

## HP9000 Series 700i

Model 745i



### Industrial Workstations



**T**he HP9000 745i is an entry-level industrial workstation based on HP's PA-RISC technology. With the 745i, you get the power and performance of the industry's leading technology plus the flexibility and features especially important for test and measurement, industrial process control, and electronic testing — all at the best price/performance anywhere.

The 745i is entry-level in price, but top-of-the-line in performance. It delivers a powerful 69 SPECmark '89 and includes the license for HP-UX, HP's UNIX\*-based operating system. Across the board compatibility means that you can integrate the 745i into practically any system you build, with

HP and non-HP equipment. You have access to HP's rich, highly-integrated software development environment, including tools such as HP SoftBench, HP RTAP, and HP-VEE.

#### **Flexible and Standards-Based**

The 745i has the flexibility you need to build the systems you want. It includes four EISA expansion slots, integrated instrument HP-IB, standard Ethernet, HP-HIL, audio, SCSI II, and Parallel (Centronics) printer ports plus dual RS-232-C serial ports. It comes with a 14 in., 17 in., or 19 in. color graphics monitor. You get complete industry-standard built-in networking, with support for NFS, TCP/IP and ARPA/Berkeley Networking Services.

---

### Power in an Industrial Package

We've even made it easier to put the whole system wherever you need it, with rack mounting and a modular approach for streamlined service. Just pull out the module, make any required changes, and tuck back into place — all in less than five minutes. You can even choose where you want your disk bays — front or back.

And because we know you need to use the 745i's power and performance in the real world, it's built to be more durable than typical desk top systems — and it's still affordable. It can handle many industrial applications. The 745i's overall size, 176.75 mm high by 425.45 mm wide by 412.6 mm deep (6.97 inches by 16.75 inches by 16.2 inches) leaves plenty of room for your other equipment and fits into a standard 19 inch rack, too.

### HP Support: The Perfect Resource

In addition to all the features and flexibility of the 745i, you get the benefit of HP support. We'll work with you to help you develop the solutions and systems that are right for you. We're committed to standards-based, innovative products and long-term support. The system you develop and install today will serve you and your customers for many years to come.

#### Features

69 SPECmark '89 Performance

Flexible Rack Mount Package

HP Quality

Binary Compatibility with Series 700

Four EISA Expansion Slots

Modularity

14 in., 17 in., and 19 in. Color Graphics

Integrated (Instrument) HP-IB Interface

Extensive Standard, On-Board I/O

Front or Rear Access for Removable Media

Wide Range of Mass Storage Options

#### Benefits

The performance to handle the work now and in the future

Easy-to-service package which fits in a standard 19 in. rack

Outstanding reliability; tested to tougher temperature, shock, and vibration levels

Access to over 3600 UNIX applications and easy application portability

Allows access to broad range of I/O and function cards — the same cards available for use in standard workstations

Fast, easy access to EISA expansion slots, power supply, CPU board, and mass storage

Choose the monitor that meets your needs; 14 in. and 17 in. are rack-mountable

No need to purchase an add-on card to connect to your instrumentation

Low-cost and high-performance; quick and easy integration in heterogeneous networks; simple connection of high-speed, low-cost disks and other peripherals

You can choose what fits your needs: access through the smooth, streamlined front panel or around back, with the connectors for access to everything

Configure your system with exactly the amount and type of mass storage that your solution requires

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

**For research and education purposes only.**

## Technical Specifications

### System Processing Unit

#### **PA-RISC 7100 Processor**

Clock frequency: 50 Mhz  
69 SPECmark `89  
36 SPEC int92  
72 SPEC fp92  
62 MIPS/13MFLOPS

#### **External Cache**

64 Kbyte external instruction cache:  
15 ns. access time, 20 ns. cycle time  
64 Kbyte external data cache:  
15 ns. access time, 20 ns. cycle time

