

Intelligent Graphics Terminal



Model 2647A



The 2647 is the intelligent solution to a host of applications that require both an on-line capability and local programmability. In addition to being user programmable in BASIC, the 2647 offers a raster scan display and a full interactive alphanumeric capability.

FEATURES

User Programmability

- · BASIC, on-line and local
- · BASIC, graphic extensions
- · BASIC, control of terminal functions
- · Calculate mode

High Level Graphics Commands

- English-like graphics commands
- · Control over graphics functions
- CPU or local BASIC program control

Graphics Memory Input/Output

 Graphics memory contents to cartridge tape, hardcopy devices or CPU

Simple User Interface

- · English-like terminal commands
- Eight user-defined soft keys
- · Graphics key pad

Shared Peripherals

 Multiple terminals share compatible plotters, printers, etc.

Dual Cartridge Tapes

· Mass storage to 110K bytes each

Multiple Automatic Plotting

- · Terminal based software
- · Pie charts
- Bar charts
- Cartesian X-Y charts, linear and logarithmic
- Menu driven operation
- Interface to color plotter (opt.)

High Resolution Alphanumeric Display

- · Raster scan technology
- Multiple character sets
- Display enhancements

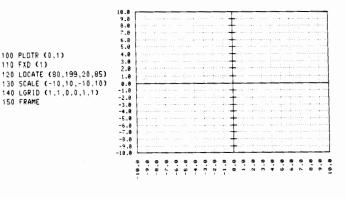
Reliability, Modularity, Self-Test

- · Self contained diagnostics
- · Aid for fault analysis

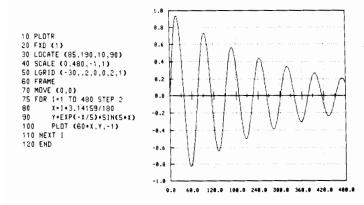
Independent Graphics and Alphanumeric Display

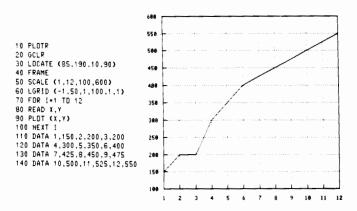
Zoom and Pan Rubber Band Line

Graphics Text Composition



10 PLBTR 20 FXD (1) 30 LDCATE (85,190,10,90) 0.6 40 SCALE (0.480,-1.1) 50 LGRID (-30,.2,0,0,2,1) 0.4 60 FRAME 70 MOVE (0,0) 80 FDR I=1 TD 480 STEP 1 90 X=I+3.141S9/180 Z*EXP(-.25*X)*COS(X) Y*Z*SIH(20*X) 100 110 PLDT (60 - X, Y, -1) 130 HEXT I -0.4 140 SETGU -0.6 150 MOVE (0,0) 160 END -0.6 128.8 188.8 248.8 388.8 368.8 428.8 488.6





BASIC LANGUAGE PROGRAMMABILITY

The 2647A can be used with a host CPU that is executing canned programms or as a local programmable graphics work station. The BASIC language used with the 2647A provides an extensive facility for solving a wide variety of business, engineering and scientific applications. An impressive array of commands, statements, functions and graphics make the 2647A a complete problem solving tool.

СОММ	ANDS
AUTO	MERGE
CSAVE	REMOVE
DELETE	RENUM
EXIT	RUN
GET	SAVE
GO	SCRATCH
LIST	SET

FUNCTIONS				
Numeric	String	Print	Input/Output	Other
ABS CSENA CSENS EXP INT LOG LONG RND SGN SHORT SGR ATH COS SIN TAN	CHRS LEN HUM POS VAL VALS RPTS TRIMS UPCS PRUCS	LIN SPA TAB MOVCS MOVCA MOVCR	GETKBD DSPINS GETDCM PUTDCM	ERRL ERRN FRE

STATEMENTS		
ASSIGN	INTEGER	PRINT USING
CALL	KEYCDE	READ
COMMAND	LET	READ#
DATA	LINPUT	REMARK
DIM	L INPUT#	RESTORE
END	LDNG	RESTORE.
ERROR	DFF KEY#	RESUME
FORNEXT	ON END#	RETURN
GETDOM ON/OFF	ONGOSUB	SHORT
GETKBD DN/OFF	ONGOTO	SLEEP
GOSUB	ON ERROR	STOP
GOTO	ON KEY#	SUB
IFTHENELSE	PRINT	SUBEND
IMAGE INPUT	PRINT#	WAKE UP

