

models 2640B, 2640C, 2640N  
2640S, 2641A, 2645A

The 2640 series of terminals brings to your HP 3000 an unparalleled set of features designed to complement your system in all areas of your organization

## Features

- Enhanced high-resolution display
- Plug-in character sets
- Dynamically allocated memory
- Pop-in modularity and expandability
- Microprocessor controlled
- Character/block mode
- Self-test
- Full editing capability
- Multi-task keyboard
- Off-screen storage with scrolling capability
- Programmable protected fields
- Inverse video for highlighting; and optional blinking, underline, half-bright
- Cursor addressability and positioning control tabulation
- Hard copy interface

### Enhanced high-resolution display

The terminals have a 5 inch by 10 inch rectangular display providing a 1,920 character capacity in 24 lines of 80 characters per line. The characters are formed by a 7 x 9 dot matrix generated in a 9 x 15 dot character cell. The high resolution of the 7 x 9 dot matrix is enhanced by dot shifting for precise character definition, and by the use of the enlarged character cell for wide character and line separation, underlining, line descenders, and inverse video. These display features are engineered to increase clarity and ease sessions at the terminal.

### Plug-in character sets

Recognizing the demand for terminals that speak many languages and fill diverse sets of needs, the terminals have the capacity to include up to four 128-character sets resident concurrently in the terminal. Adjacent characters on the display may be from any of the four character sets and are available with the optional underline, blinking and half-bright feature.



### Dynamically allocated memory

Because of the efficient linking memory organization (transparent to the user) spaces to the right of the last character typed on a line are normally not stored in memory. Consequently, the basic terminal equipped with 1024 characters of display memory can store from 8 to 50 lines of information dependent on line length. Optional memory can expand this line capacity to a maximum of over 400 lines of information. Lines are viewed 24 at a time by using the roll up, roll down, next page, and previous page keys.

### Pop-in modularity and expandability

The modular computer-like construction is designed for ease of service. Digital electronics are contained on printed-circuit cards that can be exchanged within the terminal; up to 14 cards can be accommodated to allow a choice of options. The combination of microprogramming and modularity means that this terminal can be expanded as new technologies and devices become available.

### Microprocessor controlled

The operating characteristics of the terminal are controlled through firmware. The terminal's microprocessor manages memory allocation, data communications, keyboard scanning, and display control. This microprocessor implementation and the use of single bus architecture yield a terminal utilizing electronics and mechanics with a wide range of capabilities and potential for future enhancements.

## Character/block mode

The terminals will operate character-by-character as a completely interactive terminal or are capable of operating on a block at a time. Text can be composed and edited locally thus allowing the terminal user to verify and correct data before transmission to the CPU. Editing and CPU connect times are significantly reduced by such features as: character or line insert and delete, cursor sensing and positioning control, programmable protected fields, off-screen storage with scrolling and page select capability, tabulation, transparent display control codes, 8 special function keys for user defined routines and a positionable memory protect.

## Self-test

The terminals have been engineered for high reliability, ease of maintenance, testing, and rapid repair when needed. By depressing the TEST button on the keyboard the user receives a Go/No-Go indication from results of a memory test, firmware test, and display verification.

## Hard-copy interface

The terminals accommodate most RS232C-compatible serial printers or any HP-manufactured printer which uses the HP parallel interface. The serial printers are connected via the 13250A interface card, while the parallel printers use the 13238A duplex register interface card. Commands to print data can be initiated locally from the terminal keyboard or remotely from the CPU under control of a user's program. The MPE operating system does not recognize hardcopy devices connected to the terminals. All control of hardcopy devices is assumed by the user's program.

## Display enhancements

Specific fields can be brought to the user's attention by using any of the 16 possible combinations of inverse video, blinking, underline and half-bright to emphasize areas of the display.