#### **Main Memory**

Standard 16 Mbytes SIMM ECC RAM  
Optional memory configurations:  
32, 64, 128 Mbytes  
(ECC RAM corrects 1-bit errors and  
detects multibit errors)  
4 and 16 Mbit ECC RAM supported  
64-bit data interface  
4 Memory module slots (2 pairs)

#### **Time Sources**

Battery-backed time-of-day-clock  
1 Second resolution  
Accuracy 2 seconds per day  
Battery-backed with lithium battery;  
expected battery life one year

### Standard I/O Specifications

#### **Expansion Slots**

4 EISA expansion slots  
for add-on EISA

#### **One SCSI Interface**

Type:  
SCSI-II single-ended 8-bit  
Data Rate:  
Up to 5 Mbyte/sec. synchronous  
Device Limit:  
7 devices  
Connector:  
SCSI II, ALT-1 (50-pin high density)

#### **Serial Interfaces (two standard)**

Type:  
EIA RS-232-C, CCITT V.24/V.28  
Data Rate:  
460.8 Kbaud  
Device Limit:  
1 per interface  
Connector:  
9-pin male DTE (PC standard)

#### **One Parallel Interface**

Type:  
Centronics  
Data Rate:  
Up to 300+ Kbytes/sec. with DMA  
Up to 200 Kbytes/sec. sustained  
Device Limit:  
1 per interface  
Connector:  
25-pin female D-sub (PC standard)

#### **One HP-HIL Interface**

Type:  
HP Serial Desktop Bus  
Device Limit:  
7 devices (note: some devices  
count as more than one device,  
e.g., knob box)  
Connector:  
AMP SMD; 4-pin shielded  
connector, 1 connector pin out  
provides 1 Amp of +12V to the loop

#### **One HP-IB Interface**

Type:  
IEEE-488 standard based; HP-IB  
instruments only  
Data Rate:  
350 Kbytes per sec+  
Device Limit:  
14 nominal  
Connector:  
Standard HP-IB

#### **DMA Controllers**

EISA ISP DMA  
7 channels  
32-bit address  
Transfers programmable for byte,  
16-bit and word  
EISA refresh address generation

#### **I/O Bus Converter**

Supports EISA with i486  
control signals



## Graphics Monitors

14 in., 17 in., or 19 in. color monitor supported  
14 in. and 17 in. are rack-mountable

## Graphics Specifications

### 19 in. Color

Simultaneously displayable colors  
256 from a palette of 16.7 million  
Graphics Planes  
8

Frame Buffer

1536x1024

Resolution

1280x1024

### 17 in. Color

Simultaneously displayable colors  
256 from a palette of 16.7 million  
Graphics Planes  
8

Frame Buffer

1536x1024

Resolution

1024x768

### 14 in. Color

Simultaneously displayable colors  
256 from a palette of 16.7 million  
Graphics Planes  
8

