Sperry Univac UTS 400
Universal Terminal System

MANAGEMENT SUMMARY

Sperry Univac introduced the UTS 400 Universal Terminal System in April 1976; in June 1980, the UTS 4000 family was unveiled, containing certain members which can effectively replace the UTS 400. Although no further enhancements are anticipated to the UTS 400, this popular line of terminals continues to be an active product.

The UTS 400 is a general-purpose, user-programmable, microprocessor-based alphanumeric display terminal that can be configured in stand-alone or cluster arrangements. Cluster arrangements can contain up to three or six display workstations. A special-purpose version of the UTS 400, the UTS 400 Text Editor, is available for printing and publishing applications.

All workstations in a cluster are controlled by a microprocessor (equivalent to the Intel 8080) under the direction of ROM (read-only memory) resident firmware. The terminal is available with 8K to 24K bytes (up to 32K bytes in conjunction with COBOL) of user-addressable semiconductor memory, supplied in 8K-byte increments, for user program execution. User programs are assembled or compiled on the host processor and downline loaded to the terminal for execution. User programs can be loaded directly into memory, or onto diskette or cassette tape for storage at the terminal site. ▷

A general-purpose display terminal system available in stand-alone or cluster configurations.
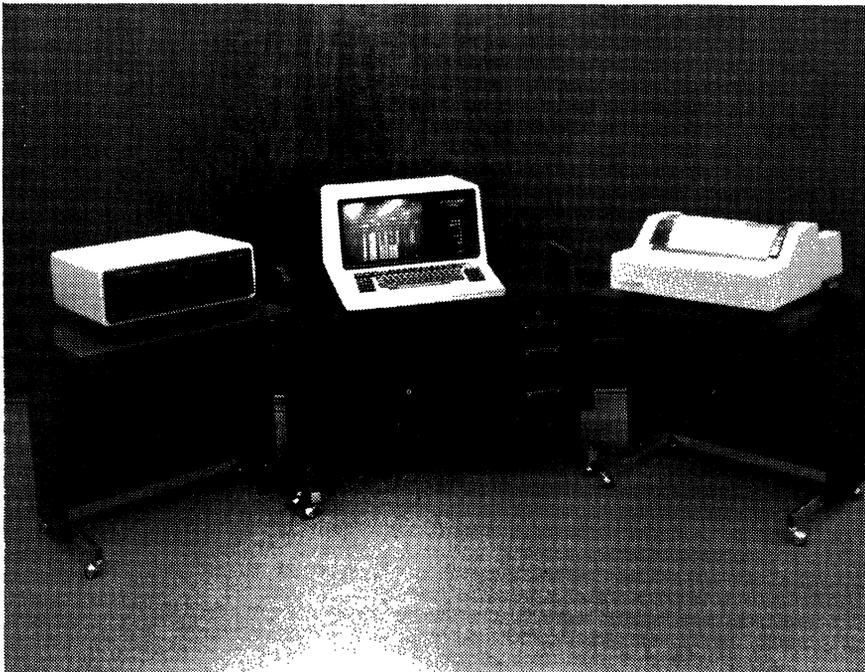
8K to 32K of memory is provided for user-written programs. Programming languages include COBOL and MAC 80 assembler language. Peripherals include printers, diskette drives, and magnetic tape cassette drives.

A basic stand-alone configuration including one CRT/keyboard, 8K bytes user memory, a single diskette drive, a 200-cps printer and 9600 bps interface costs $616 per month, including maintenance, on a 1-year lease.

A multi-station configuration with four CRT/keyboards, two diskette drives, 200-cps bidirectional printer, 16K bytes user memory, and 9600 bps interface costs $1,376 per month, including maintenance on a 1-year lease.

CHARACTERISTICS

VENDOR: Sperry Univac Division, Sperry Corporation, P.O. Box 500, Blue Bell, Pennsylvania 19422. Telephone (215) 542-4011. ▶

Components of the UTS 400 Universal Terminal System include: the Standard Dual Diskette Drive (left); the Master Display Station (middle); and the 0786 200-cps Matrix Printer (right). The UTS 400 system is available in stand-alone or cluster configurations.

REFERENCE EDITION. This is a mature product line, and no significant further developments are anticipated. Because of its importance, coverage is being continued, but no future update is planned.

Sperry Univac UTS 400
Universal Terminal System

▷ The UTS 400 is supported by a basic set of software, including a standard package for program development. Languages include COBOL and MAC 80, an assembler language. An edit processor, an IBM 3741 diskette format converter, and other utilities are also available. Only one program can be active at a time and is used by all workstations in a cluster; different portions of the program can, however, be utilized by the various workstations.

Peripherals include four printer models (a 30-cps impact printer, a 200-cps uni- or bi-directional impact printer, a 45-cps correspondence-quality printer, and a 300-cps non-impact printer), a dual tape cassette subsystem, and a single or dual diskette subsystem. As many as twelve printers in almost any mix of models, as many as three dual cassette systems, or as many as four dual diskette drives can be attached to a UTS 400 Master or Cluster Controller. The actual number and mix of peripherals that can be attached are limited by address and device restrictions explained in the Characteristics section of this report. All peripherals in a cluster arrangement are shared by the workstations.

USER REACTION

In Datapro's 1982 survey of alphanumeric display terminal users, responses were received from four Sperry Univac UTS 400 terminal users. These users represented an installed base of 273 terminals, including one user with 251 terminals installed. The ratings given the UTS 400 by these users appear in the following table:

	Excellent	Good	Fair	Poor	WA*
Overall performance	3	1	0	0	3.8
Ease of operation	2	2	0	0	3.5
Display clarity	2	2	0	0	3.5
Keyboard feel & usability	2	2	0	0	3.5
Hardware reliability	2	2	0	0	3.5
Maintenance service	2	2	0	0	3.5
Technical support	0	4	0	0	3.0

*Weighted Average based on a scale of 4.0 for Excellent.

Three of the users were utilizing the UTS 400 in cluster configurations, while the large user was utilizing both stand-alone and cluster configurations. Principal applications cited for the UTS 400 included: program development (four users); data entry and interactive inquiry (three users); intracompany message traffic (two users); and as a system console (two users). The terminal's detachable keyboard and local editing features were each cited by two users as requirements in the selection of the UTS 400.

When asked if they would recommend the UTS 400 to other users with similar applications, all four users indicated that they would.□

▶ DATE OF ANNOUNCEMENT: April 1976.

DATE OF FIRST DELIVERY: September 1976.

NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: Sperry Univac.

CONFIGURATION

The microprocessor-based UTS 400 Universal Terminal System consists of alphanumeric display stations and peripheral options that can be configured as stand-alone or clustered terminals in the following arrangements:

● Stand-alone—a Master Station with optional peripherals.

● Cluster—a Master Station with one or two slave stations that share the Master's optional peripherals.

● Cluster—a Controller with up to six slave stations that share the Controller's optional peripherals.

Each slave station can be located up to 2000 cable-feet from its Master or Controller. Keyboards can be located up to 10 feet from the corresponding display unit. Peripherals are connected in a chaining arrangement with total cable length (combined for all devices) of up to 200 feet for each peripheral interface. The UTS 400 can be located up to 50 feet from a modem or 5000 feet from a multiplexer.

The basic UTS 400 comes with no user-accessible memory. However, one to three 8K-byte memory expansions can be added to the basic system, providing a maximum of 24K bytes of memory. When the COBOL programming package is used, a fourth 8K increment can be added, for a total capacity of 32K bytes.

Peripherals include the Model 610 Tape Cassette System, the Model 8406 Diskette Subsystem, the Model 800 Terminal Printer, the Communications Output Printer, the Model 0786 Printer, and the Model 0791 Correspondence Quality Printer.

All peripherals are attached via a peripheral interface. Two peripheral interfaces are available: seven-level and eight-level. The seven-level interface accommodates the tape cassette system, the Communications Output Printer, the Model 800 Printer, and the Model 0786 Printer. The eight-level interface accommodates the diskette subsystem and all printers except the Communications Output Printer. A total of eight devices can be attached to the seven-level interface and a total of four devices can be attached to the eight-level interface. The UTS 400 will support one interface of each type.

A total of 12 device addresses are available on the UTS 400 system, and one or more device addresses are required by each peripheral: a printer requires one device address; a diskette subsystem, two device addresses per drive; and a cassette tape unit, four device addresses. Any combination of peripheral devices may be configured with the system, using either or both of the interfaces as appropriate, as long as the total number of device addresses does not exceed 12.

TRANSMISSION SPECIFICATIONS

Transmission is asynchronous or synchronous in the half-duplex mode. Asynchronous speeds range from 300 to 2400 bits/second, while synchronous speeds range up to 9600 bits/second. Transmission speed is determined by the internal clock of the specified modem. The transmission code is eight-level ASCII, including parity.

The UTS 400 is equipped with an EIA Standard RS-232-C, CCITT V.24, or MIL Std. 188 interface and operates over a voice-band leased or switched facility via a modem. External modems available from Sperry Univac provide compatibility with the Bell System (U-201) or 202 (U-202) Data Sets.

The UTS 400 system can operate in a multipoint environment with Sperry Univac Uniscope 100 and 200 terminals. An ▶

Sperry Univac UTS 400
Universal Terminal System

auto answer/hang-up feature is available for operation on the dial network.

SOFTWARE

User programs may be written in either MAC 80 or, optionally, in UTS 400 COBOL.

MAC 80 is an Intel assembler language that is provided with the basic UTS 400 system. MAC 80 permits the user to interface with the UTS 400 firmware as well as to perform applications programs. The MAC 80 package includes SMS 400, a screen management utility that provides a set of control routines that can initialize and display screen formats, validate input fields, control I/O functions and perform other tasks that simplify program development. A variety of other utility routines are also available for use with MAC 80.

UTS 400 COBOL conforms to ANSI Standard X3.23-1974 with extensions that accommodate specific UTS 400 features, such as syntax for interactive data entry and program control, screen management and data formatting, and compressing. Under UTS 400 COBOL, files may be either sequentially or randomly accessed and either formatted or unformatted. Multiple files are also supported. Files may be dedicated to a specific workstation or shared, reassigned from one device to another similar device, or changed from dedicated to shared status. COBOL program execution requires 32K bytes of user memory.

Applications programs must be assembled or compiled by the host processor and are conveyed to the UTS 400 via the communications facility. The received programs can be stored locally on diskette or cassette tape for operating convenience. Alternatively, application programs can reside at the host processor, and retrieval can be initiated by the terminal operator, by the UTS 400 program, or by an application program running at the host. In clustered arrangements, only one program can be in effect at a time. A multi-part application program can allow the individual workstations to be doing different things, but the different operations must be combined into a single program.

Examples of tasks that can be implemented via user-written software include data validation, such as restricting entries; range checking and comparison checking; data formatting/ reformatting, such as changing the order of information or excluding information; data creation, such as from tables; data editing; general logical operations; arithmetic operations; security checks, such as the use of passwords or of code sequences; highlighting invalid entries or items requiring operator attention; display of prompting sequences for operator guidance; and text compression on transfer. Via program control, specific keys can be assigned specific functions that will initiate programmed tasks, including any of those mentioned above.

Other UTS 400 software includes an IBM 3741 converter and an edit processor. The 3741 subroutine converts the data code and format of a UTS 400 diskette to IBM 3741-compatible data code and format, and vice versa. The edit processor is a stand-alone utility that permits large files to be created and updated on the UTS 400 without the assistance of the host, and includes functions for line insertion, deletion, and changes in any sequence, forward or backward.

DEVICE CONTROL

UNIVAC provides for basic terminal operations via ROM-resident firmware.

Data is transmitted to the remote computer when the terminal is interrogated via a polling message following operator initiation of the transmit function. Data entry is not normally interrupted by an unsolicited computer message; however, the operator is alerted to the pending message and can respond when ready by initiating the Message Waiting function. Via program control, the remote computer can override any operator action and display an urgent message without waiting. Displayed data can be transferred to a peripheral device (printer, diskette, or cassette unit) by manual initiation (Print or Transfer key) or automatically under program control.

Two options, the Buffer Pool and Screen Bypass features, can improve the operating performance. The Buffer Pool provides buffering between the display memory and peripherals to expedite screen-to-device data transfers so that fresh data can be immediately keyed. The Screen Bypass feature transfers data received from the host processor directly to the addressed peripheral to permit concurrent operator/display functions.

Cursor direction controls move the cursor in any of four directions (left, right, up, and down) and are designed for either step-by-step or repetitive operation. The cursor can also be returned to home position (initial display position) or to the beginning of the next line (carriage return). Tabulation allows the cursor to be advanced to the first position following the next tab stop to the right (tab forward) or to the left (tab backward) of the current position. The cursor is returned to the home position if a horizontal tab character is not located between the cursor and the end or beginning of the screen, respectively. The cursor and the character located at the cursor position blink alternately so that the cursor position can be easily located. The cursor also blinks when positioned over a nondisplayable (blanked) character other than the space character.

Edit controls provide insert, delete, and erase functions. Both line and display insert and delete functions are standard. Insertion or deletion within a line affects all data to the right of the cursor up to the end of the current line. Display insertion or deletion affects all data following the cursor up to the last displayable position of the screen. When formatted data is displayed, these functions affect only the variable fields; the fixed fields (format descriptors) are protected from inadvertent alteration.

The standard erase functions include character, line, field, and screen erase. Character erase erases the character at the cursor position. Line erase erases all data from the cursor to the end of the line. Character and line erasure erases only "unprotected" fields. Two types of screen erasure are standard: one erases all "unprotected" fields, and the other erases all data. Screen erasure begins at the cursor position.

Other standard functions include Cycle, Line Duplication, and Roll. Cycle is a character repeat feature. Line Duplication permits any displayed line to be duplicated via operator or program control; this feature facilitates setting up formats or entering repetitious data instead of rekeying. The Roll feature is implemented via software, using line insert and delete functions. Special function keys can be software-designated to perform the Roll function.

Program Attention keys are used to initiate program-designated functions; 22 PA keys are standard.

Field Control Mode, a standard feature, permits a terminal- or computer-generated format to be displayed. The parameterized format program uses field control (attribute) characters to specify display characteristics, delimit fields, set tab stops, and indicate whether a field has or has not been modified by the operator. Display characteristics feature high (normal) and low beam intensity, blanking (beam off), and blinking. Fields can be identified as alphabetic only, numeric only, alphanumeric, protected, and right-

Sperry Univac UTS 400
Universal Terminal System

▶ justified alphanumeric, alphabetic, or numeric. Besides specifying the field attribute, a field control character can double as a tab stop. The field control character (FCC) occupies a memory location, but not a screen location; up to 15 FCC's can be used in each displayed line. In the optional Character Protect Mode, individual characters within a field can be format-protected in addition to all FCC attributes, and non-significant spaces in unprotected fields can be suppressed for transmission.

A special compatibility feature permits UTS 400 operation using FCC's in a Uniscope 100 and 200 environment; these terminals do not recognize FCC codes. An operator switch establishes Uniscope compatibility via conversion between the protected field FCC's and the protected format code used by the Uniscope terminals. This feature provides some FCC capabilities without requiring application software changes.

The Control Page, also a standard feature, is a two-line control program containing I/O device operating status and operator-keyed device commands that are executed upon the depression of the corresponding function keys. The Control Page, called from memory and displayed by the depression of the Control Page key, permits the operator to examine device status and program input and output commands to specified I/O devices. Any data displayed on the first two lines when the Control Page is called is temporarily stored and is returned when the Control Page is removed from the screen. Two input devices, two output devices, and two device functions can be specified by the Control Page at one time.

Functions include data transfer, copy, edit, return-to-home (diskette), rewind (cassette tape), auto-transmit, read, and diskette preparation. All data transfer functions use the display buffer to transfer data from one device to another or from a device to the data communications facility; therefore, the transferred data is displayed. The copy function transfers all data from one device to another. The edit function performs the same operation, but permits operator manipulation of the transferred data. Auto-transmit transmits data read from a device; after the first page has been transmitted, successive pages are transmitted at the request of the host processor. The read function transfers one page of data to the screen for each key depression. Diskette preparation clears and reformats the specified diskette. Displayed status information includes the current status and storage address of the selected device.

There are three types of commands for print, transfer, and transmit functions. Each command operates on the data between the Home or Start-of-Entry position and the cursor. All three print commands print all data, but FCC's are not printed. Spaces can be substituted for protected characters, or carriage return codes can be suppressed with non-suppression of spaces. The transfer and transmit functions are identical with respect to the data acted upon. The commands can transfer/transmit all data including FCC's, all unprotected data including FCC's for each field transferred or transmitted, or only the data and FCC from each field that has been modified.

The Control Page also contains a 23-character field to define search instructions to be performed by the designated devices or to define the termination address for the copy function.

The basic Model 610 Tape Cassette System features Paging, which reverses the tape by one block to permit editing recorded data, and Search, a bidirectional address search performed at 120 inches/second. Two Feature Group options are available.

Feature Group D adds Read-After-Write, Protected Format, List, and Edit operations. Protected Format allows fixed formats to be recorded for later use. List permits off-line printing of a single block, multiple blocks, or all recorded data on the cassette. Edit allows the operator to selectively edit single blocks of data or to copy an entire tape on a second cassette.

Feature Group E combines two additional features with those of Group D: ASCII Record Separators can be used as file delimiters, blink characters, and cursor indication sequences; and Alphanumeric Identifier Search permits the use of a search key that corresponds to data within the initial 16 characters of a tape block. In addition, Feature Group E permits copying to an address.

COMPONENTS

CRT DISPLAY: The following standard display arrangements are available:

Characters/display:	960	1024	1536	1920
Lines/display:	12	16	24	24
Characters/line:	80	64	64	80

The viewing area is 10 inches wide by 7 inches high. The standard character set contains 64 symbols including upper case alphabetics, numerics, and special symbols; an optional set of 96 symbols provides lower case alphabetics as well. Data is displayed in green. Characters are formed via a 9-by-7 dot matrix.

KEYBOARD: A typewriter-style keyboard is available with a character set of 64 or 96 characters. The 96-character keyboard includes upper and lower case alphabetics. A numeric pad to the right of the main keygroup is standard. Cursor control keys are grouped to the left. Two rows of function keys are arranged over the main keygroup. Twenty-two Program Address (PA) keys are standard. Character sets for several European character sets, plus Katakana, are available. A magnetic stripe reader that reads ABA or IATA code can optionally be attached to the keyboard.

PRINTED OUTPUT: Three printers are available for the UTS 400: the non-impact Model 800 Terminal Printer, the impact-type Communications Output Printer, the 0786 serial impact printer, and the 0791 Correspondence Quality Printer.

The Model 800 provides 80 print positions and prints at 300 char./second using an electrostatic technique. The printer provides the full upper and lower case 96-character ASCII character set and forms each character via a 7-by-9 dot matrix. Horizontal pitch is 10 char./inch, and vertical spacing is 6 lines/inch.

The Communications Output Printer performs at 30 char./second using a 63-symbol print set. The print set is specified by the user from available sets that include ASCII, EBCDIC, A/H (Univac business or scientific), or ECMA/ISO (international). The unit prints 132 columns per line. Horizontal pitch is 10 char./inch, and vertical spacing is 6 lines/inch. The printer accommodates six-part continuous forms or three-part carbonless forms from 3⅝ inches to 14⅞ inches wide and up to 11 inches long. Forms are fed at 30 lines/second (manual feed); skipping speed is 12 inches or 72 lines per second. A variable forms length option handles forms up to 999 lines in length.

The 0786 Printer is an impact matrix printer and is available as a unidirectional or bidirectional printer. The printer is equipped with 132 print positions and is rated at 200 characters/second—37 lines/minute or 75 lines/minute for the bidirectional version. Several character sets are available including 64- or 96-character ASCII as well as European and other national sets. The 96-character set includes upper and lower case symbols. Each character is formed via 7-by-7 dot matrix. Horizontal and vertical spacing is 10 char- ▶

Sperry Univac UTS 400
Universal Terminal System

▶ acters/inch and 6 lines/inch, respectively. The printer accommodates continuous, 6-part forms from 1.6 to 15.3 inches wide and from 3 to 17 inches long. Format control is implemented via a two-channel tape loop. The printer includes a two-position stacker and stand.

The 0791 Correspondence Quality Printer is a table-top daisy wheel printer that operates bidirectionally at 45 characters per second. A selection of 96-character daisy wheel fonts is available and provides a variety of face styles and languages, including OCR-A and OCR-B. Horizontal and vertical spacing are operator- or program-selectable at 10 or 12 characters per inch and 6 or 8 lines per inch, respectively. The 10 cpi spacing produces a 132-character line; the 12 cpi spacing, a 158-character line. Vertical formatting, margin selection, and other print parameters are also operator- or program-selectable. The printer accommodates cut forms of up to 15 inches in width, friction-fed continuous forms of various widths, pin-fed forms 9, 9.375, or 14.375 inches wide, or sprocketed card stock. A bottom feed mechanism is optional.

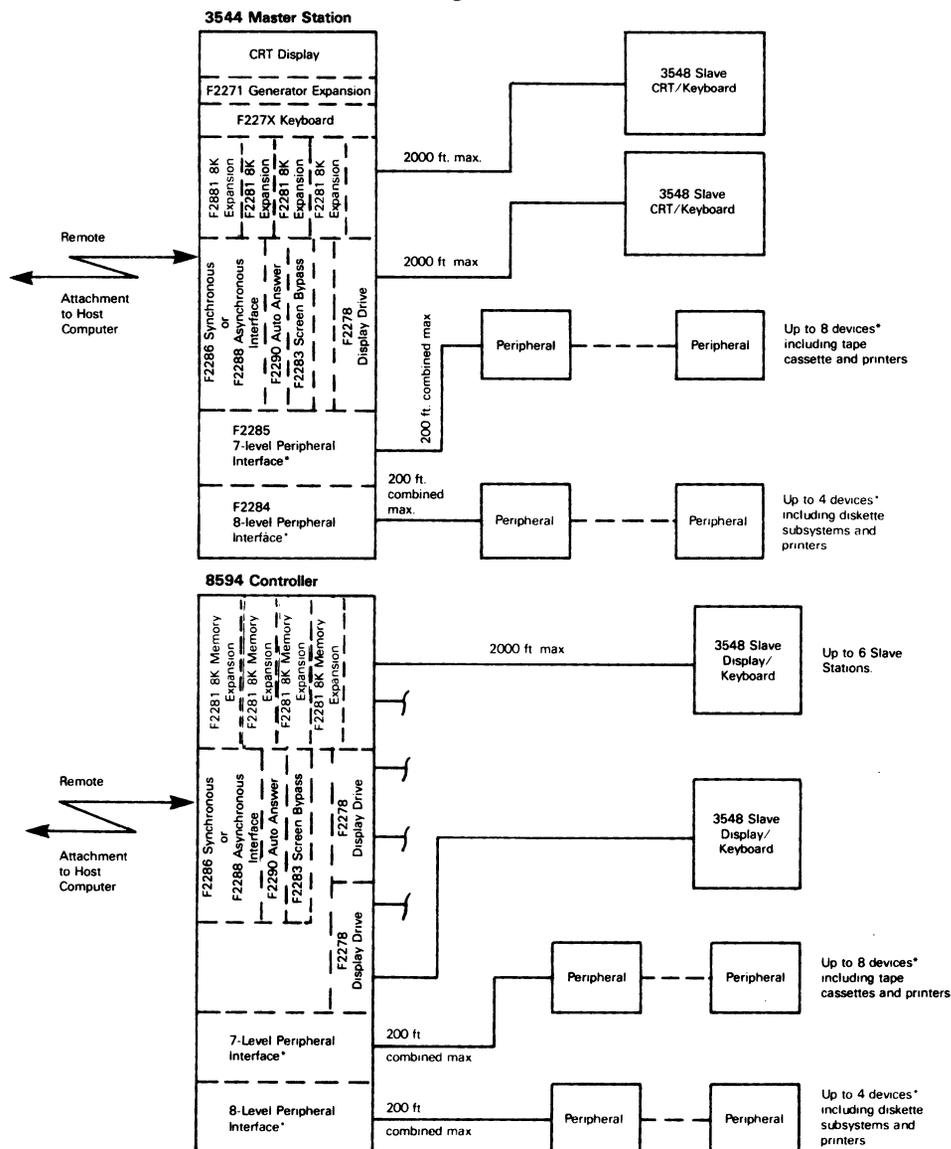CASSETTE TAPE: The Model 610 Tape Cassette System features two independent cassette tape recorders with shared electronics and a common interface to the seven-level peripheral interface of the UTS 400. Each drive accommodates a Philips-type cassette containing 300 feet of 0.15-inch-wide magnetic tape. Data is recorded serially at 800 bits/inch using phase encoding. On-line data storage is rated at 700,000 characters per cassette or 1.4 million characters per system. Tape speeds are 6 inches/second for reading and writing, 6 or 120 inches/second for searching, and 120 inches/second for rewinding.

DISKETTE: The 8406 Diskette Subsystem contains one or two diskette drives that read or write data upon the command of the UTS 400 or host computer. Each diskette has a capacity of 256K bytes. The diskette is organized into 77 data tracks, each divided into 26 sectors of 128 bytes each. Average access time is 260 milliseconds, with an average rotational delay of 83 milliseconds. The data transfer rate is 31,250 bytes/second. Up to four dual-diskette systems can be connected to the UTS 400 via the eight-level peripheral interface.

PRICING

The UTS 400 system is available for purchase or on a one-year or five-year lease. A separate maintenance contract is available with either arrangement. ▶
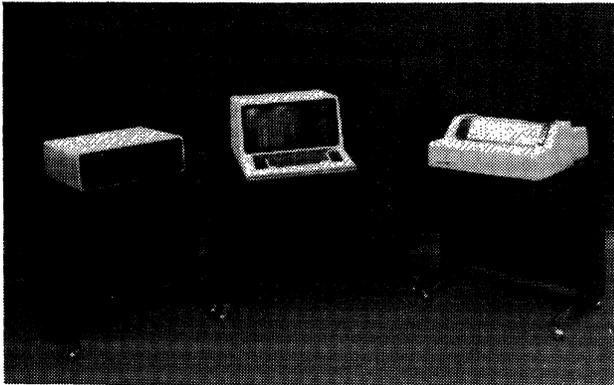
Configurations

*The UTS 400 has 12 device addresses; each printer requires 1 address; each dual cassette unit requires 4 device addresses and counts as 2 devices; each diskette drive requires 2 addresses.

Sperry Univac UTS 400
Universal Terminal System

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		Monthly Charge*			
		1-Year Lease	5-Year Lease	Purchase	Monthly Maint.
·3544-95	UTS 400 Master Station Display; includes 15-inch display without keyboard and a 64-character set generator; accommodates one or two slave display stations; the second slave station; requires F2278-00; requires F2286 or F2288 communications interface	$216	$156	$4,590	$61
8594-98	UTS 400 Terminal Controller; accommodates up to six UTS 400 Slave Stations; requires F2278-00 Display Drive for 3rd and 5th slave on controller; requires F2286 or F2288 communications interface	144	101	3,264	33
3548-95/-96	UTS 400 Slave Station Display; includes 15-inch display without keyboard, a 64-character set generator, and display control	118	97	3,000	32
F2278-00	Display Drive; accommodates two UTS 400 Slave Display Stations	15	11	440	2
F2271-01	Generator Expansion; expands 64-character generator to 96 characters	19	15	640	0
F2271-02	Katakana Character Expansion; expands 64-character generator to 128 characters	22	17	760	0
F2273-00/-99	Keyboard, 64- or 96-character	26	21	760	4
F2275-00	Keyboard, Katakana	35	27	1,040	4
F3187-00	Magnetic Stripe Reader	25	20	600	5
F3372-00	Keyboard Keylock	—	—	95	—
	Synchronous Interface:				
F2286-00	RS-232	24	19	680	4
F2286-01	MIL 188B	24	19	680	4
	Asynchronous Interface:				
F2288-00	RS-232	24	19	680	4
F2288-01	MIL 188B	24	19	680	4
F2285-00	Peripheral Interface, 7 level; accommodates up to 8 devices	15	12	520	0
F2284-01	Peripheral Interface, 8 level; accommodates up to 4 devices	18	14	600	0
F2281-00	Storage Expansion, 8K bytes; for Master Station Display or Terminal Controller; 3 max.	42	32	1,320	4
F2281-97	COBOL Memory; for interpretive execution of UTS COBOL programs when 24K of memory is already installed; max. 1; mutually exclusive with F2999-00	42	32	1,320	4
F2999-00	Character Protect Mode; provides Protected Format on a character basis; mutually exclusive with F2281-00	25	20	870	2
F2290-00	Auto Answer/Hang Up	—	—	120	1
F2283-00	Screen Bypass	23	18	720	2
8406-00/-02	Diskette Drive; 256K bytes; requires F2284 8-Level Peripheral Interface	119	95	3,360	21
F2338-00/-02	Drive Expansion; adds second 256K-byte drive; one max.	42	34	1,040	11
0791-99	Correspondence Quality Printer; 45 cps; rear paper feed	312	250	6,550	69
0791-97	Correspondence Quality Printer; 45 cps; bottom paper feed; requires F3314-00	321	259	6,742	71
F3313-00/01/02	Pin-Feed Platen; available in 9.0, 9.375, and 14.375 inch pin-to-pin widths	—	—	260	—
F3316-00	Forms Tractor	23	16	600	3
F3540-00	Cut Sheet Feeder	77	63	1,932	14
F3314-00	Printer Stand	—	—	225	—
0786-00	Receive only Unidirectional Matrix Printer in separate cabinet with stand	171	146	4,540	38
0786-02	Receive only Bidirectional Matrix Printer in separate cabinet with standard full-line buffer	241	212	6,594	64
F2656-01	Terminal Interface—7 Bit; attaches the 0786 Printer to the F2285 7-Level Peripheral Interface	11	9	422	0
F2656-03	Terminal Interface—8 Bit; attaches the 0786 Printer to the F2284 8-Level Peripheral Interface	11	9	422	0
F2696-00	Speed Upgrade; provides bidirectional printing and full line buffer for 0786-00 unidirectional printer	69	·65	1,710	25
F2648-00	Document parting bar; permits removal of single forms without removing paper from tractors	4	3	114	1
F2646-00	6/8 LPI Feature; switch selection of 6 or 8 lines per vertical inch	5	4	152	1
F2647-00	Vertical Form Unit; provides vertical format control via a 2-channel tape loop; 6 lpi spacing only	7	6	228	1
F2647-02	Vertical Form Unit; provides vertical format control via a 2-channel tape loop; 8 lpi spacing only; requires F2646-00	7	6	228	1
0774-07/-08	Model 800 Receive Only Printer	72	57	1,940	21
F2394-00	Printer Interface—7 Bit; attaches the Model 800 Printer to the 7-Level Peripheral Interface	10	7	380	0
F2394-01	Printer Interface—8 Bit; attaches the Model 800 Printer to the 8-Level Peripheral Interface	10	7	380	0
8541-06	Communications Output Printer; attaches to F2285-00 7-Level Peripheral Interface	114	92	2,596	36
F1780-00	Variable Forms Length	7	6	195	1
0866-97	Model 610 Tape Cassette System; provides two cassette tape drives and attaches to the F2285-00 7-Level Peripheral Interface	96	73	1,947	34
F2142-00	Feature Group D	15	11	577	0
F2142-01	Feature Group E	26	20	906	0

*Includes prime-shift maintenance.■

JULY 1982

Sperry Univac UTS 400
Universal Terminal System

This UTS 400 system includes the Master Station in the middle with display/keyboard, the standard dual diskette drive on the left, and the 200 cps 0786 matrix printer on the right.

MANAGEMENT SUMMARY

Although certain members of Sperry Univac's newly introduced UTS 4000 family can effectively replace the UTS 400, this older product line will continue to be marketed, and is in fact more cost-effective than the newer one in certain configurations. However, it is anticipated that no further enhancements will be made to the system.

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A general-purpose display terminal system that comes in stand-alone or cluster configurations.

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A basic stand-alone configuration including one CRT/keyboard, 8K bytes user memory, a single diskette drive, a 200-cps printer and 9600 bps interface costs $581 per month, including maintenance, on a one-year lease.

