

**PUBLICATIONS
REVISION**

UTS 20

**SPERRY UNIVAC
Universal Terminal
System 20 (UTS 20)
Single Station**

System Description

UP-9134 Rev. 2

This library memo announces the release and availability of "SPERRY UNIVAC® Universal Terminal System 20 (UTS 20) Single Station System Description," UP-9134 Revision 2. It is a Standard Library Item (SLI).

The UTS 20 is a general-purpose, microprocessor-based, nonprogrammable, remote display terminal system used for interactive data communications with a host processor. The electronic functional "personality" of this display terminal is established by a program cartridge that can be installed easily into the rear of the unit. Although nonprogrammable, the UTS 20 retains most of the functional capabilities available in the powerful SPERRY UNIVAC Universal Terminal System 400 (UTS 400). The communications protocol of the UTS 20 is compatible with that of the UTS 400.

New information in this revision includes a brief description of the UTS 20 single station operating capabilities in the IBM* Bisynchronous Communications mode.

Additional copies may be ordered by your local Sperry Univac representative.

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SPERRY UNIVAC
Universal Terminal
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System Description

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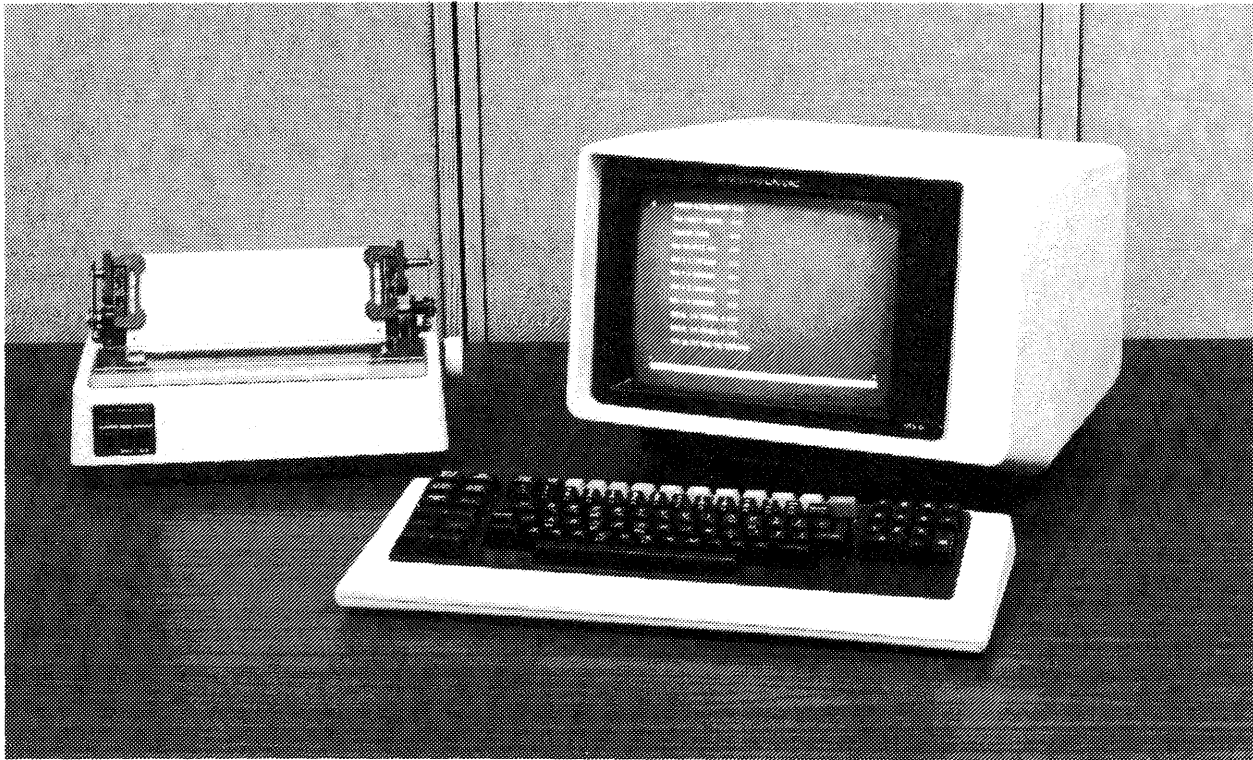
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*SPERRY UNIVAC Universal Terminal System 20 Single Station
and 0797 Printer Subsystem*

1. Introduction

1.1. ADVANTAGES OF THE UNIVERSAL TERMINAL SYSTEM 20 SINGLE STATION

The SPERRY UNIVAC Universal Terminal System 20 (UTS 20) Single Station is a versatile display terminal used to send, receive, display, and manipulate data. The functional "personality" of this nonprogrammable terminal is stored in an electronic program cartridge, which can be easily installed in the back of the terminal (Figure 1-1).

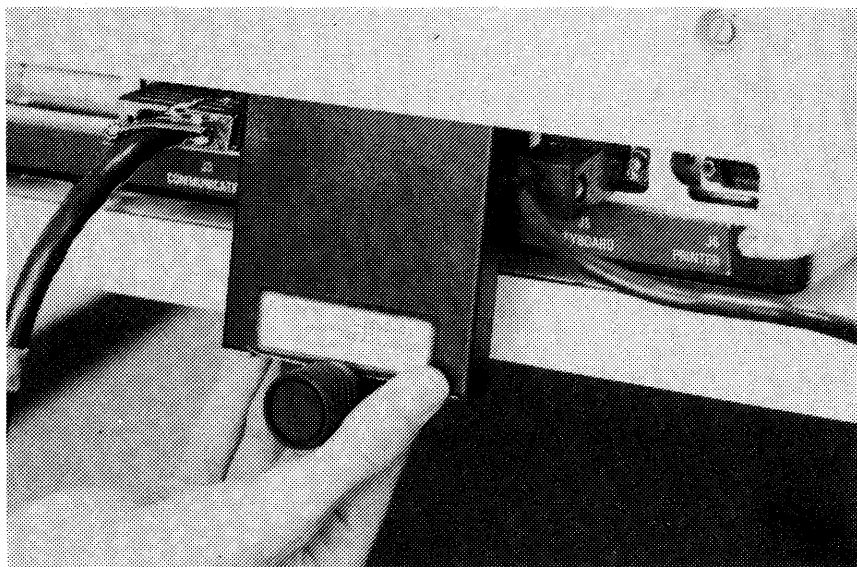
As an efficient input/output and display device interfaced with your host system, this terminal provides the basic capabilities required at remote locations, online interactive data transfers, and a hard-copy printer — plus additional advantages, including:

- Adaptability to your data processing operations
 - The UTS 20 is compatible with host processors configured to handle the SPERRY UNIVAC Universal Terminal System 400 (UTS 400) and/or the UNISCOPE Display Terminals.
 - The UTS 20, with the addition of a special BSC program cartridge, is compatible with host processors configured to handle the IBM* 3277-2 Binary Synchronous Communications (BSC) Terminal, and the TELETYPE** Dataspeed 4541-1 BSC Terminal.
 - A set of program attention keys can be used to implement user-defined functions.
 - Input and output capabilities of the terminal may be enhanced by adding an optional magnetic stripe reader (not available for BSC operations) and a peripheral printer.
 - The peripheral printer can be controlled either from the terminal keyboard or from the host processor.
 - Several customer-replaceable keyboard models are available to accommodate various data processing environments.

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- **Operator convenience and flexibility**
 - Many of the functional parameters of the terminal can be accessed and controlled from the keyboard.
 - Characters or fields on the screen can be highlighted with reverse video, high/low intensity, or blinking.
 - Operator comfort has been emphasized with human engineering design features such as the moveable keyboard and an optional tilt/rotate base.
 - The terminal operates silently because of its convection cooling system, which eliminates the need for noisy fans.
 - Optional screen bypass feature allows simultaneous operator and host access to the terminal for separate operations.
- **Cost effectiveness**
 - Microprocessor-controlled logic increases the reliability of the terminal.
 - The data transmission characteristics of the terminal reduce line costs.
 - The modular program cartridge can be easily changed for program updates.
 - The equipment can be installed or relocated by your personnel, if desired.
- **Security**
 - Two types of security keylocks guard against unauthorized use of the terminal.
 - The optional magnetic stripe reader can be used for operator identification as well as data entry.



9181-6

Figure 1-1. Program Cartridge

1.2. ADAPTABILITY

1.2.1. Operator Control

The simple-to-operate keyboard of the UTS 20 is arranged much like a typewriter keyboard, but with the addition of several data manipulation and communication keys that give the operator more capabilities and flexibility. From the keyboard, for example, an operator can condition the UTS 20 to permit entry of routine information in any desired arrangement, to highlight selected elements of data, and to transmit only changed or variable data.

Many of the operational and functional parameters of the UTS 20 are accessible through a screen display called the control page, which is a function that allows the operator to change some of the terminal characteristics. The control capabilities incorporated in this one display eliminate the need for the mechanical switches used on many other terminals.

1.2.2. Communication Configurations

The UTS 20 may be attached to the communications line by a synchronous modem, by a SPERRY UNIVAC Direct Connection Module (DCM), or through a SPERRY UNIVAC Terminal Multiplexer (which allows many terminals to communicate with the host processor through one dedicated telephone line). Except when in the BSC mode, the terminal can also communicate through a direct connection to the host. This variety of connection methods allows the UTS 20 to be configured alone or to be arranged in multidrop or multiplexed configurations.

1.2.3. Peripheral Printer Selections

Three optional, dot-matrix printers are offered with the UTS 20: the SPERRY UNIVAC 0797 Printer Subsystem, the SPERRY UNIVAC 0798 Printer Subsystem, and the SPERRY UNIVAC 0425 Printer Subsystem. The hard-copy requirements of your particular location will determine which of these three printer options best suits your needs. (The peripheral interface allows connection to only one printer.) Printer capabilities are covered in Section 6.

1.3. COST EFFECTIVENESS

1.3.1. Reliability and Data Integrity

In the design phase, great emphasis was placed on reliability and maintainability factors as a means of reducing downtime and trouble calls. Consequently, several resident functions have been incorporated in the UTS 20 specifically to ensure system reliability and data integrity. These functions include parity generation and checking, an automatic power-on confidence test, error logging, and line monitoring. The same functions also contribute to efficient maintainability.

1.3.2. Efficient Use of Communications Facilities

The UTS 20 has been designed to be an integral part of a host processor communications system. A major consideration in designing an integrated system is telephone line cost, which may account for as much as one-third of the total system cost, and the way to keep line costs down is to use a minimum number of telephone lines. The simplest method of meeting this

condition is to connect large numbers of highly efficient terminals on a single line — terminals that require only a fraction of total line time for any transmission. The UTS 20 satisfies all criteria for these efficient terminals.

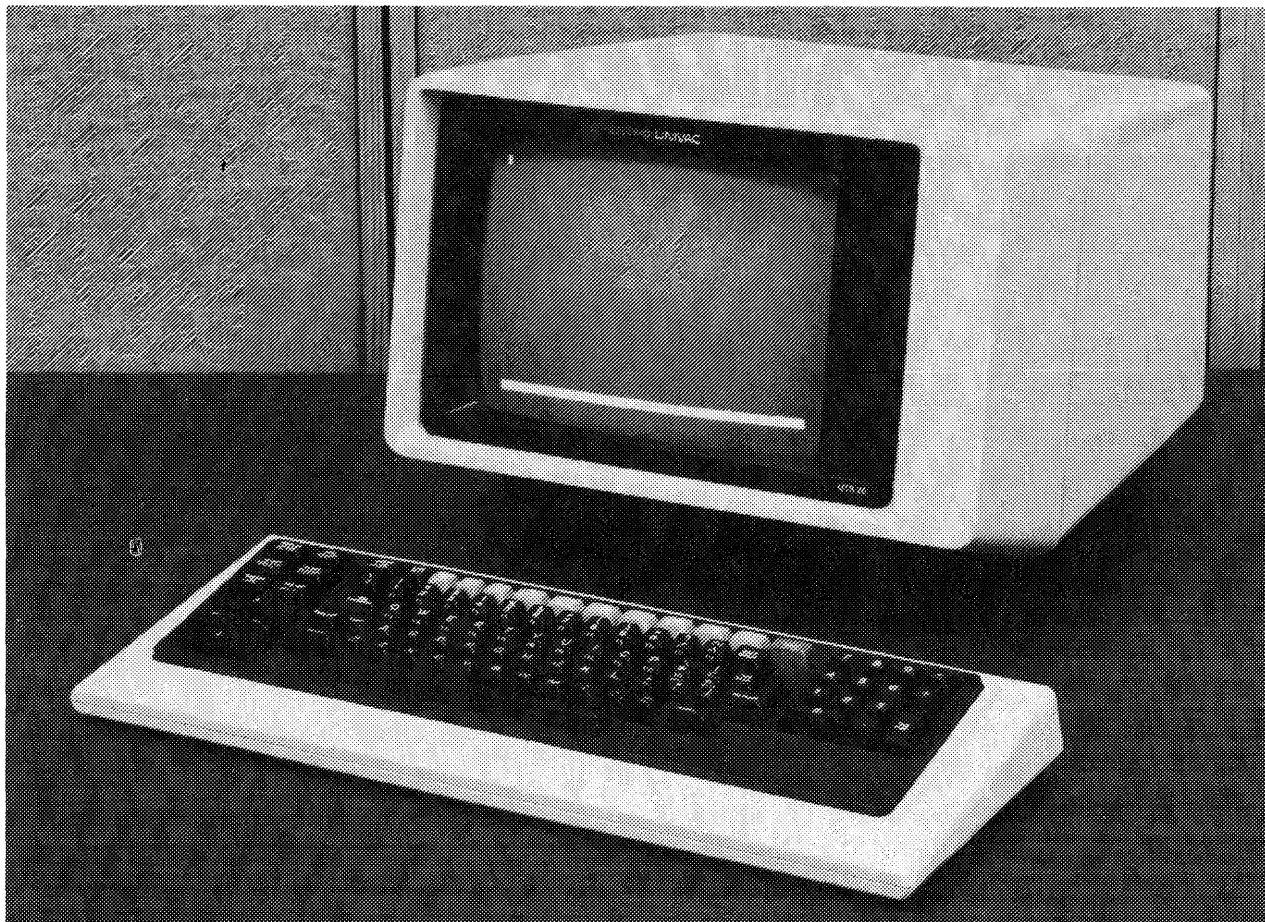
The UTS 20 has been designed to condense each transmission by sending only significant spaces: nonsignificant spaces are automatically stripped out. Line time may also be saved if the user designates only certain portions of a display for transmission, such as the unprotected data or data flagged as changed from its previous condition in the display. Both of these methods of saving transmission line time can be implemented on the UTS 20.