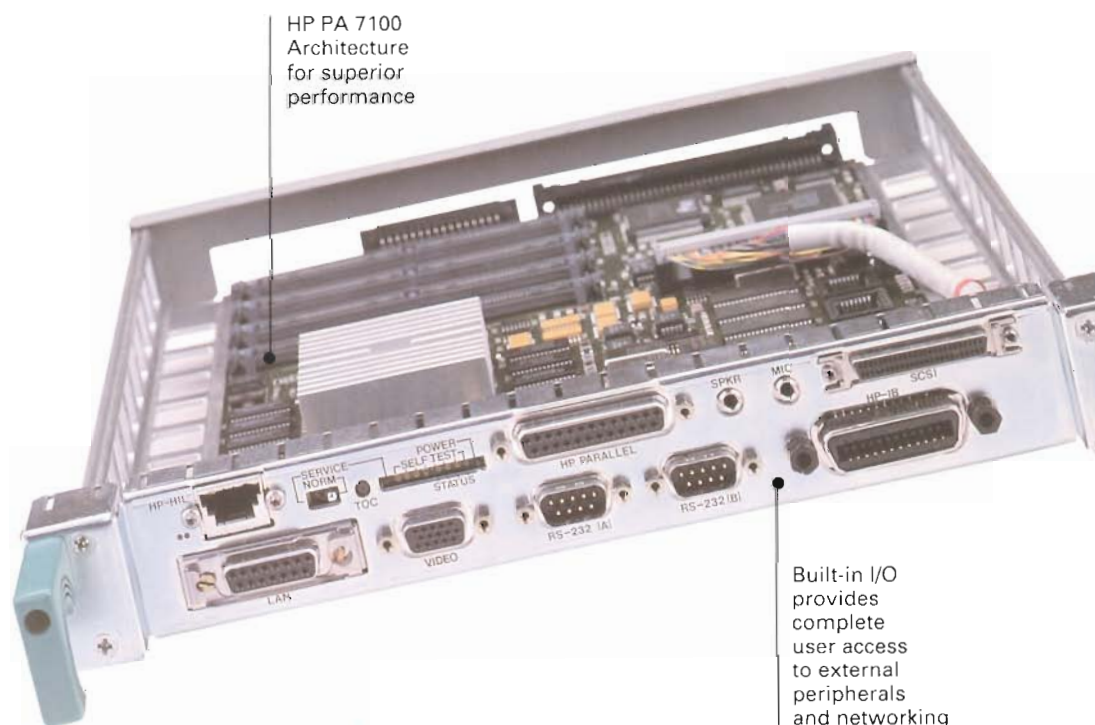
Frame Buffer

1536x1024

Resolution

1024x768

| Monitors                                | 19 in.               | 17 in.               | 14 in.               |
|-----------------------------------------|----------------------|----------------------|----------------------|
| Screen Refresh Rate                     | 72 Hz                | 75 Hz                | 60 Hz                |
| Video Signals                           | RS-343A              | RS-343A              | RS-343A              |
| Resolution                              | 1280x1024            | 1024x768             | 1024x768             |
| <i>Electrical Specifications</i>        |                      |                      |                      |
| Line Voltage                            | 88-269 VAC           | 88-269 VAC           | 90-264 VAC           |
| VAC                                     |                      |                      |                      |
| Line Frequency                          | 47-63 Hz             | 47-63 Hz             | 47-63 Hz             |
| Maximum Current                         | 2.7A                 | 1.7A                 | 1.0A                 |
| Power Consumption                       | 175 Watts max.       | 120 Watts max.       | 70 Watts max.        |
| <i>Environmental Characteristics</i>    |                      |                      |                      |
| Operating Temperature                   | 0° to 40° C          | 0° to 40° C          | 5° to 40° C          |
| Non-operating Temperature               | -40° to 71° C        | -40° to 71° C        | -40° to 70° C        |
| Humidity: Operating, 40° C              | 15% to 95% RH        | 15% to 95% RH        | 5% to 50% RH         |
| Max. Altitude Operating                 | 4570 m(15,000 ft.)   | 4570 m(15,000ft.)    | 2135 m(7,000 ft.)    |
| Max. Altitude Non-operating             | 15,240 m(50,000 ft.) | 15,240 m(50,000 ft.) | 12,200 m(40,000 ft.) |
| <i>Regulatory Compliance</i>            |                      |                      |                      |
| VDE level                               | B                    | B                    | B                    |
| FCC class                               | A                    | A                    | B                    |
| VCCI class                              | I                    | I                    | I                    |
| <i>Monitor Physical Characteristics</i> |                      |                      |                      |
| Height                                  | 471 mm (18.6 in.)    | 425 mm (16.7 in.)    | 365 mm (14.6 in.)    |
| Width                                   | 500 mm (20 in.)      | 413 mm (16.3 in.)    | 354 mm (14.0 in.)    |
| Depth                                   | 505 mm (20.2 in.)    | 435 mm (17.1 in.)    | 372 mm (14.6 in.)    |
| Net Weight                              | 24 Kg (52.8 lbs.)    | 18.5 Kg (40.7 lbs.)  | 11.5 Kg (25.4 lbs.)  |