## Optional features

### Fully integrated mass storage (2641, 45)

Benefits of mass storage: Many operations normally requiring connection to a computer system can now be done off-line with the terminal. Optional dual in-board

cartridge tape units allow batching of information, and add extensive stand-alone capabilities which can significantly reduce user time; conserve both computer and communications resources; provide a tape backup; and, very importantly, allow the terminal to keep on working even when a computer is unavailable.

Mini-cartridge: Highly reliable, interchangeable mini-cartridges each provide the capacity for many hours of typing, up to 110,000 characters of storage formatted in variable length records and files. The tape units feature rapid data transfer and bi-directional high-speed search to access any file in seconds. The mini-cartridge is ideally suited for storing data, forms, programs or text, and is an excellent substitute for paper tape. The HP 3000 Series II FCOPY utility may be used to transfer files to and from mini-cartridges to other HP 3000 Series II peripherals. (Note: This feature is not available on Series I or pre-Series II models.)

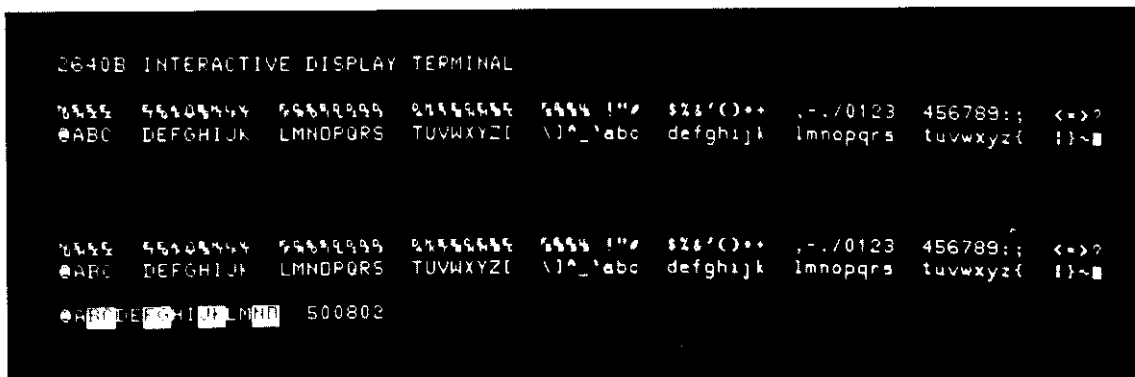
### User-defined soft keys (2641, 45)

Each of the eight special function keys can be easily used to issue a user-defined string of up to 80 characters or several control sequences stored in the 2645A. This feature allows the keyboard to adapt to specialized applications, and can considerably simplify use of the keyboard and result in greater efficiency — each soft key performs the operations of several key sequences. For example, the soft keys could issue frequently used programming sequences, search for files, aid forms construction for data entry, dynamically configure the terminal, or issue instructions to the operator, computer or both.

### Character sets

APL: With the 2641, the APL basic set and APL overstrike set are both available for user development and display of APL programs. The clarity and visual representation of the characters are facilitated by the 9 by 15 dot character cell. The basic set is comprised of the 96 APL graphics, 64 overstrike graphics and includes the ability to display control codes which help in debugging programs.

Also standard in the 2641A is a 64 character Roman set which is optionally expandable to include lowercase capability. This second set allows the terminal to be switched from APL to the ASCII mode where the 2641A can then double as a fully Teletype-compatible terminal.



Actual photograph of 2640B display

**Math:** The optional Math set is available to include equations right in the text that's composed on the screen. This feature helps to impart realism and assists in understanding technical material.

**Line drawing:** The optional Line Drawing set assists users in defining forms that appear like those normally filled out in the company's day-to-day operations. Now operator errors can be minimized due to the familiarity associated with the constructed forms.

**Norwegian:** The 2640N has the Danish/Norwegian set in place of the standard uppercase set. The non-standard characters must be handled by application programs.