2. UTS 20 Characteristics

2.1. OVERVIEW

The UTS 20, pictured in Figure 2-1, is a remote display terminal used for interactive data communications with a host processor. Although not a programmable device, the UTS 20 does have many of the functional capabilities of the programmable terminals in the SPERRY UNIVAC product line. Some of these key capabilities include:

- Host/operator use of:
 - Backward tabulation
 - Line duplication
 - Line insertion in display
 - Line deletion in display
- Host/operator generation of:
 - Line feed characters
 - Form feed characters
 - Print transparent command
 - Print form command
- Host/local use of:
 - Transmit-changed-data command
 - Error log
- Host/operator control of:
 - Field control characters
 - Control page
- Operator-initiated power-on confidence test
- Addressable cursor
- Automatic answer/hangup
- Set of program attention keys



9134-3

Figure 2-1. SPERRY UNIVAC Universal Terminal System 20 Single Station

2.2. BASIC FUNCTIONS

2.2.1. Data Access

The UTS 20 is capable of displaying any file contained in the host processor to which the terminal has access. For a quick look at your data, just scan through the file, using the display. If you need a printed copy of the data for reference or to write on, a peripheral printer can provide it.

2.2.2. Data Manipulation

Editing the data on the screen is a simple, straightforward task with operator-available attributes such as a choice of destructive or nondestructive space bar, horizontal and vertical wraparound, field control characters, tab-setting capability, backward tabulation, line duplication, line insertion and deletion, and replacement of characters by overwriting.

2.2.3. Data Communications

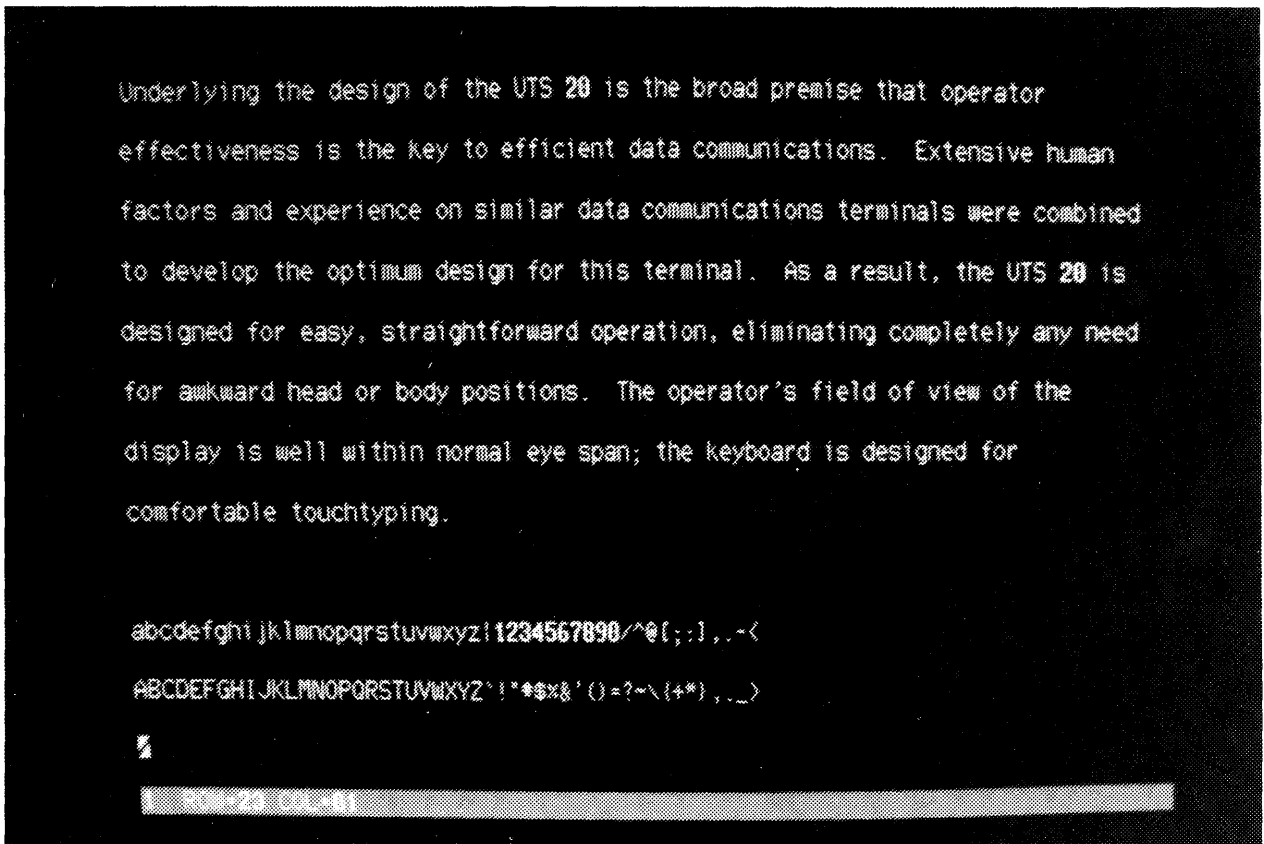
The UTS 20 transmits synchronously at speeds up to 9600 bits per second (bps) in American Standard Code for Information Interchange (ASCII), the industry standard. The communications protocol used by the UTS 20 is byte oriented and UTS 400 compatible.

2.3. HUMAN ENGINEERING DESIGN

Operator effectiveness is the basis of an efficient data communications operation. From this premise, human engineering considerations and experience on similar data communications terminals were combined to develop the optimum design for the UTS 20. As a result, the terminal is designed for easy, straightforward operation, eliminating completely any need for awkward head or body positions. The operator's field of view of the display is well within normal eye span, and the keyboard is designed for comfortable touchtyping. Because the keyboard is similar to that of a typewriter, little additional training is required to operate the terminal system and use its many extra capabilities.

The visual display consists of sharp, bright, green characters on a dark background. The characters closely resemble conventional printed material. Each character appears of equal thickness and brightness over the entire screen, resulting in excellent legibility and clarity of presentation at all times. Character brightness can be adjusted to the preferred level by the operator. Figure 2-2 shows a typical UTS 20 display.

A nonglare screen, a flicker-free display, the natural viewing angle provided by the nearly vertical CRT — all these factors contribute to viewing comfort. And, a new dimension in operating comfort is available with the addition of the optional tilt/rotate base. This base allows the operator to regulate the degree of tilt (from -10 to +30 degrees) and to rotate the terminal (about 90 degrees) for maximum convenience.



9134-4

Figure 2-2. Typical UTS 20 Display

All the control keys required to operate the terminal and to initiate data transfer are located right on the keyboard. Controls not used in regular operation — the power-on indicator and switch, display intensity control, reset switch, audible-alarm volume control, and security keylocks — are located on the casework under the screen.

The UTS 20 keyboard was designed to increase operator productivity. The light, responsive key action minimizes operator fatigue. Also, at the operator's option, a command can be entered in the terminal so that an audible "click" sounds each time the terminal accepts an entry from the keyboard, which may help to decrease the operator's dependence on the visual display during data entry.

Another useful attribute of the UTS 20 is the self-turnoff display. After a preselected time has elapsed without any keyboard or communications activity, the screen display shuts off. This feature prevents unnecessary power consumption and also alleviates the screen-phosphor "ghosts" caused by a constant display.

2.4. PROGRAM CARTRIDGE

The functional characteristics of the UTS 20 are stored in the easily replaceable program cartridge. The replaceable-cartridge concept facilitates program updates or changes, which may be accomplished quickly at your location.

2.5. CONTROL PAGE

By means of a fixed, 2-line display called the control page, the operator can control the type of data transfer to the peripheral printer, control the type of transmission from the UTS 20 to the host processor, and alter some of the characteristics of the UTS 20. When configured in the BSC mode, the UTS 20 uses a 1-line display and has its own specific set of control page code requirements. After pressing a key to bring the control page to the screen, the operator enters the proper codes in the display for the desired function. Pressing the key again removes the control page, stores the codes, and redisplay the original screen data.

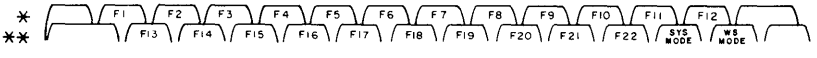
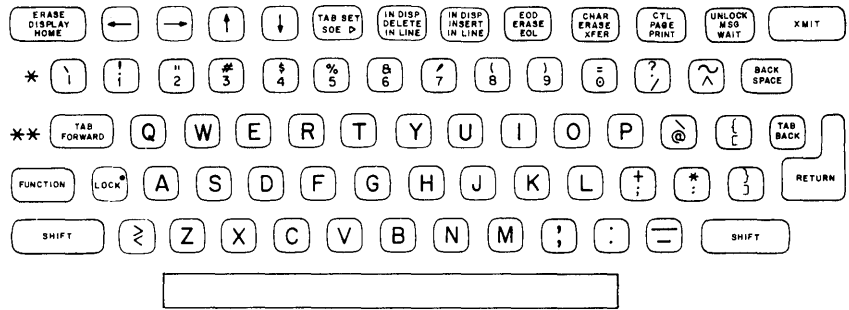
2.6. SCREEN FORMAT

The display format of the UTS 20 is limited only by the maximum constraints of 24 lines of 80 characters each per screen. Any combination of lines and characters per line (from a minimum of two lines by one character) up to the maximum can be adopted by entering the desired parameters in the control page. (The BSC mode supports only 24 lines of 80 characters each per screen line.) The selected format is centered on the display screen both vertically and horizontally.

The complete ASCII set of 96 characters, including uppercase and lowercase alphabets, can be displayed.

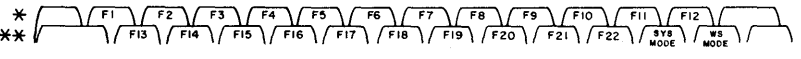
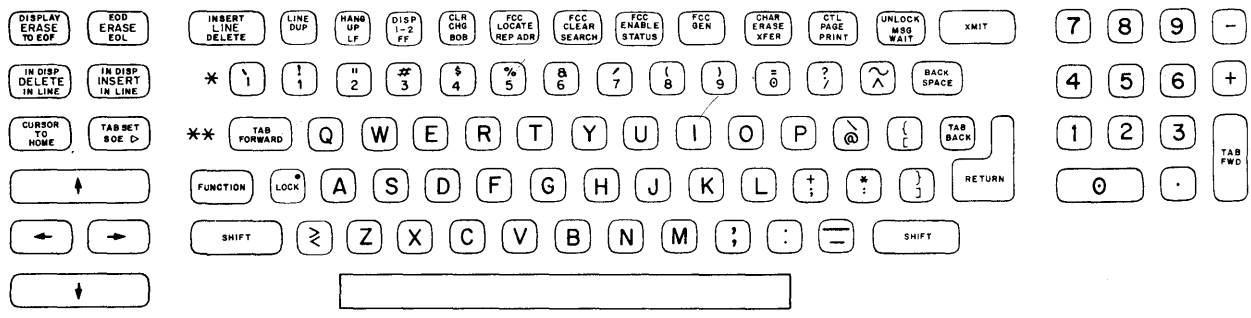
2.7. KEYBOARD MODELS

Four keyboard models are provided for the UTS 20: a typewriter keyboard, an expanded typewriter keyboard, a Katakana/English keyboard, and a UTS 400-format keyboard. Keyboard models provided for BSC operations are a typewriter keyboard and an expanded typewriter keyboard. Function keys are indicated by either a label bar or keycaps. Figures 2-3 and 2-4 show the UTS 20 keyboard models.