A multi-station configuration with four CRT/keyboards, two diskette drives, 200-cps bidirectional printer, 16K bytes user memory, and 9600 bps interface costs $1,203 per month, including maintenance on a one-year lease.

CHARACTERISTICS

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DATE OF ANNOUNCEMENT: April 1976.

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NUMBER DELIVERED TO DATE: Information not available.

SERVICED BY: Sperry Univac.

CONFIGURATION

The microprocessor-based UTS 400 Universal Terminal System consists of alphanumeric display stations and peripheral options that can be configured as stand-alone or clustered terminals in the following arrangements:

● **Stand-alone**—a Master Station with optional peripherals.

● **Cluster**—a Master Station with one or two slave stations that share the Master's optional peripherals.

● **Cluster**—a Controller with up to six slave stations that share the Controller's optional peripherals.

Each slave station can be located up to 2000 cable-feet from its Master or Controller. Keyboards can be located up to 10 feet from the corresponding display unit. Peripherals are connected in a chaining arrangement with total cable length (combined for all devices) of up to 200 feet for each peripheral interface. The UTS 400 can be located up to 50 feet from a modem or 5000 feet from a multiplexer.

The basic UTS 400 comes with no user-accessible memory. However, one to three 8K-byte memory expansions can be ▶

Sperry Univac UTS 400
Universal Terminal System

▷ Peripherals include four printer models (a 30-cps impact printer, a 200-cps uni- or bi-directional impact printer, a 45-cps correspondence-quality printer, and a 300-cps non-impact printer), a dual tape cassette subsystem, and a single or dual diskette subsystem. As many as twelve printers in almost any mix of models, as many as three dual cassette systems, or as many as four dual diskette drives can be attached to a UTS 400 Master or Cluster Controller. The actual number and mix of peripherals that can be attached are limited by address and device restrictions explained in the Characteristics section of this report. All peripherals in a cluster arrangement are shared by the workstations.

USER REACTION

In Datapro's 1980 survey of alphanumeric display terminal users, 11 users reported on their experience with 232 Sperry Univac UTS 400 terminals. In the 1980 survey on user-programmable terminals, 2 additional users with a total of 70 UTS 400's responded. The ratings of these 13 users are presented below:

	Excellent	Good	Fair	Poor	WA*
Overall performance	4	8	1	0	3.2
Ease of operation	5	7	1	0	3.3
Ease of programming	0	1	1	0	**
Manufacturer's software	0	1	1	0	**
Display clarity	4	6	0	0	3.4
Keyboard feel and usability	3	6	1	1	3.0
Hardware reliability	4	5	3	1	2.9
Maintenance service	4	5	4	0	3.0

*Weighted Average on a scale of 4.0 for Excellent.
**Weighted Average is regarded as invalid for fewer than three responses.

We contacted three of these users by phone, including the two who were using the user-programmable capabilities of their units and one whose terminals operate only in Uniscope emulation mode, and inquired further about their experience with the UTS 400. All three users agreed that in general, the UTS 400 has served them well.

None has had any notable hardware or software problems. One of the users thought that the small memory size is somewhat restrictive, and cautioned prospective buyers to be realistic about the unit's capabilities. He also felt that programming the UTS 400, especially when using the MAC 80 assembler, requires a fairly competent person who is thoroughly familiar with the system's functions, and that the COBOL package uses too much memory to be particularly useful. Two of the users felt that Sperry Univac's software support is somewhat limited, both in terms of the small number of off-the-shelf applications programs available, and in terms of the low priority placed on UTS 400 software support by Sperry Univac field engineers.

Two of the users felt that the UTS 400 is relatively expensive for the functionality it provides, but one of the two pointed out that when compared to some intelligent, but ▷

▶ added to the basic system, providing a maximum of 24K bytes of memory. When the COBOL programming package is used, a fourth 8K increment can be added, for a total capacity of 32K bytes.

Peripherals include the Model 610 Tape Cassette System, the Model 8406 Diskette Subsystem, the Model 800 Terminal Printer, the Communications Output Printer, the Model 0786 Printer, and the Model 0791 Correspondence Quality Printer.

All peripherals are attached via a peripheral interface. Two peripheral interfaces are available: seven-level and eight-level. The seven-level interface accommodates the tape cassette system, the Communications Output Printer, the Model 800 Printer, and the Model 0786 Printer. The eight-level interface accommodates the diskette subsystem and all printers except the Communications Output Printer. A total of eight devices can be attached to the seven-level interface and a total of four devices can be attached to the eight-level interface. The UTS 400 will support one interface of each type.

A total of 12 device addresses are available on the UTS 400 system, and one or more device addresses are required by each peripheral: a printer requires one device address; a diskette subsystem, two device addresses per drive; and a cassette tape unit, four device addresses. Any combination of peripheral devices may be configured with the system, using either or both of the interfaces as appropriate, as long as the total number of device addresses does not exceed 12.

TRANSMISSION SPECIFICATIONS

Transmission is asynchronous or synchronous in the half-duplex mode. Asynchronous speeds range from 300 to 2400 bits/second, while synchronous speeds range up to 9600 bits/second. Transmission speed is determined by the internal clock of the specified modem. The transmission code is eight-level ASCII, including parity.

The UTS 400 is equipped with an EIA Standard RS-232-C, CCITT V.24, or MIL Std. 188 interface and operates over a voice-band leased or switched facility via a modem. External modems available from Sperry Univac provide compatibility with the Bell System (U-201) or 202 (U-202) Data Sets.

The UTS 400 system can operate in a multipoint environment with Sperry Univac Uniscope 100 and 200 terminals. An auto answer/hang-up feature is available for operation on the dial network.

SOFTWARE

User programs may be written in either MAC 80 or, optionally, in UTS 400 COBOL.

MAC 80 is an Intel assembler language that is provided with the basic UTS 400 system. MAC 80 permits the user to interface with the UTS 400 firmware as well as to perform applications programs. The MAC 80 package includes SMS 400, a screen management utility that provides a set of control routines that can initialize and display screen formats, validate input fields, control I/O functions and perform other tasks that simplify program development. A variety of other utility routines are also available for use with MAC 80.

UTS 400 COBOL conforms to ANSI Standard X3.23-1974 with extensions that accommodate specific UTS 400 features, such as syntax for interactive data entry and program control, screen management and data formatting, and compressing. Under UTS 400 COBOL, files may be either sequentially or randomly accessed and either formatted or ⟩

Sperry Univac UTS 400
Universal Terminal System

▷ non-programmable terminals, its cost might be justifiable by the line time saved in being able to do some local format storage and processing.□

▶ unformatted. Multiple files are also supported. Files may be dedicated to a specific workstation or shared, reassigned from one device to another similar device, or changed from dedicated to shared status. COBOL program execution requires 32K bytes of user memory.

Applications programs must be assembled or compiled by the host processor and are conveyed to the UTS 400 via the communications facility. The received programs can be stored locally on diskette or cassette tape for operating convenience. Alternatively, application programs can reside at the host processor, and retrieval can be initiated by the terminal operator, by the UTS 400 program, or by an application program running at the host. In clustered arrangements, only one program can be in effect at a time. A multi-part application program can allow the individual workstations to be doing different things, but the different operations must be combined into a single program.

Examples of tasks that can be implemented via user-written software include data validation, such as restricting entries; range checking and comparison checking; data formatting/ reformatting, such as changing the order of information or excluding information; data creation, such as from tables; data editing; general logical operations; arithmetic operations; security checks, such as the use of passwords or of code sequences; highlighting invalid entries or items requiring operator attention; display of prompting sequences for operator guidance; and text compression on transfer. Via program control, specific keys can be assigned specific functions that will initiate programmed tasks, including any of those mentioned above.

Other UTS 400 software includes an IBM 3741 converter and an edit processor. The 3741 subroutine converts the data code and format of a UTS 400 diskette to IBM 3741-compatible data code and format, and vice versa. The edit processor is a stand-alone utility that permits large files to be created and updated on the UTS 400 without the assistance of the host, and includes functions for line insertion, deletion, and changes in any sequence, forward or backward.

DEVICE CONTROL

UNIVAC provides for basic terminal operations via ROM-resident firmware.

Data is transmitted to the remote computer when the terminal is interrogated via a polling message following operator initiation of the transmit function. Data entry is not normally interrupted by an unsolicited computer message; however, the operator is alerted to the pending message and can respond when ready by initiating the Message Waiting function. Via program control, the remote computer can override any operator action and display an urgent message without waiting. Displayed data can be transferred to a peripheral device (printer, diskette, or cassette unit) by manual initiation (Print or Transfer key) or automatically under program control.

Two options, the Buffer Pool and Screen Bypass features, can improve the operating performance. The Buffer Pool provides buffering between the display memory and peripherals to expedite screen-to-device data transfers so that fresh data can be immediately keyed. The Screen Bypass feature transfers data received from the host processor directly to the addressed peripheral to permit concurrent operator/display functions.

Cursor direction controls move the cursor in any of four directions (left, right, up, and down) and are designed for either step-by-step or repetitive operation. The cursor can also be returned to home position (initial display position) or to the beginning of the next line (carriage return). Tabulation allows the cursor to be advanced to the first position following the next tab stop to the right (tab forward) or to the left (tab backward) of the current position. The cursor is returned to the home position if a horizontal tab character is not located between the cursor and the end or beginning of the screen, respectively. The cursor and the character located at the cursor position blink alternately so that the cursor position can be easily located. The cursor also blinks when positioned over a nondisplayable (blanked) character other than the space character.

Edit controls provide insert, delete, and erase functions. Both line and display insert and delete functions are standard. Insertion or deletion within a line affects all data to the right of the cursor up to the end of the current line. Display insertion or deletion affects all data following the cursor up to the last displayable position of the screen. When formatted data is displayed, these functions affect only the variable fields; the fixed fields (format descriptors) are protected from inadvertent alteration.

The standard erase functions include character, line, field, and screen erase. Character erase erases the character at the cursor position. Line erase erases all data from the cursor to the end of the line. Character and line erasure erases only "unprotected" fields. Two types of screen erasure are standard: one erases all "unprotected" fields, and the other erases all data. Screen erasure begins at the cursor position.

Other standard functions include Cycle, Line Duplication, and Roll. Cycle is a character repeat feature. Line Duplication permits any displayed line to be duplicated via operator or program control; this feature facilitates setting up formats or entering repetitious data instead of rekeying. The Roll feature is implemented via software, using line insert and delete functions. Special function keys can be software-designated to perform the Roll function.

Program Attention keys are used to initiate program-designated functions; 22 PA keys are standard.

Field Control Mode, a standard feature, permits a terminal- or computer-generated format to be displayed. The parameterized format program uses field control (attribute) characters to specify display characteristics, delimit fields, set tab stops, and indicate whether a field has or has not been modified by the operator. Display characteristics feature high (normal) and low beam intensity, blanking (beam off), and blinking. Fields can be identified as alphabetic only, numeric only, alphanumeric, protected, and right-justified alphanumeric, alphabetic, or numeric. Besides specifying the field attribute, a field control character can double as a tab stop. The field control character (FCC) occupies a memory location, but not a screen location; up to 15 FCC's can be used in each displayed line. In the optional Character Protect Mode, individual characters within a field can be format-protected in addition to all FCC attributes, and non-significant spaces in unprotected fields can be suppressed for transmission.

A special compatibility feature permits UTS 400 operation using FCC's in a Uniscope 100 and 200 environment; these terminals do not recognize FCC codes. An operator switch establishes Uniscope compatibility via conversion between the protected field FCC's and the protected format code used by the Uniscope terminals. This feature provides some FCC capabilities without requiring application software changes.

The Control Page, also a standard feature, is a two-line control program containing I/O device operating status and operator-keyed device commands that are executed upon ▶

Sperry Univac UTS 400 ᶦ
Universal Terminal System

the depression of the corresponding function keys. The Control Page, called from memory and displayed by the depression of the Control Page key, permits the operator to examine device status and program input and output commands to specified I/O devices. Any data displayed on the first two lines when the Control Page is called is temporarily stored and is returned when the Control Page is removed from the screen. Two input devices, two output devices, and two device functions can be specified by the Control Page at one time.

Functions include data transfer, copy, edit, return-to-home (diskette), rewind (cassette tape), auto-transmit, read, and diskette preparation. All data transfer functions use the display buffer to transfer data from one device to another or from a device to the data communications facility; therefore, the transferred data is displayed. The copy function transfers all data from one device to another. The edit function performs the same operation, but permits operator manipulation of the transferred data. Auto-transmit transmits data read from a device; after the first page has been transmitted, successive pages are transmitted at the request of the host processor. The read function transfers one page of data to the screen for each key depression. Diskette preparation clears and reformats the specified diskette. Displayed status information includes the current status and storage address of the selected device.

There are three types of commands for print, transfer, and transmit functions. Each command operates on the data between the Home or Start-of-Entry position and the cursor. All three print commands print all data, but FCC's are not printed. Spaces can be substituted for protected characters, or carriage return codes can be suppressed with non-suppression of spaces. The transfer and transmit functions are identical with respect to the data acted upon. The commands can transfer/transmit all data including FCC's, all unprotected data including FCC's for each field transferred or transmitted, or only the data and FCC from each field that has been modified.

The Control Page also contains a 23-character field to define search instructions to be performed by the designated devices or to define the termination address for the copy function.

The basic Model 610 Tape Cassette System features Paging, which reverses the tape by one block to permit editing recorded data, and Search, a bidirectional address search performed at 120 inches/second. Two Feature Group options are available.

Feature Group D adds Read-After-Write, Protected Format, List, and Edit operations. Protected Format allows fixed formats to be recorded for later use. List permits off-line printing of a single block, multiple blocks, or all recorded data on the cassette. Edit allows the operator to selectively edit single blocks of data or to copy an entire tape on a second cassette.

Feature Group E combines two additional features with those of Group D: ASCII Record Separators can be used as file delimiters, blink characters, and cursor indication sequences; and Alphanumeric Identifier Search permits the use of a search key that corresponds to data within the initial 16 characters of a tape block. In addition, Feature Group E permits copying to an address.

COMPONENTS

CRT DISPLAY: The following standard display arrangements are available:

Characters/display:	960	1024	1536	1920
Lines/display:	12	16	24	24
Characters/line:	80	64	64	80

The viewing area is 10 inches wide by 7 inches high. The standard character set contains 64 symbols including upper case alphabetics, numerics, and special symbols; an optional set of 96 symbols provides lower case alphabetics as well. Data is displayed in green. Characters are formed via a 9-by-7 dot matrix.

KEYBOARD: A typewriter-style keyboard is available with a character set of 64 or 96 characters. The 96-character keyboard includes upper and lower case alphabetics. A numeric pad to the right of the main keygroup is standard. Cursor control keys are grouped to the left. Two rows of function keys are arranged over the main keygroup. Twenty-two Program Address (PA) keys are standard. Character sets for several European character sets, plus Katakana, are available. A magnetic stripe reader that reads ABA or IATA code can optionally be attached to the keyboard.

PRINTED OUTPUT: Three printers are available for the UTS 400: the non-impact Model 800 Terminal Printer, the impact-type Communications Output Printer, the 0786 serial impact printer, and the 0791 Correspondence Quality Printer.

The Model 800 provides 80 print positions and prints at 300 char./second using an electrostatic technique. The printer provides the full upper and lower case 96-character ASCII character set and forms each character via a 7-by-9 dot matrix. Horizontal pitch is 10 char./inch, and vertical spacing is 6 lines/inch.

The Communications Output Printer performs at 30 char./second using a 63-symbol print set. The print set is specified by the user from available sets that include ASCII, EBCDIC, A/H (Univac business or scientific), or ECMA/ISO (international). The unit prints 132 columns per line. Horizontal pitch is 10 char./inch, and vertical spacing is 6 lines/inch. The printer accommodates six-part continuous forms or three-part carbonless forms from 3⅝ inches to 14⅞ inches wide and up to 11 inches long. Forms are fed at 30 lines/second (manual feed); skipping speed is 12 inches or 72 lines per second. A variable forms length option handles forms up to 999 lines in length.

The 0786 Printer is an impact matrix printer and is available as a unidirectional or bidirectional printer. The printer is equipped with 132 print positions and is rated at 200 characters/second—37 lines/minute or 75 lines/minute for the bidirectional version. Several character sets are available including 64- or 96-character ASCII as well as European and other national sets. The 96-character set includes upper and lower case symbols. Each character is formed via 7-by-7 dot matrix. Horizontal and vertical spacing is 10 characters/inch and 6 lines/inch, respectively. The printer accommodates continuous, 6-part forms from 1.6 to 15.3 inches wide and from 3 to 17 inches long. Format control is implemented via a two-channel tape loop. The printer includes a two-position stacker and stand.

The 0791 Correspondence Quality Printer is a table-top daisy wheel printer that operates bidirectionally at 45 characters per second. A selection of 96-character daisy wheel fonts is available and provides a variety of face styles and languages, including OCR-A and OCR-B. Horizontal and vertical spacing are operator- or program-selectable at 10 or 12 characters per inch and 6 or 8 lines per inch, respectively. The 10 cpi spacing produces a 132-character line; the 12 cpi spacing, a 158-character line. Vertical formatting, margin selection, and other print parameters are also operator- or program-selectable. The printer accommodates cut forms of up to 15 inches in width, friction-fed continuous forms of various widths, pin-fed forms 9, 9.375, or 14.375 inches wide, or sprocketed card stock. A bottom feed mechanism is optional.

Sperry Univac UTS 400
Universal Terminal System

CASSETTE TAPE: The Model 610 Tape Cassette System features two independent cassette tape recorders with shared electronics and a common interface to the seven-level peripheral interface of the UTS 400. Each drive accommodates a Philips-type cassette containing 300 feet of 0.15-inch-wide magnetic tape. Data is recorded serially at 800 bits/inch using phase encoding. On-line data storage is rated at 700,000 characters per cassette or 1.4 million characters per system. Tape speeds are 6 inches/second for reading and writing, 6 or 120 inches/second for searching, and 120 inches/second for rewinding.

DISKETTE: The 8406 Diskette Subsystem contains one or two diskette drives that read or write data upon the command of the UTS 400 or host computer. Each diskette has a capacity of 256K bytes. The diskette is organized into 77 data tracks, each divided into 26 sectors of 128 bytes each. Average access time is 260 milliseconds, with an average rotational delay of 83 milliseconds. The data transfer rate is 31,250 bytes/second. Up to four dual-diskette systems can be connected to the UTS 400 via the eight-level peripheral interface.

PRICING

The UTS 400 system is available for purchase or on a one-year or five-year lease. A separate maintenance contract is available with either arrangement.

Configurations

*The UTS 400 has 12 device addresses; each printer requires 1 address; each dual cassette unit requires 4 device addresses and counts as 2 devices; each diskette drive requires 2 addresses.

Sperry Univac UTS 400
Universal Terminal System

		Monthly Charge*			
		1-Year Lease	5-Year Lease	Purchase	Monthly Maint.
3544-95	UTS 400 Master Station Display; includes 15-inch display without keyboard and a 64-character set generator; accommodates one or two slave display stations; the second slave station; requires F2278-00; requires F2286 or F2288 communications interface	$195	$138	$4,590	$48
8594-98	UTS 400 Terminal Controller; accommodates up to six UTS 400 Slave Stations; requires F2278-00 Display Drive for 3rd and 5th slave on controller; requires F2286 or F2288 communications interface	153	112	3,264	48
3548-95/-96	UTS 400 Slave Station Display; includes 15-inch display without keyboard, a 64-character set generator, and display control	108	87	3,000	25
F2278-00	Display Drive; accommodates two UTS 400 Slave Display Stations	14	11	440	2
F2271-01	Generator Expansion; expands 64-character generator to 96 characters	18	14	640	0
F2271-02	Katakana Character Expansion; expands 64-character generator to 128 characters	21	16	760	0
F2273-00/-99	Keyboard, 64- or 96-character	25	20	760	4
F2275-00	Keyboard, Katakana	33	26	1,040	4
F3187-00	Magnetic Stripe Reader	25	20	600	5
F3372-00	Keyboard Keylock	—	—	95	—
	Synchronous Interface:				
F2286-00	RS-232	23	18	680	4
F2286-01	MIL 188B	23	18	680	4
	Asynchronous Interface:				
F2288-00	RS-232	23	18	680	4
F2288-01	MIL 188B	23	18	680	4
F2285-00	Peripheral Interface, 7 level; accommodates up to 8 devices	14	11	520	0
F2284-01	Peripheral Interface, 8 level; accommodates up to 4 devices	17	13	600	0
F2281-00	Storage Expansion, 8K bytes; for Master Station Display or Terminal Controller; 3 max.	38	29	1,320	2
F2281-97	COBOL Memory; for interpretive execution of UTS COBOL programs when 24K of memory is already installed; max. 1; mutually exclusive with F2999-00	40	31	1,320	4
F2999-00	Character Protect Mode; provides Protected Format on a character basis; mutually exclusive with F2281-00	24	19	870	2
F2290-00	Auto Answer/Hang Up	4	3	120	1
F2283-00	Screen Bypass	22	17	720	2
8406-00/-02	Diskette Drive; 256K bytes; requires F2284 8-Level Peripheral Interface	112	89	3,360	19
F2338-00/-02	Drive Expansion; adds second 256K-byte drive; one max.	39	32	1,040	10
0791-99	Correspondence Quality Printer; 45 cps; rear paper feed	293	235	6,550	63
0791-97	Correspondence Quality Printer; 45 cps; bottom paper feed; requires F3314-00	302	243	6,742	65
F3313-00/01/02	Pin-Feed Platen; available in 9.0, 9.375, and 14.375 inch pin-to-pin widths	—	—	260	—
F3316-00	Forms Tractor	22	15	600	3
F3540-00	Cut Sheet Feeder	73	59	1,932	13
F3314-00	Printer Stand	—	—	225	—
0786-00	Receive only Unidirectional Matrix Printer in separate cabinet with stand	161	137	4,540	35
0786-02	Receive only Bidirectional Matrix Printer in separate cabinet with standard full-line buffer	227	199	6,250	59
F2656-01	Terminal Interface—7 Bit; attaches the 0786 Printer to the F2285 7-Level Peripheral Interface	10	8	400	0
F2656-03	Terminal Interface—8 Bit; attaches the 0786 Printer to the F2284 8-Level Peripheral Interface	10	8	400	0
F2696-00	Speed Upgrade; provides bidirectional printing and full line buffer for 0786-00 unidirectional printer	65	61	1,710	23
F2648-00	Document parting bar; permits removal of single forms without removing paper from tractors	4	3	114	1
F2646-00	6/8 LPI Feature; switch selection of 6 or 8 lines per vertical inch	5	4	152	1
F2647-00	Vertical Form Unit; provides vertical format control via a 2-channel tape loop; 6 lpi spacing only	7	6	228	1
F2647-02	Vertical Form Unit; provides vertical format control via a 2-channel tape loop; 8 lpi spacing only; requires F2646-00	7	6	228	1
0774-07/-08	Model 800 Receive Only Printer	72	57	1,940	21
F2394-00	Printer Interface—7 Bit; attaches the Model 800 Printer to the 7-Level Peripheral Interface	10	7	380	0
F2394-01	Printer Interface—8 Bit; attaches the Model 800 Printer to the 8-Level Peripheral Interface	10	7	380	0
8541-06	Communications Output Printer; attaches to F2285-00 7-Level Peripheral Interface	114	92	2,596	36
F1780-00	Variable Forms Length	7	6	195	1
0866-97	Model 610 Tape Cassette System; provides two cassette tape drives and attaches to the F2285-00 7-Level Peripheral Interface	96	73	1,947	34
F2142-00	Feature Group D	15	11	577	0
F2142-01	Feature Group E	26	20	906	0

*Includes prime-shift maintenance.■

UNIVAC UTS 400 Universal Terminal System

MANAGEMENT SUMMARY

UNIVAC introduced the UTS 400 Universal Terminal System as one of three members of a new family of intelligent terminals that also includes the UTS 700 Remote Batch Terminal and the UTS 400 Text Editor, a special-purpose version of the UTS 400 for the printing and publishing industry.

The UTS 400 is a general-purpose, user-programmable, microprocessor-based alphanumeric display terminal that can be configured in stand-alone or cluster arrangements. Cluster arrangements can contain up to three or six display workstations. As many as 16 stand-alone and clustered terminals in any mix can be attached to a communications facility via a multiplexer. What's more, the UTS 400 terminals can be mixed with Uniscope 100 and 200 display terminals on the same multiplexer, which can be cascaded to a second level to accommodate additional Uniscope terminals.

All workstations in a cluster are controlled by a microprocessor (equivalent to the Intel 8080) under the direction of ROM (read-only memory) resident firmware. The terminal is available with 8K to 24K bytes of user-addressable semiconductor memory, supplied in 8K-byte increments, for user program storage. User programs are generated on the host processor via UNIVAC programming languages and are loaded in the terminal memory via the communications facility, a technique referred to as *downline loading*. User programs can be loaded onto diskette or cassette tape at the terminal for immediate retrieval. ▷

User programmable terminal supporting up to three or six CRT/keyboard stations.

Peripheral options include magnetic tape cassette drives, diskette drives, and printers.

A basic standalone configuration including one CRT/keyboard, 8K bytes user memory, a single diskette drive, a 200-cps printer and 9600 bps interface costs $585 per month, including maintenance, on a one-year lease.

A multi-station configuration with four CRT/keyboards, two diskette drives, 200-cps bidirectional printer, 16K bytes user memory, and 9600 bps interface costs $1,141 per month, including maintenance on a one-year lease.

CHARACTERISTICS

VENDOR: UNIVAC Division, Sperry Rand Corporation, P.O. Box 500, Blue Bell, Pennsylvania 19422. Telephone (215) 542-4011.

DATE OF ANNOUNCEMENT: April 1976.

DATE OF FIRST DELIVERY: September 1976.

NUMBER DELIVERED TO DATE: –

SERVICED BY: UNIVAC. ▶

This UTS 400 system includes the Master Station in the middle with display/keyboard, the standard dual diskette drive on the left, and the 200 cps 0786 matrix printer on the right.

UNIVAC UTS 400 Universal Terminal System

▷ The salient features of the UTS 400 are described below.

- *Display capacity*—screen sizes of 960, 1024, 1536, and 1920 characters are available and can be mixed in the same cluster.

- *Character set*—the 64-character ASCII set is standard for both display and keyboard. A 96-character set including lower case alphabetics is optional. UNIVAC also offers character sets in seven European languages and Japanese (Katakana/English).

- *Peripherals*— available units include three printer models (including a 30-cps impact printer, a 200-cps uni- or bi-directional impact printer, and a 300-cps non-impact printer), a dual tape cassette subsystem, and a single or dual diskette subsystem. As many as eight printers in any mix of models, as many as three dual cassette systems, or as many as four dual diskette drives can be attached to a UTS 400 Master or Cluster Controller. The actual number and mix of peripherals that can be attached are limited by address and device restrictions explained in the Characteristics section of this report. All peripherals in a cluster arrangement are shared by the workstations.

- *Formatting capability*—a protected facility for "fill-in-the-blanks" applications is a standard firmware-supported feature, similar to the protected format feature on the Uniscope 100 and 200, but with expanded capabilities. Field display characteristics can be designated, such as blinking, display at low or high intensity, or not displayed (blanked). Fields can be restricted, based on checks such as numeric only, protected, right justification with alphabetic entry only, etc. The parameterized formats can be keyed at a workstation or generated at the host. Tabbing is standard. The field definition characters do not occupy display locations.

- *Programmed control*—a standard firmware-supported feature called Control Page lets the operator designate the input device, the output device, and the control function to be performed when a particular key is depressed.

- *Editing capability*—a full editing capability is a standard feature. It includes character, line, and display insertion and deletion, line duplication, and erasure to the end of a line or display.

- *Communications*—transmission speeds range from 300 to 9600 bits per second. Asynchronous or synchronous transmission can be specified. Integral or external modems compatible with the Bell 201 or 202 modems are available for the multiplexer or terminal, respectively.

- *Software support*—the UTS 400 is supported by standard UNIVAC software, including a standard ▷

▶ **CONFIGURATION**

The microprocessor-based UTS 400 Universal Terminal System consists of alphanumeric display stations and peripheral options that can be configured as stand-alone or clustered terminals in the following arrangements:

- Stand-alone—a Master Station with optional peripherals.

- Cluster—a Master Station with one or two slave stations that share the Master's optional peripherals.

- Cluster—a Controller with up to six slave stations that share the Controller's optional peripherals.

Each slave station can be located up to 2000 cable-feet from its Master or Controller. Keyboards can be located up to 10 feet from the corresponding display unit. Peripherals are connected in a chaining arrangement with total cable length (combined for all devices) of up to 200 feet for each peripheral interface. The UTS 400 can be located up to 50 feet from a modem or 5000 feet from a multiplexer.

Peripherals include the Model 610 Tape Cassette System, the Diskette Subsystem, the Model 800 Terminal Printer, and the Communications Output Printer.

All peripherals are attached via a peripheral interface. Two peripheral interfaces are available: seven-level and eight-level. The seven-level interface accommodates all peripherals except the Diskette Subsystem, which is attached to the eight-level interface. The UTS 400 will support one of each type of interface. A total of 12 device addresses are available on the seven-level peripheral interface: a printer requires one device address, and each cassette unit (two drives) requires four. A total of eight devices can be attached to the seven-level interface and a total of four devices (or eight diskette drives) can be attached to the eight-level interface.

A terminal multiplexer can accommodate up to 16 UTS 400 systems in any mix of arrangements. The basic multiplexer contains 8 ports or channels that can be expanded to 16 channels in 4-channel increments. One level of cascading is permitted to accommodate up to 32 terminals consisting of any mix of Uniscope 100 and 200 terminals and UTS 400 terminals; however, the UTS 400 terminals are restricted to the primary or first-level multiplexer. The multiplexer can be equipped with an integral UNIVAC U-201 synchronous or U-202 asynchronous modem that provides compatibility with Bell System 201 or 202 type modems, respectively.

TRANSMISSION SPECIFICATIONS

Asynchronous or synchronous in the half-duplex mode. Asynchronous speeds range from 300 to 2400 bits/second, while synchronous speeds range up to 9600 bits/second. Transmission speed is determined by the internal clock of the specified modem. The transmission code is eight-level ASCII, including parity. Asynchronous transmission uses a 10-unit code structure.

The UTS 400 is equipped with an EIA Standard RS-232C, CCITT V.24, or MIL Std. 188 interface and operates over a voice-band leased or switched facility via a modem. External modems available from UNIVAC provide compatibility with the Bell System (U-201) or 202 (U-202) Data Sets.

The UTS 400 system can operate in a multipoint environment with UNIVAC Uniscope 100 and 200 terminals. An auto answer/hang-up feature is available for operation on the dial network.

DEVICE CONTROL

All terminal operations are executed by a microprocessor under the control of ROM-resident firmware. A vendor-supplied software package supports program development. ▶

UNIVAC UTS 400 Universal Terminal System

package for program development. Languages include PLM, a basic FORTRAN compiler, and MAC 80, an assembler. Other terminal software supports data entry, arithmetic, text editing, and file-related functions. Only one program can be active at a time and is used by all workstations in a cluster; different portions of the program can, however, be utilized by the various workstations. Programs are assembled or compiled on a UNIVAC host computer and downline loaded on the UTS 400 terminal.

USER REACTION

In Datapro's 1978 survey of alphanumeric display terminal users, 9 users reported on their experience with 36 UNIVAC UTS 400 terminals. We talked with three of these on the telephone, plus an additional 2 users (with 12 terminals) from a list provided by UNIVAC. The ratings of the 11 users are presented below.

	Excellent	Good	Fair	Poor	WA*
Overall performance	7	3	1	0	3.5
Ease of operation	6	5	0	0	3.5
Display clarity	7	4	0	0	3.6
Keyboard feel & usability	3	5	2	0	3.1
Hardware reliability	3	7	1	0	3.2
Maintenance service	3	5	2	1	2.9
Software & technical support	2	2	5	1	2.5

*Weighted Average on a scale of 4.0 for Excellent.