HIGH LEVEL GRAPHICS COMMANDS

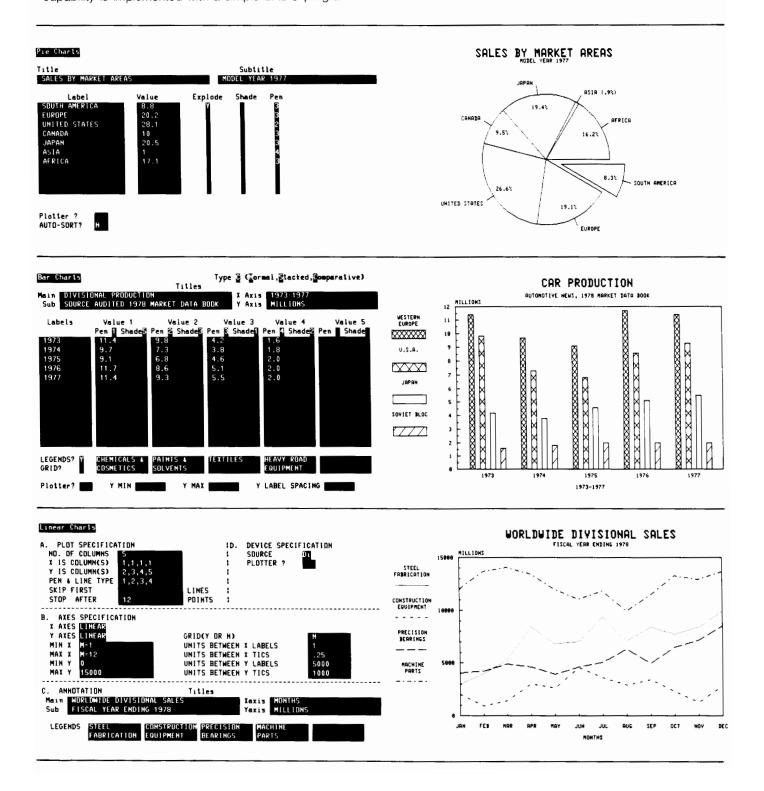
The graphics features of the 2647A may be controlled by high level English-like commands. These commands control the 2647A graphics functions in either on-line or off-line environments. This high level control extends to; graphic set up functions, axes and labeling, plotting and interactive graphic functions. The result is that the user has effective control over the terminal graphics features.

AGL FUNCTIONS			
Interactive	Set-Up	Plotting	Axis/Labeling
WHERE POINT CURSOR DIGITIZE GPMM DSIZE DSTAT GSTAT	PLOTR GPON SETAR LIMIT GCLR LOCATE MARGIN SCALE SHOW MCCALE CLIP CLIPOFF CLIPON SETGU/SETUU	PENUP/PENDN PEN LINE PLOT MOVE DRAW RPLOT IPLOT PDIR PORG	XAXIS YAXIS LAAXIS LYAXIS AXES AXES GRID LGRID FRAME FXD LORG LDIR CSIZE

MULTIPLE AUTOMATIC PLOTTING

The 2647A offers sophisticated local graphing capability while requiring little or no programming knowledge. Menu driven, the 2647A can plot columnar data in multiple formats chosen by the user. Pie charts, bar charts and X-Y Cartesian and logarithmic graphs can all be created without any host CPU graphics software. Different types of area shading are available for highlighting various areas of bar charts. This capability is implemented with a simple BASIC program.

Data may be submitted to the 2647A from one of three sources; host computer, tape cartridge or display memory. A simple menu is provided to lead the user through a question and answer session about the data. Once the data parameters are defined, the data can then be plotted with a single keystroke. This powerful feature makes graphs friendly, easy to create, and system software independent.