FRONT VIEW

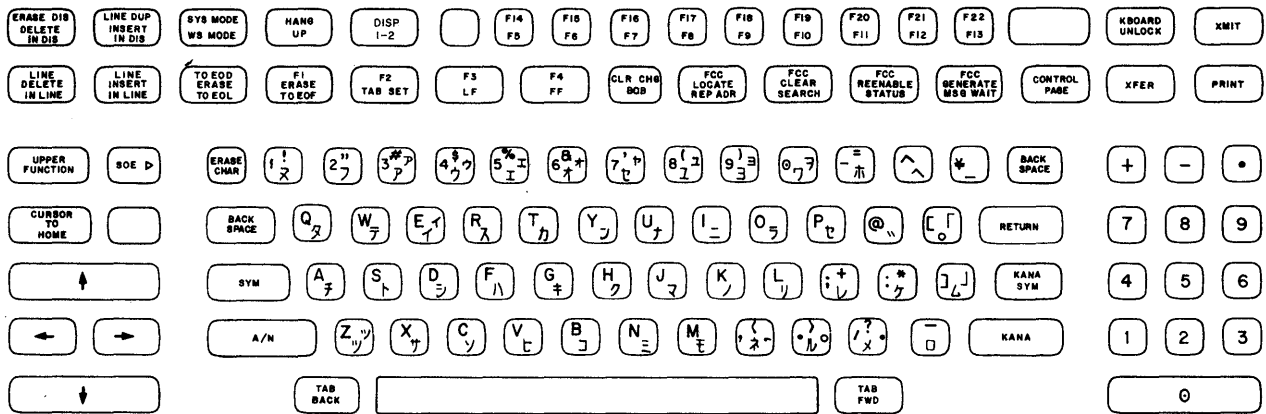
TYPEWRITER KEYBOARD



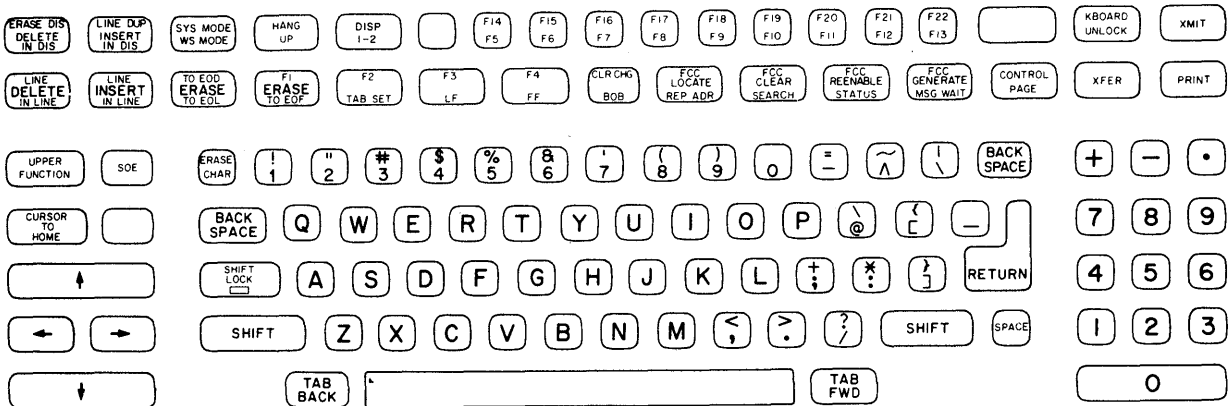
EXPANDED TYPEWRITER KEYBOARD

9134-5

Figure 2-3. Typewriter and Expanded Typewriter Keyboards



KATAKANA/ENGLISH KEYBOARD



UTS 400-FORMAT KEYBOARD

9134-6

Figure 2-4. Katakana/English and UTS 400-Format Keyboards

Each of the keyboard models contains — in addition to the standard data keys — several types of control keys, including data editing keys, cursor control keys, function control keys, and peripheral control keys. Control key functions are discussed in detail in Section 3. All four keyboards also have a set of 22 program attention keys, which can be used to initiate special host-supplied functions, as described in 2.11.

NOTE:

The expanded typewriter, Katakana/English, and UTS 400-format keyboards have some keys not found on the basic typewriter keyboard. These keys are identified in the discussion of control key functions in Section 3.

For the typewriter and expanded typewriter keyboards, data keycaps must be selected to match the language character generator being used. (Refer to Section 4 for national language selections.) Language keycap selection is not necessary for the Katakana/English and UTS 400-format keyboards.

The keyboard is attached to the display with a small, round cable, which allows the operator to move the keyboard up to 76 centimeters (30 inches) to find the most comfortable operating position. The operator may also replace a defective keyboard simply by disconnecting the cable.

2.8. FIELD DEFINITION

Field definition, one of the most potentially useful of all UTS 20 functions, gives the UTS 20 operator complete control over data formatting. This function is similar in concept to protected format, but with many more capabilities. For example, fields may be formed that will accept only numbers or letters or that will right-justify all entries. The display intensity of the entries in a field may be controlled to aid in visual identification of the data, or the entire data entry in the field may be made to blink. The same field control character (FCC) used to define the parameters of the field can also be used as a tab stop, thus saving spaces in the display for additional data. (The regular tab stop requires one space in the screen display.) Following is a complete list of the FCC capabilities:

- Designates one of the following display characteristics:
 - Normal intensity (high)
 - Alternate brightness
 - Blinking (data in the field blinks from normal to the alternate brightness)
- Specifies one of the following types of data entry:
 - Alphabetic entry only
 - Numeric entry only
 - Any input allowed
 - Protected (no data entry allowed)
 - Right justification, any entry
 - Right justification, alphabetic entry only
 - Right justification, numeric entry only
- Specifies its use as a tab stop
- Indicates that a field has or has not been changed by an operator

The operator has complete control — both for generating and for modifying the field control character — or the host processor may be given this same control.

The protected data capability, for example, can be used by the host processor to create “forms” for routine data entry; that is, protected words and phrases may be used as guides for entering the variable data. These forms are displayed for operator convenience but may be suppressed when the display is transmitted. The operator simply “fills in the blanks” and transmits the newly entered data. Obviously, if only the variable (unprotected) information is transmitted, on transmission time, which is one of the major advantages of the UTS 20. This provision is similar to the suppression of nonsignificant spaces but works on the protected characters instead. The protected format function is also a timesaver for an operator who is entering variable information.

While supplying all this versatility in formatting, the field control character still does not interfere with the screen display in any way. There can be up to 24 lines of 80 FCCs per line, one FCC for every screen character location. The FCC occupies a memory location but not a screen memory location.

2.9. FORWARD AND BACKWARD TABULATING

Entry of tab stops may be accomplished either by pressing the TAB SET key or by using the field control character to define tab positions. The field control character does not occupy a position in the display, but the conventional tab character does. When the TAB FORWARD key is pressed, the cursor moves to the first tab stop to the right. If it is a conventional tab stop, the cursor stops in the first unprotected position to the right of where the TAB SET key was pressed. If the tab stop was selected through FCCs, the cursor stops in the position where the FCC was generated. The cursor moves to home position if no tab stops are defined between the cursor and the end of the screen.

The UTS 20 can tab backward as well as forward. The tab stop provisions described previously also apply to this capability, and the same tabbing response occurs except that the cursor moves to the first tab stop position to the left of its position when the TAB BACK key is pressed. If no tab stop is encountered, the cursor goes to the home position. If a tab stop is located immediately to the left of the cursor, that tab stop will be skipped.

2.10. LINE DUPLICATION

Any line already on the screen can be duplicated, either by host processor or operator direction. This capability makes it possible to set up forms or repetitious material by a simple command or operation rather than by repeating the same information over and over again.

2.11. PROGRAM ATTENTION KEYS

These keys are handy, economical message generators that can be used to initiate special sequences or functions as designated in your host program. The control code of a program attention key can activate a complete program subroutine, causing the host processor to perform that subroutine when this code is received.

There are 22 program attention keys on the UTS 20 keyboard. The MSG WAIT key, also considered a program attention key, is used to request a message generated or forwarded by the host processor.

2.12. HOST PROGRAMMING APPLICATIONS OF UTS 20 CAPABILITIES

The capabilities of the UTS 20 are adaptable to a variety of host programming applications. The following examples illustrate two such applications, one designed primarily for operator convenience and the other for transmission-time savings as well as operator convenience.

2.12.1. Display Rolling

Under appropriate host processor control, the display on the screen can be rolled upward or downward at a variable rate, from a discernible line-at-a-time rate to a rapid roll. The effect is achieved by processor-controlled line-delete functions. The rate of roll depends on the frequency of the insert or delete function in a sequential operation. Program attention keys can be designated by the host program to initiate this function, to regulate the roll rate, and to end the function.

2.12.2. Active/Reference Screen Areas

By use of the protected format function of the field control character, part of the screen can be designated as reference (protected) and part of it as active (receiving operator-entered variable data). With the appropriate transmit function specified in the control page, only the information in the active areas will be transmitted.

The active/reference area capability allows portions of the screen to be used for active message interchange while the remainder of the data display is left unchanged. In this way, the operator can have multiple messages on the screen at one time, and the operator/host processor exchange can consist of display segments instead of the entire contents of the display.

Active/reference screen areas can be arranged in almost any manner. The active area of the screen, determined either by the operator or by the host processor, can be any area on the screen that is not designated as protected format.

2.13. AUTOMATIC ANSWER/HANGUP

For use with a dialed modem, a feature is available that enables the UTS 20 to answer a host-processor-originated call automatically. This feature also enables the terminal system to hang up automatically in response to a processor command or to initiate the disconnection command itself.

2.14. SECURITY KEYLOCKS

The keylock feature provides two separate locking functions: a keyboard keylock and a setup keylock. The keyboard keylock enables or disables input from the keyboard and magnetic stripe reader. The setup keylock enables or disables access to the control page operating parameters.

2.15. PARITY GENERATION AND CHECKING

The UTS 20 generates and checks both character and block parity on the communications line. If a parity error occurs on data, the operation is retried, but the automatic retry does not provide any unique indication to the host processor or to the operator. However, if the error continues after several retry attempts, the operator will be alerted.

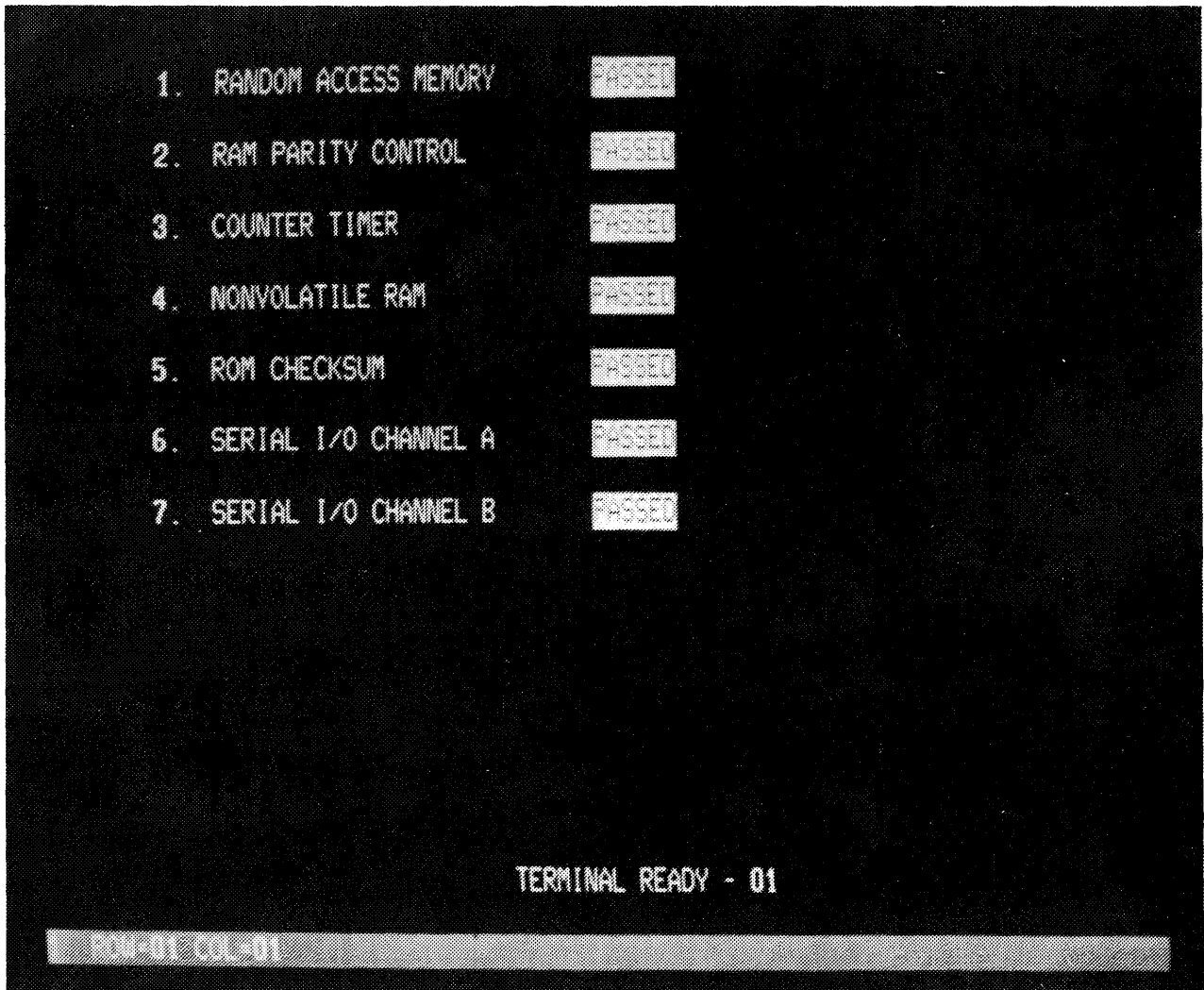
The parity generation and checking function detects any single-bit data error that occurs in random-access memory (RAM), on the communications interface, from the keyboard, or on the bit-serial peripheral interface.

2.16. RELIABILITY AND MAINTAINABILITY

The UTS 20 has several built-in functions to assist in maintenance of the equipment and to assure the user that the terminal is operating properly.

2.16.1. Power-On Confidence Test

A power-on confidence (POC) test is executed automatically by the UTS 20 when power is applied, or it may also be initiated manually by operator activation of the RESET pushbutton. The basic functionality of the terminal is checked by the POC test routines. Every POC test routine is listed in the test display and is reported as having passed, failed, or unable to be completed. When the POC tests have been completed without error, the display appears as shown in Figure 2-5.