**Large character set:** With this option, characters approximately ½ in. tall can be constructed. This is useful for warehousing operations where, for example, fork-lift drivers may have to read computer-derived instructions from a distance. Applications programs are responsible for constructing characters from supplied segments.

**Cyrillic:** 2640C has 128 character cyrillic set in addition to standard uppercase set. The non-standard characters must be handled by application programs.

**Swedish:** 2640S has 64 character Swedish (Finnish) set in place of standard uppercase set. The non-standard characters must be handled by application programs.

## Specifications

### General

Screen size: 5" x 10" (127 x 254 mm)  
 Screen capacity: 24 lines x 80 columns (1,920 characters)  
 Character generation: 7 x 9 enhanced dot matrix; 9 x 15 dot character cell; non-interlaced raster scan  
 Character size: 0.097" x 0.125" ( 2.46 x 3.175 mm)  
 Cursor: Blinking-underline  
 Display modes: White on black; black on white (inverse video) blinking, half-bright, underline.  
 Refresh rate: 60 Hz (50 Hz optional)  
 Tube phosphor: P4  
 Implosion protection: Bonded implosion panel  
 Memory: MOS, ROM: 22K bytes (program); RAM; standard 4096 bytes; 12 kilobytes maximum (16K including maximum data communications buffer)  
 Keyboard: Detachable, additional control and editing keys; ten-key numeric pad; cursor pad; multispeed auto-repeat, N-key roll-over; 4 ft. cable (1.22 m).  
 Cartridge tape (optional): Two mechanisms  
   Read/write speed: 10 ips  
   Search/rewind speed: 60 ips  
   Recording: 800 bpi  
 Mini cartridge: 110 kilobyte capacity (maximum per cartridge)

### Data communications

Data rate: 110, 150, 300, 1200, 2400 baud, and external switch selectable (110 selects two stop bits)

Standard asynchronous communications interface: EIA standard RS232C; compatible with Bell 103A modems, Bell 202C/D/S/T modems with reverse channel, and Vadic VA3400 series modems. (Note: Bell 202S is not supported for Series I or pre-Series II models.)

Transmission modes: Full or half duplex, asynchronous

Operating modes: On-line; Off-line; Character; Block

Parity: Switch selectable; even, odd, none

### Site preparation data

	USA (60 Hz)	NON-USA (50 Hz)
VOLTAGE	115	230
PHASES	1	1
CURRENT PER PHASE	1.3A	0.7A
CONNECTION CODE	F	F
HEAT OUTPUT (per hour)	483 btu	129 kcal
WEIGHT	50 lb	23 kg
SIGNAL CABLE LENGTH*	15 ft.	4.5 m

\*Cables not included; must be ordered separately as a 13232N.

### Warranty

90 day on-site parts and labor warranty.



### Hardware supplied

Terminal, keyboard plus ordered options. If tape drives ordered: two cartridges, head cleaning kit. Power cable. No data cable is supplied with the terminal or in standard HP 3000 systems. They must be ordered separately. (order 13232N from Data Terminals Division with each terminal.)

### Installation

Installation of the terminal is not covered in the list price of the terminal nor in the list price of HP 3000 System models. Installation is performed by the user (manual supplied), or by a factory-authorized Customer Engineer (on a time and materials basis).

### Environmental conditions

Since terminals may be used outside the immediate system area, they are not subject to the environmental specs of the system itself.

Temperature, free space ambient:

Non-operating: -40 to +75°C (-40 to +167°F)

Operating: 0 to +55°C (+32 to 131°F)

Humidity: 5 to 95% (non-condensing)

## System requirements

Any terminal will operate with any HP 3000 computer system subject to the following constraints:

The maximum data rate is 2400 baud. Terminals on HP 3000 systems normally operate in character mode, except when accessed via DEL/3000, when block mode is employed. Users who wish to access terminals in block mode directly (i.e. not using DEL/3000) must provide their own detection and correction facilities for transmission errors. The probability of transmission errors occurring at 2400 baud is slight, and negligible at 1200 baud or lower.