GRAPHICS MEMORY IMAGE OUTPUT

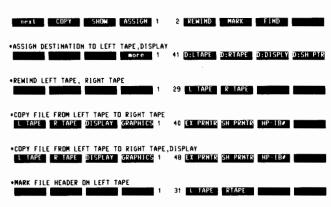
In addition to handling vector information for graphics pictures, the 2647A can input and output binary image data to and from graphics memory. The 2647A can output this image data to the dual cartridge tapes which are provided standard or to any compatible hardcopy device or host computer. This provides a very convenient facility to create pictures locally and store them. The stored pictures can be read back, edited, and stored on cartridge tape again, sent to a hardcopy device, or transmitted to a host computer. The dual mini-cartridges can give you up to 110K bytes of mass storage and a pocket full of pictures.

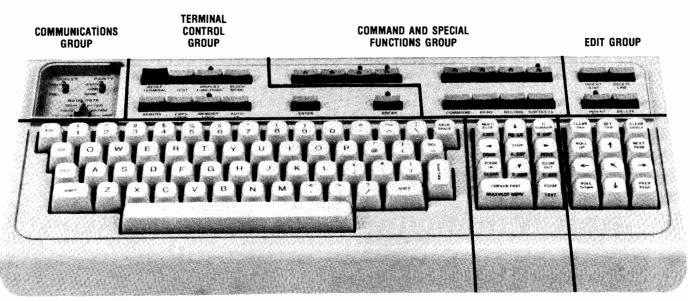


SIMPLE USER INTERFACE

Data paths between terminal facilities and peripherals are controlled by English-like commands. The user is guided by a friendly command line that utilizes soft keys and screen labels to control terminal activities. Once the user specifies an operation to be performed, the terminal presents on the screen the logical alternatives to complete the intended operation. This easy to use interface controls data flow between such terminal facilities as the screen, tape cartridges, printers, plotters, tablets, and other peripherals.

COMMAND





RASTER SCAN TECHNOLOGY

The 2647A can be used in bright, ambient light environments because raster scan provides a bright, easy-to-read display. This bright display also helps to minimize eye fatigue during extended sessions at the terminal.

With refreshed raster scan technology, the ability to modify selected portions of a picture is a natural feature. Portions of the picture can be modified without completely erasing and redrawing the entire display. This minimizes the system software overhead, user wait-time, and communication costs.

INDEPENDENT GRAPHICS AND ALPHANUMERIC DISPLAY MEMORIES

The Graphics and Alphanumeric display each have their own independent random access memory (RAM). The alphanumeric display memory can typically contain up to 75 lines each containing 80 characters. The independent graphics memory, consisting of sixteen 16K RAMs and has 720 by 360 displayable points. Because these two separate memories are independent, computer transactions do not have to obscure the graphics picture. Either the graphics or alphanumeric memory display can be suppressed without disturbing the other. This improves the readability of the display. The graphics and alphanumeric displays each have their own separate cursor control keypad.

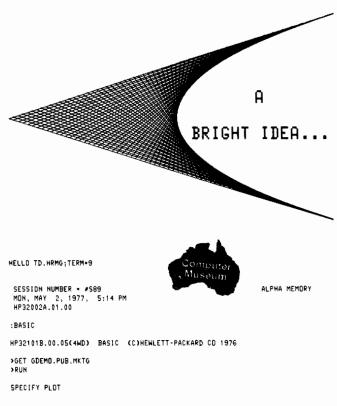
SHARED HARDCOPY AND PERIPHERAL DEVICES

Multiple 2647A terminals may share the same compatible hardcopy devices such as plotters and printers. Each 2647A may transmit to a compatible plotter the necessary vector information to obtain high quality plots. When one user completes plotter operations any other user on the same line may initiate subsequent plots on the same device.

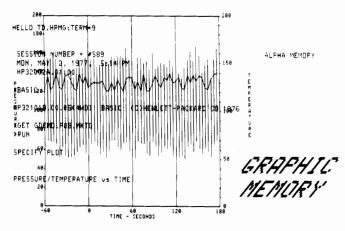
Vector information may originate from host computer, local BASIC program, or dual tape cartridge. Sharing also applies to devices that accept raster formatted information where the contents of graphics memory are output directly to the hard copy device.