9181-26

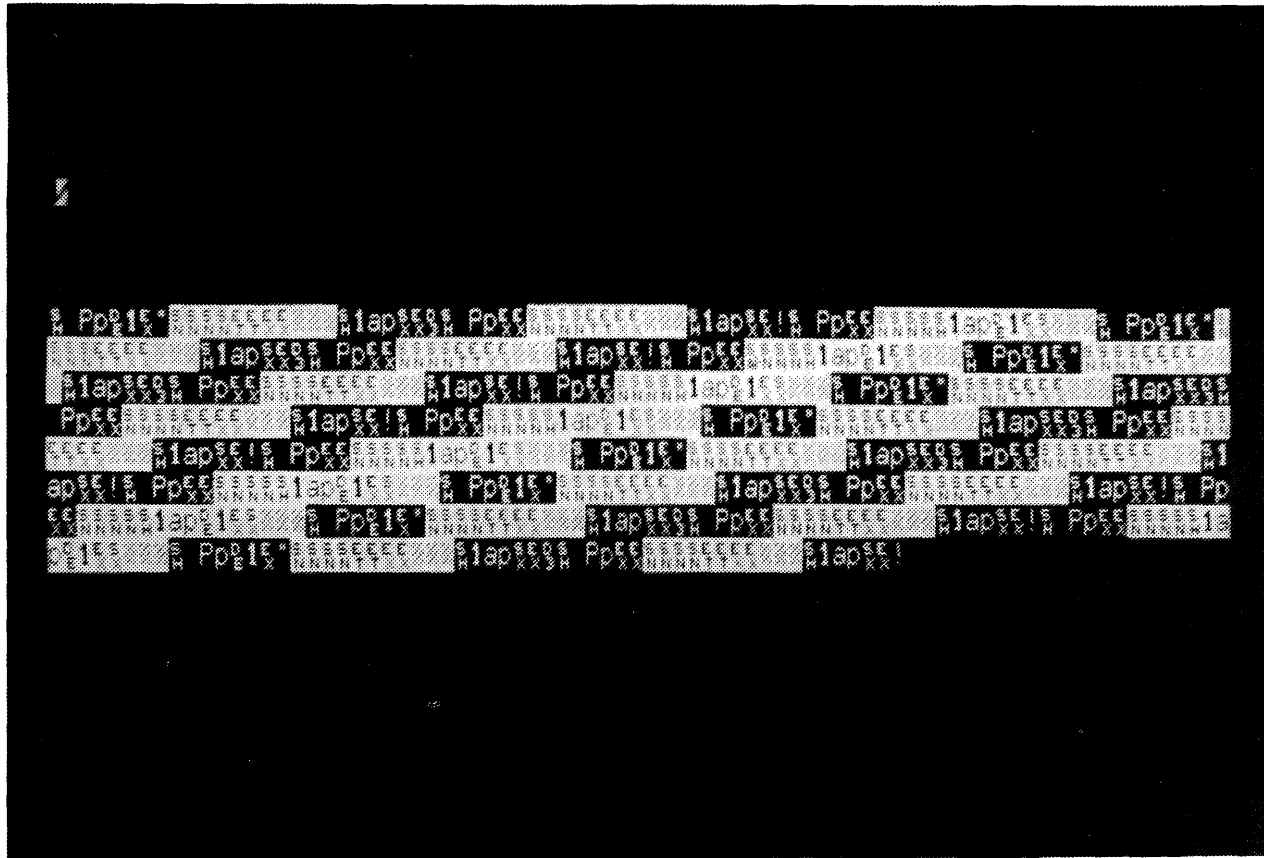
Figure 2-5. Display of Successful Power-On Confidence Test Results

2.16.2. Error Logging

A log of errors related to the communications line, peripherals, and internal operations is maintained in the memory of the UTS 20. This report may be displayed locally or transmitted to the host for examination. The user, operator, or customer services representative has access to this information, which is easily understood and useful for analysis.

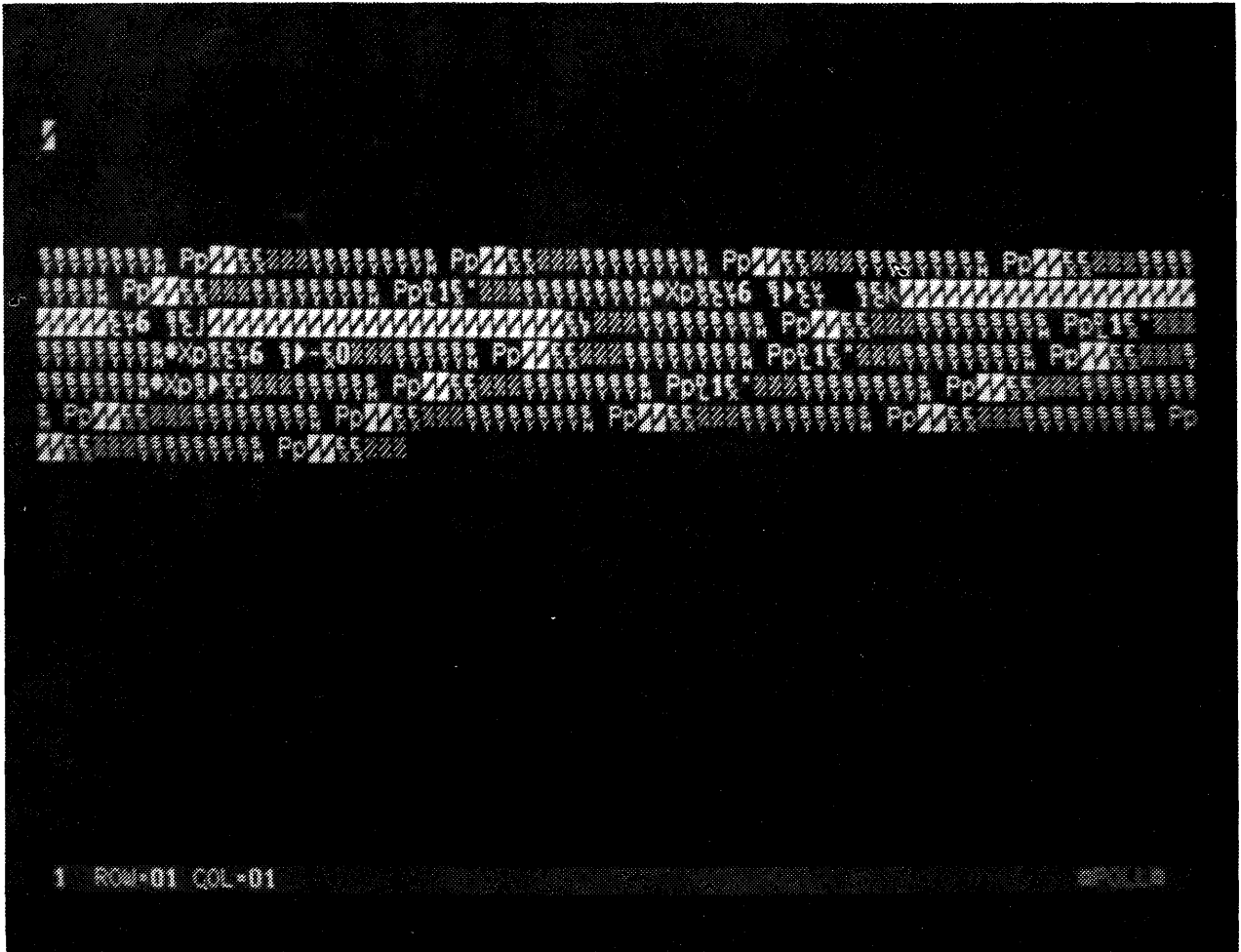
2.16.3. Line Monitoring

The monitor function permits the display of communications line traffic on the screen of the UTS 20. This function is intended to be used primarily by Sperry Univac customer services representatives for troubleshooting communications problems. The user may also convey the line monitor information over the telephone to a customer services representative to aid in failure analysis. Depending on the UTS 20 model, one of two types of line monitor displays is used. Figures 2-6 and 2-7 show typical displays on both types of line monitors.



9134-8

Figure 2-6 Line Monitor Display A



9134-20

Figure 2-7. Line Monitor Display B

2.16.4. Loopback Test

The loopback test checks UTS 20 communication channels by sending a test message sequence to the connected modem or DCM that is then reflected back to the terminal; the message sent and the message received should be identical. The loopback test is initiated through a control page entry in the maintenance mode field. (Depending on the type of modem used in the configuration, a special test adapter plug also may be required.) The test series continues to cycle until the RESET pushbutton is pressed or the terminal is turned off. If a failure occurs, the tests stop and the number of the failed test is displayed on the screen.

3. Functional Description

3.1. DATA TRANSMISSION

3.1.1. Transmission Characteristics

Transmission between the host processor communications equipment and the UTS 20 is bit-serial. The data transmission code is standard 7-level ASCII plus character parity. The UTS 20 transmits synchronously at speeds up to 9600 bits per second (bps) in the half-duplex mode.

3.1.2. Message Format

UTS 20 terminals operate in a polling environment; that is, transmission between the processor and the UTS 20 is initiated by the processor. Communications line protocol requires that terminal and device addressing be used in every transmission and that messages between the terminal and the host processor be acknowledged by the recipient. In the UTS 20, line protocol and message formatting functions are automatic — the operator is concerned only with message content.

3.1.3. Messages to the Processor

A message to be transmitted from a UTS 20 to a host processor is composed by the operator, who positions the cursor and enters the desired data from the keyboard. The operator then presses the XMIT (transmit) key. When the host processor next polls the UTS 20 for traffic, that message is transmitted to the host processor. Waiting time is a function of the host activity, poll rate, and line propagation time; normally, there is only a momentary delay.

3.1.4. Messages to the Peripheral Printer

Messages transferred from the UTS 20 to the peripheral printer can be initiated manually by the operator. After composing the message, the operator presses the PRINT or XFER (transfer) key and, if the device is properly conditioned to accept the transfer, the message is immediately transferred.

The host processor can also transfer data by way of the UTS 20 to the peripheral printer.

3.1.5. Messages From the Processor

If the UTS 20 receives an unsolicited host processor message while the operator is composing text, the terminal sounds a tone to alert the operator. Depending on the host programming provisions, keyboard entry may also be interrupted. If entry is not interrupted, the operator may finish inputting the data, transmit the data to the host, and then press the MSG WAIT key to request the host processor message.

The host processor can override any operator action and cause an urgent message to be displayed immediately, regardless of whether text is being composed at the UTS 20.

3.2. CONTROL PAGE FUNCTIONS

The operator has access to a 2-line display called the control page that is used to control the transfer of data to the peripheral printer, to control the type of transmission to the host processor, and to change the functional parameters of the terminal. Certain maintenance displays provided by the UTS 20 are also requested by means of the control page.

The control page display, shown in Figure 3-1, is painted on the screen when the operator presses the CTL PAGE key. If there is any data present on the lines replaced by the control page, that data is shifted to temporary storage; when the operator presses the CTL PAGE key again to remove the control page, the original data is returned to the screen.

```

(**PRINT*)STA-          (**XFER**)PRNT(ALL)XFER(VAR)XMIT(VAR)MM (PARAM)
( / / )ADR-            ( / / /SEARCH(          )*** ( / / )

```

9134-15

Figure 3-1. Control Page Display

While the control page is displayed, the operator can enter specified codes into the unprotected fields (the fields within parentheses) as needed. When the control page is removed from the screen, the operator inputs are interpreted and acted upon by the UTS 20.

The functions of the various fields in the control page display are described in the following paragraphs. (The ADR- and SEARCH() fields are not used in UTS 20 operation and therefore are not described here.)

3.2.1. Control of Data Transferred to Peripheral Printer

The unshaded fields shown in the following control page are used to specify the printer, to define the type of data transfer to the printer, and to display printer status, as described in Table 3-1.

```

(**PRINT*)STA-          (**XFER**)PRNT( )XFER( )XMIT( )MM (PARAM)
{ / to / }ADR-          { / to / }SEARCH( )***{ / / }

```

9134-16a

Table 3-1. Control Page Fields Used in Printer Transfers

Field	Function
(**PRINT*)	<p>The top line of this field is protected from data entry. In the second line, the entry in the "to" subfield is a 2-character mnemonic that specifies the printer for use when the PRINT key is pressed. (The mnemonic is defined in the DV parameter selection, described in 3.2.4.) The other subfields are not used in UTS 20 operation.</p>
PRNT()	<p>The entry in this 4-character field specifies the type of print function to be performed when the PRINT key is pressed. The allowable entries are "PRNT", "FORM", and "XPAR". (The default condition is "PRNT".)</p> <ul style="list-style-type: none"> ■ "PRNT" causes all data to be printed except field control characters (FCCs). ■ "FORM" causes all characters except FCCs to be printed, with spaces replacing protected characters. ■ "XPAR" specifies a print transparent operation in which all cursor-return codes are suppressed, no FCCs are included, and no spaces are suppressed.
(**XFER**)	<p>The top line of this field is protected from data entry. In the second line, the entry in the "to" subfield is a 2-character mnemonic that specifies the printer for use when the XFER (transfer) key is pressed. (The mnemonic is defined in the DV parameter selection, described in 3.2.4.) The other subfields are not used in UTS 20 operation.</p> <p>NOTE:</p> <p>The transfer function is used only when FCCs are to be printed along with the text. Normally, this function would not be used because the printed FCCs could be confusing.</p>
XFER()	<p>The entry in this 4-character field specifies the type of print function to be performed when the XFER key is pressed. The allowable entries are "ALL", "VAR", and "CHAN". (The default condition is "VAR".)</p> <ul style="list-style-type: none"> ■ "ALL" causes the transfer of all data, including FCCs. ■ "VAR" causes the transfer of all unprotected data and all FCCs. ■ "CHAN" causes the transfer of only the data and FCC from each field in which an actual change has been made.
STA-	<p>The 6-character field following this term is used by the system to display the operational status of the printer when the STATUS key is pressed. The operator specifies the printer at the initiation of this operation by placing the cursor over the printer mnemonic in the "to" subfield of the (**PRINT*) field.</p>

3.2.2. Control of Data Transmitted to Host Processor

The unshaded fields shown in the following control page are used to define the type of data transmitted to the host and to indicate the terminal transmission codes, as described in Table 3-2.

```
(**PRINT*)STA-      (**XFER**)PRNT(   )XFER(   )XMIT(   )MM (PARAM)
( / / )ADR-      ( / / )SEARCH(   )*** ( / / )
```

9134-16b

Table 3-2. Control Page Fields Used in Communications Activity

Field	Function
XMIT()	The entry in this 4-character field specifies the type of online transmission to be performed when the XMIT (transmit) key is pressed. Data on the screen between the SOE (or the home position) and the cursor location is transmitted, with spaces at the end of lines suppressed. The allowable entries are "ALL", "VAR", and "CHAN". These three entries have the same functions as defined for the XFER() field (Table 3-1.)
***	The special code field is a protected field which contains communications information that has been entered into the control page (PARAM) field and activated by pressing the RESET pushbutton. The first two positions contain the ASCII character equivalent of the RID and SID hexadecimal codes. The third position contains the letter designating communications mode: "X" for multiplexer, "M" for modem, or "D" for direct connection.