## Ordering information

**HP 2640B Interactive Display Terminal.** A low cost terminal for general purpose use on an HP 3000. Block or character mode (switch selectable); 64 character upper case Roman; 1024 bytes of storage, expandable to 8192 bytes maximum; inverse video; 110-2400 baud; RS232C; includes 2 option slots.

Option 001. 128 Character Set — Roman. Adds lower case and displayable control codes.

Option 015. 50 Hz, 230V. 13232N 15 ft. RS232 cable. Must be ordered.

13232N 15 ft. RS232 cable. Must be ordered.

**HP 13231A Display Enhancements.** Adds blinking, half-bright and underline; provides for addition of three 128 character sets (requires 1 option slot). (Note: Display enhancements operate under control of a user's program. The MPE operating system does not explicitly recognize special characters generated by display enhancements.)

**HP 13231A-201. 64 Character Mathematic Symbol Set.** Adds display of integral signs, Greek letters, etc.

**HP 13231A-202. 64 Character Line Drawing Set.** Adds display of continuous horizontal and vertical line segments for forms, histograms, etc.

**HP 13231A-203. Large Character Set.**

**HP 13234A Terminal Memory Module (+4K).** Adds 4096 bytes of user RAM memory (requires 1 option slot).

See separate HP 2640B data sheet for further accessories and special cables.

**HP 2641A APL Display Station.** For APL/3000 user on the HP 3000 Series II. Block or character mode, 128 character APL, 64 character set uppercase Roman, 64 character APL overstrike, 4096 bytes of RAM memory, optionally expandable to 12K bytes, inverse video, editing features, 8 user-defined soft keys, 110-2400 baud, RS232C, display enhancements, 5 option slots. (Note: No interface cable included).

**HP 2641A-001. 128 Character Set — Roman.** Adds lower case and displayable control codes.

**HP 2641A-007. Integrated Dual Cartridge Tape — Mini Data Station.** Adds two built-in cartridge tape transports and electronics to provide Mini Data Station capabilities (requires 2 option slots). Includes device support firmware.

**HP 2641A-013. 5 Mini Cartridges.**

**HP 2641A-015. 50 Hz, 230V**

Only one of the following options (201, 202, 203) may be ordered:

(Note: Display enhancements work only under control of user's program. The MPE operating system does not explicitly recognize special characters generated by display enhancements).

**HP 2641A-201. 64 Character Mathematic Symbol Set.** Adds display of integral signs, Greek letters, etc.

**HP 2641A-202. 64 Character Line Drawing Set.** Adds display of continuous horizontal and vertical line segments for forms, histograms, etc.

**HP 2641A-203. Large Character Set.**

**HP 13234A Terminal Memory Module (+4K).** Adds 4096 bytes of user RAM memory (requires 1 option slot).

See separate HP 2641A data sheet for further accessories and special cables.

**HP 2645A Display Station.** Powerful general-purpose terminal with optional off-line tape storage. Block or character mode, 64 character set uppercase Roman, 4096 bytes of RAM memory (optionally expandable to 12K bytes) inverse video, editing features, 8 user-defined soft keys, 110-2400 baud, RS232C, 7 option slots. (Note: No interface cable included.)

HP 2645A-001. 128 Character Set — Roman. Adds lowercase and displayable control codes.

HP 2645A-007. Integrated Dual Cartridge Tape — Mini Data Station. Adds two built-in cartridge tape transports and electronics to provide Mini Data Station capabilities (requires 2 option slots). Includes device support firmware.

HP 2645A-013. 5 Mini Cartridges

HP 2645A-015. 50 Hz, 230V.

HP 13231A Display Enhancements. Adds blinking, half-bright and underline; provides for addition of three 128 character sets (requires 1 option slot). (Note: Display enhancements operate under control of a user's program. The MPE operating system does not explicitly recognize special characters generated by display enhancements.)