Except for software and technical support, these ratings reflect well satisfied users. Operating flexibility, or hardware reliability, and strong vendor support, cited by about three-quarters of these users were noted as the terminal's key advantages. Low cost and programmability were also noted by about half of these users as notable advantages of the UTS, but 2 users felt that the cost was high.

Each of the five users we interviewed is operating UTS 400's as intelligent terminals and have not used UNIVAC's programming languages to create application programs for use on the UTS 400 as yet. Except for the one user who rated Maintenance service and Software & technical support as Poor, each of the interviewed users was well satisfied with UNIVAC support and the UTS 400. Two of the users have experienced static problems (dry environment), which UNIVAC has resolved for one user and is attempting to resolve for the other. Each of the five interviewed users replaced Uniscope 100 and 200 terminals with the UTS 400.□

► User programs cannot be generated on the UTS 400. Application programs must be created on the host processor and are conveyed to the UTS 400 via the communications facility (a procedure called downline loading). The received programs can be stored locally on diskette or cassette tape for operating convenience. Alternatively, application programs can reside at the host processor, and retrieval can be initiated by the terminal operator, by the UTS 400 program, or by an application program running at the host. In clustered arrangements, only one program can be in effect at a time. A multi-part application program can allow the individual workstations

to be doing different things, but the different operations must be combined into a single program.

The tasks that can be implemented via UNIVAC software include data validation, such as restricting entries; range checking and comparison checking; data formatting/reformatting, such as changing the order of information or excluding information; data creation, such as from tables; data editing; general logical operations; arithmetic operations; security checks, such as the use of passwords or of code sequences; highlighting invalid entries or items requiring operator attention; display of prompting sequences for operator guidance; and text compression on transfer. Via program control, specific keys can be assigned specific functions that will initiate programmed tasks, including any of those mentioned above.

Data is transmitted to the remote computer when the terminal is interrogated via a polling message following operator initiation of the transmit function. Data entry is not normally interrupted by an unsolicited computer message; however, the operator is alerted to the pending message and can respond when ready by initiating the Message Waiting function. Via program control, the remote computer can override any operator action and display an urgent message without waiting. Displayed data can be transferred to a peripheral device (printer, diskette, or cassette unit) by manual initiation (Print or Transfer key) or automatically under program control.

Two options, the Buffer Pool and Screen Bypass features, can improve the operating performance. The Buffer Pool provides buffering between the display memory and peripherals to expedite screen-to-device data transfers so that fresh data can be immediately keyed. The Screen Bypass feature transfers data received from the host processor directly to the addressed peripheral to permit concurrent operator/display functions.

Cursor direction controls move the cursor in any of four directions (left, right, up, and down) and are designed for either step-by-step or repetitive operation. The cursor can also be returned to home position (initial display position) or to the beginning of the next line (carriage return). Tabulation allows the cursor to be advanced to the first position following the next tab stop to the right (tab forward) or to the left (tab backward) of the current position. The cursor is returned to the home position if a horizontal tab character is not located between the cursor and the end or beginning of the screen, respectively. The cursor and the character located at the cursor position blink alternately so that the cursor position can be easily located. The cursor also blinks when positioned over a nondisplayable (blanked) character other than the space character.

Edit controls provide insert, delete, and erase functions. Both line and display insert and delete functions are standard. Line insertion or deletion affects all data to the right of the cursor up to the end of the current line. Display insertion or deletion affects all data following the cursor up to the last displayable position of the screen. When formatted data is displayed, these functions affect only the variable fields; the fixed fields (format descriptors) are protected from inadvertent alteration.

The standard erase functions include character, line, field, and screen erase. Character erase erases the character at the cursor position. Line erase erases all data from the cursor to the end of the line. Character and line erasure erases only "unprotected" fields. Two types of screen erasure are standard: one erases all "unprotected" fields, and the other erases all data. Screen erasure begins at the cursor position.

Other standard functions include Cycle, Line Duplication, and Roll. Cycle is a character repeat feature. Line Duplication permits any displayed line to be duplicated via operator or program control; this feature facilitates setting up formats or entering repetitious data instead of rekeying. The Roll feature is implemented via software, using line insert and delete functions. Special function keys can be software-designated to perform the Roll function. ►

UNIVAC UTS 400 Universal Terminal System

Program Attention keys are used to initiate program-designated functions. Four are standard, and an additional 18 keys can be incorporated.

Field Control Mode, a standard feature, permits a terminal- or computer-generated format to be displayed. The parameterized format program uses field control (attribute) characters to specify display characteristics, delimit fields, set tab stops, and indicate whether a field has or has not been modified by the operator. Display characteristics feature high (normal) and low beam intensity, blanking (beam off), and blinking. Fields can be identified as alphabetic only, numeric only, alphanumeric, protected, and right-justified alphanumeric, alphabetic, or numeric. Besides specifying the field attribute, a field control character can double as a tab stop. The field control character (FCC) occupies a memory location but not a screen location; up to 15 FCC's can be used in each displayed line.

A special compatibility feature permits UTS 400 operation using FCC's in a Uniscope 100 and 200 environment; these terminals do not recognize FCC codes. An operator switch establishes Uniscope compatibility via conversion between the protected field FCC's and the protected format code used by the Uniscope terminals. This feature provides some FCC capabilities without requiring application software changes.

The Control Page, also a standard feature, is a two-line control program containing I/O device operating status and operator-keyed device commands that are executed upon the depression of the corresponding function keys. The Control Page, called from memory and displayed by the depression of the Control Page key, permits the operator to examine device status and program input and output commands to specified I/O devices. Any data displayed on the first two lines when the Control Page is called is temporarily stored and is returned when the Control Page is removed from the screen. Two input devices, two output devices, and two device functions can be specified by the Control Page at one time.

Functions include data transfer, copy, edit, return-to-home (diskette), rewind (cassette tape), auto-transmit, read, and diskette preparation. All data transfer functions use the display buffer to transfer data from one device to another or from a device to the data communications facility; therefore, the transferred data is displayed. The copy function transfers all data from one device to another. The edit function performs the same operation, but permits operator manipulation of the transferred data. Auto-transmit transmits data read from a device; after the first page has been transmitted, successive pages are transmitted at the request of the host processor. The read function transfers one page of data to the screen for each key depression. Diskette preparation clears and reformats the specified diskette. Displayed status information includes the current status and storage address of the selected device.

There are three types of commands for print, transfer, and transmit functions. Each command operates on the data between the Home or Start-of-Entry position and the cursor. All three print commands print all data, but FCC's are not printed. Spaces can be substituted for protected characters, or carriage return codes can be suppressed with non-suppression of spaces. The transfer and transmit functions are identical with respect to the data acted upon. The commands can transfer/transmit all data including FCC's, all unprotected data including FCC's for each field transferred or transmitted, or only the data and FCC from each field that has been modified.

The Control Page also contains a 23-character field to define search instructions to be performed by the designated devices or to define the termination address for the copy function.

The basic Model 610 Tape Cassette System features Paging, which reverses the tape by one block to permit editing recorded data, and Search, a bidirectional address search performed at 120 inches/second. Two Feature Group options are available.

Feature Group D adds Read-After-Write, Protected Format, List, and Edit operations. Protected Format allows fixed formats to be recorded for later use. List permits off-line printing of a single block, multiple blocks, or all recorded data on the cassette. Edit allows the operator to selectively edit single blocks of data or to copy an entire tape on a second cassette.

Feature Group E combines two additional features with those of Group D: ASCII Record Separators can be used as file delimiters, blink characters, and cursor indication sequences; and Alphanumeric Identifier Search permits the use of a search key that corresponds to data within the initial 16 characters of a tape block. In addition, Feature Group E permits copying to an address.

COMPONENTS

CRT DISPLAY: The following standard display arrangements are available:

Characters/display:	960	1024	1536	1920
Lines/display:	12	16	24	24
Characters/line:	80	64	64	80

The viewing area is 10 inches wide by 7 inches high. The standard character set contains 64 symbols including upper case alphabetics, numerics, and special symbols; an optional set of 96 symbols provides lower case alphabetics as well. Data is displayed in green. Characters are formed via a 9-by-7 dot matrix.

KEYBOARD: A typewriter-style keyboard is available with a character set of 64 or 96 characters. The 96-character keyboard includes upper and lower case alphabetics. A numeric pad to the right of the main keygroup is standard. Cursor control keys are grouped to the left. Two rows of function keys are arranged over the main keygroup. Four Program Address (PA) keys are standard. An option provides 18 additional keys to total 22 PA keys. A special keyboard that utilizes four shifts to produce 128 English/Katakana (Japan) characters is available.

PRINTED OUTPUT: Three printers are available for the UTS 400: the non-impact Model 800 Terminal Printer, the impact-type Communications Output Printer, and the 0786 serial impact printer.

The Model 800 provides 80 print positions and prints at 300 char./second using an electrostatic technique. The printer provides the full upper and lower case 96-character ASCII character set and forms each character via a 7-by-9 dot matrix. Horizontal pitch is 10 char./inch, and vertical spacing is 6 lines/inch.

The Communications Output Printer is the same printer that is used in the UNIVAC DCT 500. Printing is performed at 30 char./second using a 63-symbol print set. The print set is specified by the user from available sets that include ASCII, EBCDIC, A/H (UNIVAC business or scientific), or ECMA/ISO (international). The unit prints 132 columns per line. Horizontal pitch is 10 char./inch, and vertical spacing is 6 lines/inch. The printer accommodates six-part continuous forms or three-part carbonless forms from 3-5/8 inches to 14-7/8 inches wide and up to 11 inches long. Forms are fed at 30 lines/second (manual feed); skipping speed is 12 inches or 72 lines per second. A variable forms length option handles forms up to 999 lines in length.

The 0786 Printer is an impact matrix printer and is available as a unidirectional or bidirectional printer. The printer is equipped with 132 print positions and is rated at 200 characters/second—37 lines/minute or 75 lines/minute for the bidirectional version. Several character sets are available including 64- or 96-character ASCII as well as European and other national sets. The 96-character set includes upper and lower case symbols. Each character is formed via a 7-by-7 dot matrix. Horizontal and vertical spacing is 10 characters/inch and 6 lines/inch, respectively. The printer accommodates continuous, 6-part forms from 1.6 to 15.3 inches wide and from 3 to 17 inches long. Format control is implemented via a ▶
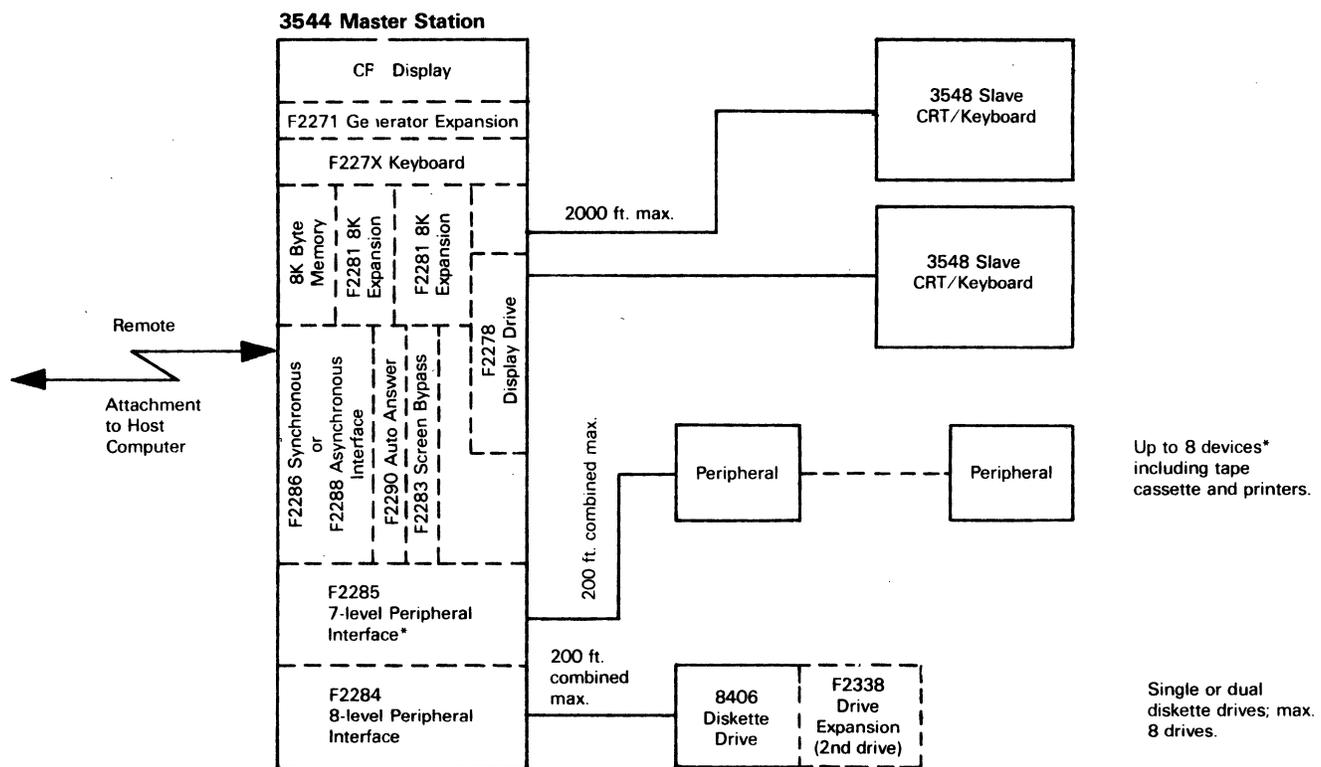
UNIVAC UTS 400 Universal Terminal System

► two-channel tape loop. The printer includes a two-position stacker and stand.

CASSETTE TAPE: The Model 610 Tape Cassette System features two independent cassette tape recorders with shared electronics and a common interface to the seven-level peripheral interface of the UTS 400. Each drive accommodates a Philips-type cassette containing 300 feet of 0.15-inch-wide magnetic tape. Data is recorded serially at 800 bits/inch using phase encoding. On-line data storage is rated at 700,000 characters per cassette or 1.4 million characters per system. Tape speeds are 6 inches/second for reading and writing, 6 or 120 inches/second for searching, and 120 inches/second for rewinding.

DISKETTE: The Diskette Subsystem contains one or two diskette drives that read or write data upon the command of the UTS 400 or host computer. Each diskette has a capacity of 256K bytes. The diskette is organized into 77 data tracks, each divided into 26 sectors of 128 bytes each. Average access time is 260 milliseconds, with an average rotational delay of 83 milliseconds. The data transfer rate is 31,250 bytes/second. Up to four dual-diskette systems can be connected to the UTS 400 via the eight-level peripheral interface.

PRICING: The UTS 400 system is available for purchase or on a one-year or five-year lease. A separate maintenance contract is available with either arrangement. ►

Configurations

3544 Master Station

CF Display

F2271 Generator Expansion

F227X Keyboard

8K Byte Memory | F2281 8K Expansion | F2281 8K Expansion | F2278 Display Drive

F2286 Synchronous or F2288 Asynchronous Interface | F2290 Auto Answer | F2283 Screen Bypass

F2285 7-level Peripheral Interface*

F2284 8-level Peripheral Interface

Remote → Attachment to Host Computer

2000 ft. max. → 3548 Slave CRT/Keyboard

3548 Slave CRT/Keyboard

200 ft. combined max. → Peripheral - - - Peripheral

Up to 8 devices* including tape cassette and printers.

200 ft. combined max. → 8406 Diskette Drive | F2338 Drive Expansion (2nd drive)

Single or dual diskette drives; max. 8 drives.

*The 7-level interface has 12 device addresses; each printer requires 1 address; each dual cassette unit requires 4 device addresses and counts as 2 devices; 8 devices maximum.

UNIVAC UTS 400 Universal Terminal System

Configurations (Contd.)

8594 Controller

8K Byte Memory | F2281 8K Byte Expansion | F2281 8K Byte Expansion

F2286 Synchronous or F2288 Asynchronous Interface | F2290 Auto Answer | F2283 Screen Bypass

F2278 Display Drive

F2278 Display Drive

Remote

Attachment to Host Computer

200 ft. combined max.

3548 Slave Display/ Keyboard

Up to 6 Slave Stations.

3548 Slave Display/ Keyboard

Peripheral — — — Peripheral

Up to 8 devices* including tape cassettes and printers.

7-Level Peripheral Interface*

8-Level Peripheral Interface

8406 Diskette Drive | F2338 Drive Expansion (2nd drive)

Single or dual diskette drives; max. 8 drives.

Multiplexing

Multiplexer

8 ports std.

4 ports

4 ports

UTS 400

16 systems max. any combination

Uniscope 100/200

Remote

Attachment to Host Computer

Multiplexer

8 ports std.

4 ports

4 ports

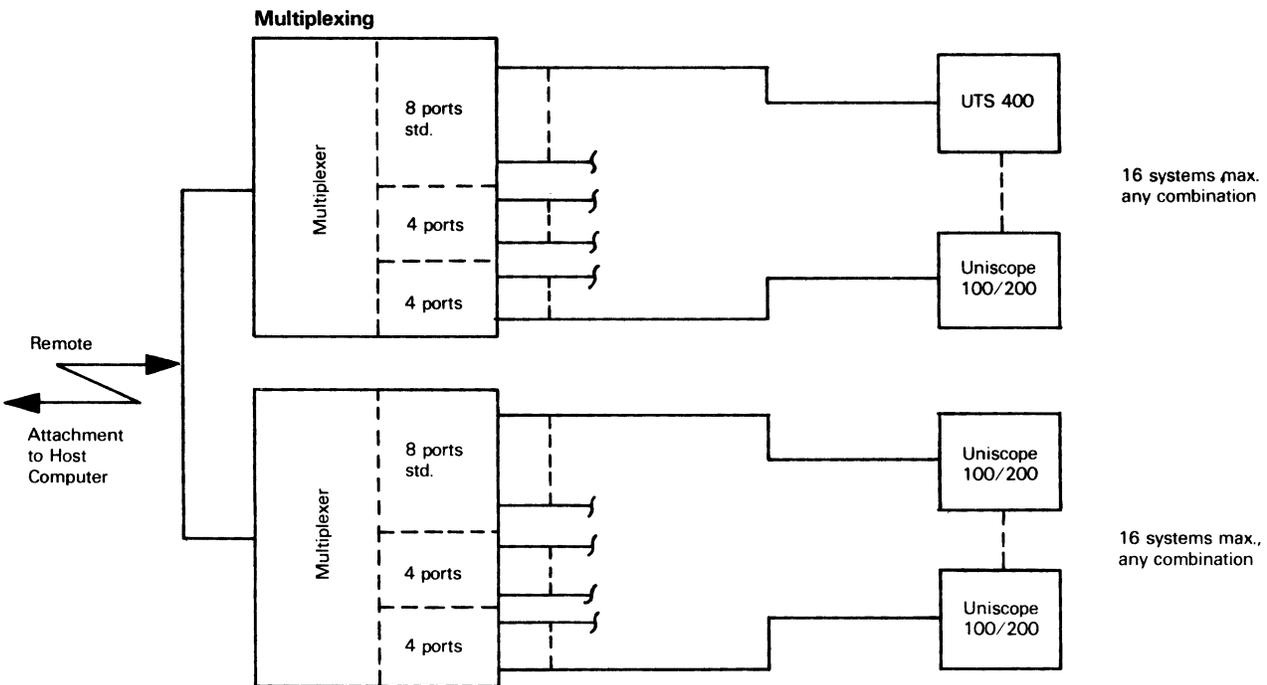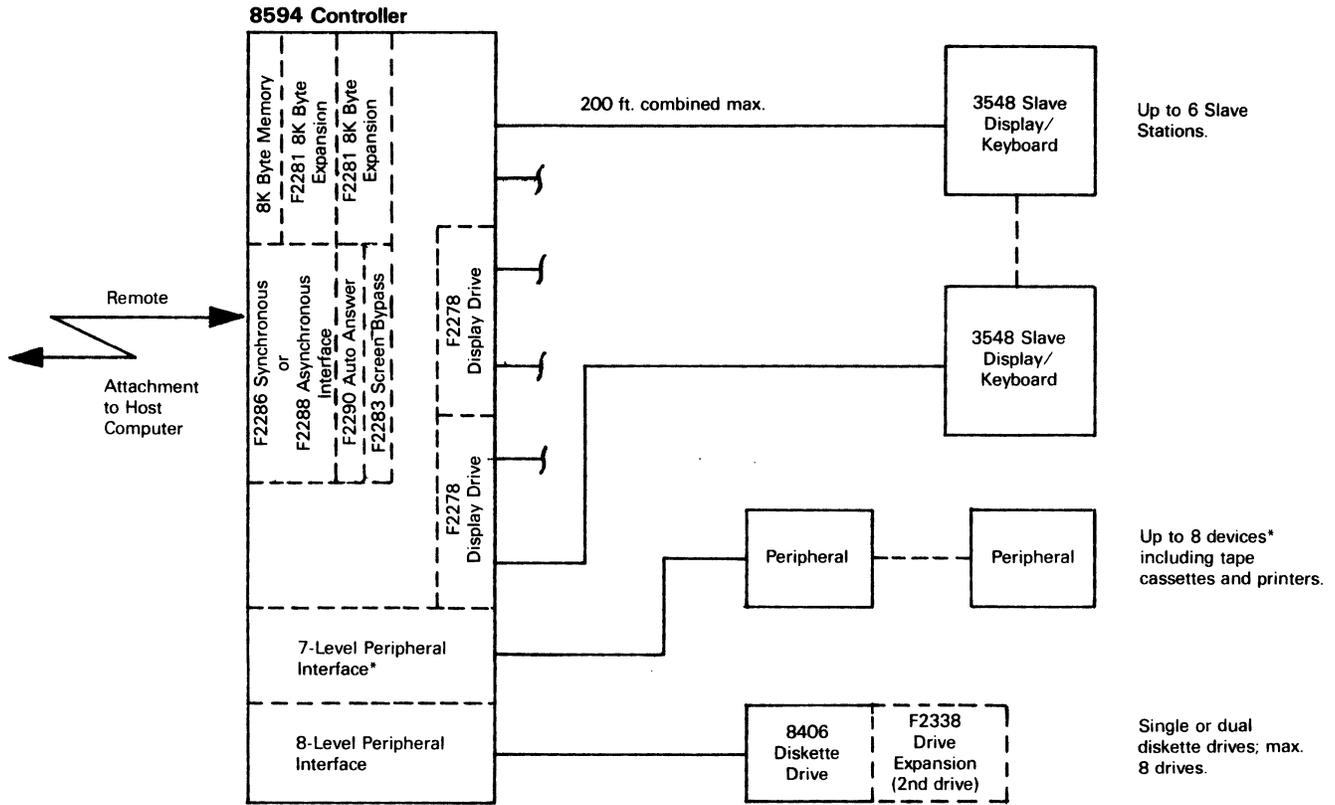**Uniscope 100/200**

16 systems max., any combination

Uniscope 100/200

*The 7-level interface has 12 device addresses; each printer requires 1 address; each dual cassette unit requires 4 device addresses and counts as 2 devices; 8 devices maximum.

UNIVAC UTS 400 Universal Terminal System

		Monthly Charge*			
		1-Year Lease	5-Year Lease	Purchase	Monthly Maint.
3544-98	UTS 400 Master Station Display; includes 15-inch display without keyboard, a 64-character set generator, and 8K-byte user memory; accommodates one or two slave display stations; the second slave station requires F2278-00; requires F2286 or F2288 communications interface	$234	$158	$6,120	$38
8594-99	UTS 400 Terminal Controller; includes 8K bytes of user memory and accommodates up to six UTS 400 Slave Stations; requires F2278-00 Display Drive for 3rd and 5th slave on controller; requires F2286 or F2288 communications interface	142	95	3,774	21
3548-99/-98	UTS 400 Slave Station Display; includes 15-inch display without keyboard, a 64-character set generator, and display control	103	82	3,000	20
F2278-00	Display Drive; accommodates two UTS 400 Slave Display Stations	14	11	440	2
F2271-01	Generator Expansion; expands 64-character generator to 96 characters	18	14	640	0
F2271-02	Katakana Character Expansion; expands 64-character generator to 128 characters	21	16	760	0
F2273-00/-99	Keyboard, 64- or 96-character	25	20	760	4
F2275-00	Keyboard, Katakana	23	26	1,040	4
	Synchronous Interface:				
F2286-00	RS 232	23	18	680	4
F2286-01	MIL 188B	23	18	680	4
	Asynchronous Interface:				
F2288-00	RS-232	23	18	680	4
F2288-01	MIL 188B	23	18	680	4
F2285-00	Peripheral Interface, 7 level, accommodates up to 8 devices	14	11	520	0
F2284-00	Peripheral Interface, 8 level; accommodates up to 4 devices	17	13	600	0
F2281-00	Storage Expansion, 8K bytes; for Master Station Display or Terminal Controller; 2 max.	38	29	1,320	2
F2290-00	Auto Answer/Hang Up	4	3	120	1
F2283-00	Screen Bypass	22	17	720	2
8406-00/-02	Diskette Drive; 256K bytes; regular F2284 8-level Peripheral Interface	126	99	3,960	16
F2338-00/-02	Drive Expansion; adds second 256K-byte drive; one max.	49	39	1,440	9
	Terminal Multiplexer; basic unit provides 8 channels:				
8538-99	For use with a non-UNIVAC modem	56	44	1,781	6
8538-97	For use with internal UNIVAC modem	54	42	1,680	6
F1970-00	Integral 201-type modem	56	45	1,781	11
F1970-01	Integral 202-type modem	41	33	1,202	9
F1264-00	Multiplexer Expansion; provides 4 additional channels; 2 max.	12	9	356	0
F1266-00	Synchronous/Asynchronous Multiplexer Interface; RS232C or MIL 188B	12	9	356	0
F1266-02	Direct Interface, Synchronous; for direct connection to a UNIVAC CTMC or DCS controller; includes clock for 2400, 4800, or 9600 bps operation	11	8	320	0
0786-00	Receive only Unidirectional Matrix Printer in separate cabinet with stand	150	132	4,540	30
0786-02	Receive only Bidirectional Matrix Printer in separate cabinet with standard full-line buffer	210	190	6,250	50
F2656-01	Terminal Interface—7 Bit; attaches the 0786 Printer to the F2285 7-Level Peripheral Interface	10	8	400	0
F2656-03	Terminal Interface—8 Bit; attaches the 0786 Printer to the F2284 8-Level Peripheral Interface	10	8	400	0
F2696-00	Speed Upgrade; provides bidirectional printing and full line buffer for 0786-00 unidirectional printer	60	58	1,710	20
F2648-00	Document parting bar; permits removal of single forms without removing paper from tractors	4	3	114	1
F2646-00	6/8 LPI Feature; switch selection of 6 or 8 lines per vertical inch	5	4	152	1
F2647-00	Vertical Form Unit; provides vertical format control via a 2-channel tape loop; 6 lpi spacing only	7	6	228	1
F2647-02	Vertical Form Unit; provides vertical format control via a 2-channel tape loop; 8 lpi spacing only; requires F2646-00	7	6	228	1
0774-07/-08	Model 800 Receive Only Printer	69	54	1,940	18
F2394-00	Printer Interface—7 Bit; attaches the Model 800 Printer to the 7-Level Peripheral Interface	10	7	380	0
F2394-01	Printer Interface—8 Bit; attaches the Model 800 Printer to the 8-Level Peripheral Interface	10	7	380	0
8541-06	Communications Output Printer; attaches to F2285-00 7-Level Peripheral Interface	102	84	2,594	28
F1780-00	Variable Forms Length	7	6	195	1
0866-97	Model 610 Tape Cassette System; provides two cassette tape drives and attaches to the F2285-00 7-Level Peripheral Interface	89	66	1,947	27
F2142-00	Feature Group D	15	11	577	0
F2142-01	Feature Group E	26	20	906	0

*Includes prime-shift maintenance.■

UNIVAC UTS 400 Universal Terminal System

MANAGEMENT SUMMARY

In April 1976, UNIVAC introduced the UTS 400 Universal Terminal System as one of three members of a new family of intelligent terminals that also includes the UTS 700 Remote Batch Terminal and the UTS 400 Text Editor, a special-purpose version of the UTS 400 for the printing and publishing industry.

The UTS 400 is a general-purpose, user-programmable, microprocessor-based alphanumeric display terminal that can be configured in stand-alone or cluster arrangements. Cluster arrangements can contain up to three or six display workstations. As many as 16 stand-alone and clustered terminals in any mix can be attached to a communications facility via a multiplexer. What's more, the UTS 400 terminals can be mixed with Uniscope 100 and 200 display terminals on the same multiplexer, which can be cascaded to a second level to accommodate additional Uniscope terminals.

All workstations in a cluster are controlled by a microprocessor (equivalent to the Intel 8080) under the direction of ROM (read-only memory) resident firmware. The terminal is available with up to 24K bytes of user-addressable semiconductor memory, supplied in 8K-byte increments, for user program storage. User programs are generated on the host processor via UNIVAC programming languages and are loaded in the terminal memory via the communications facility, a technique referred to as *downline loading* . User programs can be ▷

User programmable terminal supporting up to three or six CRT/keyboard stations.

Peripheral options include magnetic tape cassette drives, diskette drives, and printers.

A basic standalone configuration including one CRT/keyboard, 8K bytes user memory, a 30 cps printer, and an integrated modem costs $403 per month, including maintenance, on a one-year lease.

A multi-station configuration with four CRT/keyboards, two diskette drives, 300 cps printer, 16K bytes user memory, and 4800 bps interface (no integrated modem) costs $930 per month, including maintenance on a one-year lease.

CHARACTERISTICS

VENDOR: UNIVAC Division, Sperry Rand Corporation, P.O. Box 500, Blue Bell, Pennsylvania 19422. Telephone (215) 542-4011.

DATE OF ANNOUNCEMENT: April 1976.

DATE OF FIRST DELIVERY: September 1976.

NUMBER DELIVERED TO DATE: –

UNIVAC joins the ranks of intelligent terminal vendors with the UTS 400 Universal Terminal System. Components shown in this photo include the Master unit (the display with the keyboard, at right), which houses the microprocessor; a slave display, which can be equipped with a keyboard and function independently; the 610 Tape Cassette System; and the 300-cps, non-impact Model 800 Terminal Printer. Components not shown include a Controller, which permits more displays to be clustered, and a multiplexer which permits cascading of multiple systems with Uniscope 100 and 200 terminals. The UTS 400 shares the communications protocol of the Uniscope 100 and 200 and can be intermixed in the same network as these display terminals.

UNIVAC UTS 400 Universal Terminal System

▷ loaded onto diskette or cassette tape at the terminal for immediate retrieval.

The salient features of the UTS 400 are described below.

- *Display capacity*—screen sizes of 960, 1024, 1536, and 1920 characters are available and can be mixed in the same cluster.

- *Character set*—the 64-character ASCII set is standard for both display and keyboard. A 96-character set including lower case alphabetics is optional. UNIVAC also offers characters sets in seven European languages and Japanese (Katakana/English).

- *Peripherals*—available units include two printer models (including a 30-cps impact printer and a 300-cps non-impact printer), a dual tape cassette subsystem, and a single or dual diskette subsystem. As many as eight printers in any mix of models, as many as three dual cassette systems, or as many as four dual diskette drives can be attached to a UTS 400 Master or Cluster Controller. The actual number and mix of peripherals that can be attached are limited by address and device restrictions explained in the Characteristics section of this report. All peripherals in a cluster arrangement are shared by the workstations.

- *Formatting capability*—a protected facility for "fill-in-the-blanks" applications is a standard firmware-supported feature, similar to the protected format feature on the Uniscope 100 and 200, but with expanded capabilities. Field display characteristics can be designated, such as blinking, display at low or high intensity, or not displayed (blanked). Fields can be restricted, based on checks such as numeric only, protected, right justification with alphabetic entry only, etc. The parameterized formats can be keyed at a workstation or generated at the host. Tabbing is standard. The field definition characters do not occupy display locations.

- *Programmed control*—a standard firmware-supported feature called Control Page lets the operator designate the input device, the output device, and the control function to be performed when a particular key is depressed.

- *Editing capability*—a full editing capability is a standard feature. It includes character, line, and display insertion and deletion, line duplication, and erasure to the end of a line or display.