3.2.3. Control of Maintenance Display Functions

The MM field in the control page is used to call up a display of the traffic on the communications line or a display of internal parity and communications line errors that have been detected. The allowable entries in the MM field are defined in Table 3-3. If the entry is accepted, it is stored in memory and the field is cleared when the control page is redisplayed. If the entry is rejected, it remains in the MM field and the alarm sounds once.

```
(**PRINT*)STA-      (**XFER**)PRNT(   )XFER(   )XMIT(   )MM (PARAM)
( / / )ADR-      ( / / )SEARCH(   )*** ( / / )
```

9134-16c

Table 3-3. Maintenance Displays Defined in MM Field of Control Page (Part 1 of 2)

Entry	Meaning and Function
LM	Line Monitor. Displays the communications line traffic. The data transmitted from the UTS 20 is displayed in the alternate-brightness intensity (as specified in the AB parameter, described in 3.2.4). The data received by the UTS 20 is displayed in normal intensity. Katakana data characters are displayed in normal intensity only.
MO	Monitor Off. Turns off the line monitor (LM) function.
EL	Error Log. Displays the number of errors and activity retries that have occurred internally and on the communications line.

Table 3-3. Maintenance Displays Defined in MM Field of Control Page (Part 2 of 2)

Entry	Meaning and Function
CY	Cycle POC. Causes power-on confidence test to cycle repeatedly until the RESET pushbutton is pressed.
LL	Loopback (local). Tests communications loop.
LX	Loopback (external). Tests communications loop.

3.2.4. Definition of Terminal Characteristics

The (PARAM) (parameter) field in the control page is used to define specific functional characteristics of the UTS 20.

```

(**PRINT*)STA-      (**XFER**)PRNT(      )XFER(      )XMIT(      )MM (PARAM)
( / / )ADR-        ( / / )SEARCH(      )*** ( pt / po )
    
```

9134-16d

The top line of the (PARAM) field is protected from data entry. The second line is used by the operator to alter configured parameters (such as screen size, communications options, and so forth).

The (PARAM) field requires two entries, a parameter type (pt) mnemonic and a parameter option (po) mnemonic. If the entries are accepted, they are stored in memory and the field is cleared; if rejected (because of an incorrect entry), the entries remain in the (PARAM) field and the alarm sounds once.

NOTE:

Since the configuration parameters are stored in the nonvolatile memory of the UTS 20, these parameters are retained even when power is turned off for weeks at a time. When the terminal is turned back on, the parameters are automatically loaded from this memory to the working memory.

The allowable entries in the "pt" and "po" subfields of the (PARAM) field are defined in Table 3-4.

Table 3-4. UTS 20 Characteristics Defined by Parameter Field of Control Page (Part 1 of 4)

Parameter Type (pt)	Parameter Options (po)	Meaning and Function
AB		Alternate Brightness. Defines the alternate brightness for intensity and blink characteristics of the FCC. Also determines the intensity of the control page display.
	LI	Low Intensity. Specifies that the data will appear in low intensity. (This is the default condition.)
	RV	Reverse Video. Specifies that the data will appear as dark letters on a green background.
	NI	Normal Intensity. Specifies that the data will appear in normal intensity.

Table 3-4. UTS 20 Characteristics Defined by Parameter Field of Control Page (Part 2 of 4)

Parameter Type (pt)	Parameter Options (po)	Meaning and Function
PS	96 48 24 12 06 03	Printer Speed. Specifies the speed at which the UTS 20 passes characters to the printer. 9600 bps (default value) 4800 bps 2400 bps 1200 bps 600 bps 300 bps
SP	NS DS	Space Bar Selection. Specifies whether pressing the space bar causes the data under the cursor position to be deleted (destroyed). Nondestructive space (default condition) Destructive space
LN	Any decimal number from 02 to 24	Lines. Specifies the number of lines to be used on the screen. (Default value is 24.)
CL	Any decimal number from 01 to 80	Characters per Line. Specifies the number of characters per line to be used on the screen. (Default value is 80.)
CP	Any decimal number from 01 to 23	Control Page. Specifies on which line the first line of the control page will be displayed. (Default value is 01.)
DV	P1 XX	Device Mnemonic. Specifies the 2-character mnemonic to be used in the "to" subfield of the control page (**PRINT*) and (**XFER**) fields (as described in 3.2.1). Printer 1 (default condition) Any two characters
VO	01 04 16 64	Video Off Time. Specifies the amount of time that can elapse without communication or keyboard activity before the display is turned off. Off after 1 minute Off after 4 minutes (default value) Off after 16 minutes Off after 64 minutes

Table 3-4. UTS 20 Characteristics Defined by Parameter Field of Control Page (Part 3 of 4)

Parameter Type (pt)	Parameter Options (po)	Meaning and Function
AA	NO Y1 Y2 Y3 Y4	Automatic Answer/Hangup. Causes the communications line between the host processor and UTS 20 to be disconnected after the designated timeout period has elapsed without line activity (in dial-up communications). Does not hang up (default condition) 30-second timeout 1-minute timeout 3-minute timeout 5-minute timeout
CM	MX MD DC	Communications Mode. Designates the type of communicating device to be used. Multiplexer (default condition) Modem Direct connection (If this option is selected, the AR parameter must be specified.)
AR	96 48 24	Channel A Rate. Specifies the speed at which characters are passed to and from the host when a direct connection from terminal to host is used. 9600 bps (default value) 4800 bps 2400 bps
RI	Any hexadecimal number from 21 to 4F	Remote Identifier. Specifies the remote-site transmission code (RID).
SI	Any hexadecimal number from 51 to 6F	Station Identifier. Specifies the terminal transmission code (SID).
DI	Any hexadecimal number from 21 to 7E (excluding 70, 71, 72)	Device Identifier. Specifies the peripheral-device transmission code (DID).
KK	OF ON	Keyboard Click. Specifies whether keyboard entries will be audible. Keyboard entries will not be audible. Keyboard entries will be audible (default condition).

Table 3-4. UTS 20 Characteristics Defined by Parameter Field of Control Page (Part 4 of 4)

Parameter Type (pt)	Parameter Options (po)	Meaning and Function
RR	50 60	Refresh Rate. Sets the display refresh rate. This parameter is used only if the display appears unstable (typically caused by lights or motors external to the terminal that operate at a line frequency different from that of the terminal). Should this problem occur, the parameter option may be set to either 50 or 60, whichever stabilizes the display. 50-Hz refresh rate 60-Hz refresh rate (default value)
AT	YS NO	Autotransmit. Specifies whether data from the magnetic stripe reader will be automatically transmitted to the host or must be transmitted manually. Specifies automatic transmission to the host (the data is not displayed on the screen for security reasons). Specifies that the operator must initiate transmission to the host after data is displayed on the screen (default condition).
UC*	YS NO	Uppercase characters. Causes all alphabetic keys to be displayed in uppercase, regardless of use of the SHIFT key. Characters will be displayed in uppercase. Characters will be displayed as entered, in upper and lowercase (default value).
UR*	az Any two characters from 60-7E on the ASCII code chart	Uppercase range. Specifies the range of characters affected when the uppercase character (UC) parameter is set to YS. (This parameter is primarily useful to operators of non-English keyboards, where the UC parameter does not include all characters desired for uppercase display.) A through Z (default condition) \ through ~ or any range of characters between. (Entries must be made in lowercase.)
CC	ON OF	Control characters displayed. Control characters are displayed on the screen, including the tab set, line feed and form feed characters. Control characters will be displayed. Control characters will not be displayed (default value).
IL	RV NI	Indicator line. Specifies whether line 25 (indicator line) will appear in contrasting or the same intensity as the rest of the display. Reverse video (default) Normal intensity

*Not supported on Katakana keyboard

3.3. KEYBOARD CONTROL FUNCTIONS

The functions of all keyboard control keys used in UTS 20 operation are described in subsequent paragraphs. The expanded, UTS 400-format, and Katakana/English keyboards have several keys not found on the typewriter keyboard, as indicated in the following lists.

Keys Common to All Four Keyboards*

Alphanumeric and symbolic data keys
Program attention keys (F1 thru F22)
MSG WAIT (message waiting)
FUNCTION
SHIFT
SHIFT LOCK
CTL PAGE (control page)
XMIT (transmit)
UNLOCK (keyboard unlock)
SYS MODE**
WS MODE**
SOE (start of entry)
TAB SET
PRINT
XFER (transfer)
BACK SPACE
Space bar
TAB FORWARD
TAB BACK
CURSOR TO HOME
Cursor scan keys (4)
RETURN (cursor return)
CHAR ERASE (character erase)
ERASE EOD (erase to end of display)
ERASE EOL (erase to end of line)
ERASE DISPLAY
INSERT IN LINE
INSERT IN DISP (insert in display)
DELETE IN LINE
DELETE IN DISP (delete in display)

Keys Found Only on UTS 400-Format, Expanded, and Katakana Keyboards

Numeric keypad
FCC GEN (field control character generate)
FCC ENABLE
FCC CLEAR
FCC LOCATE
CLR CHG (clear changed FCC indicators)
STATUS
SEARCH**
REP ADR**
BOB**
LF (line feed)
FF (form feed)
HANG UP
LINE DUP (line duplication)
INSERT LINE
DELETE LINE
ERASE TO EOF (erase to end of field)
DISP 1-2

3.3.1. Keyboard-State Control

On the expanded and typewriter keyboards, if a nondata key has two functions, the upper function is enabled by pressing the FUNCTION key. On the UTS 400-format and Katakana/English keyboards, the UPPER FUNCTION key acts in the same manner on various function-control and editing keys.

The SHIFT and LOCK (or SHIFT LOCK) keys enable the uppercase letters or upper symbols on the data keys. (The Katakana/English keyboard has four data-section shift states to accommodate the uppercase and lowercase requirements of both Katakana and English.)

*Keyboard models offered for BSC-compatible operations not included. These models are described in the UTS 20 (BSC) system description.

**Not used in UTS 20 operation.

When the UNLOCK (keyboard unlock) key is pressed, all indicators are cleared, the audible alarm is silenced, and any communication or peripheral operation in progress from this terminal is terminated. The terminal is then free for keyboard entry.

3.3.2. Control Page Access

The CTL PAGE (control page) key is pressed once to bring the control page display to the screen and again to return the control page to storage after the operator has made the entry for which the control page was called. (Refer to 3.2 for control page functional information.)

3.3.3. Field Control

FCC GEN (Field Control Character Generate) Key. When this key is pressed, the next five sequential keyboard inputs are interpreted as code elements for the generation of a field control character (FCC). The cursor is placed at the first position of the desired field, and then each of five characters is sequentially keyed to define the appropriate function of the FCC. The keystroke sequence used to generate an FCC is as follows:

<u>Sequence</u>	<u>Entry Options</u>
1. Intensity	N (or space) — specifies normal intensity for the FCC field. L — specifies that the option selected in the alternate-brightness parameter of the control page (3.2.4) will dictate the FCC field intensity. B — Specifies that the FCC field will blink from normal intensity to the option selected in the alternate-brightness parameter of the control page.
2. Tab Stop	S (or space) — indicates no tab stop T — indicates tab stop
3. Field Entry	U (or space) — indicates any entry allowed (unrestricted) P — indicates no keyboard entry allowed (protected) A — indicates alphabetic key entries only N — indicates numeric key entries only
4. Field	Space — indicates normal justification R — indicates right justification
5. Sequence	Space or any alphanumeric key completes the sequence.

The protected option (field entry characteristic), right-justified option (field justification), and alphabetic- or numeric-only option do not take effect until the FCC ENABLE key is pressed; this arrangement allows data to be entered into the field before the FCC is enabled. The cursor remains at the same location on the screen where the FCC was generated after the sequence-complete character is entered. If an improper character is entered during an FCC generation sequence, the procedure is stopped and the alarm sounds.

Figure 3-2 illustrates how FCCs may be used to accentuate important or protected data. The prompts, shown in reverse video, are protected from operator entry. The operator just tabs to the appropriate data line and enters the information (which is displayed in normal intensity in this figure).

```

Employee Record 6473529

NAME: Jane Jones          SOCIAL SECURITY NUMBER: 123-45-6789
ADDRESS: 324216 Travis Blvd.   CONTACT IN EMERGENCY: John Jones
Houston, TX 7400              444-4444 (home)
                               555-5555 (business)

DATE OF BIRTH: 9/15/50      PLACE OF BIRTH: Boston, MA

JOB CLASSIFICATION: Accountant  SALARY LEVEL: 3T  FACILITY: Houston

DEPT: Purchasing          SECURITY CLEARED: yes  DATE OF HIRE: 6/4/75

EDUCATION: City University of New York  REVIOUS EMPLOYMENT: Great Goods, Inc.
B.S. Accounting 1972              Accountant
                                   1972-75

CURRENT PAYROLL DEDUCTIONS: Federal Income Tax  FICA  Life Insurance
Hospitalization Insurance

MISCELLANEOUS: Travel request, Houston to Denver, approved 2/25/80. Attended
professional seminar.

1 ROW=01 COL=01                               HOLE

```

9142-18

Figure 3-2. FCCs Used to Highlight Data

FCC ENABLE Key. Upon successful FCC generation, all protected and right-justified FCCs are disabled. These FCCs may be reenabled by pressing the FCC ENABLE key.

FCC CLEAR Key. When this key is pressed, the first field control character to the left of (or under) the cursor is cleared. The cursor may be located anywhere within the field defined by the FCC being cleared. The field defined by the cleared FCC becomes part of the first field to the left of the cleared FCC.