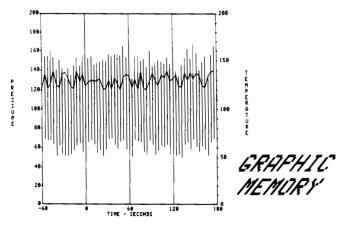
For alphanumeric output, the 2647A can also share compatible printers. So whatever your requirements are, graphs or alphanumerics, the 2647A can make HP hardcopy devices more cost effective.





PRESSURE/TEMPERATURE VS TIME





HARDWARE ZOOM AND PAN

The graphics display can be magnified incrementally from one to sixteen times (16X). This feature allows the user to make full use of the 720 by 360 dot resolution. This allows investigation and/or modification of dense display areas such as parallel lines separated by only a single dot spacing. Panning can then be used to view any area of the magnified display not in the viewing window. The complete display can be panned through without affecting the graphics display memory.

RUBBER BAND LINE

Trial graphics can be performed with or without computer support using the Rubber Band Line. This provides quick, user initiated picture generation or modification. This feature allows the user to draw a line segment between a predetermined position and the graphics cursor. Through a simple set of keystrokes, one end of a line segment is fixed into position while the other is automatically drawn to the graphics cursor. As the graphics cursor moves to a desired position, the line segment automatically stretches with directional changes of the cursor. After the graphics cursor reaches its final position, a fixed line segment can be drawn.

GRAPHICS TEXT COMPOSITION

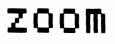
Characters entered into the graphics display memory can be varied in shape, size, and orientation. This feature allows the user to select an incremental character size, orientation (90-degree multiples), and slant (italic). In addition, it lets the user left/right justify or center graphics text automatically. This feature helps the user label axes and makes it easy to add notes or comments to a graph after it is displayed.

FULL ALPHANUMERIC CAPABILITY

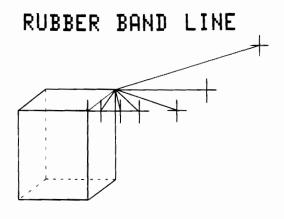
The 2647A has the same alphanumeric capability as the 2645A terminal. Forms for data entry, text editing, program preparation and interactive computer sessions are all easy.

Features such as character and line insert or delete with or without character wraparound make text editing and program preparation easy. Store the final text on tape cartridge for later transmission to a computer.

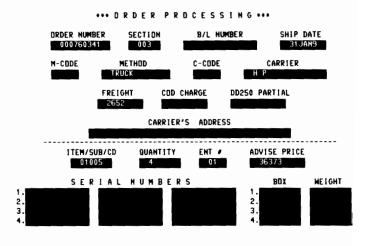
Protected fields, numeric and alpha checking, forms and block mode make the data entry a snap. Store your forms on cartridge, enter the data, edit and then store the data locally for later transmission to a computer. When the 2647A isn't being used as a powerful graphics workstation, it's a productive alphanumeric workstation.



200M



TARMINIO BONNA CARMINIO CA CAR



Ordering Example

This is an example of ordering four 2647A Intelligent Graphic Terminals and a 7245 Printer/Plotter. The four terminals can share the Printer/Plotter and can independently communicate to the CPU remotely over a modem.

