain, Gain Circles.
  This program computes u, G_u, G_{min}, G_{max}, G_0, G_{1max}, and G_{2max} from a transistor's s-parameters. It also computes r_{01} and ρ_{01} from $G_i \leq G_{max}$ $(i = 1, 2)$.
- Bilateral Design: Stability Factor, Maximum Gain, Optimum Matching.
  This program computes the maximum gain available and the load and source reflection coefficients which yield the maximum gain.
- Bilateral Design: Gain and Stability Circles, Load and Source Mapping.
  This program computes the location and radius of stability circles. It also computes the source or load reflection coefficient corresponding to a given load or source termination.

BUSINESS DECISIONS PAC I
No. 00097–13144
(Conforms to U.S.A. practice)

French version No. 00097–13145
German version No. 00097–13146

22 programs on 22 magnetic cards

- Internal Rate of Return.
  Yield of a sequence of uneven cash flows.
- Internal Rate of Return – Groups of Cash Flows.
  Yield of groups of uneven cash flows.
- Discounted Cash Flow Analysis – Net Present Value.
  Finds the net present value of future cash flows.
- Direct Reduction Loans – Sinking Fund.
  Solves problems when payments are made at the end of the compounding periods (ordinary annuity).
- Accumulated Interest/ Remaining Balance.
  Calculates accumulated interest and remaining balance, and generates an amortization schedule(s).
- Wrap-Around Mortgage.
  Calculates yield of wrap-around mortgage.
- Constant Payment to Principal Loan.
  Generates schedule for constant payment to principal loan.
- Add-on Rate Installment Loan/Rule of 78's.
  Calculations involving add-on loans and loans using the rule of 78's.
- Savings Plans-Leases.
  Solves problems involving payments at the beginning of the compounding periods (annuity due), and compounded amounts.
- Advance Payments.
  Payment and yield calculations when additional payments are made in advance.
- Savings – Compounding Periods Different from Payment Periods.
  Calculations when deposits and compounding periods differ.
- Simple Interest/Interest Conversions.
  Simple interest calculations and nominal to effective interest rate conversions.
- Depreciation Schedules.
  Straight line, SOYD, declining balance, and crossover between straight line and declining balance.
- Days Between Dates.
  Calendar routine.
- Bond Price and Yield.
  Calculates price and yield of semiannual coupon bonds.
- Interest at Maturity/Discounted Securities.
  Price or yield of interest at maturity or discounted securities.
- Linear Regression – Exponential Curve Fit.
  Fits a set of data points x, y to a straight line and a curve. Determines goodness of fit.
- Multiple Linear Regression.
  Fits a set of data points x, y, z to a straight line. Also determines goodness of fit.
- Break-even Analysis.
  Calculates all values for linear break-even chart.
- Invoicing.
  Maintains net line totals, subtotal and grand total for invoicing.
- Payroll.
  Guide for writing a payroll program.
- Inventory.
  Guide for establishing an inventory program.

CLINICAL LAB. AND NUCLEAR MEDICINE PAC I
No. 00097–13165

(available in English only)

19 programs on 19 magnetic cards.

Clinical Chemistry

- Beer's Law.
  Converts between absorbance and % transmittance; solves for an unknown concentration given standard concentration and absorbance or % T of standard and unknown.
- Protein Electrophoresis.
  Given integration counts of a number of protein fractions, finds percentage of each. Calculation of weights optional.
- LDH Isoenzymes.
  Given values for the five LDH isoenzymes, finds activity of each as a percent of total. Compares results against normal values.

- Body Surface Area.
  Calculates an estimated BSA by method of Dubois or Boyd. Accepts either English or Metric units.
- Urea Clearance.
  Calculates urea clearance with option of correcting for BSA.
- Creatinine Clearance.
  Calculates creatinine clearance with option of correcting for BSA.
- Amniotic Fluid Assay.
  Performs calculations for the spectrophotometric estimation of bile pigments in amniotic fluid.
- Blood Acid-Base Status.
  Finds total CO_2 and base excess from PCO_2, pH, and Hgb concentration.
- Oxygen Saturation and Content.
  Finds oxygen saturation and content in blood given PO_2, PCO_2, pH, and body temperature.
- Red Cell Indices.
  Given hematocrit percent, red cell count, and hemoglobin, finds mean corpuscular volume, mean corpuscular hemoglobin, and mean corpuscular hemoglobin concentration.