- *Communications*—transmission speeds range from 300 to 9600 bits per second. Asynchronous or synchronous transmission can be specified. Integral or external modems compatible with the Bell 201 or 202 modems are available for the multiplexer or terminal, respectively.

- *Software support*—the UTS 400 is supported by standard UNIVAC software, including a standard package for program development. The language scheduled for availability at the time of delivery is a ▷

▶ SERVICED BY: UNIVAC.

CONFIGURATION

The microprocessor-based UTS 400 Universal Terminal System consists of alphanumeric display stations and peripheral options that can be configured as stand-alone or clustered terminals in the following arrangements:

- Stand-alone—a Master Station with optional peripherals.

- Cluster—a Master Station with one or two slave stations that share the Master's optional peripherals.

- Cluster—a Controller with up to six slave stations that share the Controller's optional peripherals.

Each slave station can be located up to 2000 cable-feet from its Master or Controller. Keyboards can be located up to 10 feet from the corresponding display unit. Peripherals are connected in a chaining arrangement with total cable length (combined for all devices) of up to 200 feet for each peripheral interface. The UTS 400 can be located up to 50 feet from a modem or 5000 feet from a multiplexer.

Peripherals include the Model 610 Tape Cassette System, the Diskette Subsystem, the Model 800 Terminal Printer, and the Communications Output Printer.

All peripherals are attached via a peripheral interface. Two peripheral interfaces are available: seven-level and eight-level. The seven-level interface accommodates all peripherals except the Diskette Subsystem, which is attached to the eight-level interface. The UTS 400 will support one of each type of interface. A total of 12 device addresses are available on the seven-level peripheral interface: a printer requires one device address, and each cassette unit (two drives) requires four. A total of eight devices can be attached to the seven-level interface and a total of four devices (or eight diskette drives) can be attached to the eight-level interface.

A terminal multiplexer can accommodate up to 16 UTS 400 systems in any mix of arrangements. The basic multiplexer contains 8 ports or channels that can be expanded to 16 channels in 4-channel increments. One level of cascading is permitted to accommodate up to 32 terminals consisting of any mix of Uniscope 100 and 200 terminals and UTS 400 terminals; however, the UTS 400 terminals are restricted to the primary or first-level multiplexer. The multiplexer can be equipped with an integral UNIVAC U-201 synchronous or U-202 asynchronous modem that provides compatibility with Bell System 201 or 202 type modems, respectively.

TRANSMISSION SPECIFICATIONS

Asynchronous or synchronous in the half-duplex mode. Asynchronous speeds range from 300 to 2400 bits/second, while synchronous speeds range up to 9600 bits/second. Transmission speed is determined by the internal clock of the specified modem. The transmission code is eight-level ASCII, including parity. Asynchronous transmission uses a 10-unit code structure.

The UTS 400 is equipped with an EIA Standard RS-232C, CCITT V.24, or MIL Std. 188 interface and operates over a voice-band leased or switched facility via a modem. External modems available from UNIVAC provide compatibility with the Bell System (U-201) or 202 (U-202) Data Sets.

The UTS 400 system can operate in a multipoint environment with UNIVAC Uniscope 100 and 200 terminals. An auto answer/hang-up feature is available for operation on the dial network.

DEVICE CONTROL

All terminal operations are executed by a microprocessor under the control of ROM-resident firmware. A vendor- ▶

UNIVAC UTS 400 Universal Terminal System

▷ high-level language called PLM. Other terminal software supports data entry, arithmetic, text editing, and file-related functions. Only one program can be active at a time and is used by all workstations in a cluster; different portions of the program can, however, be utilized by the various workstations.

First customer deliveries of the UTS 400 are scheduled for September 1976.□

▶ supplied software package supports program development. User programs cannot be generated on the UTS 400. Application programs must be created on the host processor and are conveyed to the UTS 400 via the communications facility (a procedure called downline loading). The received programs can be stored locally on diskette or cassette tape for operating convenience. Alternatively, application programs can reside at the host processor, and retrieval can be initiated by the terminal operator, by the UTS 400 program, or by an application program running at the host. In clustered arrangements, only one program can be in effect at a time. A multi-part application program can allow the individual workstations to be doing different things, but the different operations must be combined into a single program.

The tasks that can be implemented via UNIVAC software include data validation, such as restricting entries; range checking and comparison checking; data formatting/reformatting, such as changing the order of information or excluding information; data creation, such as from tables; data editing; general logical operations; arithmetic operations; security checks, such as the use of passwords or of code sequences; highlighting invalid entries or items requiring operator attention; display of prompting sequences for operator guidance; and text compression on transfer. Via program control, specific keys can be assigned specific functions that will initiate programmed tasks, including any of those mentioned above.

Data is transmitted to the remote computer when the terminal is interrogated via a polling message following operator initiation of the transmit function. Data entry is not normally interrupted by an unsolicited computer message; however, the operator is alerted to the pending message and can respond when ready by initiating the Message Waiting function. Via program control, the remote computer can override any operator action and display an urgent message without waiting. Displayed data can be transferred to a peripheral device (printer, diskette, or cassette unit) by manual initiation (Print or Transfer key) or automatically under program control.

Two options, the Buffer Pool and Screen Bypass features, can improve the operating performance. The Buffer Pool provides buffering between the display memory and peripherals to expedite screen-to-device data transfers so that fresh data can be immediately keyed. The Screen Bypass feature transfers data received from the host processor directly to the addressed peripheral to permit concurrent operator/display functions.

Cursor direction controls move the cursor in any of four directions (left, right, up, and down) and are designed for either step-by-step or repetitive operation. The cursor can also be returned to home position (initial display position) or to the beginning of the next line (carriage return). Tabulation allows the cursor to be advanced to the first position following the next tab stop to the right (tab forward) or to the left (tab backward) of the current position. The cursor is returned to the home position if a horizontal tab character is not located between the cursor and the end or beginning of the screen, respectively. The cursor and the character located at the cursor position blink alternately so that the cursor position can be easily located. The cursor also blinks when positioned over a nondisplayable (blanked) character other than the space character.

Edit controls provide insert, delete, and erase functions. Both line and display insert and delete functions are standard. Line insertion or deletion affects all data to the right of the cursor up to the end of the current line. Display insertion or deletion affects all data following the cursor up to the last displayable position of the screen. When formatted data is displayed, these functions affect only the variable fields; the fixed fields (format descriptors) are protected from inadvertent alteration.

The standard erase functions include character, line, field, and screen erase. Character erase erases the character at the cursor position. Line erase erases all data from the cursor to the end of the line. Character and line erasure erases only "unprotected" fields. Two types of screen erasure are standard: one erases all "unprotected" fields, and the other erases all data. Screen erasure begins at the cursor position.

Other standard functions include Cycle, Line Duplication, and Roll. Cycle is a character repeat feature. Line Duplication permits any displayed line to be duplicated via operator or program control; this feature facilitates setting up formats or entering repetitious data instead of rekeying. The Roll feature is implemented via software, using line insert and delete functions. Special function keys can be software-designated to perform the Roll function.

Program Attention keys are used to initiate program-designated functions. Four are standard, and an additional 18 keys can be incorporated.

Field Control Mode, a standard feature, permits a terminal- or computer-generated format to be displayed. The parameterized format program uses field control (attribute) characters to specify display characteristics, delimit fields, set tab stops, and indicate whether a field has or has not been modified by the operator. Display characteristics feature high (normal) and low beam intensity, blanking (beam off), and blinking. Fields can be identified as alphabetic only, numeric only, alphanumeric, protected, and right-justified alphanumeric, alphabetic, or numeric. Besides specifying the field attribute, a field control character can double as a tab stop. The field control character (FCC) occupies a memory location but not a screen location; up to 15 FCC's can be used in each displayed line.

A special compatibility feature permits UTS 400 operation using FCC's in a Uniscope 100 and 200 environment; these terminals do not recognize FCC codes. An operator switch establishes Uniscope compatibility via conversion between the protected field FCC's and the protected format code used by the Uniscope terminals. This feature provides some FCC capabilities without requiring application software changes.

The Control Page, also a standard feature, is a two-line control program containing I/O device operating status and operator-keyed device commands that are executed upon the depression of the corresponding function keys. The Control Page, called from memory and displayed by the depression of the Control Page key, permits the operator to examine device status and program input and output commands to specified I/O devices. Any data displayed on the first two lines when the Control Page is called is temporarily stored and is returned when the Control Page is removed from the screen. Two input devices, two output devices, and two device functions can be specified by the Control Page at one time.

Functions include data transfer, copy, edit, return-to-home (diskette), rewind (cassette tape), auto-transmit, read, and diskette preparation. All data transfer functions use the display buffer to transfer data from one device to another or from a device to the data communications facility; therefore, the transferred data is displayed. The copy function transfers all data from one device to another. The edit function performs the same operation, but permits operator manipulation of the transferred data. Auto-transmit transmits data read from a device; after the first page has been transmitted, successive pages are transmitted at the request of the host processor. The read function transfers one page of data to the screen for each key depression. Diskette preparation clears and reformats ▶

UNIVAC UTS 400 Universal Terminal System

the specified diskette. Displayed status information includes the current status and storage address of the selected device.

There are three types of commands for print, transfer, and transmit functions. Each command operates on the data between the Home or Start-of-Entry position and the cursor. All three print commands print all data, but FCC's are not printed. Spaces can be substituted for protected characters, or carriage return codes can be suppressed with non-suppression of spaces. The transfer and transmit functions are identical with respect to the data acted upon. The commands can transfer/transmit all data including FCC's, all unprotected data including FCC's for each field transferred or transmitted, or only the data and FCC from each field that has been modified.

The Control Page also contains a 23-character field to define search instructions to be performed by the designated devices or to define the termination address for the copy function.

The basic Model 610 Tape Cassette System features Paging, which reverses the tape by one block to permit editing recorded data, and Search, a bidirectional address search performed at 120 inches/second. Two Feature Group options are available.

Feature Group D adds Read-After-Write, Protected Format, List, and Edit operations. Protected Format allows fixed formats to be recorded for later use. List permits off-line printing of a single block, multiple blocks, or all recorded data on the cassette. Edit allows the operator to selectively edit single blocks of data or to copy an entire tape on a second cassette.

Feature Group E combines two additional features with those of Group D: ASCII Record Separators can be used as file delimiters, blink characters, and cursor indication sequences; and Alphanumeric Identifier Search permits the use of a search key that corresponds to data within the initial 16 characters of a tape block. In addition, Feature Group E permits copying to an address.

COMPONENTS

CRT DISPLAY: The following standard display arrangements are available:

Characters/display:	960	1024	1536	1920
Lines/display:	12	16	24	24
Characters/line:	80	64	64	80

The viewing area is 10 inches wide by 7 inches high. The standard character set contains 64 symbols including upper case alphabetics, numerics, and special symbols; an optional set of 96 symbols provides lower case alphabetics as well. Data is displayed in green. Characters are formed via a 9-by-7 dot matrix.

KEYBOARD: A typewriter-style keyboard is available with a character set of 64 or 96 characters. The 96-character keyboard includes upper and lower case alphabetics. A numeric pad to the right of the main keygroup is standard. Cursor control keys are grouped to the left. Two rows of function keys are arranged over the main keygroup. Four Program Address (PA) keys are standard. An option provides 18 additional keys to total 22 PA keys. A special keyboard that utilizes four shifts to produce 128 English/Katakana (Japan) characters is available.

PRINTED OUTPUT: Two printers are available for the UTS 400: the non-impact Model 800 Terminal Printer and the impact-type Communications Output Printer.

The Model 800 provides 80 print positions and prints at 300 char./second using an electrostatic technique. The printer provides the full upper and lower case 96-character ASCII character set and forms each character via a 7-by-9 dot matrix. Horizontal pitch is 10 char./inch, and vertical spacing is 6 lines/inch.

The Communications Output Printer is the same printer that is used in the UNIVAC DCT 500. Printing is performed at 30 char./second using a 63-symbol print set. The print set is specified by the user from available sets that include ASCII, EBCDIC, A/H (UNIVAC business or scientific), or ECMA/ISO (international). The unit prints 132 columns per line. Horizontal pitch is 10 char./inch, and vertical spacing is 6 lines/inch. The printer accommodates six-part continuous forms or three-part carbonless forms from 3-5/8 inches to 14-7/8 inches wide and up to 11 inches long. Forms are fed at 30 lines/second (manual feed); skipping speed is 12 inches or 72 lines per second. A variable forms length option handles forms up to 999 lines in length.
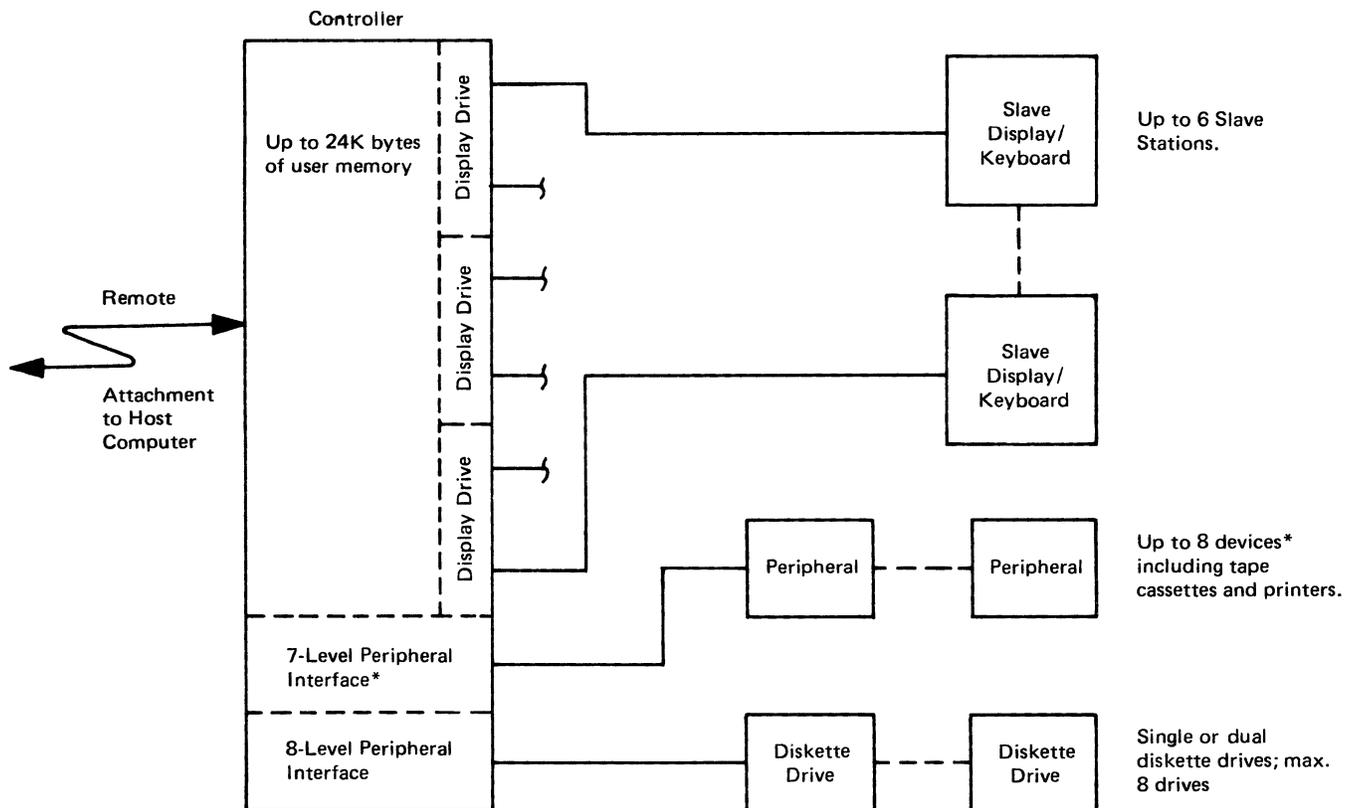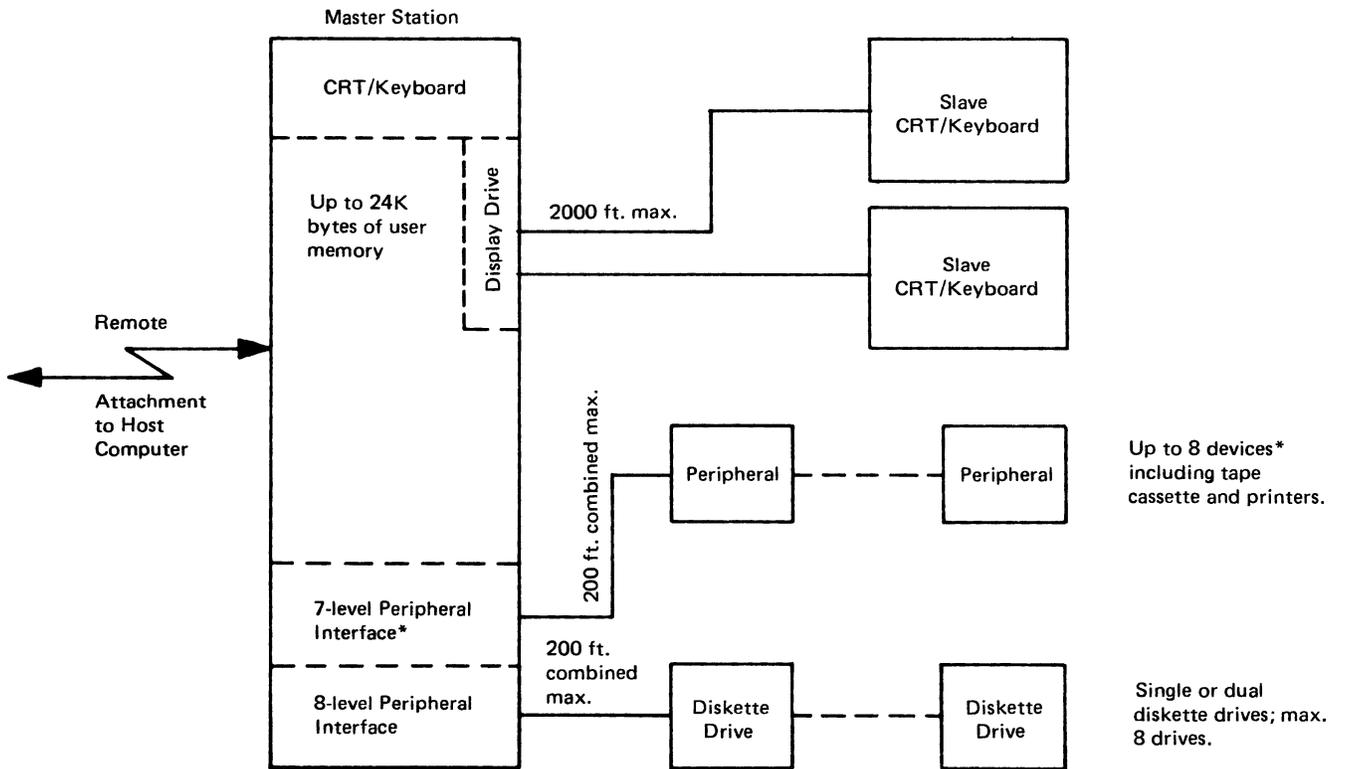
CASSETTE TAPE: The Model 610 Tape Cassette System features two independent cassette tape recorders with shared electronics and a common interface to the seven-level peripheral interface of the UTS 400. Each drive accommodates a Philips-type cassette containing 300 feet of 0.15-inch-wide magnetic tape. Data is recorded serially at 800 bits/inch using phase encoding. On-line data storage is rated at 700,000 characters per cassette or 1.4 million characters per system. Tape speeds are 6 inches/second for reading and writing, 6 or 120 inches/second for searching, and 120 inches/second for rewinding.

DISKETTE: The Diskette Subsystem contains one or two diskette drives that read or write data upon the command of the UTS 400 or host computer. Each diskette has a capacity of 256K bytes. The diskette is organized into 77 data tracks, each divided into 26 sectors of 128 bytes each. Average access time is 260 milliseconds, with an average rotational delay of 83 milliseconds. The data transfer rate is 31,250 bytes/second. Up to four dual-diskette systems can be connected to the UTS 400 via the eight-level peripheral interface.

PRICING: The UTS 400 system is available for purchase or on a one-year lease. A separate maintenance contract is available with either arrangement.

	Monthly Rental*	Purchase	Monthly Maint.
Terminal Controller**	$ 99	$3,120	$21
Master Station without keyboard**	181	5,720	38
Slave Station without keyboard	95	3,000	20
Keyboard, 64- or 96-character	20	680	3
Options			
Expanded char. set (96 displayable symbols)	16	640	NC
18 Add'l. Program Address Keys	3	80	1
Display Drive (handles two workstations)	13	440	2
Peripheral Interface—			
8-level (1 max.)	15	600	NC
7-level (1 max.)	13	520	NC
User Addressable Memory (RAM)—			
8K bytes (includes Buffer Pool)	35	1,320	2
16K bytes	70	2,640	4
24K bytes	105	3,960	6
Screen Bypass	20	720	2

UNIVAC UTS 400 Universal Terminal System

Master Station

CRT/Keyboard

Up to 24K bytes of user memory

Display Drive

2000 ft. max.

Slave CRT/Keyboard

Slave CRT/Keyboard

Remote

Attachment to Host Computer

200 ft. combined max.

Peripheral

Peripheral

Up to 8 devices* including tape cassette and printers.

7-level Peripheral Interface*

200 ft. combined max.

8-level Peripheral Interface

Diskette Drive

Diskette Drive

Single or dual diskette drives; max. 8 drives.

Controller

Up to 24K bytes of user memory

Display Drive

Display Drive

Display Drive

Slave Display/ Keyboard

Up to 6 Slave Stations.

Slave Display/ Keyboard

Remote

Attachment to Host Computer

Peripheral

Peripheral

Up to 8 devices* including tape cassettes and printers.

7-Level Peripheral Interface*

8-Level Peripheral Interface

Diskette Drive

Diskette Drive

Single or dual diskette drives; max. 8 drives

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*The 7-level interface has 12 device addresses; each printer requires 1 address; each dual cassette unit requires 4 device addresses and counts as 2 devices; 8 devices maximum.

UNIVAC UTS 400 Universal Terminal System

Multiplexing

		Monthly Rental	Purchase	Monthly Maint.
Communications Interface—				
Synchronous, up to 4800 bps		21	680	4
Synchronous, 9600 bps		31	1,080	4
Asynchronous, 300 to 2400 bps		21	680	4
Auto Answer/Hang-Up		4	120	1
External Modems—				
Bell 201-compatible		63	1,914	14
Bell 202-compatible		46	1,336	11
Multiplexers—				
For use with UNIVAC modems:				
8 channels		50	1,680	6
12 channels		61	2,036	6
16 channels		72	2,392	6
For use with non-UNIVAC modems:				
8 channels		51	1,781	6
12 channels		62	2,137	6
16 channels		73	2,493	6
Integral Modems—				
Bell 201-compatible		56	1,781	11
Bell 202-compatible		41	1,202	9
Peripherals				
Communications Output Printer		92	2,596	25
Variable Forms Length		6	195	1
Model 800 Printer		79	2,320	18
Model 610 Tape Cassette System		80	1,947	24
Feature Group D		14	577	NC
Feature Group E		24	906	NC
Diskette Subsystem—				
Single drive		115	3,960	16
Dual drive		160	5,400	25

* Includes prime-shift maintenance.

**Basic unit includes one Display Drive, which accommodates two workstations. The Controller can accommodate one or two additional Display Drives to handle up to four or six workstations total. The Master Station can accommodate one additional Display Drive to handle up to three workstations total.

NC—No Charge.■

Sperry Univac UTS 4000 Programmable Terminal Systems

MANAGEMENT SUMMARY

Sperry Univac's UTS 4000 family, introduced in June 1980, currently consists of: two stand-alone non-programmable models, the UTS 10 and the UTS 20; a stand-alone programmable terminal, the UTS 40; two cluster terminals, the UTS 20W and UTS 40W; and two programmable cluster controllers, the UTS 4020 and UTS 4040. The subjects of this report are the programmable configurations. For further information on the non-programmable models, please refer to Report C25-877-201.

The UTS 40 is a single-station display terminal system that features 32K or 64K bytes of user memory. The system handles two printers and two single- or dual-drive diskette subsystems as peripherals. The UTS 40W is the cluster version of the UTS 40.
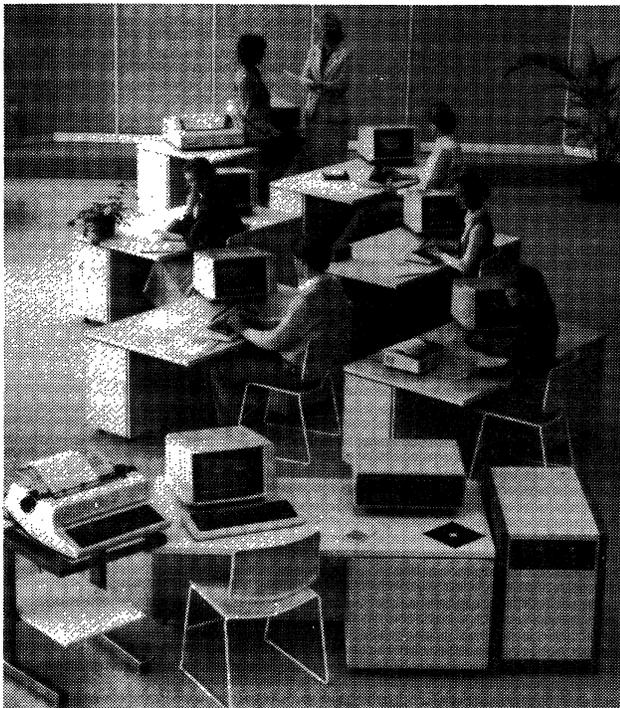
The UTS 4020 is the controlling component of a UTS 4000 clustered terminal system, and handles up to 12 UTS 20W workstations plus up to 16 peripheral devices. User memory capacity on the UTS 4020 ranges up to 256K bytes. The newer UTS 4040 contains all of the features of the UTS 4020, but provides control for up to ▷

This UTS 4000 clustered terminal configuration consists of a UTS 4020 Cluster Controller, located in the lower right corner of the photo, and 6 UTS 20W display stations. The UTS 4000 System peripherals illustrated are: a Model 8406 diskette subsystem is shown to the left of the controller; a Model 0791 printer, in the lower left corner of the photo; a Model 0797 printer, at the workstation behind the controller; and a Model 0798 printer, at the top of the photo.

A programmable terminal system available in stand-alone or cluster configurations.

Display stations available for the UTS 4000 programmable system include the UTS 40, a stand-alone terminal with 32K or 64K bytes of user memory, and two cluster work-stations, the UTS 20W and UTS 40W. The UTS 4020 Cluster Controller provides support for up to 12 workstations, while the UTS 4040 Cluster Controller supports up to 31 workstations.

A basic UTS 40 configuration, including a display, keyboard, and 32K bytes of user memory, can be purchased for $5,760, or rented for $240 per month, including maintenance, on a one-year rental.

A six-workstation UTS 4020 system with 64K bytes of user memory is priced at $29,790, and rents for $1,782 per month on a one-year rental plan, including maintenance.

CHARACTERISTICS

VENDOR: Sperry Univac Division, Sperry Corporation, P.O. Box 500, Blue Bell, PA 19422. Telephone (215) 542-4011.

DATE OF ANNOUNCEMENT: June 1980.

DATE OF FIRST DELIVERY: First quarter 1981.

SERVICED BY: Sperry Univac.

CONFIGURATION

The UTS 4000 family provides two user-programmable configurations: the stand-alone UTS 40, and a multiple-workstation system that uses the UTS 4020 or UTS 4040 Cluster Controller as its central component.

UTS 40: The UTS 40 is a microprocessor-based single-station terminal system. Basic components include a 12-inch CRT display and a choice of three keyboards. The UTS 40 provides 64K bytes of ROM system memory, plus 32K or 64K bytes of optional user memory.

The system's operating program, which Sperry Univac refers to as the "personality program," provides all basic terminal functions. The standard program offered by Sperry Univac provides for a UTS 400 mode of operation. The program is stored on a program cartridge and is active upon power-up. The program cartridge is operator-changeable.

User application programs are written in UTS COBOL and may be developed on the UTS 40 or at the host. Programs may also be developed on a UTS 4020 or UTS 4040 system, where the user may utilize that system's special program development tools. Application Programs must be sent from ▶

Sperry Univac UTS 4000 Programmable Terminal Systems

▷ 31 UTS 20W or UTS 40W workstations, and up to 512K memory.

UTS 4000 applications programs are written in UTS COBOL. The UTS COBOL compiler runs on a Sperry Univac Series 1100, Series 90, or System 80 mainframe, and compiled programs are downline loaded to the teminal system. The UTS 40 and UTS 4020 can also be connected to a V77 host; however, a V77 cannot support the UTS COBOL compiler. The programs can be loaded directly into the terminal's memory for immediate execution or stored on diskette for later use. Sperry Univac provides two UTS COBOL program development tools, which run the UTS 4020 and UTS 4040, to simplify the program creation process. Programs developed on the UTS 4020 and UTS 4040 can run on a UTS 4020, UTS 4040, UTS 40, or UTS 400 after they have been compiled by the host computer. The UTS 4020 can run 10 programs concurrently, or one for nearly every workstation even in the maximum configuration.

Peripherals that can be attached to the UTS 40, UTS 4020, and UTS 4040 include Sperry Univac's Model 8406 diskette subsystem, and three different printer models. The diskette subsystem comes in single- or dual-drive models; each drive provides 1 megabyte of on-line storage. The printers include a Model 0797 80-cps impact matrix printer, a Model 0798 200-cps impact matrix printer, a Model 0791 correspondence-quality daisy-wheel printer, a Model 0425 160/40-cps impact printer, and a Model 0789 line printer.

The UTS 4000 systems combine current technology with the functional capabilities of Sperry Univac's older UTS 400 line. Although the new products support numerous enhancements, the changes are designed to increase operator or network efficiency, without adding to or dropping any of the previously existing system functions. For example, the new systems feature Z80A microprocessors and/or 2901A bit-slice technology, instead of the UTS 400's 8080 microprocessors. Data transmission is supported at a rate of 19,200 bits per second by the UTS 4020 and UTS 4040, although the UTS 40's highest speed of 9600 bps is the same as the UTS 400. All operating logic is resident on a program cartridge or diskette and loaded into system memory upon power-up; this allows new functions to be introduced or whole operating systems to be updated simply by inserting a new cartridge or diskette.

Updated cabinet styles and operator controls have been designed with particular attention to ergonomic factors. A detachable keyboard completely redesigned to improve operator comfort and efficiency, a display screen glare filter, an optional tilt/rotate display pedestal, and operator-adjustable refresh rates, time-out values, and keyclick audibility are just some of the UTS 4000 family's features.

Meanwhile, the new systems remain compatible with Sperry Univac's existing product line. Host systems and ▷

▶ the UTS 40, 4020, or 4040 to a Series 1100, Series 90, or System 80 host on which a UTS COBOL compiler is running, for compilation. The compiled programs are then downline loaded to the UTS 40, 4020, or 4040 where they can be executed immediately or stored on diskette for later use. Two user programs can be active in the UTS 40 simultaneously.

Up to two printers, up to two Model 8406 diskette subsystems, and one magnetic stripe reader may be added to the basic system is peripherals. Printers and diskette subsystems are attached to the system via an 8-bit peripheral interface; one peripheral interface handles the system maximum of 4 peripheral devices. The peripheral interface connects the device controller of each of its peripherals to a "line module," or I/O controller, programmed to handle that type of peripheral. All data transferred between the peripheral and the central processor passes through the line module, where it may be stored temporarily in a buffer and/or prepared for use by the receiving device or program.

Printers may be selected from five models: the Model 0797 80 cps matrix printer, the Model 0798 200 cps matrix printer, the Model 0791 correspondence quality printer, the Model 0425 160/40 cps impact printer, and the Model 0789 line printer. The 8406 diskette subsystem comes in single- or dual-drive versions; each diskette drive provides up to 1 megabyte of on-line storage, for a total system maximum of 4 megabytes. The magnetic stripe reader, which can be IATA- or ABA-compatible, attaches directly to the terminal and does not require the peripheral interface.