FCC LOCATE Key. When this key is pressed, the cursor moves to the first character position of the next field defined by an FCC (which is, in effect, the position of the FCC). Then, if the FCC is to be changed, the cursor is properly positioned for the FCC generation sequence. This locate function will work as described even if the FCC is not set to act as a tab stop. The FCC LOCATE key also disables all protected, right-justified, and alphabetic-only or numeric-only FCCs. These FCCs may be reenabled by pressing the FCC ENABLE key.

CLR CHG (Clear Changed) Key. When this key is pressed, the changed-field designators in the FCCs will be cleared without altering the data in the field. One keystroke clears the entire display, regardless of the cursor position. (These designators are set internally by the UTS 20 whenever a change is made within a field.)

3.3.4. Cursor and Cursor Control Keys

For data entry and editing, the cursor is an indispensable provision of the UTS 20. With the help of this highly mobile, highly visible screen-position indicator, an operator can manipulate data with great ease, speed, and accuracy. The cursor is also used by the UTS 20 to identify the end position of data to be transmitted to the processor or transferred to the peripheral printer.

The cursor is a unique character that is displayed on the screen at all times except, briefly, during transmission to the host processor or data transfer to a peripheral printer. It appears as a bright rectangle with a dark diagonal bar (▣). The cursor advances one position each time a data key is pressed, its current position indicating the location where the next data character will be entered. If the next data character is to be entered somewhere other than the next sequential position, the cursor is moved to the desired position with one or more of the cursor control keys.

When the cursor is positioned over a displayable or nondisplayable character, including the space character, the character and cursor blink alternately. This blinking helps the operator locate the cursor when it is positioned over a character.

The most familiar cursor control keys are the return key, the space bar, and the backspace key. When pressed, the space bar and backspace key move the cursor one space at a time; when pressed and held down, they cycle at the rate of 12 characters per second. The space bar can be configured as either destructive or nondestructive (that is, when the cursor is advanced by the space bar, the character under the cursor can either be erased or left intact).

The other cursor control keys include four scan keys that move the cursor forward, backward, up, or down; the CURSOR TO HOME key; the TAB FORWARD key; and the TAB BACK key.

Any one of the scan keys, when momentarily pressed, moves the cursor one space at a time. If the key is held down, the cursor moves in that direction repeatedly until the key is released.

When pressed, the TAB FORWARD key moves the cursor immediately to the next tab stop to the right, and the TAB BACK key moves the cursor immediately to the next tab stop to the left. If there are no tab stops to the right of the cursor (including all following lines to the last position on the screen) or to the left of the cursor (including all preceding lines to the home position on the screen), the cursor moves to the home position when the appropriate tab key is pressed.

The CURSOR TO HOME key is used to move the cursor from its present location to the home position (first position at the upper left corner of the screen) or the first unprotected position to the right of home.

3.3.5. Data-Entry Control

In addition to the alphanumeric and symbolic data keys, several control key functions — tab setting, line duplication, data-key cycling, insertion of line and form feed codes — are used in generating data.

TAB SET Key. When this key is pressed, a tab stop is generated at the cursor location. The tab stop code occupies that position in display storage. When the tabulation function is used, the cursor will be located in the first unprotected screen position to the right of the tab stop. The tab stop character (•) is displayed when the control character parameter of the control page is set to ON.

LINE DUP (Line Duplication) Key. Pressing this key causes the contents of the line on which the cursor is located to be duplicated on the following line. (The location of the cursor within the line is not significant; the entire line will be duplicated regardless.) The cursor is repositioned to the corresponding location on the duplicated line. When the key is pressed repeatedly, the same line is duplicated again and again, once for each keystroke. This action will continue to the bottom of the screen, but line duplication will not occur if the key is pressed when the cursor is on the last line.

Rapid setup of field control characters, tab stops, and repetitive text for tabular or columnar treatments can be done easily with the line duplication function. Selective clearing can also be accomplished by clearing the desired portion of the line before pressing the LINE DUP key.

LINE INSERT Key. Pressing this key causes a blank line to be inserted at the cursor location. All lines already on the screen from the cursor location to the bottom move down one line. The line at the bottom of the screen when the key is pressed will be lost from storage.

LINE DELETE Key. This key is used to delete the line on which the cursor is positioned. All lines below the deleted line will shift up one, and a blank line will result at the bottom of the screen.

LF (Line Feed) Key. When this key is pressed, a line feed code is generated on the screen at the cursor location. The cursor advances to the next position just as it would with the entry of a data character. When it receives a line feed character, the peripheral printer skips to the next line of the form. The line feed character (LF) is displayed when the control character parameter of the control page is set to ON.

FF (Form Feed) Key. When this key is pressed, a form feed code character is generated on the screen at the cursor location. The cursor advances to the next position just as it would with the entry of a data character. The printer recognizes this character as a command to start a new page (or a new line if the printer does not have a variable forms loop). The form feed character (FF) is displayed when the control character parameter of the control page is set to ON.

DISP 1-2 (Display Screen 1 or Screen 2) Key. This key is functional only when the UTS 20 is equipped with the screen bypass feature. Pressing this key once displays screen "1", or the screen that appears when power is first applied. Pressing this key again displays screen "2", the alternate screen. The "1" or "2" that appears in the first position of the indicator line at the bottom of the screen shows the operator which of the two screens is currently being displayed. (This key is included only on the expanded typewriter and UTS 400-format keyboards. Display switching is host controlled when the screen bypass feature is used on a UTS 20 with the typewriter keyboard.)

3.3.6. Data Editing

The editing capabilities of the UTS 20 terminal allow the operator to edit any message completely before transmitting it to the processor, or to modify data received from the host processor. (Processor-supplied data is not changed at the processor when the display is edited; the changed data must be returned to the processor with instructions to change the file data as indicated in the edited transmission). Using the various editing keys, the operator can erase data on the display and enter new data in the erased area, or insert or delete data without changing the rest of the display.

Character Erasing. Five keys provide specialized character-erasing functions:

The CHAR ERASE key is used to erase the character in the cursor position and enter a space in that position of the display. The cursor moves one position to the right.

The ERASE EOD (erase to end of display) key is used to erase all unprotected data characters from the cursor position to the end of the screen.

The ERASE EOL (erase to end of line) key is used to erase all unprotected data characters from the cursor position to the end of the line or the end of a field, whichever comes first.

The ERASE TO EOF (erase to end of field) key is used to erase all data characters from the field in which the cursor is located. The field may be as small as a single character or as large as the entire screen, or any size between these two extremes.

The ERASE DISPLAY key is used to erase all data, both protected and unprotected, and all FCCs from the cursor position to the end of the display.

Data Manipulation. Four keys may be used to move data forward or backward, either by inserting spaces or by deleting characters and spaces in the lines of the display. When specific fields have been defined by protected-format or field control characters, these key functions apply only to the field in which the cursor is located rather than the entire display. (In a field that extends onto the next line, the "in line" function will affect only that portion of the field on the line where the cursor is located.)

When pressed, the INSERT IN LINE key causes all characters in the line to the right of and including the cursor position to shift one space to the right, and a space is inserted under the cursor. A character in the last position of the line is discarded.

The INSERT IN DISP (insert in display) key is used to insert a space at the cursor position, causing the entire display to the right of the cursor to move right one character position. The character ending each line to the right of and below the cursor position moves to the first position of the following line, and any character in the last position on the screen is discarded.

When pressed, the DELETE IN LINE key causes all characters in the line to the right of the cursor to shift left one position. The character under the cursor is deleted and a space is inserted at the right end of the line.

The DELETE IN DISP (delete in display) key is used to delete the character at the cursor position, causing the entire display to the right of the cursor to move left one character position. The character beginning each line below the cursor position moves to the last position on the previous line. A space is inserted at the last position on the screen.

3.3.7. Peripheral Printer Control

Certain control keys are used in conjunction with control page commands to select and control the peripheral printer operation. The operator uses these keys rather than the equivalent controls on the printer itself.

PRINT Key. This key initiates a data transfer to the peripheral printer according to the limitations defined in the PRNT() field of the control page. No FCCs are transferred in this type of print operation.

When "PRNT" is specified in the control page, the entire message is transferred. The "FORM" command causes a selective data transfer in which all protected characters are replaced with spaces. The "XPAR" command suppresses (that is, strips out or eliminates) the cursor return codes. The result is that the cursor return at the end of each display line is not seen by the peripheral device, and the data transferred is treated as one continuous line of data. (The "XPAR" command is useful when line-feed and form-feed codes have been used for formatting. In the absence of feed codes, whatever automatic carriage-return provisions the peripheral device may have will provide for any carriage returns during this type of transfer.)

XFER (Transfer) Key. This key also initiates a data transfer to the peripheral printer, but FCCs are included in the transfer. The type of transfer is defined in the control page XFER() field.

When "ALL" is specified in the control page, protected and unprotected data and all FCCs are transferred. The "VAR" command transfers unprotected fields and FCCs. The "CHAN" command transfers only changed fields and the associated FCCs.

STATUS Key. When pressed, this key causes the status of the peripheral printer (defined by the cursor location) to be displayed in the STA- field of the control page.

SOE ▷ Key. Pressing this key generates a start-of-entry character (▷) on the screen at the cursor location and advances the cursor one position. The SOE character defines the beginning of a field to be transferred to the host processor or the peripheral printer, while the cursor defines the end of the field.

3.3.8. Host Transmission Control

XMIT Key. When this key is pressed, the type of transmission specified in the control page will occur on the next traffic poll to the terminal. The types of transmission that may be specified in the control page are "ALL" (transmit all data and FCCs), "VAR" (transmit only unprotected fields and their FCCs), and "CHAN" (transmit only those fields and their FCCs in which data has been changed).

SOE ▷ Key. The SOE character generated by this key is used as a field delimiter in defining data for transmission to the host processor, as well as for transfer to a peripheral printer as defined in 3.3.7.

HANG UP Key. When a condition occurs necessitating an operator-initiated disconnection on a dialed transmission-line connection, pressing the HANG UP key causes the modem at each end of the line to break the connection.

3.4. TERMINAL CONTROLS AND INDICATORS

Terminal status information is presented to the operator on an indicator line at the bottom of the screen. The indicator line is formatted as follows:

```
1 ROW=XX COL=XX   □ WAIT □       □ MSGW □   □ AUXB □   □ POLL □  
  
or  
□ AXER □  
or  
□ RACK □  
or  
□ RNAK □
```

9134-25

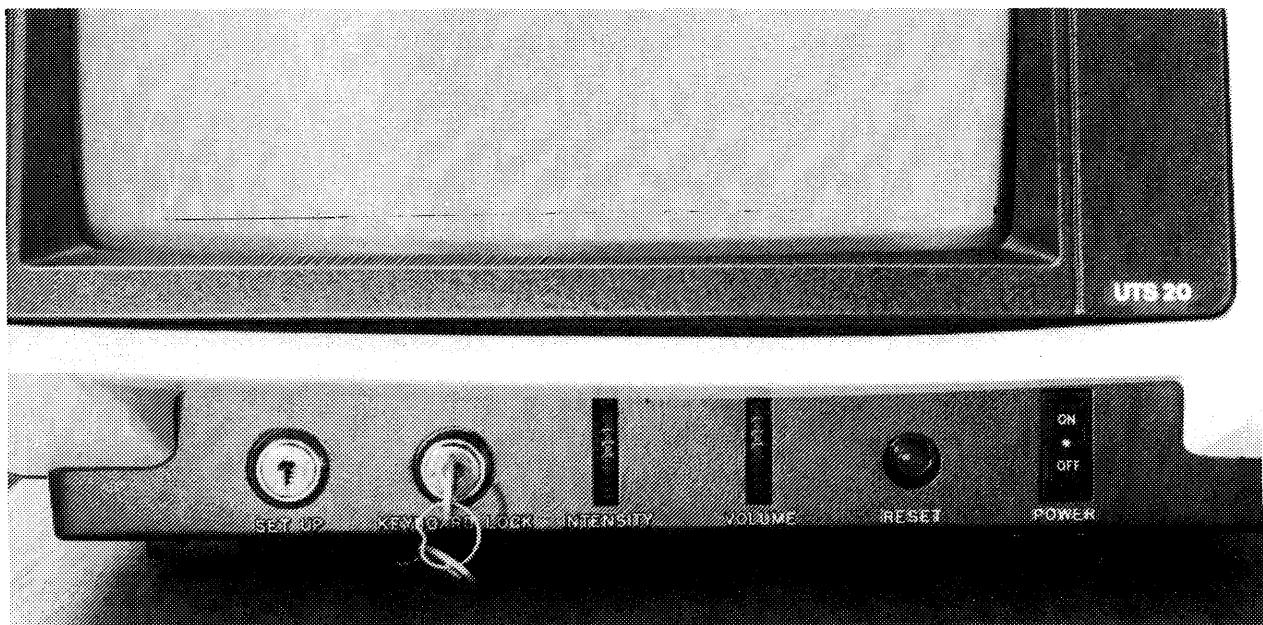
The data on this line is protected and therefore cannot be destroyed or reconstructed. Several messages are contained in the indicator line, including:

- 1 — always appears in first position of indicator line. If UTS 20 is equipped with screen bypass feature, a "2" appears when the alternate screen is displayed.
- ROW=XX and COL=XX — indicates the current location of the cursor by row and column position.
- WAIT — appears when the keyboard is locked (data transmission sequence is occurring).
- MSGW — indicates there is an unsolicited message waiting that the operator may display by pressing the MSG WAIT key.

- AUXB — appears when the auxiliary (peripheral) interface is busy and unable to accept other operations.
- AXER — appears in the same position as AUXB and indicates that the peripheral is nonfunctional. The AXER indication is removed by pressing the UNLOCK key.
- RACK — appears in the same position as AUXB and indicates that a successful magnetic-stripe-reader read function has occurred.
- RNAK — appears in the same position as AUXB and indicates an unsuccessful magnetic-stripe-reader read. This indicator stays on until the UNLOCK key is pressed or a successful read occurs.
- POLL — signifies that the communications line is active and this terminal is being polled by the host processor.