## **Physical and Environmental\***

### **System Power**

#### **Current**

RMS 6A max. @ 90-132V  
Peak 10A max @ 90-132V  
RMS 3A max. @ 180-250V  
Peak 6A max. @ 180-250V

#### **Line Select**

Auto Ranging  
90-132 Volts  
180-250 Volts

#### **Line Frequency**

50-60 Hz

#### **Power**

540 max. Watts  
1836 max. BTU/hour  
464 max. Kcal/hour

### **Physical Dimensions**

Height 176.75 mm (6.97 in.)  
Width 425.45 mm (16.75 in.)  
Depth 412.6 mm (16.2 in.)  
Net Weight 18.6 Kg (41 lbs.)

### **Environmental Range Without Mass Storage**

Temperature, Operating  
0° to 55° C

Temperature, Storage

-40° to 71° C operating

Humidity

95% Maximum operating @ 40° C

Altitude, Operating

15,000 feet at 47° C

Altitude, Storage

50,000 feet at 47° C

### **Acoustics**

Tested to ISO 7779 and declaring  
according to ISO 9296

### **EMI**

Conducted and radiated interference  
meets FCC Class A, VCCI Class 1,  
FTZ 1046/84 Level B

### **Regulatory Compliance**

UL 1950, 1st edition; CSA 22.2; IEC  
950, 1st edition 1986/TUV EN60950

### **EMC**

FCC Class A. 47 CFR Parts 2 & 15  
Radiated Interference  
CISPR 22 Radiated Interference (and  
VCCI, European CE Mark)  
EN55024-2 ESD Immunity (Supersedes  
EN55101-2 and IEC 801-2)  
EN55024-3 Radiated Immunity  
(Supersedes EN55101-3 and IEC  
801-3)  
IEC 801-4 Fast Transients

### **Mechanical Vibration Specifications**

#### **Operating**

Random 0.0003 g<sup>2</sup>/Hz at 5Hz,  
- 0.75dB/Octave rolloff 5-15Hz,  
6dB/Octave rolloff 15-170Hz,  
0.0002 g<sup>2</sup>/Hz from 170-350Hz,  
-6dB/Octave rolloff from 350-500Hz

#### **Survival Random**

0.02 g<sup>2</sup>/Hz from 5-100Hz,  
-6dB/Octave rolloff 100-137Hz,  
0.0107 g<sup>2</sup>/Hz from 137- 350Hz,  
-6dB/Octave rolloff from 350-500Hz

#### **Swept Sine, Survival**

0.75G 0 peak one octave /minute  
log scale. Dwell at four lowest  
resonances from five minutes each

### **Shock**

#### **End use shock**

Operating survival, half sine  
<3 msec. 55 in./sec. velocity change

#### **Shock, Transport**

Packaged 30G trapezoidal

#### **Package Drop**

Drop Height 61 cm all six faces and  
lower corners

### **Safety Specifications**

UL 1950 with D3 deviations at 55 809C  
(Supersedes spec UL478)  
CSA 950 (Supersedes spec CSA220)  
IEC950/EN60950 with Nordic  
deviations at 55 809C (Supersedes  
specs IEC380 & IEC435)

### **Laser Safety**

European Harmonized document 194  
IEC 825  
VBG 93 (Germany)  
BS4803 Part II (UK)  
21 CFR Chapter 1 sub-chapter J (US)

### **Ergonomics**

ISO 9241-3  
ZH1-618  
90/270/EEC - VDU directive and MPR 2

### **Service/Diagnostic Support Hardware**

User visible power indication  
(connector and non-connector end)  
User visible ten single LED displays  
writeable by software  
Rear panel hardware soft reset  
TOC (Transfer of Control)

### **Rack-mount Package**

Front /Back/Center column mounting  
Front or back power control access  
Modular serviceability through  
connector end of box  
4 Rack units high  
Dimensions 176.75 mm high x 425.45  
mm wide x 412.6 mm deep (6.97 in.  
x 16.75 in. x 16.2 in.)  
Rack mountable with standard rack  
mount kits

Easy  
serviceability

\* The specifications shown do not include mass storage device.