UTS 4020/UTS 4040: The UTS 4020/UTS 4040 Cluster Controllers are the primary components of a UTS 4000 clustered terminal system. The UTS 4020 controller accommodates up to 12 workstations plus up to 16 peripheral devices. The UTS 4040 accommodates up to 31 workstations. Workstations for both the UTS 4020 and UTS 4040 may be either the UTS 20W or UTS 40W.

The UTS 4020 provides 64K bytes of RAM memory, expandable up to 256K bytes in 64K-byte increments. However, depending on the configuration, 64K to 128K bytes of memory is required for system use, leaving a maximum of 192K bytes for user application programs. The UTS 4040 provides 64K bytes of RAM, expandable to 512K bytes.
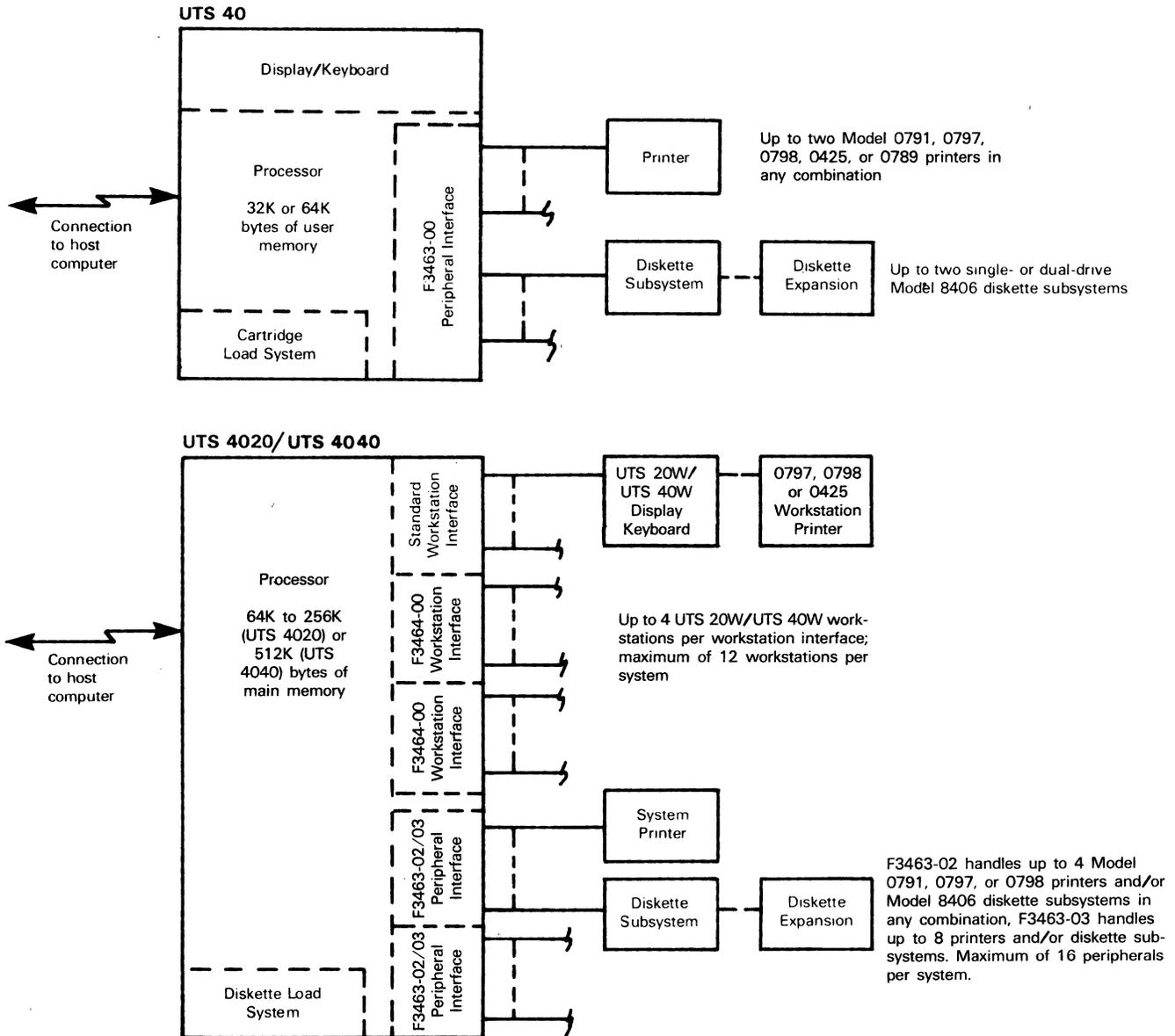
The System Control Program (SCP), the UTS 4020/UTS 4040's operating system, controls all system functions. Under SCP, workstations operate in UTS 400 mode, which provides compatibility with both the UTS 400 and Uniscope 100 and 200 terminals. The SCP is stored on diskette and loaded into the UTS 4020/UTS 4040's memory upon power-up via an integral 1-megabyte diskette drive provided for this purpose.

User application programs are written in UTS COBOL. Several program development tools, including the Edit Processor, simplify the program creation process. Application programs must be sent from the UTS 4020 or 4040 to a Series 1100, Series 90, or System 80 host on which a UTS COBOL compiler is running, for compilation. The compiled programs are then downline loaded to the UTS 4020 or 4040, where they can be executed immediately or stored on diskette. An external diskette drive is required for loading application programs into memory from diskette. Up to ten application programs can run concurrently on the UTS 4020 and UTS 4040.

Workstations are attached to the UTS 4020 and UTS 4040 via workstation interfaces and may be loaded up to 5000 feet from the controller. Each workstation interface handles up to 4 workstations. One workstation interface is provided on ▶

Sperry Univac UTS 4000 Programmable Terminal Systems

Configuration

UTS 40

Display/Keyboard

Processor

32K or 64K bytes of user memory

Cartridge Load System

F3463-00 Peripheral Interface

Connection to host computer

Printer — Up to two Model 0791, 0797, 0798, 0425, or 0789 printers in any combination

Diskette Subsystem — Diskette Expansion — Up to two single- or dual-drive Model 8406 diskette subsystems

UTS 4020/UTS 4040

Processor

64K to 256K (UTS 4020) or 512K (UTS 4040) bytes of main memory

Connection to host computer

Diskette Load System

Standard Workstation Interface

F3464-00 Workstation Interface

F3464-00 Workstation Interface

F3463-02/03 Peripheral Interface

F3463-02/03 Peripheral Interface

UTS 20W/ UTS 40W Display Keyboard — 0797, 0798 or 0425 Workstation Printer

Up to 4 UTS 20W/UTS 40W workstations per workstation interface; maximum of 12 workstations per system

System Printer

Diskette Subsystem — Diskette Expansion

F3463-02 handles up to 4 Model 0791, 0797, or 0798 printers and/or Model 8406 diskette subsystems in any combination, F3463-03 handles up to 8 printers and/or diskette subsystems. Maximum of 16 peripherals per system.

> applications software needs no revision, since the UTS 40, UTS 4020, and UTS 4040 operate in a UTS 400 emulation mode and, like the UTS 400, provide compatibility with the Uniscope 100 and 200 terminals. No new operator functions have been added, although in a few instances, the methods of performing certain functions have been revised for increased operator efficiency. The new systems are designed so that if the operator has previously used a UTS 400, transition to a UTS 40 or to a UTS 4020 or UTS 4040 workstation should be minimal.

Two additional cost-saving programs were introduced by Sperry Univac with the UTS 4000 family. The first, which Sperry Univac has instituted as a standard procedure for all UTS 4000 components, is the Customer Set-Up policy. As the name implies, CSU units are shipped to the ▷

▶ the basic system; two additional workstation interfaces may optionally be added.

Each workstation consists of a UTS 20W or UTS 40W display, a choice of one of three keyboards, an optional Model 0797 or 0798 printer, and an optional IATA- or ABA-compatible magnetic stripe reader. One workstation must be designated as the Master Station and acts as the system console in addition to its other functions.

Peripherals are attached to the system via 8-bit peripheral interfaces. Two types of peripheral interfaces are provided: one that supports up to 4 peripherals, and one that supports up to 8 peripherals. Up to two peripheral interfaces (either type) may optionally be added to the system.

Peripherals include a selection of printers and the Model 8406 diskette subsystem. Printer choices include the Model 0797 80 cps matrix printer, the Model 0798 200 cps matrix printer, the Model 0791 correspondence quality printer, and the 0425 160/40 cps impact printer. ▶

Sperry Univac UTS 4000 Programmable Terminal Systems

▷ customer, who is responsible for unpacking, inspecting, installing, and testing the system using Sperry Univac instructions. Sperry Univac Customer Engineers are available by phone, or on-site when necessary, if problems are encountered.

The second is the optional Central Repair Service plan, which is currently available only for purchased UTS 20's and their peripherals, but is anticipated to be extended to all UTS 4000 components eventually. This plan permits customers to ship malfunctioning units to a Sperry Univac maintenance site for service, at prices substantially below normal on-site maintenance fees.

In the 1982 survey of user-programmable terminals, Datapro received no responses on the UTS 40 terminals; therefore, no User Reaction section appears in this report.□

▶ **TRANSMISSION SPECIFICATIONS**

Transmission is synchronous in half duplex mode. A seven-level ASCII code, plus parity, is used. The UTS 40 can transmit at speeds up to 9600 bps; the UTS 4020 and UTS 4040 transmit at rates up to 19,200 bps. The standard UTS 400 transmission protocol is utilized. The UTS 400 protocol performs internal parity checking, and provides a single-bit error detection scheme on all communication line and peripheral transfers. Data is automatically retransmitted upon detection of an error.

The UTS 4000 systems may be connected to a Sperry Univac Series 1100, Series 90, System 80, or V77 host computer via direct or modem connection. (Note, however, that V77 systems do not support a UTS COBOL compiler, which is required for UTS 40, 4020, or 4040 user program compilation.) An RS-232-C/V.24 interface is provided for modem connection. A direct connect interface is also available.

SOFTWARE

The UTS 40 operating system, or "personality program," is provided on a program cartridge and supports all basic system functions and operations. The system provides all the capabilities of its predecessor, the UTS 400, including compatiblity with the Uniscope 100 and 200, so that these devices may coexist in a user network with minimal change to host software. It includes as standard the UTS 400's optional screen bypass capability, which permits the host to selectively address a workstation's peripherals and initiate a data transfer to or from a peripheral without interfering with the operator's use of the keyboard and display. The UTS 40 performs some tasks more quickly than the UTS 400, and some new operator controls have been added to increase operation or network efficiency, but no new capabilities have been provided. The UTS 40 operating system requires 64K bytes of ROM memory, which is provided for this purpose in the basic system.

The UTS 4020/UTS 4040 operating system is diskette-resident Sperry Univac program product called the System Control Program (SCP). The SCP provides all basic system functions, including workstation support, peripheral handling, diskette file management, and communications with the host. With the SCP, the UTS 4020/UTS 4040 is a fully operable terminal controller that handles interactive data communications between its workstations and the host.

Each UTS 20W and UTS 40W workstation and each peripheral line module has its own microprocessor and RAM memory. When the SCP is loaded into the controller, the controller passes a "personality program" to each workstation, and an operating program that provides appropriate logic for each peripheral to its respective line module. UTS 20W workstations are supported in basic UTS 400 mode (the screen bypass function is not provided). Depending on the configuration, the SCP requires 64K to 128K bytes of main memory.

UTS 4000 application programs are written in UTS COBOL. UTS COBOL conforms to ANSI Standard X.323-1974 with syntax extensions that accommodate specific UTS terminal features, such as interactive data entry and program control, screen management and data formatting, and compressing. Under UTS COBOL, files may be either sequentially or randomly accessed and either formatted or unformatted. Multiple files are also supported. Files may be dedicated to a specific workstation or shared, reassigned from one device to another similar device, or changed from dedicated to shared status and vice versa. The UTS COBOL compiler runs on a Series 1100, Series 90, or System 80 mainframe. Compiled programs are downloaded to the UTS 40 or UTS 4020 for execution. COBOL program execution requires a minimum of 32K bytes of user memory.

The Edit Processor is available as a program development tool and runs on the UTS 4020/4040 only. The Edit Processor permits local files containing data or program source code to be created and updated off-line, without the assistance of the host. The Edit Processor provides line-oriented text handling and editing functions that can simplify off-line program development. Once compiled, programs created on a UTS 4020/4040 system may run on any UTS 4020/4040, UTS 40, or UTS 400 interconnected through the host system.

A Diskette Utility program product is available for the UTS 40 that converts data code and format from UTS 400 format to IBM 3741 format and vice versa, formats diskettes, copies diskettes, and performs other diskette utility functions.

DEVICE CONTROL

The UTS 40, UTS 20W, and UTS 40W "personality programs" support basic terminal operations in UTS 400 mode.

Operator controls move the cursor up, down, left, right, home, to the beginning of the next line (return), to the first position following the next tab stop to the right (tab forward), or to the left (tab backward) of the current position.

Edit controls provide insert, delete, and erase functions. Both line and display insert and delete functions are standard. Insertion or deletion within a line affects all data to the right of the cursor up to the end of the current line. Display insertion or deletion affects all data following the cursor up to the last displayable position of the screen. When formatted data is displayed, these functions affect only the variable fields; the fixed fields (format descriptors) are protected from inadvertent alteration.

The standard erase functions include character, line, field, and screen erase. Character erase erases the character at the cursor position. Line erase erases all data from the cursor to the end of the line. Character and line erasure erases only "unprotected" fields. Two types of screen erasure are standard: one erases all "unprotected" fields, and the other erases all data. Screen erasure begins at the cursor position.

Other standard functions include Line Duplication and Scroll. Line duplication permits any displayed line to be duplicated via operator or program control; this feature ▶

Sperry Univac UTS 4000 Programmable Terminal Systems

► facilitates setting up format or entering repetitious data instead of rekeying. The Scroll feature is implemented via software, using line insert and delete functions.

Program Attention keys are used to initiate program-designated functions; 22 PA keys are standard.

Field Control Mode, a standard feature, permits a terminal- or computer-generated format to be displayed. The parameterized format program uses field control (attribute) characters to specify display characteristics, delimit fields, set tab stops, and indicate whether a field has or has not been modified by the operator. Display characteristics feature high (normal) and low beam intensity, blinking, reverse video, and, on the UTS 40 only, underscore, blanking (beam off), and strike-through. Fields can be identified as alphabetic only, numeric only, alphanumeric, protected, and right-justified alphanumeric, alphabetic, or numeric. Besides specifying the field attribute, a field control character can double as a tab stop. The field control character (FCC) occupies a memory location but not a screen location. Up to 80 FCC's can be used in each displayed line. Via the Character Protect Mode, individual characters within a field can be format-protected in addition to all FCC attributes.

A special compatibility feature permits UTS 400 mode operation using FCC's in a Uniscope 100 and 200 environment; these terminals do not recognize FCC codes. Software provides Uniscope compatiblity via conversion between the protected field FCC's and the protected format code used by the Uniscope terminals. This feature provides some FCC capabilities without requiring application software changes.

The Control Page, also a standard feature, is a two-line control program containing I/O device operating status and operator-keyed device commands that are executed upon the depression of the corresponding function keys. The Control Page, called from memory and displayed by the depression of the Control Page key, permits the operator to examine and revise device status and program input and output commands to specified I/O devices. The commands specify data transfer, copy, edit, transmit, read, diskette preparation and other functions.

Data is transmitted to the remote computer when the terminal is interrogated via a polling message following operator initiation of the transmit function. Data entry is not normally interrupted by an unsolicited computer message; however, the operator is alerted to the pending message and can respond when ready by initiating the Message Waiting function. Via program control, the remote computer can override any operator action and display an urgent message without waiting. Displayed data can be transferred to a peripheral device (printer, diskette, or cassette unit) by manual initiation (Printer or Transfer key) or automatically under program control.

The Screen Bypass feature (supported on the UTS 40 only) transfers data received from the host processor directly to the addressed peripheral without interfering with concurrent operator/display functions.

COMPONENTS

UTS 40, UTS 20W, and UTS 40W DISPLAY: A 12-inch (diagonal) CRT with a 10-inch by 7-inch viewing area. The display format can range from 2 lines of 2 characters each, up to 24 lines of 80 characters each, for a total maximum display capacity of 1920 characters. A 25th display line is inaccessible to the operator and displays operating status and other information. Displayable character sets containing 96 characters are available in standard ASCII or any of several European languages; a 128-character Katakana set is also available. Characters are formed using a 7-by-11 dot

matrix that provides for lower case descenders. Operator controls include a brightness adjuster, a refresh rate selector (50 or 60 times per second), and a time-out value selector. A tilt-and-rotate base is optional.

UTS 40, UTS 20W, and UTS 40W KEYBOARDS: A choice of four keyboards are offered: an ASCII typewriter-style keyboard (for use with UTS 20W only); an expanded typewriter keyboard that includes a function key cluster and a numeric pad; a UTS 400-compatible keyboard; and a Katakana keyboard. The expanded typewriter keyboard is available with standard ASCII or any of several European languages. All keyboards are detached and can be up to 3.3 feet from the display.

DISKETTE SUBSYSTEM: The Model 8406 Diskette Subsystem is a stand-alone unit that contains one or two diskette drives that read or write data in single- or double-density on one or both sides of the diskette. On single-side single-density diskettes, the formatted storage capacity is 242K bytes; data can be stored in UTS 400 or IBM BDE format. On double-side double-density diskettes, the capacity is 980K bytes, and the IBM Format H format is used. The diskette is organized into 77 data tracks. Single-density diskettes contain 26 sectors per track, each of which stores 128 bytes. Double-density diskettes can contain 26, 15, or 8 sectors per track, with 256, 512, or 1024 bytes per sector, respectively. Average access time is 260 milliseconds, with an average rotational delay of 88.3 milliseconds. The data transfer rate is 31,250 bytes per second for single-sided single-density diskettes, and 62,500 bytes per second for double-sided double-density diskettes.

PRINTERS: Any of five printers can be attached to a UTS 40 or UTS 4020/UTS 4040 system: the Model 0797 and 0798 matrix printers, the Model 0791 correspondence quality printer, the Model 0425 impact printer, and the Model 0789 line printer. Models 0797, 0798, or 0425 may also be used as a UTS 20W workstation printer.

The Model 0797 is an 80-cps impact printer that prints unidirectionally over a print width of 80 columns. Characters are formed by a 9-by-7 half-space dot matrix. Eleven different 96-character sets featuring various font styles and language symbols (standard ASCII, plus several European languages), as well as a 128-character Katakana set, are offered. Horizontal spacing is 10 characters per inch; vertical spacing is selectable at 6 or 8 lines per inch. Vertical format controls provide for nine industry-standard form lengths from 3 to 12 inches, plus continuous feed; an automatic six-vertical-space line skip over a cross-form perforation is featured. A friction feed platen that accommodates cut forms up to 8.5 inches wide is standard; a pin-feed for 9.5-inch wide forms, and an adjustable forms tractor that accommodates sprocketed continuous forms from 3.0 to 10.0 inches in width, are optional. An original and two copies can be produced.

The Model 0798 is a 200 cps matrix printer that prints bidirectionally over a print width of 132 columns. Characters are formed by a 7-by-7 half-space dot matrix. A 7-by-9 dot matrix is optional for ASCII character sets only. Several character sets, including a 64- and a 96-character ASCII set and various European character sets, are offered. Horizontal spacing is 10 characters per inch; a compressed print option provides switch-selection of a 14-cpi horizontal spacing, allowing 132 columns to be printed on 11-inch wide paper. Vertical spacing is 6 lines per inch; operator-selection of 6 or 8 lines per inch is optional. A document-parting bar, which permits removal of newly printed pages without removing the paper from the tractors, is optional.

The Model 0791 correspondence quality printer is a table-top daisy-wheel printer that operates bidirectionally at 45 ►

Sperry Univac UTS 4000 Programmable Terminal Systems

▶ characters per second. A selection of 96-character daisy wheel fonts is available and provides a variety of typeface styles and languages, including OCR-A and OCR-B. Horizontal and vertical spacing are manually- or program-selectable at 10 or 12 characters per inch and 6 or 8 lines per inch, respectively. The 10 cpi spacing produces a 132-character line; the 12-cpi spacing, a 158-character line. Vertical formatting, margin selection, and other print parameters are also operator- or program-selectable. The printer accommodates cut forms of up to 15 inches in width, friction-fed continuous forms of various widths, pin-fed forms 9.0, 9.375, or 14.375 inches wide, or sprocketed card stock. A bottom feed mechanism is optional.

The Model 0425 is a bidirectional impact printer available in data processing quality (with a print speed of 160 cps), or high definition quality (with print speeds of 160/40 cps). Characters are formed via a 9-by-7 dot matrix (the high definition quality printer prints unidirectionally at 40 cps, and utilizes 18-by-40 dot matrix characters. A 9-pin printhead is standard.

The Model 0789 Printer Subsystem consists of a line printer available in the following print speeds: 180/300 lpm, 300 lpm, and 640 lpm. A variety of print bands may be selected. Vertical spacing is 6 or 8 lpi, with 132 print positions per line. Includes an enclosed paper stacking area.

PRICING

The UTS 40 and UTS 4020/UTS 4040 systems are available for purchase, on one-year rental, or on a five-year lease. Quantity discounts apply for UTS 40, UTS 40W, UTS 4020, UTS 4040 and UTS 20W equipment acquired by purchase or on a five-year lease. The discount scale is 10% for quantities of 25 or more units, 20% for 50 or more units, and 30% for 100 or more units. Certain quantity discounts also apply for optional features and peripherals; contact Sperry Univac for details.

A separate maintenance contract is available for all equipment, whether purchased, rented, or leased. (Rental and lease prices shown below include the monthly maintenance fee.) As an alternative for purchased equipment only, Sperry Univac's Central Repair Service (CRS) may be utilized at substantial savings. Currently, CRS is available only for UTS 20's and their peripherals (except UTS 20's configured with the Model 0798 as a workstation printer). CRS requires the customer to ship units in need of repair to a Sperry Univac maintenance depot, where they are serviced and returned to the user.

The UTS 4000 family components have been designated Customer Set-Up units, and the customer is responsible to unpack, inspect, install, and test the equipment in accordance with Sperry Univac's instructions. Sperry Univac Customer Engineers are available by phone (or for on-site help, when necessary) if problems are encountered.

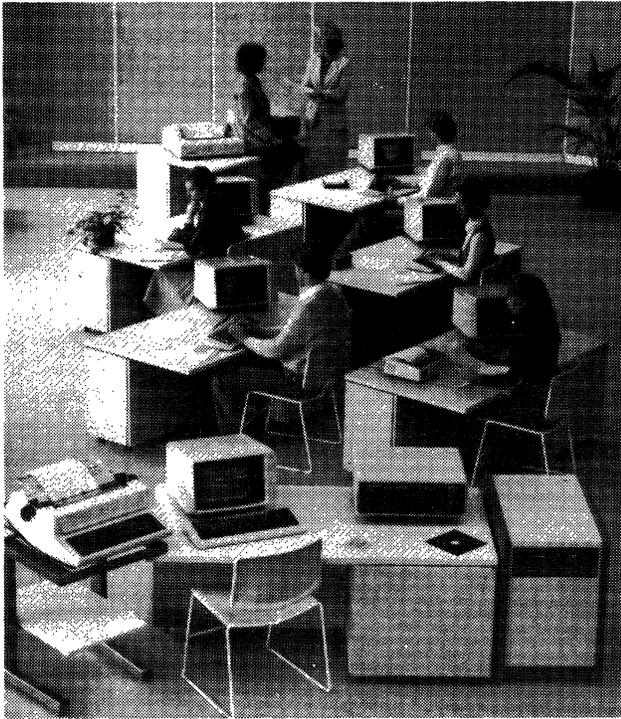|		Monthly Charge*			
		1-Year Rental	5-Year Lease	Purchase	Monthly Maint.
3561-85/86	UTS 40 Single Station Programmable CRT Display; includes 12-inch CRT, security keylock, system RAM, RS-232-C/V.24 synchronous communications interface, and 96-character generator.	$150	$124	$3,227	$39
3561-83/84	UTS 40W Cluster Workstation CRT Display; includes 12-inch CRT, interface to cluster controller (UTS 4020 or UTS 4040, system RAM; and 96-character generator	128	101	2,815	31
F3620-00	Expanded typewriter keyboard	20	17	428	3
F3620-01	Text processing utility keyboard	24	21	453	4
F3621-00	UTS 400 keyboard	24	21	453	4
F3574-00	Tilt/Rotate Base	9	7	350	—
F3390-00	Blank Keycap Set; for special customer-defined character sets	—	—	100	—
F3389-00	Magnetic Stripe Reader; IATA or ABA format customer-selectable	25	21	560	5
F3642-00	User Memory; 32K bytes	53	43	1,600	3
F3642-01	User Memory Expansion; 32K bytes; requires F3642-00	26	22	800	2
F3642-99	64K RAM	65	50	1,800	5
F3643-00	8-bit Peripheral Interface; supports up to 2 printers and up to 2 diskette subsystems	17	14	560	3
F3576-00	Program Cartridge	17	14	505	—
8600-98/99	UTS 4020 Cluster Controller; includes integral diskette system load device, 1 workstation interface (supports first 4 UTS 20W/UTS 40W workstations), 64K RAM, and RS-232-C/V.24 synchronous communications interface	406	321	9,000	67
F3462-00	Memory Expansion; 64K bytes; maximum 256K	136	115	4,000	9
F3462-99	Memory Expansion; 128K bytes; maximum 256K	208	168	6,000	18
F3464-00	Additional Workstation Interface; supports up to 4 UTS 20W/UTS 40W workstations; max. 2 per system	36	25	800	4
F3463-02	8-Bit Peripheral Interface; supports up to 4 printers and/or diskette subsystems; max. of 2 per system	25	18	560	3
F3463-03	Dual 8-Bit Peripheral Interface; supports up to 8 printers and/or diskette subsystems; max. of 2 per system	37	25	820	3
8601-98/99	UTS 4040 Cluster Controller; includes integral diskette system load device, 1 workstation interface (supports first four UTS 20W/UTS 40W workstations), 64K RAM, and RS-232-C/V.24 synchronous communications interface	483	382	11,520	80
F3462-01	Memory Expansion; 64K bytes; maximum 512K	136	115	4,000	9
F3462-98	Memory Expansion; 128K bytes; maximum 512K	208	168	6,000	18
F3464-00	Additional Workstation Interface; supports up to 4 UTS 20W/UTS 40W workstations; maximum of 2 per system	36	25	800	4
F3463-02	8-Bit Peripheral Interface; supports up to 4 printers or diskette subsystems; maximum of 6 per system	25	18	560	3
F3463-03	Dual 8-Bit Peripheral Interface; supports up to 8 printers or diskette subsystems; maximum of 6 per system	37	25	820	3

*Includes prime-shift maintenance.

SEPTEMBER 1982

Sperry Univac UTS 4000 Programmable Terminal Systems

| | | Monthly Charge* | | | |
		1-Year Rental	5-Year Lease	Purchase	Monthly Maint.
3560-60/59	UTS 20W Cluster Workstation; includes 12-inch CRT, security keylock, interface to cluster controller, 96-character generator, and serial printer interface	$114	$ 89	$ 2,237	$ 24
	Typewriter keyboard	16	11	403	2
	Expanded typewriter keyboard	20	17	428	3
	UTS 400 keyboard	24	21	453	4
F3574-00	Tilt/Rotate Base	9	7	160	—
F3389-00	Magnetic Stripe Reader; IATA or ABA format customer-selectable	25	21	560	5

PERIPHERALS

		1-Year Rental	5-Year Lease	Purchase	Monthly Maint.
8406-04/05/06/07	Diskette Subsystem; for UTS 40 and UTS 4020 only; 1-megabyte single drive; requires F3643-00/01	125	101	3,600	22
F3145-00/01/02/03	Diskette Expansion; provides second 1-megabyte drive	72	58	2,160	11
0797-96/97/98/99	Matrix Printer; 80 cps; 80-column print width; requires F3643-00/01 for attachments to UTS 40 and UTS 4020	111	90	1,900	27
F3563-00	Forms Tractor	7	6	152	1
F3564-00	Pin-Feed Platen; for 9.5-inch wide forms	7	6	152	1
0798-97/99	Matrix Printer; 200 cps; 132-column width; requires F3643-00/01 for attachment to UTS 40 and UTS 4020	252	220	6,650	64
F3582-00	Operator-Selectable Vertical Spacing; 6 or 8 lines per inch; mutually exclusive with F3583-00	5	4	152	1
F3583-00	Nine-Wire Printhead; permits printing of lower case ASCII characters with descenders; mutually exclusive with F3582-00	18	11	300	2
F2648-00	Documents Parting Bar	4	3	114	1
F3587-00	Compressed Print; provides switch-selection of 10 or 14 characters per inch	7	6	185	1
	Correspondence-Quality Printer; 45 cps; for UTS 40 and UTS 4020 only; requires F3643-00/01				
0791-98/99	With rear feed	312	250	6,550	69
0791-96/97	With bottom feed; requires F3314-00	321	259	6,742	71
F3316-00					
F3313-00/01/02	Pin-Feed Platen; available in 9.0, 9.375, and 14.375 inch widths	—	—	260	—
F3316-00	Forms Tractor	23	16	600	3
F3540-00	Cut Sheet Feeder	77	63	1,932	14
F3314-00	Stand	—	—	225	—
0425-93/97	Data Processing-Quality Impact Printer; 160 cps	85	75	3,300	35
0425-92/96	High Definition Quality Impact Printer; 160/40 cps	92	82	3,600	40
F3861-00	Forms Tractor	5	4	95	1
0789-81	Line Printer; 180/300 lpm; requires F2865XX	—	—	10,584	87
0789-78	Line Printer; 300 lpm; requires F2865XX	—	—	12,500	133
0789-75	Line Printer; 640 lpm; requires F2865XX	—	—	15,560	156
F2865-XX	Initial Print Bands	—	—	184	—
F2970-00	180 to 300 lpm upgrade	—	—	1,916	46

SOFTWARE

		Monthly License
6181-00	Diskette Utility; for UTS 40 only	$21
6180-00	UTS 400 Mode SCP; for UTS 4020/UTS 4040 only	99
6183-00	Edit Processor; for UTS 4020/UTS 4040 only	53
6183-01	Edit Processor; for UT 40 only	36
6185-01	Text Processing Utility; for UTS 40 only	28
6185-02	Text Processing Utility; for UTS 4040/UTS 4040 only	90

*Includes prime-shift maintenance.■

Sperry Univac UTS 40 and UTS 4020 Programmable Terminal Systems

This UTS 4000 clustered terminal configuration consists of a UTS 4020 Cluster Controller, located in the lower right corner of the photo, and 6 UTS 20W display stations. All UTS 4000 System peripherals are illustrated: a Model 8406 diskette subsystem is shown to the left of the controller; a Model 0791 printer, in the lower left corner of the photo; a Model 0797 printer, at the workstation behind the controller; and a Model 0798 printer, at the top of the photo.

MANAGEMENT SUMMARY

Sperry Univac's UTS 4000 family, introduced in June 1980, represents its first new line of terminals in four years. The family consists of: two stand-alone non-program-mable models, the UTS 10 and the UTS 20; a stand-alone programmable terminal, the UTS 40; and a programmable clustered terminal system based on the UTS 4020 Cluster Controller. The subject of this report is the two programmable configurations. For further information on the non-programmable models, please refer to Report C25-877-201.

The UTS 40 is a single-station display terminal system that features 32K or 64K bytes of user memory. The system handles two printers and two single- or dual-drive diskette subsystems as peripherals.

The UTS 4020 is the controlling component of a UTS 4000 clustered terminal system, and handles up to 12 UTS 20W workstations plus up to 16 peripheral devices. User memory capacity on the UTS 4020 ranges up to 192K bytes.

UTS 40 and UTS 4020 applications programs are written in UTS COBOL. The UTS COBOL compiler runs on a ▷

Two programmable terminal members of Sperry Univac's UTS 4000 family.