The controls and indicators located on the UTS 20 front panel (Figure 3-3) are as follows:

- POWER control — used to apply or remove primary power.
- POWER indicator (mounted on POWER control) — lights when power is applied to the terminal.
- RESET pushbutton — may be used to initiate the power-on confidence test (described in 2.16.1).
- Over-temperature indicator (contained within the RESET pushbutton) — lights when the terminal is overheated and nonfunctional. Also lights when the RESET pushbutton is pressed.
- VOLUME control — used to adjust the volume of the audible alarm and keyboard click.
- INTENSITY control — used to adjust the brightness of the display.



9134-10

Figure 3-3. UTS 20 Controls and Security Keylocks

Other controls and indicators used in UTS 20 operation are as follows:

- Shift lock indicator (located in the SHIFT LOCK key) — lights when the keyboard is in the uppercase state. (On Katakana/English keyboards, the KANA SYM, KANA, A/N, and SYM keys also have a shift indicator.)
- Audible alarm — sounds for any of the following conditions:
 - once when the cursor moves into the eighth character position from the right on any line in the display
 - once when the cursor first moves into the last line (in any character position)
 - once when an error is made in manually entering an FCC
 - once when an operator attempts to enter data that does not meet the field-entry criteria set up by an FCC
 - once for an entry error in the control page (PARAM) or MM field.
 - once for a keyboard parity error
 - once when the POC test is complete
 - once when the FUNCTION key is pressed concurrently with an alphanumeric key (illegal key combination)
 - repeatedly when a message is received from the host processor (pressing the MSG WAIT key, UNLOCK key, or a specific program attention key turns off the alarm)
 - repeatedly when a peripheral operation was unsuccessful (pressing the UNLOCK key turns off the alarm).
 - repeatedly when a random-access memory (RAM) parity error occurs.
 - once for successful card read from the magnetic stripe reader.
 - once for an entry in the (PARAM) field of the control page when the SET-UP keylock is locked.

4. Configurations

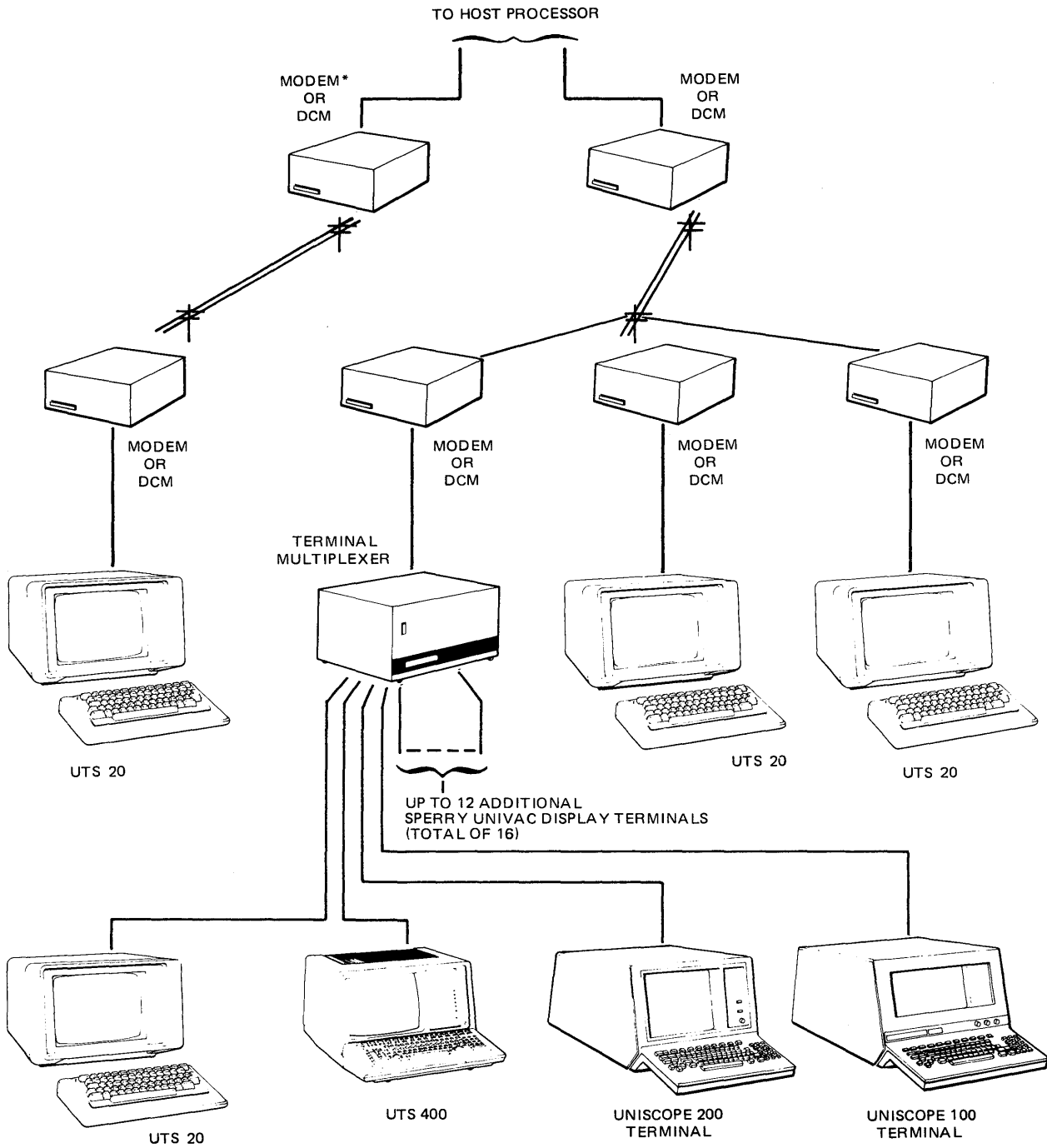
4.1. DATA COMMUNICATION SYSTEMS

The UTS 20 remote display terminal can communicate with a host processor via modems, SPERRY UNIVAC Direct Connection Modules (DCMs), or a direct connection to the host. The data may be transmitted over the public telephone network, on leased common-carrier voice-grade lines, or directly over a private communications line. The UTS 20 uses the same communications protocol as the SPERRY UNIVAC Universal Terminal System 400 (UTS 400).

Data communication systems may be configured with various combinations of UTS 20 single stations. Also, UTS 20 single stations may be used on the same communications line with UTS 400 terminals and UNISCOPE terminals. Depending on system requirements, the terminals may be connected to a host processor by any of the following methods:

- Point-to-point (one terminal connected via modem or DCM and communicating over an exclusive communications line to the processor)
- Multidrop (multiple terminals communicating with the host, each through its own modem or DCM, but on the same communications line). Requires the host to specific poll only.
- Multiplex (up to 16 terminals connected through a multiplexer, which in turn communicates with the host through a modem or DCM)
- A combination of multidrop and multiplexed terminals in a system configuration
- Direct connection to a SPERRY UNIVAC host processor (9600 bits per second in half-duplex mode)

Figure 4-1 depicts a combination of point-to-point, multidrop, and multiplexed terminal configurations.



*A direct connection module (DCM) connection is made only within a single-plant facility with common primary power throughout. When telephone lines are used as the transmission line, a modem connection is required.

9134-11

Figure 4-1. Data Communications System Containing Point-to-Point, Multidrop, and Multiplexed Terminal Configurations

4.2. OPTIONAL FEATURES

Adding to the capabilities of the UTS 20, several optional features are available. These features include:

■ Screen Bypass

The screen bypass feature provides use of two separate screens, one displayed and one stored in memory, that may be accessed simultaneously by the operator and by the host processor. This capability enables the operator to initiate a peripheral operation from one screen, then display the other screen simultaneously to enter data.

Each screen has its own indicator line and control page. (The control page codes last entered on either screen control the operations of both screens.) Screen "1" always appears when power is turned on or the UTS 20 is reset and is designated by a "1" in the first position of the indicator line. By pressing the DISP 1-2 keys, the operator can display screen 2, designated by a "2" in the same position of the indicator line. The operator can switch back and forth to either screen by pressing the DISP 1-2 key.

The screen bypass feature can function on any UTS 20 provided with the appropriate program cartridge. However, operator-initiated display switching, using the DISP 1-2 key, can only be performed from the expanded typewriter and UTS 400-format keyboard. Display switching is host controlled on UTS 20s with the basic typewriter keyboard, on which there is no DISP 1-2 key.

■ Magnetic Stripe Reader

This feature allows the UTS 20 to read data stored on the magnetic stripe of a badge or card. The reader is connected to the keyboard.

■ Tilt/Rotate Base

Installation of this feature allows the operator to adjust the terminal position for maximum convenience.

4.3. STANDARD FEATURES

The following standard items are supplied with each UTS 20:

■ Latin Alphabet or Katakana Character Set

The 96-character Latin-alphabet set is available on the typewriter and expanded typewriter keyboards in several national language variations. Any one of the following sets may be selected:

- USA English
- United Kingdom
- Germany
- France
- Spain

- Denmark/Norway
- Sweden/Finland
- Italy

The Katakana set provides 64 English and 64 Katakana characters.

■ Bit-Serial Peripheral Interface

This interface allows attachment of a peripheral printer.

4.4. CABLING

Standard-length cables are provided for connecting the UTS 20 to modems or multiplexers. The cable between the UTS 20 and a modem or DCM may be up to 15.2 meters (50 feet) long. The cable from DCM to DCM may be up to 524 meters (5000 feet) long; for transmission speeds up to 2400 bits per second, the DCM-to-DCM cable may be up to 4572 meters (15,000 feet) long. The direct connection cable to the host may be 15.2 to 91.5 meters (50 to 200 feet) long, depending on the host.

5. Terminal System Applications

The UTS 20 is designed to accommodate a wide range of applications requiring direct operator interaction with a central data processing system. Whether your application involves a narrowly specified function or covers the broadest spectrum of functions, the UTS 20 has been designed to satisfy your needs.

Applications for the UTS 20 fall into one or more of the following general categories:

- Source data entry
- Data accessing
- Conversational interaction

5.1. SOURCE DATA ENTRY

UTS 20 terminals are ideally suited for data entry operations. These operations are basically one way — the data flow is mainly from the UTS 20 to the host processor. The terminal system is used in this category for applications such as filling in forms, or sending instructional commands or other data to the host processor for retention or for use in other locations.

The editing capability of the UTS 20 is indispensable for data entry operations. With this capability, a screen of data can be generated, and then that data can be manipulated and edited as much as necessary before it is transmitted.

If your application requires protected forms as guides for data entry, the host software can provide them. Then, using simple code commands, the UTS 20 operator can call the forms to the screen as they are needed.

5.2. DATA ACCESSING

When the UTS 20 is used for data accessing, it is basically extracting from the host processor information that has previously been stored, although not necessarily by that station. The data flow for this function is primarily from the host processor to the UTS 20. The input activity of the UTS 20 is generally limited to specifying the desired data and acknowledging receipt of a transmission from the host processor. This function does not usually include the capability to change the files, only to look at what is in the files.

By use of this limited function, great economy is realized because a relatively large amount of information can be viewed, with only a minimum of time expended — both transmission and operation time — to specify each input segment. The program attention keys are quite useful in such applications.

5.3. CONVERSATIONAL INTERACTION

The versatility of the UTS 20 is most evident in conversational applications, when terminal operator and host processor are interacting on a real-time basis. Such interaction makes full use of the UTS 20 two-way communications capability.

Applications for the UTS 20 in the conversational category are numerous. In effect, this type of application combines both the data entry and data accessing applications previously described, but it goes a large step further by incorporating real-time responses into each input or output transaction and thus creating a constantly changing data base.

6. Peripheral/Auxiliary Devices

6.1. GENERAL PERIPHERAL REQUIREMENTS

A bit-serial peripheral interface, which controls all printer activity, is provided to connect the UTS 20 to an optional printer. One printer can be attached to this interface.

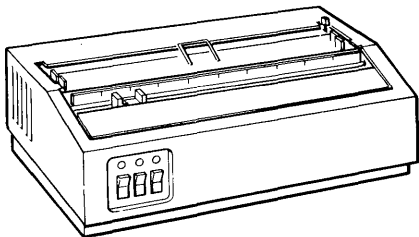
6.1.1. Device Address Codes

For online activity, the peripheral printer requires a device identifier (DID) — a unique signal sent by the processor to activate that particular device. Only one DID is required to use either of the SPERRY UNIVAC printers or any other compatible printer.

6.1.2. Interface Cable Length

A maximum of 15.2 meters (50 feet) of cable may be used to connect the printer to the UTS 20 peripheral interface.

6.2. 0797 PRINTER SUBSYSTEM

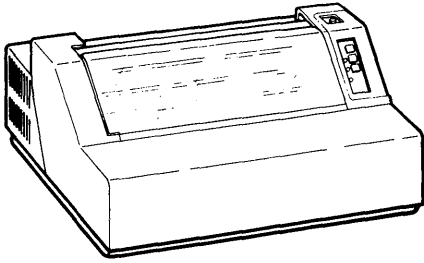


The 0797 printer is a compact device that incorporates a miniature printhead, simplified structure, and microprocessor logic to reduce casework size to a minimum. Smaller than a conventional typewriter, the unit fits conveniently on a desk top, or it may be installed on a separate stand.

Printing unidirectionally at rates up to 80 characters per second, this 80-column printer produces clear, legible copy on single or multipart forms (original and two copies). Either cut sheets or continuous pin-feed forms may be used.

The printed characters are formed within a 9-by-7 dot matrix, and characters are spaced at 10 per inch. Line spacing can be set for either six or eight lines per inch. A variable-forms-control switch provides nine different form-length settings.

6.3. 0798 PRINTER SUBSYSTEM

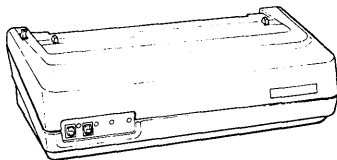


The 0789 printer operates bidirectionally at rates up to 200 characters per second, using a 7-by-7 dot-matrix impact printing method. Used either as a desk-top device or on its own stand, this printer produces clear, legible characters on single or multipart forms (up to six copies). Form sizes from 4.1 to 38.8 centimeters (1.6 to 15.3 inches) wide and 7.6 to 43.2 centimeters (3.0 to 17.0 inches) long can be accommodated.

