

# HP 9000 SERIES 200 DESKTOP COMPUTERS

## Introduction

The HP 9000 Series 200 traces its heritage to 1967 with the introduction of the first programmable desktop calculator for engineers and scientists, the HP 9100A. Since that time, HP has developed several generations of professional desktop computing systems. The HP 9830 was the first desktop computer with built-in BASIC programming and general purpose input/output capability.

The current HP 9000 Series 200 is a fourth generation family of products providing a range of personal workstations for the technical professional. Each of the HP 9000 Series 200 products features a common architecture based on the Motorola MC68000 CPU, the state of the art 16/32 bit microprocessor. The various models fill needs defined by a wide range of users.

## Overview

There are five products in the HP 9000 Series 200 line ranging from personal computers to modular controllers to color workstations. All are compatible, high performance computers that share languages, software, and hardware accessories.

The Model 216 is the lowest cost product in the series, yet it features large computer performance and capability. The Model 216 can be configured with up to 768k bytes of memory, provides built-in graphics capability on its 9 inch CRT, and has built-in HPIB and RS-232 I/O ports. At the same time, it takes only about the same space on a desk as an open notebook.

The Model 226 is an integrated solution to many instrument control applications. Its package is designed to conveniently stack with common measurement instruments, and it includes built-in CRT, 5.25 inch disc drive, and HPIB. It can also be configured with up to 2M bytes of memory.

There are two versions of the Model 236, the monochrome Model 236A and the color Model 236C. Each features a large 12 inch CRT, dual 5.25 inch disc drives and 2M byte memory capacity. The Model 236C uses a four-bit frame buffer to provide a 16 color display from a palette of 4096 colors.

Finally, the Model 220 is a modular version of the HP 9000 Series 200 architecture. It consists of a CPU box and a variety of a user/programmer interface options to suit a variety of applications, especially in production test. Options include: remote keyboards, custom keypad interface, remote CRT's, and a

variety of mass storage devices. In fact, mass storage may be EPROM or bubble memory cards for use where a disc drive may not be suitable. The Model 220 can contain up to 3.9M bytes of memory.

Each of the HP 9000 Series 200 products features the same 8 MHz MC68000 in a multiple processor configuration. Since the keyboard interface, CRT control, disc control, and HPIB control are all handled by separate processors, the CPU is free to spend its time doing the meaningful work it was intended to do. Throughput is enhanced. A variety of I/O cards is available for interfacing to almost any external device and for data communications. A 9888A Bus Expander allows memory and I/O expansion beyond the capabilities mentioned above for all HP 9000 Series 200 products.

HP 9000 Series 200 products support a variety of languages. For example, HP BASIC is the most powerful BASIC offered on any system. It includes over 400 keywords, including a rich set of I/O commands. BASIC is available in either ROM or soft loaded (RAM) versions. HP Pascal is a compiled language which significantly increases the speed of the HP 9000 Series 200 product line. Unlike most Pascal implementations, HP Pascal has a vast I/O and graphics library. Pascal internals documentation is available to those systems designers who would like to dig in further to design custom operating systems or I/O systems.

A unique feature of HP technical computers is Shared Resource Management; with SRM, up to 68 desktop workstations can share data and other files on a common disc drive, and the workstations can also share peripherals such as printers. Workstations can be separated by up to 60 meters, providing a convenient cluster for a lab or office environment. SRM is available on HP 9000 Series 200 computers, the Series 500/600/700 and 9853/45 computers.

#### UPGRADE PATHS

Pascal and BASIC software for HP 9000 Series 200 products is compatible with the Series 500/600/700 computers. This provides a link into the 32-bit high performance family.

Systems can be linked via Shared Resource Management to share files and peripherals.

DSN/DL and terminal emulation software allow linking into larger computer systems.

Software written for the Model 216 can be transported upward throughout the entire HP 9000 Series 200.

**HP Computer Museum**  
**[www.hpmuseum.net](http://www.hpmuseum.net)**

**For research and education purposes only.**

## ENHANCEMENTS

The Bus Expander (9888A) adds 15 backplane slots to any HP 9000 Series 200 computer. This allows 7 additional I/O cards or 3.75M bytes of additional memory (or combinations of both) to be used. Model 226 and 236 computers can use up to 4 expanders, while the Model 216 can use one.