The UTS 40 is a single-station display terminal with 32K or 64K bytes of user memory.

The UTS 4020 Cluster Controller is the basic component of a UTS 4000 clustered terminal system and supports up to 12 workstations.

A basic UTS 40 configuration, including a display, keyboard, and 32K bytes of user memory, can be purchased for $5,760, or rented for $225, including maintenance, on a one-year rental plan.

A 6-workstation UTS 4020 system with 64K bytes of user memory is priced at $30,440, or $1,203 on a one-year rental plan including maintenance.

CHARACTERISTICS

VENDOR: Sperry Univac Division, Sperry Corporation, P.O. Box 500, Blue Bell, PA 19422. Telephone (215) 542-4011.

DATE OF ANNOUNCEMENT: June 1980.

DATE OF FIRST DELIVERY: First quarter 1981.

SERVICED BY: Sperry Univac.

CONFIGURATION

The UTS 4000 family provides two user-programmable configurations: the stand-alone UTS 40, and a multiple-workstation system that uses the UTS 4020 Cluster Controller as its central component.

UTS 40: The UTS 40 is a microprocessor-based single-station terminal system. Basic components include a 12-inch CRT display and a choice of three keyboards. The UTS 40 provides 64K bytes of ROM system memory, plus 32K or 64K bytes of optional user memory.

The system's operating program, which Sperry Univac refers to as the "personality program", provides all basic terminal functions. The standard program offered by Sperry Univac provides for a UTS 400 mode of operation. The program is stored on a program cartridge and is active upon power-up. The program cartridge is operator-changeable.

User application programs are written in UTS COBOL and may be developed on the UTS 40 or at the host. Programs may also be developed on a UTS 4020 system, where the user may utilize that system's special program development tools. Application Programs must be sent from the UTS 40 or 4020 to a Series 1100, Series 90, or System 80 host on which a UTS COBOL compiler is running, for compilation. The compiled programs are then downline loaded to the UTS 40 or UTS 4020, where they can be executed immediately or stored on diskette for later use. Two user programs can be active in the UTS 40 simultaneously.

➤

Sperry Univac UTS 40 and UTS 4020
Programmable Terminal Systems

▷ Sperry Univac Series 1100, Series 90, or System 80 mainframe, and compiled programs are downline loaded to the terminal system. The UTS 40 and UTS 4020 can also be connected to a V77 host; however, a V77 cannot support the UTS COBOL compiler. The programs can be loaded directly into the terminal's memory for immediate execution or stored on diskette for later use. Sperry Univac provides two UTS COBOL program development tools, which run the UTS 4020, to simplify the program creation process. Programs developed on the UTS 4020 can run on a UTS 4020, UTS 40, or UTS 400 after they have been compiled by the host computer. The UTS 4020 can run 10 application programs concurrently, or one for nearly every workstation even in the maximum configuration.

Peripherals that can be attached to the UTS 40 and UTS 4020 include Sperry Univac's Model 8406 diskette subsystem, and three different printer models. The diskette subsystem comes in single- or dual-drive models; each drive provides 1 megabyte of on-line storage. The printers include a Model 0797 80-cps impact matrix printer, a Model 0798 200-cps impact matrix printer, and a Model 0791 correspondence-quality daisy-wheel printer.

The UTS 40 and UTS 4020 systems combine new up-to-date technology with the functional capabilities of Sperry Univac's older UTS 400 line. Although the new products support numerous enhancements, the changes are designed to increase operator or network efficiency, without adding to or dropping any of the previously existing system functions. For example, the new systems feature Z80A microprocessors and/or 2901A bit-slice technology, instead of the UTS 400's 8080 microprocessors. Data transmission is supported at a rate of 19,200 bits per second by the UTS 4020, although the UTS 40's highest speed of 9600 bps is the same as the UTS 400. All operating logic is resident on a program cartridge or diskette and loaded into system memory upon power-up; this allows new functions to be introduced or whole operating systems to be updated simply by inserting a new cartridge or diskette.

Updated cabinet styles and operator controls have been designed with particular attention to ergonomic factors. A detachable keyboard completely redesigned to improve operator comfort and efficiency, a display screen glare filter, an optional tilt/rotate display pedestal, and operator-adjustable refresh rates, time-out values, and keyclick audibility are just some of the UTS 4000 family's features.

Meanwhile, the new systems remain completely compatible with Sperry Univac's existing product line. Host systems and applications software needs no revision, since the UTS 40 and UTS 4020 operate in a UTS 400 emulation mode and, like the UTS 400, provide compatibility with the Uniscope 100 and 200 terminals. No new operator functions have been added, although in a few instances, the methods of performing certain functions have been revised for increased operator efficiency. The new systems are designed so that if the operator has ▷

▶ Up to two printers, up to two Model 8406 diskette subsystems, and one magnetic stripe reader may be added to the basic system as peripherals. Printers and diskette subsystems are attached to the system via an 8-bit peripheral interface; one peripheral interface handles the system maximum of 4 peripheral devices. The peripheral interface connects the device controller of each of its peripherals to a "line module", or I/O controller, programmed to handle that type of peripheral. All data transferred between the peripheral and the central processor passes through the line module, where it may be stored temporarily in a buffer and/or prepared for use by the receiving device or program.

Printers may be selected from three models: the Model 0797 80 cps matrix printer, the Model 0798 200 cps matrix printer, and the Model 0791 correspondence quality printer. The 8406 diskette subsystem comes in single- or dual-drive versions; each diskette drive provides up to 1 megabyte of on-line storage, for a total system maximum of 4 megabytes. The magnetic stripe reader, which can be IATA- or ABA-compatible, attaches directly to the terminal and does not require the peripheral interface.

UTS 4020: The UTS 4020 Cluster Controller is the primary component of a UTS 4000 clustered terminal system. The controller accommodates up to 12 workstations plus up to 16 peripheral devices.

The UTS 4020 provides 64K bytes of RAM memory, expandable up to 256K bytes in 64K-byte increments. However, depending on the configuration, 64K to 128K bytes of memory is required for system use, leaving a maximum of 192K bytes for user application programs.

The System Control Program (SCP), the UTS 4020's operating system, controls all system functions. Under SCP, workstations operate in UTS 400 mode, which provides compatibility with both the UTS 400 and Uniscope 100 and 200 terminals. The SCP is stored on diskette and loaded into the UTS 4020's memory upon power-up via an integral 1-megabyte diskette drive provided for this purpose.

User application programs are written in UTS COBOL. Several program development tools, including the Interactive Program Generator and the Edit Processor, simplify the program creation process. Application programs must be sent from the UTS 4020 to a Series 1100, Series 90, or System 80 host on which a UTS COBOL compiler is running, for compilation. The compiled programs are then downline loaded to the UTS 4020, where they can be executed immediately or stored on diskette. An external diskette drive is required for loading application programs into memory from diskette. Up to ten application programs can run concurrently on the UTS 4020.
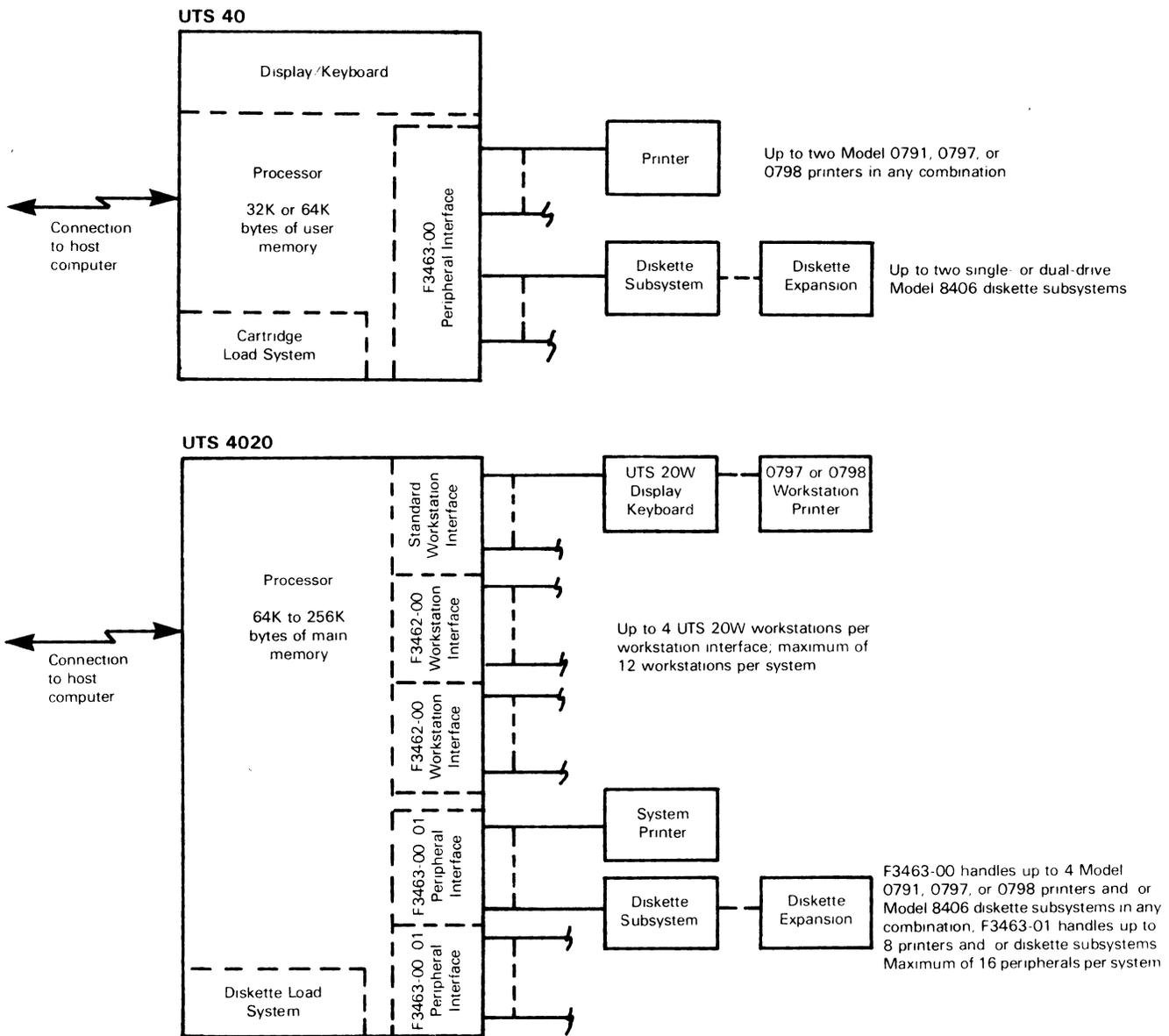
Workstations are attached to the UTS 4020 via workstation interfaces and may be located up to 5000 feet from the controller. Each workstation interface handles up to 4 workstations. One workstation interface is provided on the basic system; two additional workstation interfaces may optionally be added.

Each workstation consists of a UTS 20W display, a choice of one of three keyboards, an optional Model 0797 or 0798 printer, and an optional IATA- or ABA-compatible magnetic stripe reader. One workstation must be designated as the Master Station and acts as the system console in addition to its other functions.

Peripherals are attached to the system via 8-bit peripheral interfaces. Two types of peripheral interfaces are provided: one that supports up to 4 peripherals, and one that supports up to 8 peripherals. Up to two peripheral interfaces (either type) may optionally be added to the system. ▶

Sperry Univac UTS 40 and UTS 4020
Programmable Terminal Systems

Configuration

UTS 40

Display/Keyboard

Processor

32K or 64K bytes of user memory

Connection to host computer

F3463-00 Peripheral Interface

Cartridge Load System

Printer — Up to two Model 0791, 0797, or 0798 printers in any combination

Diskette Subsystem — Diskette Expansion — Up to two single- or dual-drive Model 8406 diskette subsystems

UTS 4020

Processor

64K to 256K bytes of main memory

Connection to host computer

Standard Workstation Interface

F3462-00 Workstation Interface

F3462-00 Workstation Interface

F3463-00 01 Peripheral Interface

F3463-00 01 Peripheral Interface

Diskette Load System

UTS 20W Display Keyboard — 0797 or 0798 Workstation Printer

Up to 4 UTS 20W workstations per workstation interface; maximum of 12 workstations per system

System Printer

Diskette Subsystem — Diskette Expansion

F3463-00 handles up to 4 Model 0791, 0797, or 0798 printers and or Model 8406 diskette subsystems in any combination. F3463-01 handles up to 8 printers and or diskette subsystems. Maximum of 16 peripherals per system

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▷ previously used a UTS 400, transition to a UTS 40 or to a UTS 4020 workstation should be minimal.

Configurationally, both the UTS 40 and UTS 4020 systems provide more memory, and the UTS 4020 accommodates a greater number of workstations and peripherals, than the UTS 400. The UTS 40's maximum user memory is 64K bytes, and the UTS 4020's is 192K bytes, compared with the UTS 400 maximum of 32K bytes. The UTS 4020 handles up to 12 workstations plus 16 peripherals while the largest UTS 400 configuration contains 6 workstations and 12 peripherals.

Not unexpectedly in light of industry trends, the UTS 40 and UTS 4020 systems are, in spite of these improvements, frequently less expensive than their UTS 400 counterparts. For example, a basic UTS 40 display/keyboard with 32K ▷

▶ **Peripherals include a selection of printers and the Model 8406 diskette subsystem. Printer choices include the Model 0797 80 cps matrix printer, the Model 0798 200 cps matrix printer, and the Model 0791 correspondence quality printer.**

TRANSMISSION SPECIFICATIONS

Transmission is synchronous in half duplex mode. A seven-level ASCII code, plus parity, is used. The UTS 40 can transmit at speeds up to 9600 bps; the UTS 4020 transmits at rates up to 19,200 bps. The standard UTS 400 transmission protocol is utilized. The UTS 400 protocol performs internal parity checking, and provides a single-bit error detection scheme on all communication line and peripheral transfers. Data is automatically retransmitted upon detection of an error.

The UTS 40 and UTS 4020 may be connected to a Sperry Univac Series 1100, Series 90, System 80, or V77 host computer via direct or modem connection. (Note, however, that V77 systems do not support a UTS COBOL compiler, ▶

Sperry Univac UTS 40 and UTS 4020
Programmable Terminal Systems

▷ bytes of user memory sells for $5,760, and rents for $225 (including maintenance) on a month-to-month basis. This compares with a $9,990 purchase price, and a $357 month-to-month rental, for a single-station UTS 400 configuration with 24K bytes of memory. In small-cluster configurations (two to six workstations), the UTS 400 is priced below a comparable UTS 4020 cluster, but the improved operating efficiency of the UTS 4020 should be considered when evaluating the two systems. The larger the UTS 4020 configuration, the more justifiable it becomes, since the UTS 4020 controller is more expensive than the UTS 400 controller but UTS 20W workstations are priced considerably below their UTS 400 counterparts.

Two additional cost-saving programs were introduced by Sperry Univac with the UTS 4000 family. The first, which Sperry Univac has instituted as a standard procedure for all UTS 4000 components, is the Customer Set-Up policy. As the name implies, CSU units are shipped to the customer, who is responsible for unpacking, inspecting, installing, and testing the system using Sperry Univac instructions. Sperry Univac Customer Engineers are available by phone, or on-site when necessary, if problems are encountered.

The second is the optional Central Repair Service plan, which is currently available only for purchased UTS 20's and their peripherals, but is anticipated to be extended to the UTS 40 and UTS 4020 eventually. This plan permits customers to ship malfunctioning units to a Sperry Univac maintenance site for service, at prices substantially below normal on-site maintenance fees.□

▶ which is required for UTS 40 and 4020 user program compilation.) An RS-232-C/V.24 interface is provided for modem connection. A direct connect interface is also available.

SOFTWARE

The UTS 40 operating system, or "personality program", is provided on a program cartridge and supports all basic system functions and operations. The system provides all the capabilities of its predecessor, the UTS 400, including compatibility with the Uniscope 100 and 200, so that these devices may coexist in a user network with minimal change to host software. It includes as standard the UTS 400's optional screen bypass capability, which permits the host to selectively address a workstation's peripherals and initiate a data transfer to or from a peripheral without interfering with the operator's use of the keyboard and display. The UTS 40 performs some tasks more quickly than the UTS 400, and some new operator controls have been added to increase operation or network efficiency, but no new capabilities have been provided. The UTS 40 operating system requires 64K bytes of ROM memory, which is provided for this purpose in the basic system.

The UTS 4020 operating system is a diskette-resident Sperry Univac program product called the System Control Program (SCP). The SCP provides all basic system functions, including workstation support, peripheral handling, diskette file management, and communications with the host. With the SCP, the UTS 4020 is a fully operable terminal controller that handles interactive data communications between its workstations and the host.

Each UTS 20W workstation and each peripheral line module has its own microprocessor and RAM memory. When the SCP is loaded into the UTS 4020, the controller passes a "personality program" to each workstation, and an operating program that provides appropriate logic for each peripheral to its respective line module. UTS 20W workstations are supported in basic UTS 400 mode (the screen bypass function is not provided). As with the UTS 40, the UTS 20W provides for greater operator and network efficiency, but minimal differences in capability, compared to the UTS 400. Depending on the configuration, the SCP requires 64K to 128K bytes of main memory.

UTS 40 and UTS 4020 application programs are written in UTS COBOL. UTS COBOL conforms to ANSI Standard X.323-1974 with syntax extensions that accommodate specific UTS terminal features, such as interacative data entry and program control, screen management and data formatting, and compressing. Under UTS COBOL, files may be either sequentially or randomly accessed and either formatted or unformatted. Multiple files are also supported. Files may be dedicated to a specific workstation or shared, reassigned from one device to another similar device, or changed from dedicated to shared status and vice versa. The UTS COBOL compiler runs on a Series 1100, Series 90, or System 80 mainframe. Compiled programs are downloaded to the UTS 40 or UTS 4020 for execution. COBOL program execution requires a minimum of 32K bytes of user memory.

Two program products, the Interactive Program Generator (IPG) and the Edit Processor, are available as program development tools and run on the UTS 4020 only. The IPG is a tutorial program that prompts users through the definition of program input, output, and processing requirements for applications such as interactive data entry, file inquiry/response, and report generation. Then, using the operator's responses, the IPG generates a UTS COBOL source program ready for compilation. The Edit Processor permits local files containing data or program source code to be created and updated off-line, without the assistance of the host. The Edit Processor provides line-oriented text handling and editing functions that can simplify off-line program development. Once compiled, programs created on a UTS 4020 system may run on any UTS 4020, UTS 40, or UTS 400 interconnected through the host system.

A Diskette Utility program product is available for the UTS 40 that converts data code and format from UTS 400 format to IBM 3741 format and vice versa, formats diskettes, copies diskettes, and performs other diskette utility functions.

DEVICE CONTROL

The UTS 40 and UTS 20W "personality programs" support basic terminal operations in UTS 400 mode.

Operator controls move the cursor up, down, left, right, home, to the beginning of the next line (return), to the first position following the next tab stop to the right (tab forward), or to the left (tab backward) of the current position.

Edit controls provide insert, delete, and erase functions. Both line and display insert and delete functions are standard. Insertion or deletion within a line affects all data to the right of the cursor up to the end of the current line. Display insertion or deletion affects all data following the cursor up to the last displayable position of the screen. When formatted data is displayed, these functions affect only the variable fields; the fixed fields (format descriptors) are protected from inadvertent alteration.

The standard erase functions include character, line, field, and screen erase. Character erase erases the character at the cursor position. Line erase erases all data from the cursor to the end of the line. Character and line erasure erases only ▶

Sperry Univac UTS 40 and UTS 4020
Programmable Terminal Systems

➤ "unprotected" fields. Two types of screen erasure are standard: one erases all "unprotected" fields, and the other erases all data. Screen erasure begins at the cursor position.

Other standard functions include Line Duplication and Scroll. Line Duplication permits any displayed line to be duplicated via operator or program control; this feature facilitates setting up format or entering repetitious data instead of rekeying. The Scroll feature is implemented via software, using line insert and delete functions.

Program Attention keys are used to initiate program-designated functions; 22 PA keys are standard.

Field Control Mode, a standard feature, permits a terminal- or computer-generated format to be displayed. The parameterized format program uses field control (attribute) characters to specify display characteristics, delimit fields, set tab stops, and indicate whether a field has or has not been modified by the operator. Display characteristics feature high (normal) and low beam intensity, blinking, reverse video, and, on the UTS 40 only, underscore, blanking (beam off), and strike-through. Fields can be identified as alphabetic only, numeric only, alphanumeric, protected, and right-justified alphanumeric, alphabetic, or numeric. Besides specifying the field attribute, a field control character can double as a tab stop. The field control character (FCC) occupies a memory location but not a screen location. Up to 80 FCC's can be used in each displayed line. Via the Character Protect Mode, individual characters within a field can be format-protected in addition to all FCC attributes.

A special compatibility feature permits UTS 400 mode operation using FCC's in a Uniscope 100 and 200 environment; these terminals do not recognize FCC codes. Software provides Uniscope compatibility via conversion between the protected field FCC's and the protected format code used by the Uniscope terminals. This feature provides some FCC capabilities without requiring application software changes.

The Control Page, also a standard feature, is a two-line control program containing I/O device operating status and operator-keyed device commands that are executed upon the depression of the corresponding function keys. The Control Page, called from memory and displayed by the depression of the Control Page key, permits the operator to examine and revise device status and program input and ouput commands to specified I/O devices. The commands specify data transfer, copy, edit, transmit, read, diskette preparation and other functions.

Data is transmitted to the remote computer when the terminal is interrogated via a polling message following operator initiation of the transmit function. Data entry is not normally interrupted by an unsolicited computer message; however, the operator is alerted to the pending message and can respond when ready by initiating the Message Waiting function. Via program control, the remote computer can override any operator action and display an urgent message without waiting. Displayed data can be transferred to a peripheral device (printer, diskette, or cassette unit) by manual initiation (Printer or Transfer key) or automatically under program control.

The Screen Bypass feature (supported on the UTS 40 only) transfers data received from the host processor directly to the addressed peripheral without interfering with concurrent operator/display functions.

COMPONENTS

UTS 40 and UTS 20W DISPLAY: A 12-inch (diagonal) CRT with a 10-inch by 7-inch viewing area. The display format can range from 2 lines of 2 characters each, up to 24 lines of 80 characters each, for a total maximum display capacity of 1920 characters. A 25th display line is inaccessible to the operator and displays operating status and other information. Displayable character sets containing 96 characters are available in standard ASCII or any of several European languages; a 128-character Katakana set is also available. Characters are formed using a 7-by-11 dot matrix that provides for lower case descenders. Operator controls include a brightness adjuster, a refresh rate selector (50 or 60 times per second), and a time-out value selector. A tilt-and-rotate base is optional.

UTS 40 and UTS 20W KEYBOARDS: A choice of four keyboards are offered: an ASCII typewriter-style keyboard (for use with UTS 20W only); an expanded typewriter keyboard that includes a function key cluster and a numeric pad; a UTS 400-compatible keyboard; and a Katakana keyboard. The expanded typewriter keyboard is available with standard ASCII or any of several European languages. All keyboards are detached and can be up to 3.3 feet from the display.

DISKETTE SUBSYSTEM: The Model 8406 Diskette Subsystem is a stand-alone unit that contains one or two diskette drives that read or write data in single- or double-density on one or both sides of the diskette. On single-side single-density diskettes, the formatted storage capacity is 242K bytes; data can be stored in UTS 400 or IBM BDE format. On double-side double-density diskettes, the capacity is 980K bytes, and the IBM Format H format is used. The diskette is organized into 77 data tracks. Single-density diskettes contain 26 sectors per track, each of which stores 128 bytes. Double-density diskettes can contain 26, 15, or 8 sectors per track, with 256, 512, or 1024 bytes per sector, respectively. Average access time is 260 milliseconds, with an average rotational delay of 88.3 milliseconds. The data transfer rate is 31,250 bytes per second for single-sided single-density diskettes, and 62,500 bytes per second for double-sided double-density diskettes.

PRINTERS: Any of three printers can be attached to a UTS 40 or UTS 4020 system: the Model 0797 and 0798 matrix printers and the Model 0791 correspondence quality printer. Model 0797 or 0798 may also be used as a UTS 20W workstation printer.

The Model 0797 is an 80-cps impact printer that prints unidirectionally over a print width of 80 columns. Characters are formed by a 9-by-7 half-space dot matrix. Eleven different 96-character sets featuring various font styles and language symbols (standard ASCII, plus several European languages), as well as a 128-character Katakana set, are offered. Horizontal spacing is 10 characters per inch; vertical spacing is selectable at 6 or 8 lines per inch. Vertical format controls provide for nine industry-standard form lengths from 3 to 12 inches, plus continuous feed; an automatic six-vertical-space line skip over a cross-form perforation is featured. A friction feed platen that accommodates cut forms up to 8.5 inches wide is standard; a pin-feed for 9.5-inch wide forms, and an adjustable forms tractor that accommodates sprocketed continuous forms from 3.0 to 10.0 inches in width, are optional. An original and two copies can be produced.

The Model 0798 is a 200 cps matrix printer that prints bidirectionally over a print width of 132 columns. Characters are formed by a 7-by-7 half-space dot matrix. A 7-by-9 dot matrix is optional for ASCII character sets only. Several character sets, including a 64- and a 96-character ASCII set and various European character sets, are offered. Horizontal spacing is 10 characters per inch; a compressed print option provides switch-selection of a 14-cpi horizontal spacing, allowing 132 columns to be printed on 11-inch wide paper. Vertical spacing is 6 lines per inch; operator-selection of 6 or 8 lines per inch is optional. A document-parting bar, which ➤

Sperry Univac UTS 40 and UTS 4020
Programmable Terminal Systems

➤ permits removal of newly printed pages without removing the paper from the tractors, is optional.

The Model 0791 correspondence quality printer is a table-top daisy-wheel printer that operates bidirectionally at 45 characters per second. A selection of 96-character daisy wheel fonts is available and provides a variety of typeface styles and languages, including OCR-A and OCR-B. Horizontal and vertical spacing are manually- or program-selectable at 10 or 12 characters per inch and 6 or 8 lines per inch, respectively. The 10 cpi spacing produces a 132-character line; the 12 cpi spacing, a 158-character line. Vertical formatting, margin selection, and other print parameters are also operator-or program-selectable. The printer accommodates cut forms of up to 15 inches in width, friction-fed continuous forms of various widths, pin-fed forms 9.0, 9.375, or 14.375 inches wide, or sprocketed card stock. A bottom feed mechanism is optional.

PRICING

The UTS 40 and UTS 4020 systems are available for purchase, on one-year rental, or on a five-year lease. Quantity discounts apply for UTS 40, UTS 4020, and UTS 20W

equipment acquired by purchase or on a five-year lease. The discount scale is 10% for quantities of 25 or more units, 20% for 50 or more units, and 30% for 100 or more units. Certain quantity discounts also apply for optional features and peripherals; contact Sperry Univac for details.

A separate maintenance contract is available for all equipment, whether purchased, rented, or leased. (Rental and lease prices shown below include the monthly maintenance fee.) As an alternative for purchased equipment only, Sperry Univac's Central Repair Service (CRS) may be utilized at substantial savings. Currently, CRS is available only for UTS 20's and their peripherals (except UTS 20's configured with the Model 0798 as a workstation printer). CRS requires the customer to ship units in need of repair to a Sperry Univac maintenance depot, where they are serviced and returned to the user.

The UTS 4000 family components have been designated Customer Set-Up units, and the customer is responsible to unpack, inspect, install, and test the equipment in accordance with Sperry Univac instructions. Sperry Univac Customer Engineers are available by phone (or for on-site help, when necessary) if problems are encountered.

| | | Monthly Charge* | | | |
		1-Year Rental	5-Year Lease	Purchase	Monthl Maint.
	UTS 40 Single Station Programmable CRT Display; includes 12-inch CRT, security keylock, system ROM, RS-232-C/V.24 synchronous communications interface, 96-character generator, and UTS 400 mode program cartridge; requires 32K or 64K RAM (F3642-00/01):				
3561-98/99	With expanded typewriter keyboard	$172	$141	$4,160	$37
3561-96/97	With UTS 400 keyboard	172	141	4,160	37
F3574-00	Tilt/Rotate Base	—	—	350	—
F3390-00	Blank Keycap Set; for special customer-defined character sets	—	—	100	—
F3389-00	Magnetic Stripe Reader; IATA or ABA format customer-selectable	23	19	560	5
F3642-00	User Memory; 32K bytes	53	43	1,600	3
F3642-01	User Memory Expansion; 32K bytes; requires F3642-00	26	22	800	2
F3643-00	8-bit Peripheral Interface; supports up to 2 printers and up to 2 diskette subsystems	17	24	560	3
8600-98/99	UTS 4020 Cluster Controller; includes integral diskette system load device, 1 workstation interface (supports first 4 UTS 20W workstations), 64K RAM, and RS-232-C/V.24 synchronous communications interface	359	284	9,000	59
F3462-00	Memory Expansion; 64K bytes; max. 3 per system	128	108	4,000	8
F3464-00	Additional Workstation Interface; supports up to 4 UTS 20W workstations; max. 2 per system	34	24	800	4
F3463-00	8-Bit Peripheral Interface; supports up to 4 printers and/or diskette subsystems; max. of 2 F3463-00/01's per system	24	17	560	3
F3463-01	Dual 8-Bit Peripheral Interface; supports up to 8 printers and/or diskette subsystems; max. of 2 F3463-00/01's per system	35	24	820	3
	UTS 20W Cluster Workstation; includes 12-inch CRT, security keylock, interface to cluster controller, 96-character generator, and serial printer interface				
3560-88/89	With typewriter keyboard	108	87	2,640	21*
3560-86/87	With expanded typewriter keyboard	108	87	2,640	21*
3560-84/85	With UTS 400 keyboard	108	87	2,640	21*
F3574-00	Tilt/Rotate Base	—	—	350	—
F3390-00	Blank Keycap Set; for special customer-supplied character sets	—	—	100	—
F3389-00	Magnetic Stripe Reader; IATA or ABA format customer-selectable	23	19	560	5*
	PERIPHERALS				
8406-04/05/06/07	Diskette Subsystem; for UTS 40 and UTS 4020 only; 1-megabyte single drive; requires F3643-00/01	118	95	3,600	20
F3145-00/01/02/03	Diskette Expansion; provides second 1-megabyte drive	68	55	2,160	10
0797-96/97/98/99	Matrix Printer; 80 cps; 80-column print width; requires F3643-00/01 for attachments to UTS 40 and UTS 4020	105	85	2,400	25*

*Includes prime-shift maintenance.
**For users who purchase their UTS 20W units and choose the Central Repair Service, the annual maintenance charge is $120 for the UTS 20W, $40 for the Magneti(Stripe Reader, and $150 for a Model 0797 printer peripheral to the 20W.

Sperry Univac UTS 40 and UTS 4020
Programmable Terminal Systems

		Monthly Charge*			
		1-Year Rental	5-Year Lease	Purchase	Monthly Maint.
► F3563-00	Forms Tractor	7	6	152	1
F3564-00	Pin-Feed Platen; for 9.5-inch wide forms	7	6	152	1
0798-97/99	Matrix Printer; 200 cps; 132-column width; requires F3643-00/01 for attachment to UTS 40 and UTS 4020	237	207	6,650	59
F3582-00	Operator-Selectable Vertical Spacing; 6 or 8 lines per inch; mutually exclusive with F3583-00	5	4	152	1
F3583-00	Nine-Wire Printhead; permits printing of lower case ASCII characters with descenders; mutually exclusive with F3582-00	17	11	300	2
F2648-00	Document Parting Bar	4	3	114	1
F3587-00	Compressed Print; provides switch-selection of 10 or 14 characters per inch	7	6	185	1
	Correspondence-Quality Printer; 45 cps; for UTS 40 and UTS 4020 only; requires F3643-00/01				
0791-98/99	With rear feed	293	235	6,550	63
0791-96/97	With bottom feed; requires F3314-00	302	243	6,742	65
F3313-00/01/02	Pin-Feed Platen; available in 9.0, 9.375, and 14.375 inch widths	—	—	260	—
F3316-00	Forms Tractor	22	15	600	3
F3540-00	Cut Sheet Feeder	73	59	1,932	13
F3314-00	Stand	—	—	225	—

SOFTWARE

		Monthly License
6181-00	Diskette Utility; for UTS 40 only	$15
6180-00	UTS 400 Mode SCP; for UTS 4020 only	70
6182-00	Interactive Program Generator; for UTS 4020 only	50
6183-00	Edit PRocessor; for UTS 4020 only	40

*Includes prime-shift maintenance.
**For users who purchase their UTS 20W units and choose the Central Repair Service, the annual maintenance charge is $120 for the UTS 20W, $40 for the Magnetic Stripe Reader, and $150 for a Model 0797 printer peripheral to the 20W.■

UNIVAC UTS 700 Universal Terminal System

Programmable terminal system that supports file management, data entry, and batch communications.