Nuclear Medicine

- Total Blood Volume.
  Computes total blood volume by the radioisotope dilution method.
- Schilling Test.
  The radioisotope determination of vitamin B_{12} absorption.
- Thyroid Uptake.
  The radioisotope determination of thyroid uptake.
- Radioactive Decay Corrections.
  Finds the activity of a radioisotope corrected for decay over time.

Radioimmunoassay

- Radioimmunoassay.
  Computes least-squares regression line of logit of net counts vs. log concentration, including regression constants, correlation coefficient, and concentration for a given count.

Statistics

- Basic Statistics
  Computes mean, standard deviation, standard error, and coefficient of variation for grouped or ungrouped data.
- Chi-Square Evaluation and Distribution.
  Computes the chi-square statistic for goodness of fit. For given $x \geq 0$, finds the chi-square density function f(x) and the cumulative distribution P(x).
- t Statistics.
  Computes the paired t statistic and the unpaired t statistic.
- t Distribution.
  For a given $x > 0$, evaluates the t density function and cumulative distribution.

MECHANICAL ENG. PAC I
No. 00097–13155

(available in English only)

- Vector Statics.
  Performs basic vector operations of addition, cross product, and dot product, and finds angle between vectors.
- Section Properties (2 Cards).
  The area, centroid, and moments of inertia of an arbitrarily complex polygon may be calculated using this program.
- Stress on an Element.
  Reduces data from rosette strain gauge measurement and performs Mohr circle analysis.
- Soderberg's Equation for Fatigue.
  Solves for any one of the seven variables of Soderberg's equation for fatigue.
- Cantilever Beams.
  Calculates deflection, slope, moment and shear for point, distributed, and moment loads applied to cantilever beams.
- Simply Supported Beams.
  Calculates deflection, slope, moment and shear for point, distributed, and moment loads applied to simply supported beams.
- Beams Fixed at Both Ends.
  Calculates deflection, slope, moment, and shear for point, distributed, and moment loads applied to beams fixed at both ends.
- Propped Cantilever Beams.
  Calculates deflection, slope, moment, and shear for point, distributed, and moment loads applied to propped cantilever beams.
- Helical Spring Design.
  Performs two point design for helical compression springs.
- Four Bar Function Generator (2 Cards).
  Program designs four bar systems which will approximate an arbitrary function of one variable.
- Progression of Four Bar System.
  Calculates angular displacement, velocity, and acceleration for the output and connecting link of a four bar system.
- Progression of Slider Crank.
  Calculates displacement, velocity, and acceleration of the slider and angular velocity and acceleration of the connecting rod for the progression of a slider crank system.
- Circular Cams.
  Computes parameters necessary for design of harmonic or cycloidal, circular cams with roller, flat or point followers.
- Linear Cams.
  Computes the parameters necessary for design of harmonic, cycloidal, or parabolic profiles for linear cams with roller followers.
- Gear Forces.
  Computes the reaction forces resulting from torque applied to helical, bevel, or worm gears.
- Standard External Involute Spur Gears.
  Calculates parameters necessary in design manufacture, and testing of standard, external, involute, spur gears.
- Belt Length.
  Computes belt length around an arbitrary set of pulleys.
- Free Vibrations.
  Calculates an exact solution to the differential equation for a damped oscillator vibrating freely.
- Vibration Forced by $F_0 COS \omega t$.
  Finds the steady-state solution for a damped oscillator forced by $F_0 COS\ \omega\ t$.
- Equations of State.
  Ideal gas relation plus Redlich-Kwong model of real gas behavior.
- Isentropic Flow for Ideal Gases.
  Replaces isentropic flow tables for ideal gases in converging-diverging passages.
- Conduit Flow.
  Calculate velocity or pressure drop for incompressible viscous flow in conduits.
- Heat Exchangers (2 Cards).
  Performs analysis of counter-flow, parallel-flow, parallel-counter-flow and cross-flow (fluids unmixed) heat exchangers.