4 — 2647A Intelligent Graphics Terminal

-096 Shared Peripheral Interface Option

4 — 13232N RS232 cable to modem

1 — 7245B Printer Plotter

-001 Graphics Option

PRODUCT NUMBER	DESCRIPTION	PRICE
2647A	INTELLIGENT GRAPHICS TERMINAL 720 × 360 Dot Graphics Image Memory and random access alphanumeric memory, BASIC interpreter with graphics commands, multiple automatic plotting, 128 character Roman, inverse video, 8 user-defined soft keys, 75 lines of display memory, RS232C communications, integrated dual cartridge tapes, 1 option slot.	
-003	DISPLAY ENHANCEMENTS Adds blinking, half-bright, underline, and Line Drawing character set; and provides for	
-004	addition of two 128 character sets. (Requires 1 option slot.) DISPLAY ENHANCEMENTS WITH MATH AND LARGE CHARACTER SETS Adds blinking, half-bright and underline; and Line Drawing, Math (integral signs, Greek letters, etc.) and Large Character sets. (Requires 1 option slot.)	
-013 -015 -016 -032	5 mini cartridges 50 Hz, 230V 50 Hz, 115V EXTENDED ASYNCHRONOUS COMMUNICATIONS Upgrade which provides either RS232C or 20mA current loop communications for the 2647A. Has split speed and custom baud rates.	
-033	ASYNCHRONOUS MULTIPOINT COMMUNICATIONS Provides asynchronous multipoint communications interface for the 2647A allowing daisy chained line sharing. Monitor Mode capability is included.	
-034	SYNCHRONOUS MULTIPOINT COMMUNICATIONS Provides synchronous multipoint communications interface for the 2647A allowing daisy chained line sharing. Monitor Mode capability is included.	
-054	VIDEO OUTPUT INTERFACE Provides video signal for a compatible monitor or hardcopy unit. (Requires 1 option slot.)	
-096	SHARED PERIPHERAL INTERFACE Provides shared interface for compatible devices, includes cable. (Requires 1 option slot.)	
CCESSORIES		
13250B	SERIAL PRINTER INTERFACE Adds interface for connecting RS232C printing devices (requires 1 option slot). No interface cable included (local only, not shared).	
98200A	Mini-cartridge (available in boxes of fives from Corporate Parts Center).	
CABLES		
13232A 13232B 13232C 13232F 13232G 13232H 13232J 13232Z 13232X 13232N 13232N 13232P 13232P 13232P 13232C 13232T 13232T	103/202 Modem (male, 15 ft.) 12880A/12531D (50 ft.) RS232 Connector (female, 5 ft.) Current Loop Connector Kit (5 ft.) 13250 to RS232C Printer (male, 15 ft.) 13250 to RS232C Printer (female, 25 ft.) 13254 to video hardcopy printer (15 ft.) 13254 to compatible TV monitor (15 ft.) 13250B to European modems 103/202/201/208/209 modem (male, 15 ft.) Modem/Multipoint Cable, male RS232C, male multipoint connector, 30 ft. total Multipoint Cable, male multipoint, female multipoint connector, 30 ft. total Multipoint Extension Cable, male multipoint/female multipoint connector, 100 ft. 13238 to 9866 line printer (6 ft.) Power Protect Multipoint Cable, male multipoint connector with relays/female multipoint connector, 30 ft. total Modem bypass (5 ft.) Electromagnetic Pulse Protect Cable, male RS232C, 15 ft.	
TRAINING		
2647AT 2647AP	2647A User Training Course	

POWER REQUIREMENTS

Input Voltage: 115V (+10%, -23%) at 50/60 Hz (±0.2%)

230V (+10%, -15%) at 50 Hz $(\pm 0.2\%)$

Power Consumption: 140W to 170W maximum

PHYSICAL SPECIFICATIONS

Display Monitor Weight:

21.9 kg (48.2 lbs.) 3.2 kg (7 lbs.)

Display Monitor Dimensions:

444 mm (W) \times 457 mm (D) \times 342 mm (H), (17.5 inches (W) \times 18 inches (D) \times 13.5 inches

(H)); depth including keyboard is 648 mm (25.5 inches).

Keyboard Dimensions:

Keyboard Weight:

 $444 \,\text{mm}(W) \times 216 \,\text{mm}(D) \times 90 \,\text{mm}(H)$, $(17.5 \,\text{inches}(W) \times 8.5 \,\text{inches}(D) \times 3.5 \,\text{inches}(H))$.

ENVIRONMENTAL CONDITIONS

Temperature (Free Space

Ambient):

-10° to 60°C (14°F to 140°F); Non-operating 5° to 40°C (41°F to 104°F); Operating

20% to 80%; Non-condensing

Humidity: Altitude:

Sea level to 7620 m (25,000 ft.); Non-operating

Sea level to 4572 m (15,000 ft.); Operating

Vibration*:

0.37 mm (0.012 inch) pp, 10 Hz to 55 Hz, 3 axis

Shock*:

30 g, 11 ms, 1/2 sine

*Type tested to qualify for normal shipping and handling in original shipping container.

PRODUCT SAFETY

Product Meets: Unite

United States: UL requirements for EDP equipment, office appliances, and teaching

machines.