The disk-based terminal can be configured with up to 3 million bytes of diskette storage, up to 40 million bytes of cartridge disk storage, or a combination of both types of storage (subject to capacity limitations). Peripheral options include up to four CRT workstations, line printers, card readers and punches, and industry-compatible magnetic tape drives. Standard software includes a disk operating system, utilities, and emulators for UNIVAC and IBM terminals. RPG-II support, a key feature, lets users create their own programs.

A basic UTS 700 with 48K bytes of main memory, 1 million bytes of diskette storage, a 300 lpm printer and 300 cpm card reader rents for $1,250 per month on a one-year rental including maintenance.

An expanded UTS 700 with 48K bytes of memory, 20 million bytes of cartridge disk storage, two workstations, a 600 lpm printer, and a 600 cpm card reader rents for $2,679 per month on a one-year rental including maintenance.

A large-scale UTS 700 with 65K bytes of main memory, 40 million bytes of cartridge disk storage, two workstations, a 600 lpm printer and a 600 cpm card reader rents for $3,809 per month on a one-year rental including maintenance.

The UTS 700 is also a potential contender for the IBM System/32 small scale computer market.

MANAGEMENT SUMMARY

UNIVAC introduced the UTS 700 Universal Terminal System in April 1976 as one of three members of a new family of intelligent terminals that include the UTS 400 and the UTS 400 Text Editor, a special purpose version of the UTS 400 for the printing and publishing industry. The UTS 700 is a microprocessor-driven, disk-based, super remote batch terminal. Not limited to being just a batch terminal, the UTS 700 also supports file management and limited data entry via optional workstations. And its variety of peripherals including card readers, a card punch, line printers, and industry-compatible magnetic tape drives provide a high degree of configuration flexibility.

Supported as a turnkey system, the standard terminal implements all functions via vendor-supplied software called the System Control Language. This parameter-driven, disk-resident operating system interfaces the workstation operator with displayed "menus" or lists of job functions and executes the selected function under simple operator command. File management, a subset of SCL, supports sequential, direct sequential, and indexed file structures. Files can be created, updated, and deleted. A host of utility programs, executed under SCL commands, support a variety of activities including ▷

CHARACTERISTICS

MANUFACTURER: UNIVAC Division, Sperry Rand Corporation, PO Box 500, Blue Bell, Pennsylvania 19422. Telephone (215) 542-4011.

DATE OF ANNOUNCEMENT: April 28, 1976.

DATE OF FIRST DELIVERY: September 1976.

NUMBER DELIVERED TO DATE: Over 400.

SERVICED BY: UNIVAC.

UNIVAC UTS 700 Universal Terminal System

▷ sort/merge, data entry, library creation and manipulation and diagnostic aids. A system directory, maintained by file management software and interrogated by utilities and file management, contains information on all system-resident files and libraries.

UNIVAC provides a high-level programming language called ESCORT for creation of user programs. UNIVAC also offers an RPG II compiler to support the development of more complex user programs. The vendor chose RPG II as the programming language supported by the UTS 700 because of its support for a wide variety of applications, its universal popularity, and the large base of programmers already trained in the language. Program development is performed on the UTS 700.

Disk storage is an integral element of UTS 700 operation. Either diskette or cartridge disk can be specified or the two can be combined in the same system to satisfy specific user operating parameters. Both media are available in standard or dual density with diskette storage capacities ranging from 0.5 million to 3 million bytes and cartridge disk storage capacities ranging from 5 million to 40 million bytes. A minimum capacity of one million bytes of diskette storage or 5 million bytes of cartridge disk storage are required for adequate system support. Configurations that combine diskette units with cartridge disk drives can accommodate up to 2 million bytes of diskette storage and up to 20 million bytes of cartridge disk storage.

Batch transmission is supported via software emulation. UNIVAC offers several emulators for UNIVAC devices in addition to emulators for the IBM 2780 and 3780 that include EBCDIC transparency. Additional emulators, such as IBM HASP multi-leaving, may be provided in the future.

Concurrent operations are supported on terminals with 65K bytes of memory. An RPG-II program can run simultaneously with a communications emulator program. Terminals with the minimum 48K bytes of memory can simultaneously run an off-line utility with an emulator.

Data entry is limited to four workstations; each workstation displaces any one of the following peripherals: line printer, card reader, or card punch. The workstation is a CRT keyboard/display unit with typewriter-style keyboard and a 12-inch screen that can display up to 1920 characters. Data entry and verification is performed under the control of fixed formats. Format protection is a standard feature. An optional 300-cps, non-impact printer provides hard copy.

With disk storage, an operating system, file handling capabilities, and a user programming language (RPG II), the UTS 700 sounds more like a small computer system than a terminal, doesn't it? Would you perhaps compare it to the IBM System/32? Go ahead. Except for the lack of extensive applications program support, the UTS 700 will hold up well in such a comparison. As a matter of fact, the UTS 700 can have more main memory, more disk storage, a faster printer, — and a higher price tag. It will ▷

▶ **CONFIGURATION**

The UTS 700 is built around a microprocessor with 48K bytes of main memory, expandable to 65K bytes in one 16K-byte increment. Peripherals, attached via discrete controllers, include disk and/or diskette drives, card readers, card punches, line and serial printers, industry-compatible magnetic tape drives, and operator workstations. An alternate communications interface is optional.

The terminal controllers and their peripheral accommodations are defined as follows:

● CDMA—Cartridge Disk Direct Memory Access. This controller accommodates one or two single- or dual-density cartridge disk drives having a storage capacity of 5 or 10 million bytes each. One or two drives of the same capacity are housed in a single cabinet that also contains the controller.

● DDMA—Diskette Direct Memory Access. This controller accommodates one or two single- or dual-density diskette units with a storage capacity of 0.5 or 1.0 million bytes, respectively. Each diskette unit contains two drives. The terminal can accommodate a maximum of two DDMA's; however, system limitations restrict the Expansion DDMA to one single- or dual-density diskette unit for a maximum of six drives.

● SDMA—Shared Direct Memory Access. This controller accommodates up to four devices including any combination of up to four workstations, two printers, two card readers and two card punches. The terminal can accommodate a maximum of two SDMAs; however, system limitations restrict the SDMA Expansion to one or two devices for a total of six devices.

● TDMA—Tape Direct Memory Access. This controller accommodates one or two industry-compatible magnetic tape drives housed in a separate cabinet with the controller. The terminal accommodates one TDMA.

● MCLA—Microprocessor Communications Line Adapter. This controller accommodates one communications line. Two lines can be attached via the optional Alternate Communications Interface feature, which permits alternate use of either line.

The minimum terminal configuration includes an MCLA, SDMA, and either a DDMA (diskette controller) or CDMA (cartridge disk controller). The terminal can be expanded to a maximum of four controllers by adding any one of the following controllers: CMDA, DDMA, SDMA, or TDMA.

The terminal processor, main memory, and all controllers are housed in a single-pedestal desk that includes an operator console and serves as the control center for the overall system.

TRANSMISSION SPECIFICATIONS

Synchronous in the half- or full-duplex mode. Transmission parameters defined by the communications protocol such as transmission rate, code, control characters, message sequence, and blocking/deblocking are a function of the communications software. Communications software currently consists of emulator programs for the following terminals:

● UNIVAC 1004 Models I, II, and III and 9200/9300 using RMS-1 protocol and XS-3 data code; can also support MIL-STD 188 or CCITT V.24 interface, alternate communications line, and disk storage. ▶

UNIVAC UTS 700 Universal Terminal System

▷ also support a multi-user arrangement; i.e., multiple workstations can be operating simultaneously. (The IBM System/32 does not support a multi-user environment at this time.) In addition to the System/32, there are many small computer systems from minicomputer vendors and systems that provide similar capabilities.

At the opposite end of the market from computers are the shared processor key/disk, data entry/validation systems, such as UNIVAC's own CADE 1900 system. Because it is limited to just four entry stations, the UTS 700 does not compete with this class of equipment.

Finally, there is a group of microcomputer and minicomputer-based programmable terminals that form a competitive group, including systems from IBM (3790), Four-Phase, Datapoint, Sycor, Incoterm, and others.

The difficulty of placing the UTS 700 and the other sophisticated programmable terminals just mentioned into perspective arises because this group's true place in data processing is in development. This is illustrated by the difficulty in distinguishing between a small computer marketed for small business processing that can also operate as a batch terminal (e.g., the IBM System/32) and a programmable communications terminal that can also function as a stand-alone data processing unit (e.g., the UNIVAC UTS 700). The question is more extensive than just trying to neatly put labels on systems.

The magic buzz words of today, such as distributed processing, network architecture, networking, etc. are the verbalizations of a revolution in data processing concepts. No longer do the economies of scale (large central processor) necessarily outweigh the advantages of processing data at the place it originates and is used.

While it is true that programmable terminals have been available and have been successfully used for several years, they have not had the impact on business procedures in the past that they will have over the next few years, because costs of processing components have fallen so dramatically.

Although arriving somewhat tardily on the programmable terminal scene, the UTS will be one of the units that help users to participate in these changes in data processing.

Datapro was unable to find any users of the UTS Terminal System, and UNIVAC declined to provide a list of users. Therefore we could not determine how well the UTS 700 is working in the field.☐

▶ ● UNIVAC 9200 and 9300 using full-duplex NTR (Nine Thousand Remote) protocol; can also support disk storage.

● UNIVAC DCT 1000 using ASCII; can also support line printer, disk storage, and display workstations.

● UNIVAC DCT 2000 using ASCII; can also support MIL-STD 188 or CCITT V.24 interface, alternate communications line, and disk storage.

● IBM 2780 or 3780 using ASCII, EBCDIC, or EBCDIC transparency; can also support MIL-STD 188 or CCITT V.24 interface, alternate communications line, and disk storage.

SOFTWARE

The UTS 700 is a turnkey system that implements all tasks via a disk (or diskette) resident, *parameterized* program called System Control Language (SCL), which is the interface between operator and terminal. The SCL program facilitates ease of operation via displayable lists of job functions or *menus* that guide the workstation operator in selecting specific, predefined job procedures, jobs can also be selected via punched cards. Once a procedure is selected, the operator is requested to key its corresponding parameters into displayed job control statements that define the job. User generated programs are prepared in RPG-II or ESCORT.

SYSTEM CONTROL LANGUAGE: SCL commands specify programs to be executed, identify the files to be used, and aid in debugging. The commands can be keyed at a workstation or read from cards or disk. SCL commands are divided into eight categories: job definition, file definition, SCL control, system control, utility program support, language processor calls, disk support, and special subsystem support.

A job (or job stream) is defined as a set of sequentially executed programs that can reside on disk and be called by command.

The File command describes a specific file and is used only when the file parameters are to be changed. SCL control supports operator interaction with the SCL, including parameterization of the job stream and run-time decision-making for establishing alternate paths through a job stream. System control statements define various operating options including date, modes of operation, and menu items to be displayed at a workstation. SCL commands can call forth any of several utility programs that reside in the system to invoke the RPG II compiler, to call special utility programs that aid disk maintenance, or to invoke the batch communications or data entry operating modes. (The terminal cannot operate in these two modes concurrently.)

The *File Management System (FMS)*, a subset of SCL, implements the management of data files, program libraries, system files, and working files, and includes an optional file directory. The FMS is the interface between disk (or diskette) and tape I/O operation and requests from other system components and user programs. The FMS supports sequential, direct sequential, and indexed file structures; file sharing; opening or closing files; retrieving or writing records; controlling certain I/O functions specifying I/O buffering, blocking, and deblocking; waiting for completion of I/O sequences (for overlapping I/O with processing); and loading indexed files. Each file contains a file definition table, a list that describes the characteristics of the logical file, identifies options to be invoked by file management, and contains the addresses of the program's I/O buffers, record work areas, and function parameter areas. Programs interface the FMS via I/O control calls; file openings and closings, buffering, and blocking/deblocking are FMS functions. Logical records can be blocked into physical records, or file sections, of 256 or 1024 bytes. A file section is equivalent in size to the program I/O buffers used by the file. The user can build or process records in the program I/O buffers or move them to or from user-program-assigned record work areas to perform the operations. These functions are also handled by FMS via subroutines. ▶

UNIVAC UTS 700 Universal Terminal System

The system directory, maintained by FMS and used by utility programs and file management, contains information on all files and libraries within the system. The system directory is maintained on disk.

UTILITY PROGRAMS: Executed via SCL commands, utilities include card utilities, sort/merge, data and program file services, system support facilities, and data entry.

The *card utilities* support duplication and listing (printing) card decks. A deck can be reproduced with options for numbering, editing, and reformatting. Listing prints the contents of the cards (a card count is automatically provided) with options for formatting and editing.

The *sort/merge utility*, via sequence specification parameters, rearranges, omits, and reformats records from any type of file and outputs the results to any type of file via a temporary work file created and controlled by the sort utility.

Three sort versions are supported: record sort, address out, and summary sort. The resultant output of a record sort can contain key fields only, key fields and data fields, or data fields only. An address out sort requires input from disk or diskette. The output will contain a 1-byte flag, 4-byte address, and up to a 251-byte key field. The result of this sort is a file which constitutes the index portion of the keyed access mechanism. The summary sort drops all but one record of those records with identical keys; specified fields in the dropped records are added to the corresponding field of the retained record. The summary sort can be called in two ways. External calls are issued by an SCL statement followed by sort sequence specifications. Internal calls by the SCL result in files containing either keys, or keys and record addresses.

Data file services are utility programs that allow manipulation of disk data files. Functions include display, copy, delete, and erase. Display prints the entire volume index or selected information on specified files. The volume index contains the file ID, location (starting tracks, number, and size), status (permanent, temporary, or scratch), type of file, date of creation, etc. Copy executes the copying of a volume, a file, or selected records of a file to another volume or file. Printing and reorganization of a file can also be specified, where the records are written in the same sequence as their index. Delete eliminates references to a file in the volume index, which is marked to indicate the file is scratched. All the files in a volume can be marked as scratch files. Erase places blanks or other neutral indicators in the file.

Program file services are utility programs that allow manipulation of libraries. Functions include the capability to reserve space for a library on disk, to change the size of the space, to delete a library or elements within a library, to copy a library, removing the deleted elements, to copy selected elements from a library, to create an element with the option to print the created element, to rename an element, to add or replace elements in a library by name, to add, replace, or delete records in an element, and to print a library of selected elements.

System support facilities are utility programs that provide aids in debugging fault detection, and general system operation. They include Disk Preparation, Alternate Track Assignment or Build, and Build or Modify Procedure. Disk Preparation can be used to assign a name to a disk, to write tracks and sector addresses on disk, to perform surface analysis to check for defective tracks, or to assign alternate tracks for defective areas. Alternate Track Assignment performs surface analysis on a defective track and assigns an alternate track, if available. This function prints the incorrect data of the defective tracks, transfers data to an alternate track, and cancels the alternate track assignment. Alternate Track Build rebuilds the incorrect data from a defective track, using information supplied by the user in the alternate track. The Rebuild command is followed by one or more parameter records that contain the sector number and the character positions where the defective data is found, together with the replacement data in hexadecimal notation. The Build Procedure is used to build a library and consists of a series of SCL commands that can reside on disk and be called in for execution when needed. The set is created and stored by the Build command and executed by the Call command. Modify Procedure permits modification of control statements within a procedure or to create a new procedure utilizing many of the control statements of the original procedure.

The *data entry software* supports the creation and maintenance of data files keyed from a workstation and stored on diskette or cartridge disk. Record formats, used to define fields and specify validity checks, reside in a disk library and are handled under the control of a format description utility program, which also supports format editing functions such as deletion and/or modification of an entry in the format element. The five modes of the data entry facility are: data enter, data update, data search/modify, data verification, and data output/display. The software supports up to four workstations operating simultaneously in any mode. The software handles variable-length records up to 512 characters.

The data entry software, except for the format description program, can operate in a separate partition (background) from the other programs. The format description program will execute in the 16K-byte main storage partition (foreground) and can be interrupted under normal roll-in, roll-out procedures.

ESCORT is a high-level programming language designed for interactive data processing, inquiry, report generation, transaction processing, and file maintenance applications. ESCORT provides two operating modes: tutorial and program. The tutorial mode is a training and programming aid that provides support via programmer response to a sequence of displayed prompts and diagnostic messages. The program mode is used by experienced programmers to create or modify ESCORT programs. ESCORT can be used to build file structures; define data files; construct global and detail statements; save all the information as library elements; and execute globals using details, structures, and data files as stated in the global statement.

RPG-II: UNIVAC RPG-II is "industry compatible;" i.e., essentially compatible with IBM RPG-II. It provides file oriented processing capabilities for local operations.

The language supports the following peripherals for input/output: disk storage, console, card reader, card reader/punch, one or two printers, and one to four workstations. Programs can be developed and compiled using punched cards for the source code or by using a display workstation to input source code.

UNIVAC RPG-II supports up to 20 files. Each data file, as well as each record address table, data array, and data table, counts as one file. Sequential or random order processing is supported.

EMULATORS: See Transmission Specifications.

COMPONENTS

PROCESSOR: The terminal processor is a byte-oriented (8 bits/byte) microprocessor which consists of an 8-bit accumulator, six 8-bit programmable work/index registers, four condition flags, and an 8-bit external data path. It ▶

UNIVAC UTS 700 Universal Terminal System

features 16-bit immediate operators for initializing the work/index registers, limited 16-bit double-precision, 2-digit decimal arithmetic correction, a 16-bit program counter, and a 16-bit programmable stacker pointer, which uses a portion of main memory as a stack for system control. Cycle time is 2.0 microseconds and is divided into four phases of 500 nanoseconds each. An instruction requires 1 to 5 full processor cycles to execute. Memory is directly addressable; any of the 48K to 64K (expanded) memory locations can be directly addressed. A total of 32 discrete I/O addresses are addressable via I/O instructions only.

Processor, memory, and I/O are serviced by a common 8-bit data bus. Memory access is granted in a priority interrupt basis, where processor and I/O contend for the use of memory. The data rate transfer over the bus is one megabyte/second. The read access time is 300 nanoseconds; the read, write, refresh cycle time is 100 microseconds. Memory parity is generated and checked for each transfer. An addressing error and corresponding interrupt results from addressing a nonexistent memory location.

WORKSTATION: A CRT keyboard/display unit equipped with its own microprocessor and main storage. The Model 800, a 300-cps, non-impact priner, is optional for hard-copy output. The CRT's 12-inch screen displays up to 1920 characters arranged in 24 lines of 80 characters each. A total of 96 symbols including upper and lower case alphabetics are displayed in green. The typewriter-style keyboard is detachable and also includes a numeric keypad.

DISKETTE STORAGE: The diskette subsystem includes a basic dual diskette drive plus one or two additional dual diskette drives for a maximum of six drives. The basic unit accommodates two UNIVAC-formatted double-density diskettes for a per-diskette storage capacity of 492,544 bytes. IBM-formatted dual diskette drives (with a per-diskette storage capacity of 246,272 bytes) or UNIVAC-formatted, double-density dual diskette drives can be used in any combination for the one or two additional units to provide a maximum storage capacity of 3 million bytes.

The diskette is organized into 77 tracks, each divided into 26 sectors of 128 bytes (IBM format) or 256 bytes (UNIVAC format) each. Record size can range from 128 to 512 bytes for the IBM format and from 256 to 1024 bytes for the UNIVAC format.

Drive parameters are the same for either format. Average rotational delay is 83.3 milliseconds. Positioning time is 10 milliseconds maximum. The data transfer rate is 28K bytes/second for an IBM-formatted diskette and 56K bytes/second for a UNIVAC-formatted diskette.

CARTRIDGE DISK: The cartridge disk unit consists of a fixed disk and a removable disk; four surfaces are recorded. Two versions are available, a 5-million byte, single-density unit and a 10-million byte, dual-density unit. The storage capacity is doubled by doubling the number of tracks per recording surface. The UTS 700 accommodates up to four single- and/or dual-density drives (two each if mixed) for a total storage capacity of 20 or 40 million bytes, respectively. Each disk is arranged in 24 sectors of 256 bytes each per track. The record size can range from 256 to 1024 bytes. The data transfer rate and average rotational delay are 267K bytes/second and 12.5 milliseconds, respectively. Positioning time ranges from 10 milliseconds (track-to-track) to 90 milliseconds maximum. Average positioning time is 50 milliseconds.

CARD READERS AND PUNCH: The punched card equipment included two table-top, 80-column card readers rated at 300 or 600 cards/minute and a card punch rated at 75 to 160 cards/minute for 80 or 28 punched columns,

respectively. The readers each provide a 1000-card input hopper and output stacker capacity. The card punch has an input hopper capacity of 700 cards and primary and secondary output stacker capacities of 700 and 100 cards respectively.

PRINTED OUTPUT: Four printers are available for the UTS 700: the non-impact, Model 800 Workstation Printer; the 0781 Belt Printer; the 0784 Cartridge Line Printer; and the 0786 Matrix Printer.

The Model 800 provides 80 print positions and prints at 300 characters per second using an electrostatic technique. The printer provides the full upper and lower case 96-character ASCII character set and forms each character via a 7-by-9 dot matrix. Horizontal pitch is 10 characters per inch; vertical spacing is 6 lines per inch.

The 0781 Belt Printer is available with a rated speed of 125 or 250 lines/minute with a 64-character print set; the speed drops to 85 or 175 lines/minute with a 96-character set. It is equipped with 132 print positions. A 96-character ASCII print belt requires the 96-character control feature (F2608). Horizontal and vertical spacing are 10 characters per inch and 6 or 8 (selectable) lines per inch, respectively. The printer accommodates continuous, 6-part, pin-fed forms from 4 to 17.5 inches wide and up to 14 inches long. The slew rate is 8.33 inches/second.

The 0784 Cartridge Line Printer is available with a rated speed of 300 or 600 lines per minute with a 64-character print set; the speed drops to 215 or 430 lines/minute with a 96-character print set and increases to 350 or 700 lines/minute with a 48-character print set. The printer is equipped with 132 print positions. Print cartridges are available for a wide variety of 48-, 64- or 96-character sets including ASCII, OCR-A/-B/-H14, and international sets. Horizontal and vertical spacing are 10 characters per inch and 6 or 8 (selectable) lines per inch. The printer accommodates continous 6-part pin-fed forms from 3⅝ to 18¾ inches wide.
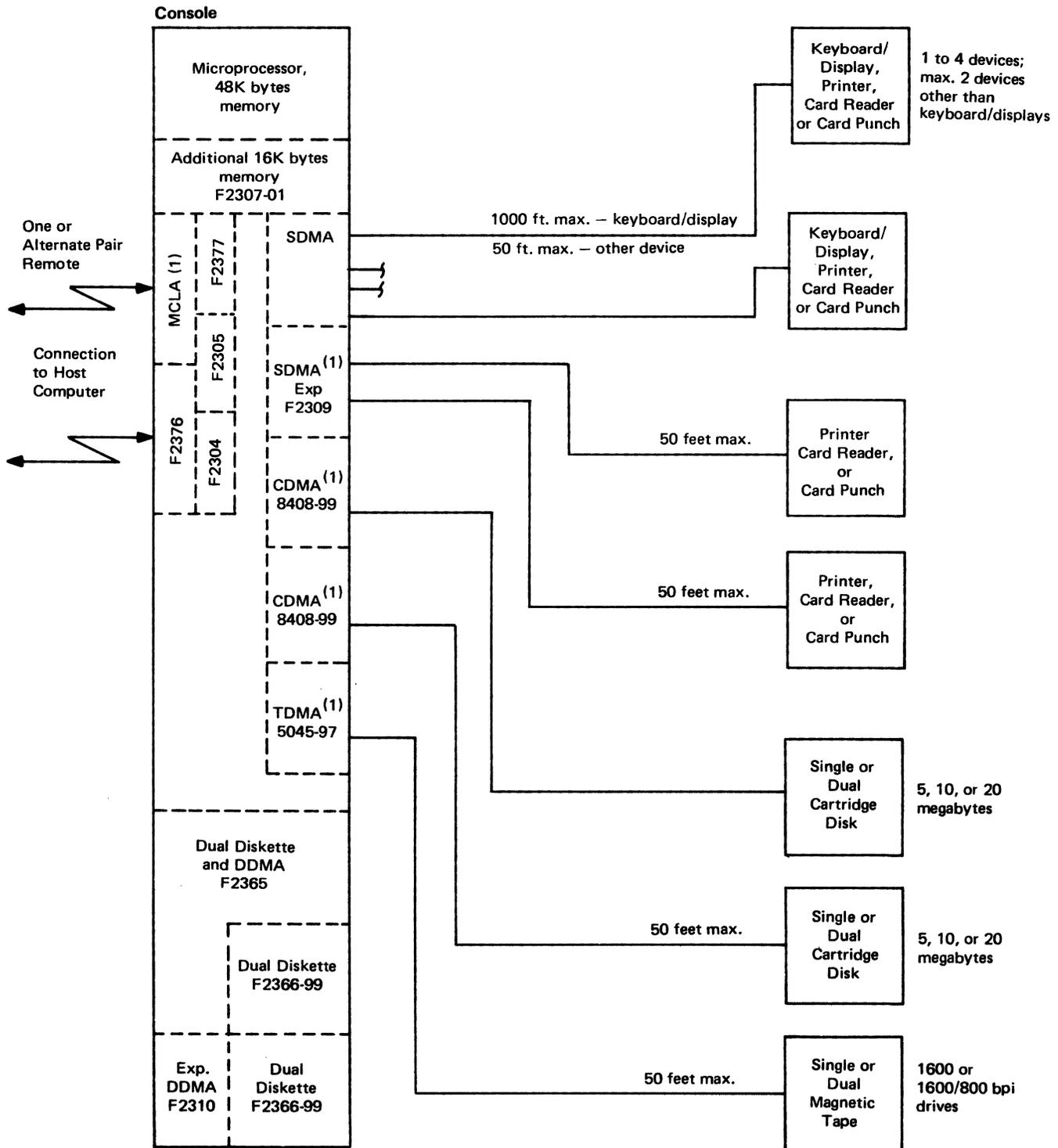
The 0786 Printer is an impact matrix printer and is available as a unidirectional or bidirectional printer. The printer is equipped with 132 print positions and is rated at 200 characters/second. This rate is equivalent to 37 lines/minute for the unidirectional model and 75 lines/minute for the bi-directional version. Several character sets are available, including 64- or 96-character ASCII, as well as European and other national sets. The 96-character set includes upper and lower case symbols. Each character is formed via a 7-by-7 dot matrix. Horizontal and vertical spacing is 10 character/inch and 6 lines/inch, respectively. The printer accommodates continuous, 6-part forms from 1.6 to 15.3 inches wide and from 3 to 17 inches long. Format control is implemented via a two-channel tape loop. The printer includes a two-position stacker and stand.

TAPE DRIVES: The 9-track industry-compatible Uniservo 10 magnetic tape drives are available with selectable recording densities of 800 or 1600 bits/inch (NRFI and PE) or 1600 bits/inch only (PE). The read/write tape speed is 25 inches/second. Rewind speed is 200 inches/second. The transfer rate is 20K or 40K bytes/second for the 800 bpi or 1600 bpi densities, respectively. The UTS 700 accommodates up to two drives of the same type.

OPERATOR CONSOLE: The operator console is a single-pedestal disk that houses the terminal microprocessor and main memory and up to three dual-diskette units (total of 6 drives). The console provides a 5-inch CRT screen which displays system messages (in English) in two 16-character lines. A group of pressure-sensitive switches are used for initial program load and operator communication with the system.

UNIVAC UTS 700 Universal Terminal System

Configuration

Console

Microprocessor,
48K bytes
memory

Additional 16K bytes
memory
F2307-01

One or
Alternate Pair
Remote

Connection
to Host
Computer

MCLA (1)

F2377

F2305

F2376

F2304

SDMA

SDMA (1)
Exp
F2309

CDMA (1)
8408-99

CDMA (1)
8408-99

TDMA (1)
5045-97

Dual Diskette
and DDMA
F2365

Dual Diskette
F2366-99

Exp.
DDMA
F2310

Dual
Diskette
F2366-99

Keyboard/
Display,
Printer,
Card Reader
or Card Punch

1 to 4 devices;
max. 2 devices
other than
keyboard/displays

1000 ft. max. — keyboard/display

50 ft. max. — other device

Keyboard/
Display,
Printer,
Card Reader
or Card Punch

50 feet max.

Printer
Card Reader,
or
Card Punch

50 feet max.

Printer,
Card Reader,
or
Card Punch

Single or
Dual
Cartridge
Disk

5, 10, or 20
megabytes

50 feet max.

Single or
Dual
Cartridge
Disk

5, 10, or 20
megabytes

50 feet max.

Single or
Dual
Magnetic
Tape

1600 or
1600/800 bpi
drives

(1) Basic controller includes MCLA and SDMA and requires one CDMA or one DDMA and accommodates any one of the following: Expansion SDMA, Expansion DDMA, CDMA, or TDMA.

▶ **PRICING**

The UTS 700 is available for purchase, a one-year rental, or a five-year lease. A separate maintenance contract is offered for rented, leased, or purchased equipment.

The investment tax credit on the UTS 700 is not passed on to the customer.

Maintenance is covered under a contract that defines the Principal Period of Maintenance (PPM) as between the hours of 7AM and 6PM, Monday through Friday. An ▶

UNIVAC UTS 700 Universal Terminal System

▶ additional charge of 10 percent of the total prime-shift maintenance charges for the equipment is applied to maintenance contracted outside the Univac-defined PPM. Univac provides maintenance for emergency service calls outside the contracted PPM at a charge of $35 per man hour for the initial hour (or less) and for each additional hour. Each additional one-quarter hour after the initial full hour of service is charged at $9 (computed to the nearest 1/4 hour).

Customer locations beyond 25 miles from the city limits in which a Univac service center is located are charged at the rate of $35 per hour for the travel time beyond the 25-mile limit. All travel-time is charged for at the $35-per-hour rate for maintenance performed outside the PPM.

Except for field installations of features on existing customer equipment, no installation charges are applied.

All software support for the UTS 700 is bundled with the cost of the equipment. Training is provided at Univac, for a reasonable number of customer personnel, typically over the course of seven working days. A video training tape may be included.

Tape drives, cartridge disk drives, and line printers are available for either 100/120 volts or 200/240 volts. The Dual Diskette unit is available for either 100/117 or 200/208/220 volts. Systems are available for either 50 or 60 Hz operation.

