

# HP Series 200, Model 16 Personal Technical Computer

HP 16-bit Computing Software • Merging Science with Business

## Introduction

As HP's top-of-the-line personal technical computer, Model 16 features the fast and powerful 16/32-bit MC68000 microprocessor from Motorola, backed by a practical selection of both technical and business software.

The Model 16 is a serious solution for engineers and scientists faced with the demands of research and development, but plagued by the day-to-day requirements of project management. Through the Model 16, you can turn "extra" work — presentations, memos, reports — into "computer-aided" work.

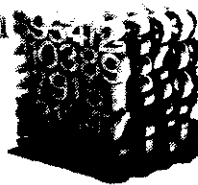
See just how you can convert tedious, time-consuming tasks into simple "plug-in" solutions through the Model 16, HP-developed software below.

In addition, our HP Third Party Software Program, HP PLUS, is working with over 100 independent software houses to soon bring you even more solutions: word processing, spread sheet planning aids, data base management, data communications, graphics, utilities, languages, technical software and much more.

## Software

- Computation and Analysis
- Computer-Aided Engineering (CAE)
- Management
- Languages
- Networking

## Computation and Analysis



### VisiCalc (HP 98810A)

VisiCalc is one of the most powerful and widely-used analytical tools available for personal computers. It allows the user to set up a form or worksheet, enter changes to one or more figures in a matrix, and quickly assess the impact of those changes on related data. It saves considerable time and provides a means to explore many different options in a short period of time. Problems VisiCalc can help solve include: calculating sales projections, budgets, costs estimates, engineering changes, financial ratios, product pricing, and many other applications where "What if?" questions are asked.

### Numerical Analysis Library (HP 98820A)

This software package contains a large number of numerical analysis techniques written in the form of subroutines which may be added to application programs. Simple drivers for the subroutines are also included so that they may be used as stand-alone programs. For input, data and parameters may be passed as parameters to the numerical analysis subroutine from the application program. Alternatively, the data and parameters may be entered from the keyboard in response to prompts from the simple driver programs. Routines include: root finders, integration, ordinary differential equations, linear algebraic systems, Eigen Analysis, interpolation, and Fourier Analysis.

### Statistics Library (HP 98820A)

The Statistics Library is an economical set of routines for data exploration, analysis and graphical display. It features a unified data base and easy-to-use graphics. Statistics Library is a multiple pack containing:

**Basic Statistics and Data Manipulation** — provides comprehensive summary statistics as well as routines for entering, editing, naming, recoding, sorting, storing, transforming, and listing data for statistical analysis by other programs.

**General Statistics** — contains parametric and non-parametric tests for single sample, paired sample, two independent sample and multiple sample data. The pack also eliminates the need for books of reference tables by providing statistical distributions.

**Statistical Graphics** — contains nine routines for plotting statistical data: time plot, histogram, probability plots, x-y scatter plot, semi-log plot, log-log plot, xyz plot, and Andrews plot.

**Regression Analysis** — performs multiple linear regression, variable selection methods using stepwise, forward, backward or manual procedures, polynomial regression and residual analysis. It uses Marquardt's Method to fit non-linear models using up to ten parameters, and allows residual analysis.

**Monte Carlo Simulation** — includes advanced random number generators, random deviate generators for various statistical distributions and a series of tests which aid in the evaluation of simulation studies.

**Analysis of Variance** — a collection of routines for the analysis of statistically designed experiments. This pack includes procedures for factorial (up to four factors), nested, split-plot, one-way, two-way unbalanced and one-way covariate designs. It also contains routines for generating contrasts, orthogonal polynomials, multiple comparisons and interactive plots.

### Principal Components and Factor

**Analysis** – has routines for multivariate analysis, including principal components, factor extraction (principal axes or maximum likelihood method), factor rotations (orthogonal or oblique), and plots of case scores.

### Statistics Library, Part I (HP 98820B)

A basic library of general statistics, Part I consists of Basic Statistics and Data Manipulation, General Statistics, Statistical Graphics and Regression Analysis.

### Statistics Library, Part II (HP 98820C)

An advanced library of general statistics, Part II consists of Monte Carlo Simulation, Analysis of Variance, and Principal Components and Factor Analysis. Requires Part I to run.