Canada: CSA requirements for EDP equipment.

Switzerland: SEV

Germany: VDE, (Data Comm), FTZ (RFI). United Kingdom: GPO (Data Comm).

PRODUCT SUPPORT

Hardware Supplied:

2647A Intelligent Graphics Terminal

2 blank tape cartridges1 system tape cartridge

Documentation Supplied:

2647A User's Manual (02647-90001) 2647A User Instructions Tapes (qty. = 2) 2647A Reference Manual (02647-90002) 2647A Terminal BASIC Manual (02647-90005) 2647A Quick Reference Guide (02647-90006)

Customer Training:

2647A User Training Course (2647AT) 2647A System Training Course (2647AP)

Hard Copy Interface:

RS232 serial printer interface (opt.)
HP parallel printer interface (opt.)

Video interface (opt.)

Shared peripheral interface (opt.)

Installation:

All product preparation can be performed by the owner/user. Refer to reference manual supplied with unit for detailed instructions. HP assistance is provided for installation upon

request and at prevailing rates.

HP Systems Support:

Refer to appropriate HP system data sheet for use and support of 2647A in these systems. When this product is used in a customer-assembled system, the overall operational

responsibility of the system rests with the customer.

Warranty:

The HP 2647A is warranted against defects in materials and workmanship. Contact your

local HP Sales Office for terms and conditions.

Specifications

GENERAL

Screen Size: 127 mm (5 inches) × 254 mm (10 inches)

Screen Capacity: 24 lines × 80 columns [A], 720 dots × 360 dots [G]

Character Generation: 7×9 enhanced dot matrix, 9×15 dot character cell, non-interlaced raster scan. Character Size: $2.46 \text{ mm} (0.097 \text{ inches}) \times 3.175 \text{ mm} (0.125 \text{ inches}) [A], <math>5 \times 7$ dot character cell [G]

Character Set: 128 characters upper/lower case, control codes

Cursor: Blinking-underline [A], Crosshair [G]

Display Enhancements: White on black, black on white (inverse video), half-bright (opt.), underline (opt.) and

blinking (opt.)

Refresh Rate: 60 Hz or 50 Hz

Tube Phosphor: P4

Implosion Protection: Bonded implosion panel

Memory: 75 lines of 80 characters max. [A], 720 dots × 360 dots of displayable points [G], typically

9K-15K bytes basic work space.

Keyboard: Detachable, user-defined soft keys, 18 control and editing keys, Graphics pad, cursor pad,

auto-repeat, n-key rollover, 1.2 m (4 ft.) cable.

Option Slots: 1 available

Dual Cartridge Tapes: Read/write speed: 10 ips. Search/rewind speed: 60 ips. Recording: 800 bits per

inch. Storage capacity: 110K bytes max.

[A] Alphanumeric, [G] Graphics

DATA COMMUNICATIONS

Data Rate: 110, 150, 300, 1200, 2400, 4800, 9600 baud external switch selectable. Operations above

1200 baud may require nulls or handshake protocol to ensure data integrity. External

clocking requires a TTL signal 16 × bps.

Vector Drawing Time: 9600 baud (typical), 7 ms half screen, 10 ms full screen.

Communication Interface: Asynchronous, point-to-point, RS232C; compatible with Bell 103A modems; limited com-

patibility with Bell 202/D/S/T modems. Choose either main or reverse channel line turn-

around for half duplex operation; CCITT V.24.

Current loop, split speed, custom baud rates (opt.).

Asynchronous multipoint communications (opt.). Synchronous multipoint communications (opt.).

Transmission Modes: Full or half duplex, asynchronous.

Operating Modes: On-line, off-line, character, block.

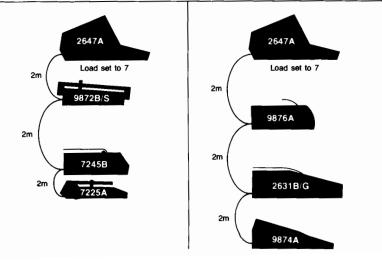
Parity: Even, odd, none; switch selectable.