## Networking

Includes Ethernet/802.3 hardware integrated on the CPU board  
LAN type:  
IEEE 802.3  
Connector:  
LAN AUI  
Requires MAU for connection to LAN  
Data Rate:  
10 Mbits/sec.  
Standard HP-UX Networking:  
NCS, NFS, ARPA/Berkeley 4.3  
Network Services, HP Diskless

## Operating System

HP-UX Operating System; complies with IEEE POSIX.1-1988 FIPS 151-I, ANS X3.159-1989, proposed POSIX.2 FIPS (June 1990), System V Interface Definition (SVID) Issue II (Base System and all Extensions except AS, NS and schmat (KE\_OS), X/Open Portability Guide Issue III (XPG3), (Base Component and all Optional Components except XTI)

HP-UX 9.0 also supports IS 9945/1 and Base Component and all Optional Components except XTI

## Windows Systems

X Window Systems, Version 11  
Release 5  
(X11R5), OSF Motif 1.2

## Language Support

HP-PA Assembly, HP C/ANSI C, C++,  
Fortran 77, Pascal

## User Interface

HP VUE 3.0, HP SharedX

## Human Interface

### Keyboard

HP-UX style and PC 101 style  
keyboard (connected through  
HP-HIL)

### Mouse

3-button, roller ball, HP-IILL

### Audio

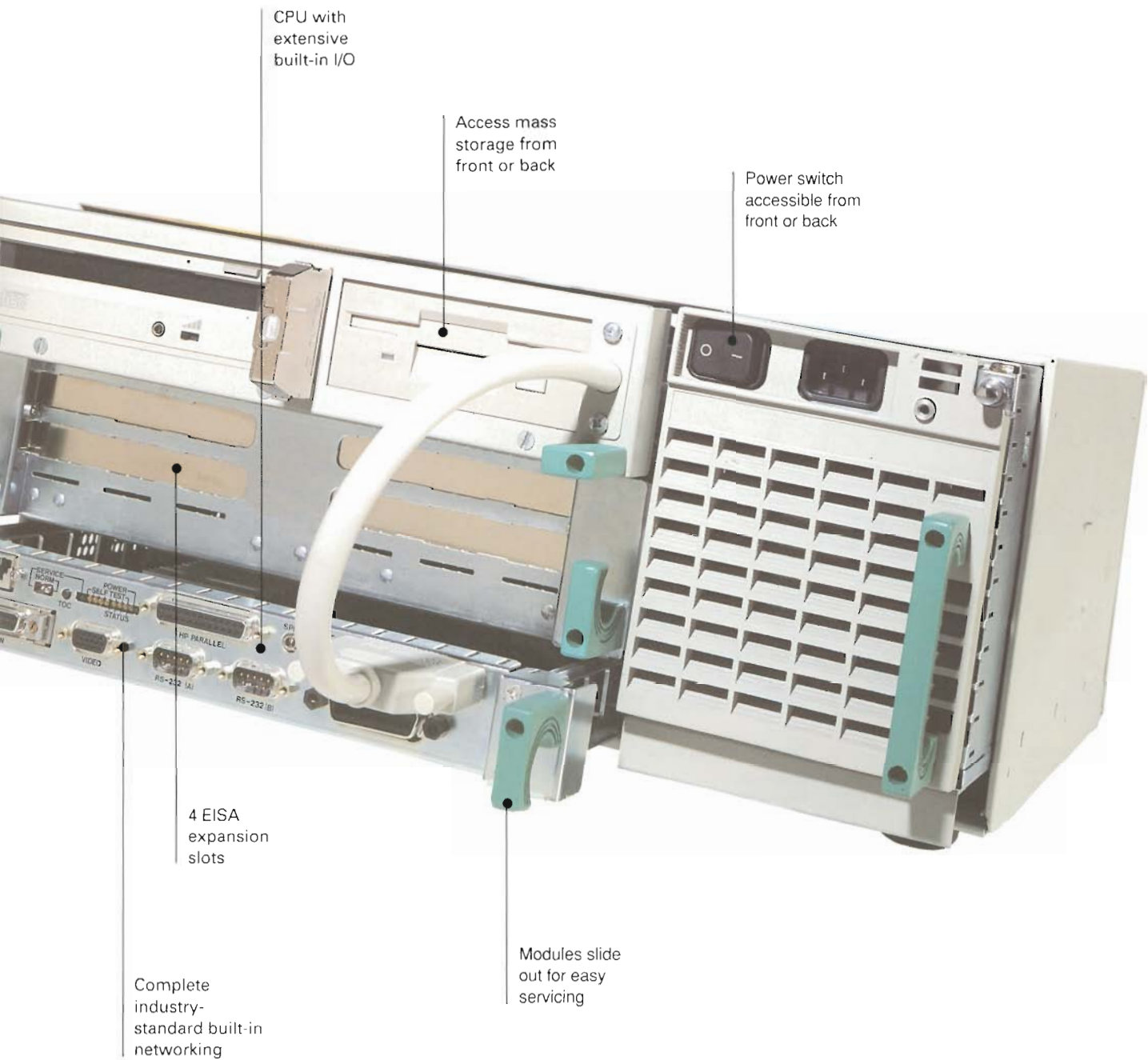
8 KHz voice quality  
Microphone in standard stereo  
microjack (1/8 in.)  
Headphone out standard stereo  
microjack (1/8 in.)  
128 Byte input and 128 byte output  
channel buffering  
Device limit >20 ohms per output,  
one input

## Mass storage

High-performance, single-ended  
internal and external disk  
subsystems using industry-  
standard SCSI II interface; capable  
of supporting up to 5 Mbytes/sec.  