## Computer-Aided-Engineering (CAE)



### AC Circuit Analysis (HP 98825A)

With this pack you can quickly and easily model your AC circuits and accurately analyze their performance. By simulating your circuit designs on a Model 16 Personal Technical Computer, you can recognize design problems early in the development process – before making substantial investments in the project. You can use an interactive mode of operating to design optimal solutions – whether they involve amplifier design, power and transmission systems, control systems, instrumentation, filter design, spectral analysis, or environmental component design. To evaluate alternative circuit designs, you simply input new values for variables and continue to run your simulation until you reach the response you desire. With AC Circuit Analysis you can calculate the magnitude and phase of node voltage, branch voltage, and branch current. You can also compute branch power and the ratios of any of these parameters. The pack performs these computations for resistors, capacitors, inductors, voltage controlled sources, and independent current sources. Magnitude,

phase, time and impedance plots are available. These plots can include the effects of component tolerances.

### Linear Systems Analysis (HP 98826A)

The Linear Systems Analysis package is capable of analyzing single input/single output linear systems. These linear systems can either be in the form of a control system block diagram, or a single transfer function in Laplace (S) notation. This pack can analyze block diagrams which have 20 or fewer blocks and nodes, and transfer functions to the order 19 or less. Included are modules for entering the system design into the computer, plotting routines for analyzing the system performance, and editing tools which are used for modifying the system design.

### Digital Filter Design (HP 98828A)

This pack is an interactive, menu-oriented program for analyzing and designing digital filters. You can use the Model 16 to compute, tabulate, and plot filter coefficients, filter impulse responses, and filter frequency responses. Its design features include: automated design of Finite Impulse Response (FIR) and Infinite Impulse Response digital filters; frequency sampling design of FIR filters; least squares design of FIR filters; and transformation of analog systems to digital systems using impulse invariance, bilinear  $z$ , and covariance invariance.

### Waveform Analysis (HP 98827A)

This pack offers you a wide range of applications for signal analysis in the time and frequency domains. In addition to electrical engineering applications, this pack gives you problem-solving capabilities in such areas as acoustics, oil exploration, engine vibration analysis, signal noise detection, and image processing. You can input a single function and analyze up to 8192 data points on the Model 16. You may enter dual channel time domain data from a keyboard, data file, or internal software source. This data may be passed through a user-specified preprocessing filter. Data is then scanned, segmented into records, windowed, Fourier analyzed, correlated, and fitted to an auto-regressive model. All analysis is performed in an off-line mode. Results such as power spectra, correlation functions, impulse responses, and nodal parameters may be listed or graphed on the internal CRT. Results may also be printed or plotted on an HP-IB compatible peripheral.

## Management

### Context MBA™

Context MBA is a precedent-setting, integrated business management software program.

Context MBA brings together five major management functions – a powerful electronic spreadsheet, word processing, graphics and database – into one totally integrated package. The fifth function, telecommunications, which automatically converts mainframe data for use in the MBA spreadsheet, will be available early this year. Through Context MBA, the user can organize and arrange information in a variety of forms – tabular, graphics or verbal – and display them all at once for comparison and analysis.

Context MBA proves that much more useful when teamed with the high-speed HP Model 16S 68000-based personal computers.

Context MBA is provided by Context Management Systems through Hewlett-Packard's HP PLUS third-party software program.

### Graphics Presentations (HP 98815A)

Overhead slides of bar charts, pie charts, line charts and text material can now be created easily and quickly using the HP Model 16, the HP 7470 graphics plotter, and the Graphics Presentations software. This versatile pack allows you to create – on acetate or paper – professional quality presentation materials that will impress your audience and help hold their attention. You'll want to use this pack for all your customer presentations, management meetings, sales meetings, management reports and much more. The Model 16 graphics system was designed to be easy to use. Even if you've never used a computer before, you'll be creating slides and charts in no time at all.

### Forecasting (HP 98818A)

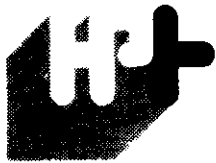
Objectively evaluating historical results and then accurately predicting future values are the bases for many important commercial and scientific decisions. The HP Forecasting application software package contains statistical routines that analyze and smooth initial raw data under a variety of assumptions to determine trends, seasonality, and random variations. In addition, five alternative forecasting methods are available for applications such as sales forecasting, cash planning, setting expense and budgets,

manpower projections, and production/inventory planning and control.