Peripheral Support: The optional shared peripheral interface allows the user to connect up to a total of 8 of the

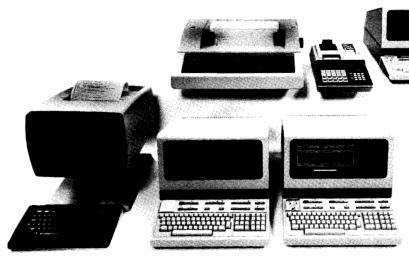
following qualified peripheral devices only: 2631B/G, 7225A, 7245B, 7310A, 9872B/S, 9874A, 9876A, and 2647A terminals. The maximum overall interconnecting cable allowed is 15 m. The permissible overall interconnecting cable between the 2647A and any peripheral device is 2 meters of cable. System performance is a function of the application device type and the number of attached peripherals. Please refer to the examples given

below.





Contact Hewlett-Packard We'll introduce you to our whole family of data terminals.



United States

ALABAMA

Huntsville Tel: (205) 881-4591

ARIZONA

Phoenix Tel: (602) 244-1361

CALIFORNIA

Tel: (714) 870-1000 Los Angeles Tel: (213) 970-7500 Santa Clara Tel: (408) 249-7000 Sacramento

Tel: (916) 929-7222 San Diego Tel: (714) 279-3200

COLORADO

Englewood Tel: (303) 771-3455

CONNECTICUT

New Haven Tel: (203) 389-6551

FLORIDA

Ft. Lauderdale Tel: (305) 973-2600 Orlando Tel: (305) 859-2900

GEORGIA

Tel: (404) 955-1500

HAWAII

Honolulu Tel: (808) 955-4455

ILLINOIS

Rolling Meadows Tel: (312) 255-9800

INDIANA

Indianapolis Tel: (317) 842-1000

IOWA

Iowa City Tel: (319) 338-9466

LOUISIANA

Kenner Tel: (504) 443-6201

MARYLAND

Baltimore Tel: (301) 944-5400 Rockville Tel: (301) 948-6370

MASSACHUSETTS

Tel: (617) 861-8960

MICHIGAN

Farmington Hills Tel: (313) 476-6400

MINNESOTA

Roseville Tel: (612) 636-0700

MISSOURI

Kansas City, Tel: (816) 763-

Maryland Heights Tel: (314) 878-0200

NEW JERSEY

Paramus Tel: (201) 265-5000

NEW MEXICO

Albuquerque Tel: (505) 292-1330 Las Cruces Tel: (505) 526-2484

NEW YORK

New York City Manhattan, Bronx Contact Paramus. NJ Office Tel: (201) 265-5000 Brooklyn, Queens,

Richmond Contact Woodbury Office Tel: (516) 921-0300 Fairport

Tel: (716) 223-9950 Syracuse

Tel: (315) 454-2486 Woodbury Tel: (516) 921-0300

NORTH CAROLINA

High Point Tel: (919) 885-8101

Cleveland Tel: (216) 243-7300 Dayton Tel: (513) 859-8202

OKLAHOMA

Oklahoma City Tel: (405) 721-0200 Tel: (918) 665-3300

OREGON

Tualatin Tel: (503) 620-3350

PENNSYLVANIA

Pittsburgh Tel: (412) 782-0400 King of Prussia Tel: (215) 265-7000

TEXAS

Richardson Tel: (214) 231-6101 Houston Tel: (713) 776-6400

LITAH

Salt Lake City Tel: (801) 972-4711

VIRGINIA

Richmond Tel: (804) 285-3431

WASHINGTON

Bellevue Tel: (206) 454-3971

WISCONSIN

West Allis Tel: (414) 541-0550

Canada ALBERTA

Calgary Tei: (403) 253-2713

BRITISH COLUMBIA

Vancouver

Tel: (604) 254-0531

NOVA SCOTIA Dartmouth Tel: (902) 469-7820

ONTARIO

Ottawa Tel: (613) 820-6483

Mississauga Tel: (416) 678-9430

QUEBEC

Pointe Claire TI: (514) 697-4232

Central and South America

ARGENTINA

Ruenos Aires Tel: 31-6063, 4, 5, 6

BRAZIL

06400 Barueri-SP Tel: 429-3222 90000-Porto Alegre-RS Tel: (0512) 22-2998, 22-5621 20000-Rio de Janeiro-GB Tel: 257-80-94-DDD (021)