As alluded to above, memory and I/O cards plug into a backplane. The user can upgrade his system easily. Memory comes on 256K byte boards which can occupy any backplane slot. I/O cards can only be used in alternate slots, so there is a tradeoff between I/O and memory.

Any offered language can be added at any time. Thus a user can migrate from BASIC to Pascal with ease. In fact, compiled subprograms can be written in Pascal and accessed from BASIC.

## Product Positioning



As might be expected, there are several application areas for these powerful computers. However, the primary position of each model defines a set of applications which is well matched to the features of the individual product.

The Model 216 is the personal computer for technical and other performance-sensitive professionals. It is a powerful, low cost, small footprint, 16/32 bit computer with a wide variety of software for technical and "core" applications.

In production testing, the Model 220's modularity, customizable user interface, large I/O and memory card capacity make it a good match. It's also rack mountable, so it can be added to an instrument configuration easily.

Just as the Model 220 is well suited to production test applications, the Model 226 works well in laboratory test. Its small, yet integrated package conserves valuable bench space. Data display graphics make results easily understandable and I/O programming is simple in any of three languages; HPL, BASIC, or Pascal.

Both versions of the Model 236 are matched to the needs of the designer. The large graphics CRT with 512x390 resolution, large memory capacity, and variety of design software are combined to provide a personal workstation that is both powerful and reasonably priced.

The various products in the HP 9000 Series 200 fit well within the overall HP computer offering.

The Model 236 is our low-end engineering workstation in a line capped by the Series 500/600/700 computers. The Model 236 is a high performance, yet easy to use workstation that fits on a desk. With a choice of color or monochrome displays, it can handle a variety of design applications. If even higher performance is required, the Series 500/600/700 32-bit computers are a compatible growth path from the Model 236 and HP 9000 Series 200 products.

Finally, the Models 220 and 226 are premier instrument controllers with a level of performance that slots them neatly above the Series 80 product line.

	MODEL 216	MODEL 220	MODEL 226	MODEL 236
CRT	9 inch monochrome	Opt 9 inch Opt 12 inch monochrome	7 inch monochrome	12 inch monochrome (236A)
characters per line	80	80	50	80
Graphics resolution	400x300	400x300	400x300	512x390
Max memory	768K bytes	3.9M bytes	2M bytes	2M bytes
Languages	BASIC Pascal HPL	BASIC Pascal	BASIC Pascal HPL	BASIC Pascal HPL(236A ONLY)
Built-in I/O	HPIB, RS-232	HPIB	HPIB	HPIB
I/O slots	1	7	4	4
Built-in Mass Storage	None	None	1 Mini-disc	2 Mini-discs
Networking (Opt)	DSN/DL SRM Term Emulator	DSN/DL SRM Term Emulator	DSN/DL SRM Term Emulator	DSN/DL SRM Term Emulator

## Software Solutions

Software for HP 9000 Series 200 products can be lumped into two categories, core functions which are discipline independent, and those functions which apply to specific job areas.

Core software is generally defined to include word processing, data base management, spreadsheet analysis, graphics presentations, and data communications. The HP 9000 Series 200 products offer the following core software:

Context MBA (includes data base management, spreadsheet,\* graphics, and word processing)(Context MBA is a registered trademark of Context Management, Inc.)

\* not on Model 226

VisiCalc (VisiCalc is a registered trademark of VisiCorp)

Graphics Presentations

Terminal Emulator

Project Management

Forecasting

Technical software is also available. This is a partial listing:

AC Circuit Analysis

Linear Systems Analysis

Digital Filter Design

Waveform Analysis

Numerical Analysis Library

Statistics Library

Engineering Graphics System 200 (EGS/200) is a highly interactive 2D drawing system for engineering applications. The system works with a user definable parts library and is user re-configurable. HP supplied personalities include printed circuit board (PC) and schematics.

There are, in addition, a number of instrument control application packages available. Also, a growing library of third party software is available.