synchronous data rate throughput.  
Front to back reversible mount so  
media can be accessed through  
connector or non-connector face  
of package  
One 5 1/4 in. half height removable  
media bay (convertible to 3 1/2 in.  
full height removable or fixed  
media bay)  
One 3 1/2 in. full height removable or  
fixed media bay  
One 3 1/2 in. full height fixed disk bay  
Daisy chaining SCSI connectors  
provided



| Disk Model                       | 525 Mbyte                   | 1.05 Gbyte     |
|----------------------------------|-----------------------------|----------------|
| (formatted capacity)             |                             |                |
| Controller Type                  | SCSI II                     | SCSI II        |
| Disk Size                        | 3.5 in.                     | 3.5 in.        |
| Average Seek Time                | 14.5 msec.                  | 13.5 msec.     |
| Data Transfer Rate               | 1.51 Mbyte/sec.             | 2.2 Mbyte/sec. |
| Number of Internal disks         | 3                           | 3              |
| Maximum Internal Disk Capacity : | 3.15 Gbyte (3 x 1.05 Gbyte) |                |



**For more information, call  
1-800-637-7740. In Canada, call  
1-800-387-3867. Or contact  
your local HP sales office or  
authorized HP reseller.**

**United States**

Hewlett-Packard Company  
4 Choke Cherry Road  
Rockville, MD 20850  
(301) 670 4300

Hewlett-Packard Company  
5201 Tollview Drive  
Rolling Meadows, IL 60008  
(708) 255 9800