EL SALVADOR

San Salvador Tel: 252787

GUATEMALA

Guatemala City Tel: 63627, 64786, 66471-5. Ext. 9

MEXICO Mexico 23. D.F. Tel: (905) 676-4600

Lima Tel: 41-4325

PUERTO RICO

San Juan 00929 Tel: (809) 762-7255

VENEZUELA

Caracas 107 Tel: 35-00-11 (20 lines)

Europe

Tel: (0222) 351620 - 29

RELGIUM

B-1170 Brussels Tel: (02) 672 22 40

DENMARK

Tel: (02) 81 66 40 FINLAND SE-00211 Helsinki 21

Tel: 6923031

FRANCE F-91401 Orsay Tel: (1) 907 78 25 F-69130 Ecully Tel: (78) 33 81 25 F-31300 Toulouse-Le Mirail Tel: (61) 40 11 12 F-13721 Marignane Tel: (91) 89 12 36

GERMAN FEDERAL REPUBLIC

Tel: (0611) 50 04-1 D-7030 Boblingen, Wurttemberg Tel: (0703) 667-1 D-4000 Dusseldorf Tel: (0211) 59711 D-2000 Hamburg 1 Tel: (040) 24 13 93 D-3000 Hannover Tel: (0511) 46 60 01 D-8012 Ottobrunn Tel: (089) 601 30 61/7

GREECE

GR-Athens Tel: 3237731

IRELAND

Hewlett-Packard Ltd. King Street Lane Winnersh Wokingham GB-Berkshire RG11 5AR Tel: (0734) 78 47 74

ITALY

1-20100 Milano Tel: (2) 6251 (10 lines) 1-35100 Padova Tel: (49) 66 48 88 1-00143 Roma Tel: (06) 54 69 61

LUXEMBURG

R-1170 Brussels Tel: (02) 672 22 40

NETHERLANDS

Amstelveen Tel: (020) 47 20 21

NORWAY

N-1344 Haslum Tel: (02) 17 11 80

SPAIN

E-Madrid 16 Tel: (1) 458 26 00 (10 lines) E-Barcelona 17 Tel: (3) 203 6200 (5 lines)

SWEDEN

S-161 20 Bromma 20 Tel: (08) 730 05 50

SWITZERLAND

CH-8952 Schlieren Zurich Tel: (01) 730 52 40 CH-1219 LeLignon-Geneva Tel: (022) 96 03 22

UNITED KINGDOM

GB-Winnersh, Wokingham Berks RG11 5AR Tel: (0734) 78 47 74 GB-Altrincham Cheshire WA14 INU Tel: (061) 928 6422 GB-Thornton Heath CR4 6XL Surrey Tel: (01) 684 0103/8

USSR Moscow 101000 Tel: 207.59.24

Africa, Asia,

Australia AUSTRALIA Fyshwick A.C.T. 2609 Tel: 95-2733 Pymble, New South Wales Doncaster East, Victoria Tel: 89-6351 Parkside S.A. Tel: 272-5911

Nedlands W A

Tel: 86-5455

CYPRUS

CY-Nicosia Tel: 45628/29

HONG KONG

Hong Kong Tel: H-255291-5

Bombay 400 025 Tel: 45 78 87 New Delhi Tel: 634770 & 635166 Calcultta

Madras Bangalore

Secunderabad

Tel: 70126, 70127 Cochin Tel: 32069, 32161, 32282

Tel: 851082-7

ISRAFI

Tel-Aviv Tel: 38973

JAPAN

Suginami-ku, Tokyo Tel: 03-331-6111 Osaka, 532 Tel: 06-304-6021

NEW ZEALAND Wellington Tel: 877-199 Pakuranga Tel: 569-651

PHILIPPINES

Tel: 85-35-81, 85-34-91

SINGAPORE Singapore Tel: 270-2355

SOUTH AFRICA

Sandton, Transvaal 2144 Tel: 802-1040/8

TAIWAN

Taipei Tel: 389160-4, 3141010. 3715121

Kaohsiung Tel: (07)242318