## Features

## Advantages

MC68000 processor	High speed and large memory capacity
Several processors	Better throughput than other 68000-based systems
Multiple languages	Choose the one best suited for your application
CRT graphics	See results in easy to understand form
Soft Keys and Knob	Easy to interact with programs (friendly user interface)
Compatibility	Growth path. Pay only for what you need at the time
Powerful I/O	Instrument control made simple
Variety of configurations	The right tool for the job
Shared Resource Management	Shared files and peripherals among up to 68 users in a network

## Markets

The primary market for HP 9000 Series 200 computers is as a workstation for electrical, mechanical, and software engineering. In fact, scientific applications of all types require the kind of performance offered by HP 9000 Series 200 products.

Part of most engineering jobs is testing of designs in prototype form. The test techniques might also be used later in the production phase. HP 9000 Series 200 computers are well suited to test applications, and this is often the primary use of a desktop computer.

Of course, products such as the Model 216 are attractive as personal computers where high performance is needed.

### CUSTOMER NEEDS

### FEATURES

High speed for design simulation

MC6800 CPU with multiple support chips; compiled Pascal

Graphics for data reduction	Internal, standard CRT graphics Optional color graphics External monitor output card
Easy programming for instrument control	BASIC includes powerful I/O statements; Pascal I/O library
Small footprint to conserve space	1.7 square foot Model 216; Model 220 rack mount capability
Shared data files and/or expensive peripherals among members of a project team	Shared Resource Management network
Growth path/compatibility	Compatible languages and software; Shared Resource Management; HP 9000 Series 500 compatibility
Software solutions	Software from HP and third parties

## Typical Sales Situations



- A. Customer wants to obtain a workstation for each member of his team. These workstations must do design work, and be able to be used as a general purpose computer for budgeting, memo writing, etc. The individual users should be able to share data and access the existing mainframe computer. The group manager wants a small computer, since his desk space is limited. Others want a variety of configurations.

HP 9000 SERIES 200 PROVIDES A UNIQUE SOLUTION TO THIS PROBLEM

- B. A Lab engineer has developed a set of test suites for a new product using an HP 9000 Series 200 computer. Now production wants to use the same software, but doesn't want the test technician to have a full keyboard. Also, the environment is not good for use with a disc drive.

MODEL 220 PROVIDES A COMPATIBLE PRODUCT WITH THE CAPABILITY TO USE CUSTOM KEYPAD AND EPROM OR BUBBLE MASS STORAGE

- C. A potential OEM wants to automate a new design without extensive investment in software or hardware interfacing.

HP 9000 SERIES 200 PRODUCTS ARE THE SHORTEST PATH TO AUTOMATION WITH BUILT-IN I/O DRIVERS, CHOICE OF I/O CARDS, AND SIMPLE PROGRAMMING LANGUAGES.



## Questions and Answers

Q. What standard operating systems are available on HP 9000 Series 200?

A. Currently, the operating systems available are the HP language systems (BASIC, PASCAL, HPL\*) and third party languages such as FORTRAN 77, FORTH, etc. We currently offer CP/M 68K through a third party, and plan to offer HP-UX (HP's implementation of UNIX) with Fortran, Pascal and C in the second half of 1983. (UNIX is a registered trademark of Bell Laboratories. CP/M is a registered trademark of Digital Research).

\*not available on the 236C or Model 220

Q. Is there a listing of available third part software?

A. The Technical Computer Software Catalog lists all available software for HP 9000 Series 200, HP 1000, and 9835/45. It can be ordered from any HP sales office.

Q. Will HPL be supported as a language on future products in HP 9000 Series 200?

A. No. In fact, HPL is not supported on the Model 236C and Model 220.

Q. What "standard" data communications is planned for the HP 9000 Series 200?

A. Currently, RS-232 and terminal emulation allow communicating with a variety of computers. IEEE-802 will be implemented when the standard is set.

A. Disc drives from 3.5 inch micro discs (270K bytes/disc) to Winchester discs up 65M bytes/drive with streaming tape backup.

Plotters from low cost A-size, two pen, up to E-size, eight pen.

Printers include low cost thermal or impact, letter quality daisy wheel, thermal and impact graphics printers in various price ranges.

A digitizing tablet simplifies data entry and program interaction.

All the above peripherals are manufactured and supported by HP.

Q. Can applications software be transported from the HP 9835/45 to HP 9000 Series 200?

A. A translator pack is available to translate 90% of the keywords.

Q. Can I read IBM format 8" discs?

A. With an HP 9895A Disc Drive and a utility pack, IBM format discs can be read.

