

HP-67/HP-97 Application Pacs

Based on years of experience in developing software for fully programmable portable calculators, Hewlett-Packard offers a wide range of application pacs to give instant utility value to your HP-67 or HP-97.

The six pacs listed here represent the basis for an initial software support but in our continuing effort to help you concentrate the capabilities of your calculator in your field of interest, more pacs, in new application areas will be produced in the future. Many of these pacs are also available in GERMAN, FRENCH and ITALIAN. (Those customers who are included in our mailing list will periodically receive

BUSINESS DECISIONS Pac I

English version No. 00097-13144

Deutsche Version Nr. 00097-13146

Edition française No. 00097-13145

- 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.

EE Pac I

English version No. 00097-13131

Deutsche Version Nr. 00097-13133

Edition française No. 00097-13132

- 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: $S \leftrightarrow Y, Z, G, H$
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.

information regarding software developments and programming techniques.)

Pacs contain about 20 preprinted, prerecorded program cards, a program card holder and a comprehensive manual containing operating instructions, equations, limits, warnings and sample problems with solutions for each program in the pac. All programs are fully documented with commented program listings, making it possible to adapt the programming techniques found to be useful in each application area.

These pacs are available through your nearest HP Sales Office or official HP Dealer.

- 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 ($\sigma, \rho, SWR, R.L.$) 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 $u, G_u, G_{min}, G_{max}, G_o, G_{1max},$ and G_{2max} from a transistor's s-parameters. It also computes ρ_{01} and ρ_{02} from $G_i < G_{max}$ ($i=1, 2$).
- 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.

STAT Pac I

English version No. 00097-13111

Deutsche Version Nr. 00097-13113

Edition française No. 00097-13112

Edizione italiana No. 00097-13114

- 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 (ONE WAY)
This program is used to test the observed differences among k 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.
- 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 ν .
- F DISTRIBUTION
This program evaluates the integral of the F distribution for given values of $x(>0)$, degrees of freedom ν_1, ν_2 , provided either ν_1 or ν_2 is even.
- 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.
- t STATISTICS
Paired t statistic tests the null hypothesis $H_0: \mu_1 = \mu_2$ for two observations. t statistic for two means tests the null hypothesis $H_0: \mu_1 - \mu_2 = d$ 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×k and 3×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.
- **χ AND R CONTROL CHART**
χ (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.
- **SINGLE- AND MULTI-SERVER QUEUES**
Queueing theory for infinite customers and finite customers.

MATH Pac I

English version No. 00097-13121
Deutsche Version Nr. 00097-13123
Edition française No. 00097-13122
Edizione italiana No. 00097-13124

- **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.

MECHANICAL ENG. Pac I

English version No. 00097-13155

- **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 gage 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.

CLINICAL LAB. AND NUCLEAR

MEDICINE Pac I

English version No. 00097-13165 (available late 1976)

- **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.
- **TOTAL BLOOD VOLUME**
Computes total blood volume by the radioisotope dilution method.
- **SCHILLING TEST**
The radioisotope determination of vitamin B₁₂ absorption.
- **THYROID UPTAKE**
The radioisotope determination of thyroid uptake.
- **RADIOACTIVE DECAY CORRECTIONS**
Finds the activity of a radioisotope corrected for decay over time.
- **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.
- **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.



Sales and service from 172 offices in 65 countries.