SURVEYING PAC I
No. 00097–13175
(Conforms to U.S.A. practice)

19 programs on 26 magnetic cards. (available in English only)

- Traverse, Inverse and Sideshots.
  Reduction on field traverse data with closure and area calculation.
- Traverse Adjustment.
  Adjustment of traverses by compass rule or Crandall's rule.
- Intersections.
  Bearing-bearing, bearing-distance and distance-distance intersections and offset from a point to a line.
- Curve Solutions.
  Calculation of parameters of circular curves.
- Horizontal Curve Layout.
  Calculation of field data for layout of horizontal circular curves.
- Spiral Curve Layout.
  Calculation of field data for layout of spiral transition curves.
- Vertical Curves and Grades.
  Station and elevation calculations for vertical curves and grades.
- Resection.
  Solution of the "three point problem".
- Two Instrument Radial Survey.
  Location of a point using a distance meter and theodolite.
- EDM Slope Reduction.
  Reduction of slope distances measured with an Electronic Distance Meter.
- Stadia Reduction/3-Wire Leveling.
  a. Reduction of stadia-observations to distance and elevation.
  b. Calculation of elevations for a line of wire levels.
- Taping Reduction/Field Angle Check.
  a. Correction and reduction of taped distances.
  b. Reduction of field angle data.
- Azimuth of the Sun.
  Calculation of the sun's azimuth from a solar observation.
- Predetermined Area.
  Location of one side of a land parcel to enclose a specified area.
- Earthwork.
  Calculation of volume by average end area and volume of a borrow pit.
- Coordinate Transformation.
  Scaling, rotation and translation of coordinates from one system to a second.

- State Plane Coordinates – Lambert.
  Conversion of geographic coordinates to and from state plane coordinates on Lambert projections.
- State Plane Coordinates – Transverse Mercator.
  Conversion of geographic coordinates to and from state plane coordinates on transverse Mercator projections.
- State Plane Coordinates – Alaska Zones 2-9.
  Conversion of geographic coordinates to and from state plane coordinates for Alaska zones 2-9.

TOPOGRAPHIE (Application Manual)
French version No. 00097–13176

VERMESSUNG (Application Manual)
German version No. 00097–90162
(These two locally developed pacs are delivered without magnetic cards)

PROGETTO CURVE STRADALI
Italian version

CIVIL ENGINEERING PAC
No. 00097–13195

- Vector Statics.
  Performs basic vector operations of addition, cross product, and dot product, and find the angle between vectors.
- Section Properties (2 cards).
  The area, centroid, and moments of an arbitrarily complex polygon may be calculated using this program.
- Properties of Special Sections.
  Section properties for rectangles, triangles, ellipses circles and concentric circles are provided by this program.
- Stress on an Element.
  Reduces data from rosette strain gage measurement and performs Mohr circle analysis.
- Bending or Torsional Stress.
  Solves either the bending stress equation ($s = Mv/I$) or the analogous torsional shear stress equation ($s = TR/J$) interchangeably for all variables.
- Linear or Angular Deformation.
  This program solves for linear deflection under tensile load or the analogous angular deflection under torque. The solution is interchangeable between the five variables.
- Cantilever Beams.
  Calculates deflection, slope, moment, and shear for point, distributed, and moment loads applied to cantilever beams.
- Cantilever Beams—Trapezoidal Load.
  Calculates deflection, slope, moment and shear for cantilever beams with distributed trapezoidal loads.
- Simply Supported Beams.
  Calculate deflection, slope, moment, and shear for point, distributed, and moment loads applied to cantilever beams.
- Simply Supported Beams—Trapezoidal Load.
  Calculates deflection, slope, moment and shear for simply supported beams with distributed trapezoidal loads.
- Beams Fixed at Both Ends.
  Calculates deflection, slope, moment, and shear for point, distributed and moment loads applied to beams with rigidly fixed ends.
- Beams Fixed at Both Ends—Trapezoidal Load.
  Calculates deflection, slope, moment and shear for point, distributed, and moment loads applied to cantilever beams.
- Propped Cantilever Beams.
  Calculates deflection, slope, moment, and shear for point, moment and distributed loads applied to propped cantilever beams.
- Propped Cantilever Beams—Trapezoidal Load.
  Calculates deflection, slope, moment and shear for distributed trapezoidal loads applied to propped cantilever beams.
- Six-span Continuous Beams.
  Solves for the intermediate couples present at the supports of continuous beams. Two to six spans are allowed.
- Steel Column Formula.
  Computes allowable loads for steel columns. Column ends must be constrained by welds, rivets or in some other means which prevents deflection and rotation.
- Reinforced Concrete Beams.
  Solves interchangeably between steel area, width, depth, concrete strength, steel strength and internal moment for reinforced concrete beams. Base on the American Concrete Institute code—ACI 318-71.
- Bolt Torque.
  Calculates the torque that will yield a specified bolt load or the load resulting from a specified torque. The shear stress in the bolt may be calculated as an option.