HP 13231A-201. 64 Character Mathematic Symbol Set. Adds display of integral signs, Greek letters, etc.

HP 13231A-202. 64 Character Line Drawing Set. Adds display of continuous horizontal and vertical line segments for forms, histograms, etc.

HP 13231A-203. Large Character Set. Adds display of character segments for combination into large characters.

HP 13234A Terminal Memory Module (+4K). Adds 4096 bytes of user RAM memory (requires 1 option slot).

See separate 2645A data sheet for further accessories and special cables.

**HP 2640C Cyrillic Terminal.** Cyrillic (Russian) version of 2640B, available with Series II systems only. 64 character uppercase Roman plus 128 character Cyrillic. 4K RAM storage, expandable to 8K bytes. Inverse video, underline, half-bright, and blinking. Capacity for two alternate character sets. 110, 150, 300, 1200, 2400 baud (switch selectable). Does not include any option slots.

HP 2640C-001. 128 Character Set — Roman.

HP 2640C-015. 50 Hz, 230V.

HP 2640C-201. Math Set.

HP 2640C-202. Line Drawing Set.

HP 2640C-203. Large Character Set.

HP 13234A Terminal Memory Module (+4K). Adds 4096 bytes of user RAM memory (requires 1 option slot).

**HP 2640N Danish/Norwegian Terminal.** Danish/Norwegian version of 2640B, available with Series II systems only. 64 character Danish/Norwegian. Block or character mode. 1K bytes RAM storage (expandable to 8K bytes) 110, 150, 300, 1200, 2400 baud. Two spare slots.

HP 2640N-001. 128 Character Danish/Norwegian.

HP 2640N-015. 50 Hz, 230V.

HP 13231A Display Enhancements (uses 1 slot). Blinking, half-bright and underline.

HP 13231A-201. Math Set.

HP 13231A-202. Line Drawing.

HP 13231A-203. Large Character Set.

HP 13234A Terminal Memory Module (+4K). Adds 4096 bytes of user RAM memory (requires 1 option slot).

**HP 2640S Swedish/Finnish Terminal.** Swedish/Finnish version of 2640B, available with Series II systems only. 64 character Swedish/Finnish. Block or character mode, 1K bytes RAM storage (expandable to 8K bytes) 110, 150, 300, 1200, 2400 baud. Two spare slots.

HP 2640S-001. 128 Character Swedish/Finnish.

HP 2640S-015. 50 Hz, 230V.

HP 13231A Display Enhancements (1 slot). Blinking, half-bright and underline.

HP 13231A-201. Math Set.

HP 13231A-202. Line Drawing.

HP 13231A-203. Large Character Set.

HP 13234A Terminal Memory Module (+4K). Adds 4096 bytes of user RAM memory (requires 1 option slot).

### TERMINALS AT A GLANCE

	2640B	2640N	2640C	2640S	2641A	2645A
Two tape cartridge drives	—	—	—	—	Optional	Optional
APL character set	—	—	—	—	Standard	—
Inverse video	Standard	Standard	Standard	Standard	Standard	Standard
Underline, blinking 1/2 brite	Optional	Optional	Standard	Optional	Standard	Optional
Math character set	Optional	Optional	Optional	Optional	Optional	Optional
Line drawing set	Optional	Optional	Optional	Optional	Optional	Optional
Large character set	Optional	Optional	Optional	Optional	Optional	Optional
Soft keys	—	—	—	—	Standard	Standard
Norwegian character set	—	Standard	—	—	—	—
Swedish/Finnish character set	—	—	—	Standard	—	—
Cyrillic character set	—	—	Standard	—	—	—
Maximum memory	8Kb	8Kb	8Kb	8Kb	12Kb	12Kb
Lowercase	Optional	Optional	Optional	Optional	Optional	Optional