UNIVAC UTS 700		Monthly Charge*			
		1-Year Lease	5-Year Lease	Purchase	Monthly Maint.
3038-99	UTS 700 Terminal; includes a desk-style cabinet, processor with 48K bytes of memory, MCLA controller, and SDMA controller, and space for three dual diskette drives; requires a dual diskette or disk cartridge drive	$391	$311	$12,290	$ 71
F2307-01	Memory Expansion, 16K bytes; 1 max.	42	33	1,470	5
F2376-00	Alternate Communications Interface; provides a second communications interface	38	30	1,260	5
F2304-00	Integral Modem; Bell System 201A (2000 bps) or 201 B/C compatibility (2400 bps)	58	46	1,781	11
F2305-00	Automatic Answering	5	4	178	1
F2377-00	BSC Capability; required for Binary Synchronous Communications	11	9	325	2
F2309-00	SDMA Expansion; provides memory access for 1 or 2 low-speed peripherals	12	10	390	2
F2365-99	Dual Diskette Subsystem; includes dual diskette drive (UNIVAC format), DDMA controller for 2 dual drives (UNIVAC format) and power supply for 3 dual drives; 1 max.	175	139	5,675	30
F2310-00	Expansion DDMA; required for third dual diskette drive, UNIVAC format	44	34	1,510	5
F2310-01	Expansion DDMA; supports second and third IBM formatted dual diskette drive	44	34	1,510	5
F2366-99	Dual Diskette Drive Expansion; format determined by F2310-00/-01	117	93	3,780	20
8408-99	Cartridge Disk Subsystem; includes cabinet and CDMA for two disk drives; F2380; 2 max. per controller	72	55	2,881	5
F2380-00	Cartridge Disk Drive, 5 megabytes; includes one 2.5 megabyte fixed disk and drive spindle for one 2.5 megabyte removable disk cartridge	388	310	13,459	75
F2380-04	Cartridge Disk Drive, 10 megabytes; includes one 5 megabyte fixed disk and drive spindle for one 5 megabyte removable disk cartridge	508	404	17,750	90
5045-97	Magnetic Tape Subsystem; includes cabinet and TDMA controller for two Uniservo 10 tape drives; 1 max. per controller	120	95	4,200	20
0870-26	Uniservo 10 Tape Drive; 9-track, 1600 bpi	298	239	11,376	61
0870-27	Uniservo 10 Tape Drive; 9-track, 800/1600 bpi	329	264	12,576	67
F3545-99	Workstation; keyboard/display unit	117	93	3,600	22
0781-95	Belt Printer; 125 lpm, 64 character set	416	333	11,297	83
0781-93	Belt Printer; 250 lpm, 64 character set	524	404	13,759	104
F2608-00	96-Character Control	8	7	280	0
0784-96	Cartridge Line Printer; 300 lpm with 64 character set; includes stacking tray; requires print cartridge; 2 max. per controller	495	393	17,480	85
0784-99	Cartridge Line Printer; 600 lpm with 64 character set; includes stacking tray; requires print cartridge; 2 max. per controller	748	601	25,000	160
F2365-00	Speed Upgrade; converts 300-lpm printer to 600-lpm printer	253	208	7,520	75
F234X-XX	Print Cartridge; choice of 14 character sets containing 48, 64, or 96 characters, and including ASCII, OCR-A, OCR-B-, OCR-1414 and international character sets	33	25	1,440	0
0786-95/-94	Receive Only Unidirectional Matrix Printer; includes stand and attaches to UTS 700 via SDMA; available with 64- or 96-character ASCII set	160	140	4,940	30
0786-91/-90	Receive Only Bidirectional Matrix Printer; includes stand and full line buffer and attaches to UTS 700 via SDMA; available with 64- or 96-character ASCII set	220	198	6,650	50
F2646-00	Speed Upgrade; provides bidirectional printing and full line buffering for 0786-95/-94	60	58	1,710	20
F2648-00	Document Parting Bar; permits removal of single forms without removing paper from the tractors	4	3	114	1
F2646-00	6/8 Lines/Inch; provides operator selection of printing at 6 or 8 lines per vertical inch	5	4	152	1
0774-93/-92	Model 800 Receive Only workstation printer; available with any of eight U.S. and international character sets	79	61	2,320	18
0719-97	Card Reader; 300 cpm; max. 2 card readers per controller	190	151	6,060	35
0719-99	Card Reader; 600 cpm; max. 2 card readers per controller	218	174	7,000	40
F2329	600 CPM Upgrade; upgrades 300-cpm reader to 600 cpm	28	22	940	5
0608-99	Card Punch; max. 2 per controller	440	350	14,000	81

*Includes prime-shift maintenance.■

UNIVAC UTS 700 Universal Terminal System

MANAGEMENT SUMMARY

UNIVAC introduced the UTS 700 Universal Terminal System in April 1976 as one of three members of a new family of intelligent terminals that include the UTS 400 and the UTS 400 Text Editor, a special purpose version of the UTS 400 for the printing and publishing industry. The UTS 700 is a microprocessor-driven, disk-based, super remote batch terminal. Not limited to being just a batch terminal, the UTS 700 also supports file management and limited data entry via optional workstations. And its variety of peripherals including card readers, a card punch, line printers, and industry-compatible magnetic tape drives provide a high degree of configuration flexibility.

Supported as a turnkey system, the standard terminal implements all functions via vendor-supplied software called the System Control Language. This parameter-driven, disk-resident operating system interfaces the workstation operator with displayed "menus" or lists of job functions and executes the selected function under simple operator command. File management, a subset of SCL, supports sequential, direct sequential, and indexed file structures. Files can be created, updated, and deleted. A host of utility programs, executed under SCL commands, support a variety of activities including ▷

Programmable terminal system that supports file management, data entry, and batch communications.

The disk-based terminal can be configured with up to 3 million bytes of diskette storage, up to 40 million bytes of cartridge disk storage, or a combination of both types of storage (subject to capacity limitations). Peripheral options include up to four CRT workstations, line printers, card readers and punches, and industry-compatible magnetic tape drives. Standard software includes a disk operating system, utilities, and emulators for UNIVAC and IBM terminals. RPG-II support, a key feature, lets users create their own programs.

A basic UTS 700 with 48K bytes of main memory, 1 million bytes of diskette storage, a 300 lpm printer and 300 cpm card reader rents for $1,225 per month on a one-year rental including maintenance.

An expanded UTS 700 with 48K bytes of memory, 20 million bytes of cartridge disk storage, two workstations, a 600 lpm printer, and a 600 cpm card reader rents for $2,856 per month on a one-year rental including maintenance.

A large-scale UTS 700 with 65K bytes of main memory, 40 million bytes of cartridge disk storage, two workstations, a 600 lpm printer and a 600 cpm card reader rents for $4,091 per month on a one-year rental including maintenance.

The UTS 700 is also a potential contender for the IBM System/32 small scale computer market.

CHARACTERISTICS

MANUFACTURER: UNIVAC Division, Sperry Rand Corporation, PO Box 500, Blue Bell, Pennsylvania 19422. Telephone (215) 542-4011.

DATE OF ANNOUNCEMENT: April 28, 1976.

DATE OF FIRST DELIVERY: September 1976.

NUMBER DELIVERED TO DATE: –

SERVICED BY: UNIVAC.

UNIVAC UTS 700 Universal Terminal System

sort/merge, data entry, library creation and manipulation and diagnostic aids. A system directory, maintained by file management software and interrogated by utilities and file management, contains information on all system-resident files and libraries.

UNIVAC offers an RPG II compiler to support the development of more complex user programs. The vendor chose RPG II as the programming language supported by the UTS 700 because of its support for a wide variety of applications, its universal popularity, and the large base of programmers already trained in the language. Program development is performed on the UTS 700.

Disk storage is an integral element of UTS 700 operation. Either diskette or cartridge disk can be specified or the two can be combined in the same system to satisfy specific user operating parameters. Both media are available in standard or dual density with diskette storage capacities ranging from 0.5 million to 3 million bytes and cartridge disk storage capacities ranging from 5 million to 40 million bytes. A minimum capacity of one million bytes of diskette storage or 5 million bytes of cartridge disk storage are required for adequate system support. Configurations that combine diskette units with cartridge disk drives can accommodate up to 2 million bytes of diskette storage and up to 20 million bytes of cartridge disk storage.

Batch transmission is supported via software emulation. UNIVAC offers several emulators for UNIVAC devices in addition to emulators for the IBM 2780 and 3780 that include EBCDIC transparency. Additional emulators, such as IBM HASP multi-leaving, may be provided in the future.

Concurrent operations are supported on terminals with 65K bytes of memory. An RPG-II program can run simultaneously with a communications emulator program. Terminals with the minimum 48K bytes of memory can simultaneously run an off-line utility with an emulator.

Data entry is limited to four workstations; each workstation displaces any one of the following peripherals: line printer, card reader, or card punch. The workstation is a CRT keyboard/display unit with typewriter-style keyboard and a 12-inch screen that can display up to 1920 characters. Data entry and verification is performed under the control of fixed formats. Format protection is a standard feature. An optional 300-cps, non-impact printer provides hard copy.

With disk storage, an operating system, file handling capabilities, and a user programming language (RPG II), the UTS 700 sounds more like a small computer system than a terminal, doesn't it? Would you perhaps compare it to the IBM System/32? Go ahead. Except for the lack of extensive applications program support, the UTS 700 will hold up well in such a comparison. As a matter of fact, the UTS 700 can have more main memory, more disk storage, a faster printer, — and a higher price tag. It will

CONFIGURATION

The UTS 700 is built around a microprocessor with 48K bytes of main memory, expandable to 65K bytes in one 16K-byte increment. Peripherals, attached via discrete controllers, include disk and/or diskette drives, card readers, card punches, line printers, industry-compatible magnetic tape drives, and operator workstations. An alternate communications interface is optional.

The terminal controllers and their peripheral accommodations are defined as follows:

● CDMA—Cartridge Disk Direct Memory Access. This controller accommodates one or two single- or dual-density cartridge disk drives having a storage capacity of 5 or 10 million bytes each. One or two drives of the same capacity are housed in a single cabinet that also contains the controller.

● DDMA—Diskette Direct Memory Access. This controller accommodates one or two single- or dual-density diskette units with a storage capacity of 0.5 or 1.0 million bytes, respectively. Each diskette unit contains two drives. The terminal can accommodate a maximum of two DDMAs; however, system limitations restrict the Expansion DDMA to one single- or dual-density diskette unit for a maximum of six drives.

● SDMA—Shared Direct Memory Access. This controller accommodates up to four devices including any combination of up to four workstations, two line printers, two card readers and two card punches. The terminal can accommodate a maximum of two SDMAs; however, system limitations restrict the SDMA Expansion to one or two devices for a total of six devices.

● TDMA—Tape Direct Memory Access. This controller accommodates one or two industry-compatible magnetic tape drives housed in a separate cabinet with the controller. The terminal accommodates one TDMA.

● MCLA—Microprocessor Communications Line Adapter. This controller accommodates one communications line. Two lines can be attached via the optional Alternate Communications Interface feature, which permits alternate use of either line.

The minimum terminal configuration includes an MCLA, SDMA, and either a DDMA (diskette controller) or CDMA (cartridge disk controller). The terminal can be expanded to a maximum of four controllers by adding any one of the following controllers: CMDA, DDMA, SDMA, or TDMA.

The terminal processor, main memory, and all controllers are housed in a single-pedestal desk that includes an operator console and serves as the control center for the overall system.

TRANSMISSION SPECIFICATIONS

Synchronous in the half- or full-duplex mode. Transmission parameters defined by the communications protocol such as transmission rate, code, control characters, message sequence, and blocking/deblocking are a function of the communications software. Communications software currently consists of emulator programs for the following terminals:

● UNIVAC 1004 Models I, II, and III and 9200/9300 using RMS-1 protocol and XS-3 data code; can also support MIL-STD 188 or CCITT V.24 interface, alternate communications line, and disk storage.

UNIVAC UTS 700 Universal Terminal System

▷ also support a multi-user arrangement; i.e., multiple workstations can be operating simultaneously. (The IBM System/32 does not support a multi-user environment at this time.) In addition to the System/32, there are many small computer systems from minicomputer vendors and systems that provide similar capabilities.

At the opposite end of the market from computers are the shared processor key/disk, data entry/validation systems, such as UNIVAC's own CADE 1900 system. Because it is limited to just four entry stations, the UTS 700 does not compete with this class of equipment.

Finally, there are a group of microcomputer and minicomputer based programmable terminals that form a competitive group, including systems from IBM (3790), Four-Phase, Datapoint, Sycor, Incoterm, and others.

The difficulty of placing the UTS 700 and the other sophisticated programmable terminals just mentioned into perspective arises because this group's true place in data processing is in development. This is illustrated by the difficulty in distinguishing between a small computer marketed for small business processing that can also operate as a batch terminal (e.g., the IBM System/32) and a programmable communications terminal that can also function as a stand alone data processing unit (e.g., the UNIVAC UTS 700). The question is more extensive than just trying to neatly put labels on systems.

The magic buzz words of today, such as distributed processing, network architecture, networking, etc. are the verbalizations of a revolution in data processing concepts. No longer do the economies of scale (large central processor) necessarily outweigh the advantages of processing data at the place it originates and is used.

While it is true that programmable terminals have been available and have been successfully used for several years, they have not had the impact on business procedures in the past that they will have over the next few years, because costs of processing components have fallen so dramatically.

Although arriving somewhat tardily on the programmable terminal scene, the UTS will be one of the units that help users to participate in these changes in data processing.□

➤ ● UNIVAC 9200 and 9300 using full-duplex NTR (Nine Thousand Remote) protocol; can also support disk storage.

● UNIVAC DCT 1000 using ASCII; can also support line printer, disk storage, and display workstations.

● UNIVAC DCT 2000 using ASCII; can also support MIL-STD 188 or CCITT V.24 interface, alternate communications line, and disk storage.

● IBM 2780 or 3780 using ASCII, EBCDIC, or EBCDIC transparency; can also support MIL-STD 188 or CCITT V.24 interface, alternate communications line, and disk storage.

SOFTWARE

The UTS 700 is a turnkey system that implements all tasks via a disk (or diskette) resident, *parameterized* program called System Control Language (SCL), which is the interface between operator and terminal. The SCL program facilitates ease of operation via displayable lists of job functions or *menus* that guide the workstation operator in selecting specific, predefined job procedures, jobs can also be selected via punched cards. Once a procedure is selected, the operator is requested to key its corresponding parameters into displayed job control statements that define the job. User generated programs are prepared in RPG-II.

SYSTEM CONTROL LANGUAGE: SCL commands specify programs to be executed, identify the files to be used, and aid in debugging. The commands can be keyed at a workstation or read from cards or disk. SCL commands are divided into eight categories: job definition, file definition, SCL control, system control, utility program support, language processor calls, disk support, and special subsystem support.

A job (or job stream) is defined as a set of sequentially executed programs that can reside on disk and be called by command.

The File command describes a specific file and is used only when the file parameters are to be changed. SCL control supports operator interaction with the SCL, including parameterization of the job stream and run-time decision-making for establishing alternate paths through a job stream. System control statements define various operating options including date, modes of operation, and menu items to be displayed at a workstation. SCL commands can call forth any of several utility programs that reside in the system to invoke the RPG II compiler, to call special utility programs that aid disk maintenance, or to invoke the batch communications or data entry operating modes. (The terminal cannot operate in these two modes concurrently.)

The *File Management System (FMS)*, a subset of SCL, implements the management of data files, program libraries, system files, and working files, and includes an optional file directory. The FMS is the interface between disk (or diskette) and tape I/O operation and requests from other system components and user programs. The FMS supports sequential, direct sequential, and indexed file structures; file sharing; opening or closing files; retrieving or writing records; controlling certain I/O functions specifying I/O buffering, blocking, and deblocking; waiting for completion of I/O sequences (for overlapping I/O with processing); and loading indexed files. Each file contains a file definition table, a list that describes the characteristics of the logical file, identifies options to be invoked by file management, and contains the addresses of the program's I/O buffers, record work areas, and function parameter areas. Programs interface the FMS via I/O control calls; file openings and closings, buffering, and blocking/deblocking are FMS functions. Logical records can be blocked into physical records, or file sections, of 256 or 1024 bytes. A file section is equivalent in size to the program I/O buffers used by the file. The user can build or process records in the program I/O buffers or move them to or from user-program-assigned record work areas to perform the operations. These functions are also handled by FMS via subroutines.

The system directory, maintained by FMS and used by utility programs and file management, contains information on all files and libraries within the system. The system directory is maintained on disk. ►

UNIVAC UTS 700 Universal Terminal System

► UTILITY PROGRAMS: Executed via SCL commands, utilities include card utilities, sort/merge, data and program file services, system support facilities, and data entry.

The *card utilities* support duplication and listing (printing) card decks. A deck can be reproduced with options for numbering, editing, and reformatting. Listing prints the contents of the cards (a card count is automatically provided) with options for formatting and editing.

The *sort/merge utility,* via sequence specification parameters, rearranges, omits, and reformats records from any type of file and outputs the results to any type of file via a temporary work file created and controlled by the sort utility.

Three sort versions are supported: record sort, address out, and summary sort. The resultant output of a record sort can contain key fields only, key fields and data fields, or data fields only. An address out sort requires input from disk or diskette. The output will contain a 1-byte flag, 4-byte address, and up to a 251-byte key field. The result of this sort is a file which constitutes the index portion of the keyed access mechanism. The summary sort drops all but one record of those records with identical keys; specified fields in the dropped records are added to the corresponding field of the retained record. The summary sort can be called in two ways. External calls are issued by an SCL statement followed by sort sequence specifications. Internal calls by the SCL result in files containing either keys, or keys and record addresses.

Data file services are utility programs that allow manipulation of disk data files. Functions include display, copy, delete, and erase. Display prints the entire volume index or selected information on specified files. The volume index contains the file ID, location (starting tracks, number, and size), status (permanent, temporary, or scratch), type of file, date of creation, etc. Copy executes the copying of a volume, a file, or selected records of a file to another volume or file. Printing and reorganization of a file can also be specified, where the records are written in the same sequence as their index. Delete eliminates references to a file in the volume index, which is marked to indicate the file is scratched. All the files in a volume can be marked as scratch files. Erase places blanks or other neutral indicators in the file.

Program file services are utility programs that allow manipulation of libraries. Functions include the capability to reserve space for a library on disk, to change the size of the space, to delete a library or elements within a library, to copy a library, removing the deleted elements, to copy selected elements from a library, to create an element with the option to print the created element, to rename an element, to add or replace elements in a library by name, to add, replace, or delete records in an element, and to print a library of selected elements.

System support facilities are utility programs that provide aids in debugging, fault detection, and general system operation. They include Disk Preparation, Alternate Track Assignment or Build, and Build or Modify Procedure. Disk Preparation can be used to assign a name to a disk, to write tracks and sector addresses on disk, to perform surface analysis to check for defective tracks, or to assign alternate tracks for defective areas. Alternate Track Assignment performs surface analysis on a defective track and assigns an alternate track, if available. This function prints the incorrect data of the defective tracks, transfers data to an alternate track, and cancels the alternate track assignment. Alternate Track Build rebuilds the incorrect data from a defective track, using information supplied by the user in the alternate track. The Rebuild command is followed by

one or more parameter records that contain the sector number and the character positions where the defective data is found, together with the replacement data in hexadecimal notation. The Build Procedure is used to build a library and consists of a series of SCL commands that can reside on disk and be called in for execution when needed. The set is created and stored by the Build command and executed by the Call command. Modify Procedure permits modification of control statements within a procedure or to create a new procedure utilizing many of the control statements of the original procedure.

The *data entry software* supports the creation and maintenance of data files keyed from a workstation and stored on diskette or cartridge disk. Record formats, used to define fields and specify validity checks, reside in a disk library and are handled under the control of a format description utility program, which also supports format editing functions such as deletion and/or modification of an entry in the format element. The five modes of the data entry facility are: data enter, data update, data search/modify, data verification, and data output/display. The software supports up to four workstations operating simultaneously in any mode. The software handles variable-length records up to 512 characters.

The data entry software, except for the format description program, can operate in a separate partition (background) from the other programs. The format description program will execute in the 16K-byte main storage partition (foreground) and can be interrupted under normal roll-in, roll-out procedures.

RPG-II: UNIVAC RPG-II is "industry compatible;" i.e., essentially compatible with IBM RPG-II. It provides file oriented processing capabilities for local operations.

The language supports the following peripherals for input/output: disk storage, console, card reader, card reader/punch, one or two printers, and one to four workstations. Programs can be developed and compiled using punched cards for the source code or by using a display workstation to input source code.

UNIVAC RPG-II supports up to 20 files. Each data file, as well as each record address table, data array, and data table, counts as one file. Sequential or random order processing is supported.
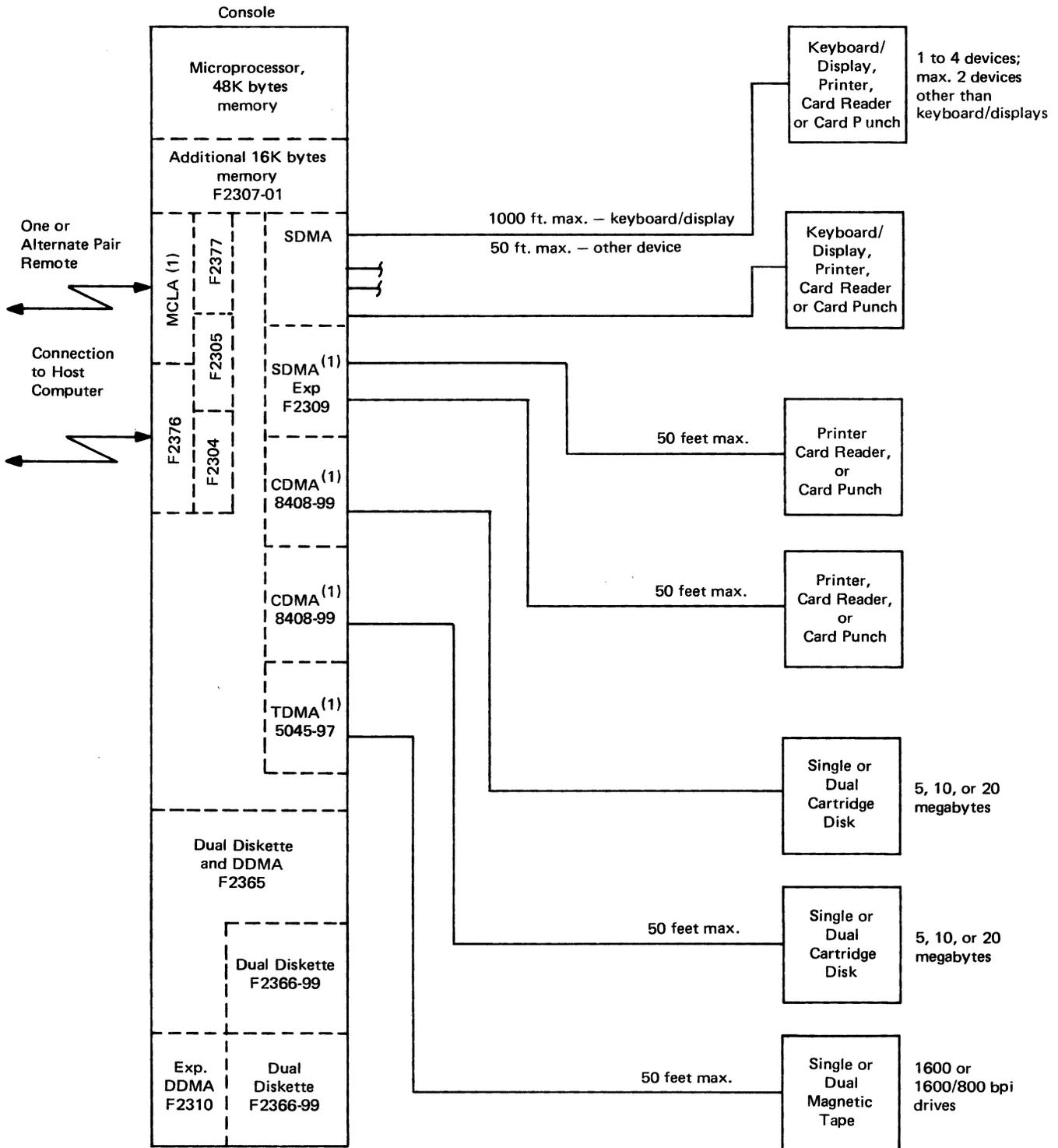
EMULATORS: See Transmission Specifications.

COMPONENTS

PROCESSOR: The terminal processor is a byte-oriented (8 bits/byte) microprocessor which consists of an 8-bit accumulator, six 8-bit programmable work/index registers, four condition flags, and an 8-bit external data path. It features 16-bit immediate operators for initializing the work/index registers, limited 16-bit double-precision, 2-digit decimal arithmetic correction, a 16-bit program counter, and a 16-bit programmable stacker pointer, which uses a portion of main memory as a stack for system control. Cycle time is 2.0 microseconds and is divided into four phases of 500 nanoseconds each. An instruction requires 1 to 5 full processor cycles to execute. Memory is directly addressable; any of the 48K to 64K (expanded) memory locations can be directly addressed. A total of 32 discrete I/O addresses are addressable via I/O instructions only.

Processor, memory, and I/O are serviced by a common 8-bit data bus. Memory access is granted in a priority interrupt basis, where processor and I/O contend for the use of memory. The data rate transfer over the bus is one ►

UNIVAC UTS 700 Universal Terminal System

UNIVAC UTS 700 CONFIGURATION

(1) Basic controller includes MCLA and SDMA and requires one CDMA or one DDMA and accommodates any one of the following: Expansion SDMA, Expansion DDMA, CDMA, or TDMA.

▶ megabyte/second. The read access time is 300 nanoseconds; the read, write, refresh cycle time is 100 microseconds. Memory parity is generated and checked for each transfer. An addressing error and corresponding interrupt results from addressing a nonexistent memory location.

WORKSTATION: A CRT keyboard/display unit equipped with its own microprocessor and main storage. The Model 800, a 300-cps, non-impact priner, is optional for hard-copy output. The CRT's 12-inch screen displays up to 1920 characters arranged in 24 lines of 80 characters each. A ▶

UNIVAC UTS 700 Universal Terminal System

▶ total of 96 symbols including upper and lower case alphabetics are displayed in green. The typewriter-style keyboard is detachable and also includes a numeric keypad.

DISKETTE UNIT: The diskette unit consists of two single- or dual-density diskette drives with storage capacities of 0.25 or 0.5 million bytes per drive, respectively. The UTS 700 accommodates two single-density or three dual-density dual-diskette units for a total storage capacity of 1.0 or 3.0 million bytes, respectively. The diskette is organized into 77 data tracks, each divided into 26 sectors of 128 bytes (single-density) or 256 bytes (dual-density) each. Record size can range from 128 to 512 bytes for a single-density record and 256 to 1024 bytes for a dual-density record. The data transfer rate is 28K or 56K bytes/second for a single- or dual-density drive, respectively.

Average rotational delay is 83.3 milliseconds. Positioning time ranges from 10 milliseconds (track-to-track) to 760 milliseconds maximum. Average positioning time is 380 milliseconds.

CARTRIDGE DISK: The cartridge disk unit consists of a fixed disk and a removable disk; four surfaces are recorded. Two versions are available, a 5-million byte, single-density unit and a 10-million byte, dual-density unit. The storage capacity is doubled by doubling the number of tracks per recording surface. The UTS 700 accommodates up to four single- and/or dual-density drives (two each if mixed) for a total storage capacity of 20 or 40 million bytes, respectively. Each disk is arranged in 24 sectors of 256 bytes each per track. The record size can range from 256 to 1024 bytes. The data transfer rate and average rotational delay are 267K bytes/second and 12.5 milliseconds, respectively. Positioning time ranges from 10 milliseconds (track-to-track) to 90 milliseconds maximum. Average positioning time is 50 milliseconds.

CARD READERS AND PUNCH: The punched card equipment included two table-top, 80-column card readers rated at 300 or 600 cards/minute and a card punch rated at 75 to 160 cards/minute for 80 or 28 punched columns, respectively. The readers each provide a 1000-card input hopper and output stacker capacity. The card punch has an input hopper capacity of 700 cards and primary and secondary output stacker capacities of 700 and 100 cards respectively.

PRINTERS: Two line printers are available with rated speeds of 300 or 600 lines/minute. Both printers provide 132 print positions and accommodate continuous sprocketed forms from 3-5/8 to 18-3/4 inches wide and print up to six copies. Spacing is 10 char/inch horizontally and 6 or 8 lines/inch vertically. The printers are equipped with a character set of 64 symbols; 48 or 96 characters sets are optional.

TAPE DRIVES: The 9-track industry-compatible Uniservo 10 magnetic tape drives are available with selectable recording densities of 800 or 1600 bits/inch (NRFI and PE) or 1600 bits/inch only (PE). The read/write tape speed is 25 inches/second. Rewind speed is 200 inches/second. The transfer rate is 20K or 40K bytes/second for the 800 bpi or 1600 bpi densities, respectively. The UTS 700 accommodates up to two drives of the same type.

OPERATOR CONSOLE: The operator console is a single-pedestal disk that houses the terminal microprocessor and main memory and up to three dual-diskette units (total of 6 drives). The console provides a 5-inch CRT screen which displays system messages (in English) in two 16-character lines. A group of pressure-sensitive switches are used for initial program load and operator communication with the system.

PRICING

The UTS 700 is available for purchase or one-year rental. A separate maintenance contract is offered for rented, or purchased equipment.

The investment tax credit on the UTS 700 is not passed on to the customer.

Maintenance is covered under a contract that defines the Principal Period of Maintenance (PPM) as between the hours 7AM and 6PM, Monday through Friday. An additional charge of 10 percent of the total prime-shift maintenance charges for the equipment is applied to maintenance contracted outside the Univac-defined PPM. Univac provides maintenance for emergency service calls outside the contracted PPM at a charge of $35 per man hour for the initial hour (or less) and for each additional hour. Each additional one-quarter hour after the initial full hour of service is charged at $9 (computed to the nearest 1/4 hour).

Customer locations beyond 25 miles from the city limits in which a Univac service center is located are charged at the rate of $35 per hour for the travel time beyond the 25-mile limit. All travel-time is charged for at the $35-per-hour rate for maintenance performed outside the PPM.

Except for field installations of features on existing customer equipment, no installation charges are applied.

All software support for the UTS 700 is bundled with the cost of the equipment. Training is provided at Univac, for a reasonable number of customer peronnel, typically over the course of seven working days. A video training tape may be included. ▶

PRICE DATA

		Monthly Rental*	Purchase	Monthly Maint.
3038-99	UTS 700 Terminal; includes 48K bytes of memory, MCLA controller, and SDMA controller	$362	$12,290	$71
F2307-01	Memory Expansion, 16K bytes	39	1,470	5
F2376-00	Alternate Communications Feature	35	1,260	5
F2304-00	Integral modem; 2400 bps	54	1,781	11
F2305-00	Auto Answer	5	178	1
F2377-00	BSC Compatibility	10	325	2
F2309-00	SDMA Expansion	11	390	2
8408-99	CDMA; includes disk cabinet; max. 2; each accommodates 1 or 2 disks of similar capacity	72	2,881	5

UNIVAC UTS 700 Universal Terminal System

PRICE DATA

		Monthly Rental*	Purchase	Monthly Maint.
5045-97	TDMA; includes tape cabinet; 1 max.; accommodates 1 or 2 similar tape drives	120	4,200	20
F2365-97	Dual Diskette Unit; includes dual diskette drive, DDMA controller for 2 dual drives; power for 3 dual drives; Univac compatible; IBM compatible version available (-99)	162	3,675	30
F2366-97	Dual Diskette Drive Expansion; Univac compatible; IBM compatible version available (-99)	108	3,780	20
F2310-00	DDMA Expansion; required for third dual diskette unit; UNIVAC compatible; IBM compatible version available (-01)	40	1,510	5
F3545-99	Workstation; keyboard/display	108	3,600	22
0785-99	Printer; 300 lpm	525	18,920	85
0784-99	Printer; 600 lpm	880	30,270	176
F234X-XX	Print Cartridge	30	1,440	0
0719-97	Card Reader; 300 cpm	176	6,060	35
F2329-00	600 cpm upgrade	26	940	5
0719-99	Card Reader; 600 cpm	202	7,000	40
0608-99	Card Punch	407	14,000	81
F2380-00	Disk Drive; 5 megabytes	388	13,459	75
F2380-04	Disk Drive; 10 megabytes	562	20,296	90
0870-26	Tape Drive; 9-track, 1600 bpi	298	11,376	61
0870-27	Tape Drive; 9-track, 800/1600 bpi	329	12,576	67

*Monthly rental for a one-year arrangement; includes prime shift maintenance.

► Tape drives, cartridge disk drives, and line printers are available for either 100/120 volts or 200/240 volts. The Dual Diskette unit is available for either 100/117 or 200/208/220 volts. Systems are available for either 50 or 60 Hz operation.■