BIBLIOTHÈQUE BÉTON ARMÉ – STRUCTURES (Application Manual)

French version No. 00097–90148
This pac, developed in France, is delivered without magnetic cards.

INGEGNERIA CIVILE 1
Italian version No. 00097–90150

INGEGNERIA CIVILE 2
Italian version No. 00097–90151

GAMES I
No. 00097–13185

- Game of 21.
  This card game is also known as blackjack.
- Dice.
  This includes the game of "Craps" as well as a dice roller.
- Slot machine.
  The familiar one armed bandit.
- Submarine Hunt.
  Find and then sink the moving submarine with your depth charges.
- Artillery.
  Can you locate and destroy the moving target before it destroys you?
- Space War.
  Your mission: Search out and annihilate the 3 evil Alglogs before time and energy are gone.
- Super Bagels.
  Based on "Mastermind". How fast can you guess the secret number?
- Nim$_k$.
  Who will pick the last object from the last pile, you or the machine?
- Queen Board.
  You and the calculator take turns moving a chess queen to its target. The one who moves last, wins.
- Hexapawn.
  You and the 67/97 command armies of 3 chess pawns each. Caution: The calculator learns from its mistakes.
- Tic-Tac-Toe.
  Your best hope is to play the machine to a draw.
- Wari.
  You have a reasonable chance of beating the HP-67/97, but beware of a smart human. This ancient game is also known as Man-Kalah.
- Racetrack.
  Up to 5 players can race. Be alert to the differences between velocity and acceleration.
- Teaser.
  Changing from one pattern to the other looks easy, but...
- Golf.
  The HP Country Club course is challenging, but a duffer with his handicap can beat a champion.
- The Dealer.
  This shuffles and deals a deck of cards to 4 people; it also calls Bingo.
- Bowling Scorekeeper.
  Tired of keeping score and missing the game? Here's your answer for up to 10 bowlers.
- Biorhythmus.
  Calculates cycle values for any date, and tells which of the next 33 days are critical, maximum or minimum days.
- Timer.
  Offers 2 visible timers, a count-up and count-down timer, and allows splits to be taken.

NAVIGATION PAC
No. 00097–13205

14 programs on 21 magnetic cards

Course Planning Programs
- Estimated Time of Arrival.
- Great Circle and Rhumb Line Navigation.
- Dead Reckoning.
  Predicts or keeps track of your dead reckoning position.
- Velocity Triangle and Course to Steer.
  An interchangeable solution for the vector addition problem. Also computes course to steer.

Celestial Navigation Programs
- Star Sight Planner (2 cards).
  Produces a list of available stars given location, date and time. Also gives approximate time of middle of morning and evening twilight periods.

- Almanac Interpolator. Interpolates in Almanac for position of any body and reduces sight as well. Can be used to compute sextant setting for difficult-to-see objects.
- Sun Line of Position. This program is virtually a perpetual Sun almanac.
- Star Line of Position (7 cards). This program is virtually a perpetual star almanac. Six data cards contain almanac data on all 57 navigational stars plus Polaris.
- Bearing Line of Position. Produces a fix from bearing on two objects. May be used to provide a line of position.
- Two-Angle Line of Position. Produces one or two lines of position for the Position Fixing program.
- Fix from Two Lines of Position. Uses two lines of position from any combination of above programs to compute a fix. Also computes running fixes.