## Project Management (HP 98817A)

One of the most important phases of any project is the planning and organization of many interrelated activities. Network analysis is the method most often used to plan project management. Besides helping formulate the basic plan, network analysis permits following the project closely, anticipating problem areas, evaluating alternate plans, and achieving the economic and timing objectives of the project. The Model 16 system has the power and speed to handle extremely complex networks, and it permits updates and modifications as changes occur during the project. The Project Management software incorporates these network methods: PERT Program Evaluation and Review Technique; CPM – Critical Path Method; MPM – Metra Potential Method.

## Languages

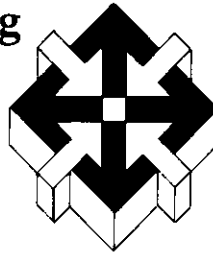


In addition to the Model 16's HP BASIC and Pascal language systems, Multi-FORTH is available. MultiFORTH, a product of Creative Solutions, Inc., is part of the HP PLUS Third Party Program.

### Multi-FORTH (HP + 97030JA)

This language maximizes programmer efficiency in laboratory and process control applications. It provides multi-tasking and multi-user capabilities. It is compatible with FORTH-79 standard, with several extensions to provide full access to Model 16 hardware features.

## Networking



The "X" shown in the product numbers below specifies the media on which the software is supplied, and can have the following values:  
3 for use in 3½-in. external flexible disc drives.  
5 for use in 5¼-in. external flexible disc drives.

### Terminal Emulator (HP 09800-10X80)

This pack enables the Model 16 to respond like an intelligent terminal, bridging the gap between two computing environments – the powerful, stand-alone workstation and the central host computer. The terminal emulator's friendly features allow the Model 16 to be more than just a Teletype; you can "log-on" to a central host and transfer data without having to write a program on the computer to do it. The Model 16 Terminal Emulator runs standalone, independent of any language system. Line modify and character modes are supported as well as ENQ/ACK handshake or XON/XOFF Host/Terminal handshake. File transfer allows data to be shared with the host computer. ASCII files can be transferred to and from the host computer.

## Utilities

### BASIC Utilities Library (HP 09800-10X00)

Provides media and system management utilities and programming aids. Also, mainframe feature and application demonstration programs for the BASIC Language System. (Included with every BASIC 2.0 Language System.)

### Loader Utility (HP 09800-10X10)

Allows loading of BASIC 2.0 system and binary programs with one operation. Uses disc drivers in the 3.0 Boot ROM to load other drivers from an external disc. (Included with every BASIC 2.0 Language System.)

## For More Information ...

For additional information and a demonstration of any of this software, see your HP dealer today.

## Additional Equipment Required

The following table indicates what equipment must be ordered with your Model 16A/S to use each software pack.

The product numbers are:

98256A = 256K memory board  
98611A = RAM-based BASIC 2.0  
98601A = ROM-based BASIC 2.0

	Model 16S	Model 16A
Context MBA™ (97038JA)	None	98256A
VisiCalc® (98810A)	None	98256A
Numerical Analysis (98821A)	None	98256A (two), 98611A or 98256A, 98601A
Statistics Libraries (98820A/B/C)	None	98256A (two), 98611A or 98256A, 98601A
AC Circuit Analysis (98825A)	None	98256A (two), 98611A or 98256A, 98601A
Linear Systems Analysis (98826A)	Printer	98256A (two), 98611A or 98256A, 98601A and printer
Digital Filter Design (98828A)	None	98256A (two), 98611A or 98256A, 98601A
Waveform Analysis (98827A)	98256A	98256A (two), 98611A or 98256A, 98601A
Graphics Presentations (98815A)	None	98256A (two), 98611A or 98256A, 98601A
Forecasting (98818A)	None	98256A (two), 98611A or 98256A, 98601A
Project Management (98817A)	None	98256A (two), 98611A or 98256A, 98601A
Terminal Emulator	None	98256A
BASIC Utilities	None	98611A or 98601A
BASIC Loader	None	98611A or 98601A

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Context MBA™ is a trademark of Context Management Systems.