Hewlett-Packard Company  
5161 Lankershim Blvd.  
North Hollywood, CA 91601  
(818) 505 5600

Hewlett-Packard Company  
2015 South Park Place  
Atlanta, GA 30339  
(404) 955 1500

Hewlett-Packard Company  
300 Apollo Drive  
Chelmsford, MA 01824  
(508) 256 6600  
FAX: (508) 256 2384

**Canada:**

Hewlett-Packard (Canada) Ltd.  
6877 Goreway Drive  
Mississauga, Ontario L4V 1MB  
Canada  
(416) 678 9430

**Latin America:**

Hewlett-Packard  
Latin America Region Headquarters  
Monte Pelvoux No. 111-2nd Floor  
Lomas de Chapultepec  
11000 Mexico, D.F.  
(525) 202 0155

**Japan:**

Yokogawa-Hewlett-Packard Ltd.  
Kohrakuen Shinjuku Bld.  
15-7, Nishi Shinjuku 4 Chome  
Shinjuku-ku, Tokyo 160  
Japan  
+81 3/5371 1351

**Asia Pacific:**

Hewlett-Packard Asia Pacific Ltd.  
22/F Bond Centre  
West Tower  
89 Queensway, Central  
Hong Kong  
+852 848 7777

**Australia/New Zealand:**

Hewlett-Packard Australia Ltd.  
31-41 Joseph Street  
Balckburn, Victoria 3130  
Melbourne, Australia  
+61 3/272 2895

**European Headquarters:**

Hewlett-Packard S.A.  
Route du Nanat-d'Avril 150  
CH-1217 Meyrin 2/Geneva  
Switzerland  
+41/22/780 8111

**Austria:**

Tel: +43/222/2500 0

**Belgium:**

Tel: +32/2/761 3400

**Czechoslovakia:**

Tel: +42/2/471 73 21

**Denmark:**

Tel: +45/45/99 10 00

**Finland:**

Tel: +358/0/88 721

**France:**

Tel: +33/1/698 260 60

**Germany:**

Tel: +49/6172/16 0

**Greece:**

Tel: +30/1/682 88 11

**Hungary:**

Tel: +38/61/5584 72

**Iceland:**

Tel: +354/1/67 10 00

**Ireland:**

Tel: +253/12/88 33 99

**Italy:**

Tel: +39/2/92 19 91

**Netherlands:**

Tel: +31/20/54 769 11

**Norway:**

Tel: +47/2/87 97 00

**Poland:**

Tel: +48/22/36 83 00

**Portugal:**

Tel: +35/1/130 173 30

**Russia:**

Tel: +007/95/923 50 01

**Slovenia:**

Tel: +38/61/55 84 72

**Spain:**

Tel: +34/1/626 16 00

**Sweden:**

Tel: +48/8/ 750 20 00

**Switzerland:**

Tel: +41/57/31 31 11

Customer Information Center:

Tel: +41/46/05 15 05

**Turkey:**

Tel: +90/1/175 29 70

**United Kingdom:**

Tel: +44/344/360 000

For countries not listed:

**European Multi country Sales Region:**

Tel: +41/22/780 81 11

**Middle East and Africa Operations:**

Tel: +41/22/780 71 11

\*UNIX is a registered trademark of UNIX  
System Laboratories Inc. in the U.S. and  
other countries.

HP-UX is based on and is compatible with  
USL's UNIX operating system. It also  
complies with X/Open's\* XPG3, POSIX  
1003.1 and SVID2 interface specifications.

\*X/Open is a trademark of X/Open  
Company Limited in the U.K. and other  
countries.

Hewlett-Packard is committed to five-year  
product life and ten-year product support  
for the HP 9000 Series 700 models 742rt,  
745i, and 747i. HP will continue to  
develop, upgrade, and add to this product  
line while still providing compatibility  
between the various components,  
when possible.

The information contained in this docu-  
ment is subject to change without notice.