Miscellaneous Programs

- Radar Plotting Closest Point of Approach. Tracks two vessels simultaneously, computing range, bearing, and time of CPA. Also computes new course to steer to avoid another vessel by a specified distance.
- Distance by Horizon Angle. Computes the distance to an object of known height either beyond or short of the horizon. Also can be used with vertical angles of objects.
- Beating to Windward. From measurements made on your boat, your speed-made-good and course-made-good are calculated. Then time to the lay line, course and speed-made-good on the next tack, and time to the mark are computed.

SERIES E/C

For the HP-33E/C, HP-34C, HP-37E, HP-38E/C:

A Standard Applications Book for each model provides ready-ritten solutions to a variety of multi-disciplinary problems. Optional Application Books provide ready-written solutions in the the specialised fields of Student Engineering, Mathematics, Statistics, and Surveying.

HP-33E/33C Mathematics (00033-90030)

includes fifteen programs in the fields of algebra and number theory, numerical methods and analytical geometry.

HP-33E/33C Statistics (00033-90031)

includes 16 programs in general statistics, probability, distributions, curve fitting and test statistics.

HP-33E/33C Surveying (00033-90033)†

includes 14 programs, using North American surveying conventions, in traverses, inverses, sideshots, intersections, curves, earthworks and more.

HP-33E/33C Student Engineering (00033-90032)†

has 14 programs demonstrating concepts in electrical engineering, heat and thermal engineering, mechanical engineering, stress analysis and engineering economics.

HP-34C Student Engineering (00034-90035)†

French version (00034-90042)
German version (00034-90043)
Italian version (00034-90044)

Electricity: ohm's law, reactance chart, impedance of a ladder network, series-parallel resistor addition and standard resistance values.
Thermal: ideal gas equation of state.
Transport: conduit flow.
Mechanical: equation of motion, kinetic energy.
Structural: Mohr circle for stress, simply supported beams sections properties, static equilibrium at a point.

HP-34C Mathematics (00034-90032)

covers various fields of mathematics such as matrix operations, integration by discrete points, vector operation, analytical geometry, etc...

HP-34C Statistics (00034-90033)

offers advanced programs such as permutations, combinations, distribution (t, F, Poisson), contingency, table, Spearman's Rank correlation coefficient, etc...

HP-34C Surveying (00034-90034)†

includes 13 programs, using North American surveying convention in traverses, inverses, sideshots, intersections, curves, earthwork.

† Conform to U.S.A. practice

HP-37E, HP-38E, HP-38C Marketing and Forecasting, 00038-90049

German version (00038-90069)
French version (00038-90070)
Forecast: moving average, seasonal variation factors, exponential curve fit, gompertz curve trend analysis, forecasting with exponential smothing.
Finance: breakeven analysis, operating leverage, profit and loss analysis.
Pricing: markup, margin, list and net prices with discounts
Miscellaneous: learning curve, queuing and waiting line theory, cash flow loader, percentage tabulator.

HP-37E, HP-38E, HP-38C Lending, Saving and leasing (00038-90025)†

covers annual percentage rate calculations, rule of 78's, add-on to APR rate conversion, savings with variations in compounding periods, credit, life insured loans and more.

HP-37E, HP-38E, HP-38C (00038-90052)† Personal finance

covers portfolio evaluation, bond purchased between coupons, and various U.S. personal finance calculations.

HP-37E, HP-38E, HP-38C (00038-90025)† Real estate I

includes routines for variations in mortgage problems, equity investment analysis, depreciation, appreciation, appraisal and more.

HP-37E, HP-38E, HP-38C (00038-90051)† Real Estate II

covers annual property cash flow analysis, mortgage-equity (Ellwood) analysis, and investment and feasibility analysis.

HP-11C/12C

A specific Solution Book is available in English only for each calculator.