The buffer in the 0789 printer can store up to 132 characters (one print line). Character spacing is either 5 or 6 per inch, and line spacing is 6 per inch.

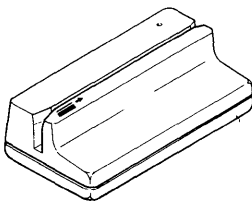
Various character sets may be selected for the 0798 printer, including the 64- and 96-character ASCII sets as well as 96-character sets for several different language applications and a 128-character English/Katakana set for Japan.

6.4. 0425 PRINTER SUBSYSTEM



The 0425 is a compact, inexpensive 132-column printer that is available in two types of print quality: the data processing quality (DPQ) and the high definition quality (HDQ). This lightweight printer subsystem is capable of printing up to 160 characters per second (DPQ) using a 9-by-7 dot matrix or 40 characters per second (HDQ) using an 18-by-40 dot matrix. The 0425 printer accepts either cut paper or continuous pin-feed forms.

6.5. MAGNETIC STRIPE READER*



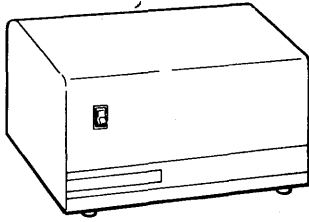
The SPERRY UNIVAC Magnetic Stripe Reader is a read-only device used to enter prerecorded data, read from the magnetic stripe on bank cards or similar media, into the UTS 20. Information stored in a data format consistent with that used by the American Banking Association (40 characters of numeric data) or the International Air Transport Association (79 characters of alphanumeric data) is accepted by the reader.

The magnetic stripe reader is connected in the rear of the UTS 20 to the keyboard connector, and the keyboard cable is then connected to the magnetic stripe reader connector. The UTS 20 treats data from the magnetic stripe reader as though it were data from the keyboard itself. The data transfer occurs one character at a time at 20-millisecond intervals.

A device address code is not required for the magnetic stripe reader because the data is treated as keyboard entry. Input from the reader to the UTS 20 cannot be activated by a host processor, since operator intervention is required to generate the input data.

*Not available for BSC operation

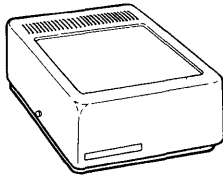
6.6. TERMINAL MULTIPLEXER



With the SPERRY UNIVAC Terminal Multiplexer, multiple UTS 20 stations can be connected into a data communication system at one interface point. Up to 16 UTS 20 stations can be connected to one terminal multiplexer, or the UTS 20 can be connected on the same terminal multiplexer with UNISCOPE 100 and 200 terminals and UTS 400 terminals.

The primary purpose of the multiplexer is to select, one at a time, those terminals and cascaded multiplexers (with attached terminals) having information to send to the processor, and to provide line access for the selected UTS 20. The terminal with the highest priority condition is selected first. To save time and number of transmissions, the multiplexer also combines with the current message certain communications protocol responses from a previously selected UTS 20. The multiplexer does not detect or recognize characters; this function is performed by the UTS 20.

6.7. DIRECT CONNECTION MODULE



The SPERRY UNIVAC Direct Connection Module (DCM) is a communications device designed as a modem replacement in data communication systems using dedicated lines up to 4572 meters (15,000 feet) long in building installations with a single power source and common power ground. The DCM operates at speeds up to 9600 bits per second and conforms to EIA RS-232C requirements.

Features of the DCM include switch-selectable transmission speeds, the capability of operating with an internal or external clock, and patchable operational options.

7. Specifications

7.1. UTS 20 SINGLE STATION

7.1.1. Functional Characteristics

Display format selections	Any display format may be used, from a minimum of 2 lines of 1 character each to 24 lines of 80 characters each
View area	25.4 cm (10 inches wide) by 17.8 cm (7 inches) high
Character generation	Character cell size is 9 by 14 dot matrix, with an actual character size of 7 by 9 dots plus 2 dots used for descenders; refresh rate of 50 or 60 times per second
Character generator	96 characters
Transmission code	7-level ASCII plus parity
Transmission mode	Half-duplex
Transmission facilities	Voice-grade telephone line (switched network or private line)
Transmission type	Synchronous
Transmission rate	Up to 9600 bits per second
Communications interface	EIA RS-232C/CCITT V.24
Data integrity provisions	Minimum single-bit error detection on communications line and peripheral transfers Automatic retry with communications line Internal parity checks
Selective calling	Host processor can select terminal system or peripheral device or both
Keyboard selections	Typewriter keyboard Expanded typewriter keyboard Katakana/English keyboard UTS 400-format keyboard

Language selections	U.S.A. English United Kingdom Germany France Spain Denmark/Norway Sweden/Finland Italy Katakana/English (for Katakana/English) keyboard only)
Protected format	Protection of specified data fields by field control and SO/SI characters
Program attention keys	Keys that generate unique characters for use as requests or indicators, extending operational and system control

7.1.2. Physical Characteristics

Width	42.7 centimeters (16.8 inches)
Height	32.5 centimeters (12.8 inches)
Depth	43.2 centimeters (17.0 inches)
Weight	15.5 kilograms (33.0 pounds)

7.1.3. Power Requirements

Nominal voltage	100, 120, 220, or 240 volts
Nominal frequency	50 or 60 Hertz
Phases and lines	Single phase, 3 wire
Power dissipation (maximum)	144 kilojoules/hour (60 watts)

7.2. 0797 PRINTER SUBSYSTEM

Print speed	80 characters per second
Character set	64 uppercase and 31 lowercase characters
Width	36.1 centimeters (14.1 inches)
Depth	26.9 centimeters (10.6 inches)
Height	11.7 centimeters (4.65 inches)
Weight	6.5 kilograms (14.21 pounds)
Nominal primary power	100 or 120 volts at 50 or 60 Hertz 220 or 240 volts at 50 Hertz

7.3. 0798 PRINTER SUBSYSTEM

Print speed	200 characters per second
Character set	96 characters, uppercase and lowercase (except 64-character ASCII and 128-character Katakana)
Width	57.5 centimeters (22.6 inches)
Height	24.5 centimeters (9.6 inches)
Depth	48.5 centimeters (19.0 inches)
Weight	25.5 kilograms (56 pounds)
Nominal primary power	100 or 120 volts at 60 Hertz 100, 200, or 240 volts at 50 Hertz

7.4. 0425 PRINTER SUBSYSTEM

Print speed	160 characters per second
Character set	96 characters, uppercase and lowercase
Width	50.5 centimeters (19.9 inches)
Depth	25.0 centimeters (9.8 inches)
Weight	10.7 kilograms (23.5 pounds)
Nominal primary power	120 volts at 60 Hertz

7.5. SPERRY UNIVAC MAGNETIC STRIPE READER

Transfer rate	Up to 9600 bits per second
Width	11.2 centimeters (4.4 inches)
Height	7.4 centimeters (2.9 inches)
Depth	21.6 centimeters (8.5 inches)
Weight	1.1 kilograms (2.4 pounds)
Nominal primary power	+ volts (supplied by the terminal)

7.6. TERMINAL MULTIPLEXER

Terminal system capacity	Interfaces up to eight UTS 20 stations, with expansion features to interface eight more; accepts one level of cascading
Width	40.6 centimeters (16.0 inches)
Height	30.5 centimeters (12.0 inches)
Depth	21.6 centimeters (8.5 inches)
Weight	12.9 kilograms (30 pounds)
Nominal primary power	120 volts at 60 Hertz 220 volts at 50 Hertz

7.7. DIRECT CONNECTION MODULE

Width	20.3 centimeters (8.0 inches)
Height	11.4 centimeters (4.5 inches)
Depth	30.5 centimeters (12.0 inches)
Weight	1.8 kilograms (4.0 pounds)
Nominal primary power	120 volts at 60 Hertz 220 volts at 50 Hertz

Glossary

The terms in this glossary are defined as they apply to data communications, and particularly to the UTS 20, its peripherals, and its communications protocol.

accessing	Data or control-signal transfer from the terminal to an input/output device (peripheral or host processor).
addressing	A communications protocol method of identifying one communications-line interface point and a specific terminal system at that location. Also, the same method used in identifying a specific peripheral device associated with the addressed terminal system.
ASCII	Acronym for "American Standard Code for Information Interchange."
bit	A convenient expression for "binary digit," which is the smallest quantity of digital information capable of being stored. A bit is either a binary 1 or 0.
bps	Acronym for "bits per second."
buffer	A place or function for the temporary holding of data. Also, a device (or software routine) used to compensate for a difference in rate of data flow, or in timing of events, when data is being transmitted from one device to another.
cascading	The technique of expanding the number of terminal systems at one communications interface point by connecting a terminal multiplexer to the terminal port of the primary multiplexer and then connecting single terminals to the cascaded multiplexer.
character	A series of 1 and 0 bits that are assigned a meaning when they conform to a given pattern.
character generator	Portion of memory that, when accessed, determines how the CRT hardware will form a character or characters on the screen.
conversational	See "interactive."
communications protocol	The means used to control the orderly communication of information between data communications terminals and a data communications link (that is, a processor or another terminal).

control page	A 2-line display called to the screen when the operator presses the CTL PAGE key. The control page is used to control the type of data transfer to and from peripheral devices and to the host processor. Initial display terminal parameters are also entered in the control page.
CRT	Acronym for "cathode-ray tube," the element used as a display screen in a display terminal.
DCM	Acronym for "SPERRY UNIVAC Direct Connection Module" (a modem replacement).
default	A predetermined alternative selected by the operating program, in lieu of a choice made by the operator, to define a functional characteristic.
deselection	The sequence by which peripheral devices are removed from active participation on an interface, thus precluding their involvement in data transfer.
DID	Acronym for "device identifier." A transmission code assigned a peripheral device to identify it for the terminal, controller, or host. This is the third level of host processor addressing (RID, SID, and then DID).
display	The visual presentation of information either being prepared for entry into the processor storage or retrieved from processor storage.
encoding	Changing computer data to a transmittable form.
FCC	Acronym for "field control character," a nondisplayable character that takes no space on the screen. The FCC is used to define traits in operator-specified regions of the display.
firmware	A program that is permanently resident in a processor read-only memory and that provides basic machine instructions through the use of microprogramming techniques.
half-duplex	Refers to a mode of transmission in which communication takes place in one direction at a time.
handler	A software package written for a special purpose; in data communications, it generally controls input and output between the processor and the terminals or other communications devices.
host or host processor	The data processing system controlling the communications environment in which the UTS 20 is operating.
interactive	Refers to the process of communication between two stations in which each station responds alternately to procedural formalities. (Also called "conversational.")
interface	Points of interconnection between two units having different functions.
list	To print or otherwise produce a permanent representation of data.

mnemonic	A term intended to assist memory (remembering). In UTS 20 operations, mnemonics are 2-character codes used in the control page to define a function or device.
modem	A contraction of "modulator-demodulator." A device that modulates and demodulates signals transmitted over communications facilities.
multidrop	Refers to a communications method using two or more data communications terminals on a communications line at a single interface point.
multiplex	Refers to a method of transmitting data from two or more terminals across one transmission line.
nonvolatile memory	Memory that stores data intact when power is removed.
offline	Refers to terminal system activity performed without access to a host processor or communications line.
online	Refers to terminal system activity performed between two or more stations linked together on a communications line or joined in a direct communications link.
parameters	Those functional characteristics of a terminal that are variable.
parity	An element added to the basic message or character for the purpose of checking correctness of the data transmission.
peripheral device	A device that operates from a terminal system and need not be under continuous control of the host processor but may depend on the terminal for overall control.
peripheral interface	The special interface in a UTS 20 designed for the peripheral devices associated with this terminal.
point-to-point	Refers to a communications method providing an exclusive communications link between two stations. One of these stations may be the host processor.
polling	A technique for inviting a data communications terminal to transmit status or messages at a given time.
processor	A device or group of devices, with the supporting software, capable of executing a systematic sequence of operations upon data.
program cartridge	A module containing read-only memory that defines the functional characteristics of the terminal.
protocol	See "communications protocol."
RAM	Acronym for "random-access memory." Memory that can be written to or read from without sequentially accessing any memory locations situated before the addressed location.
real time	Refers to a computation or other data processing sequence that occurs during the actual time the related process is occurring so that the results are available for modifying or guiding the process.

RID	Acronym for "remote identifier." A transmission code assigned to a location where a terminal or number of terminals reside. This is the first level of host processor addressing (RID, SID, and then DID).
right justification	An FCC function that allows character entry on the display from the right side to the left.
ROM	Acronym for "read-only memory." Memory that is preprogrammed and cannot be altered in the normal use of the terminal.
screen bypass	A feature that allows the operator to use the terminal for keying in data while the host is simultaneously accessing a peripheral (the host does not require use of the screen memory).
selection	The sequence by which a particular peripheral device attached to an interface is designated as the source or the destination of data.
SID	Acronym for "station identifier." A transmission code assigned to an individual terminal. This is the second level of host processor addressing (RID, SID, and then DID).
software	The programs and routines used in the operation of data processing systems, such as assemblers, compilers, handlers, and operating systems.
storage	A device into which data can be entered, in which it can be held, and from which it can be retrieved at a later time. Loosely, any device that can store data.
synchronous	Refers to a method of timing or pacing of data transmission by synchronizing the transmitting equipment and the receiving equipment with a series of synchronizing characters.
timesharing	The use of a processor for two or more purposes or operations during the same overall time interval, accomplished by interleaving portions of each function throughout the processing time. In data communications, this term is popularly applied to processing services sold to independent subscribers who access the host processor by means of terminal systems.
transfer	The conveying of data between a terminal and one of its peripheral devices via a peripheral interface.
transmission	The conveying of data and procedural messages between a processor and a remote terminal across a communications line.