HP-11C Solution Book (00011-90009)†
HP-12C Solution Book (00012-90009)†

†Conform to U.S.A. practice

Accessories

* HP-41C/CV
* HP-67/97
* Series E/C

HP-41 Accessories: Those Needed Extras

As an added support feature, HP offers a complete line of hardware accessories for the HP-41. Keep your calculator at peak operating efficiency with:

HP-41 Accessories

82111A Vinyl Case
82152A Overlay Kit
82151A Module Holder
00041-15001 Standard Applications Module
82120A Rechargeable battery pack and reserve power pack
82066B Recharger*
(220 V-Euro plug)
82067B Recharger*
(230 V-UK plug)

Wand Accessories

Creating your own HP-41C Bar Code 82153-90019

Bar-Code Generation

A program which produces Bar-Code on a HP plotter is available for the HP-85 Personal Computer from the Users' Program Library Europe (UPLE). Furthermore, custom Bar-Code Services are available from independent companies in several European countries. Your local Hewlett-Packard sales office will be able to indicate companies providing such services.

Printer Accessories

82045A Blue Thermal Paper
82175A Black Thermal Paper box of
6 rolls
82033A Battery Pack
82067B Recharger (230 V-UK plug)
82066B Recharger
(220 V-Euro plug)
82044A Security Cable
82037A Reserve Power Pack

Card Reader Accessories

Blank magnetic cards
00097-13141 40-Pac (with holder)
00097-13143 120-Pac (with holders)
00097-13206 1000-Pac
00097-13142 3 Card Holders

HP-IL Accessories

82176A Digital Cassettes (10-Pac)
82167A HP-IL Cable 0.5 m
82167B HP-IL Cable 1.0 m

* can be used only with the rechargeable battery pack (82120A)

HP-67/HP-97 Accessories

Optional Accessories

These optional accessories have been created to help you maximize the usability and convenience of your calculator.

HP-67

Security Cradle 82015A*
Reserve Power Pack 82004A*
Field Case 82016A*

HP-97

Security Cable 82044A
Reserve Power Pack 82037A
Thermal Paper 82045A (box of 6 rolls)

HP-67/97 Common Accessories

Programming Pad 00097-13154
Blank Magnetic Cards (1 x 40) 00097-13141
Multiple Card Packs (3 x 40) 00097-13143
Program Card Holders (x 3) 00097-13142

* Limited availability

Accessories for Series E/C Calculators

With HP accessories, you can take full advantage of your calculator.

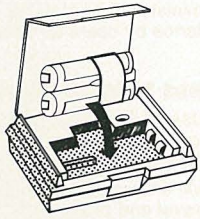
Standard Accessories

82109B Battery Pack
82089B Adaptor/recharger (230 V a.c. U.K. plug)
82090B Adaptor/recharger (220 V a.c. Euro plug)
82110A Soft vinyl case

Optional Accessories

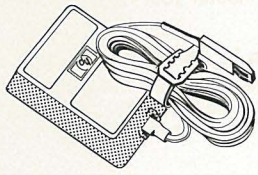
Reserve Power Pack (82103A)

comes with an extra battery pack and attaches to the recharger supplied with your calculator. Allows you to recharge a battery pack outside your calculator so you always have a fresh pack.



Recharger/AC Adaptor for 110 V US plug (82087B)

for the international traveller who uses his calculator in locations where 110 V a.c. is available. Comes with U.S. flat pin connector only.



HP Users' Program Library Europe

The Hewlett-Packard Users' Program Library is a customer service offered to owners of HP fully-programmable personal calculators. **(HP-67/97/41)**

At nominal cost, it offers programs contributed by other users. Over 5,000 application programs, from all imaginable fields of science and professional activity, are available. Launched in 1974 as the HP-65 Users' Library, it was later extended to the HP-67 and HP-97 and, now, to the HP-41. The library is multilingual and has grown into a huge success with over 10,000 members at present. While the Users' Library is administered by Hewlett-Packard its aim is to provide application assistance by users for users.

Access to international expertise and solutions

The Users' Program Library gives you access to a vast pool of knowledge that enables you to take full advantage of the capabilities of your calculator... faster.

You will find solutions to problems that might otherwise take you hours to unravel and program yourself. You will discover interesting programming techniques and individual styles pioneered by others to help you master your HP-67, HP-97 or HP-41 faster and more efficiently.

Join in an active dialogue

While *you* benefit from other users' experience, remember that they may need yours. You can contribute your own programs to the Library and receive a reward.

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