

**UNIVAC**

**UNISCOPE 100  
DISPLAY TERMINAL**

GENERAL DESCRIPTION

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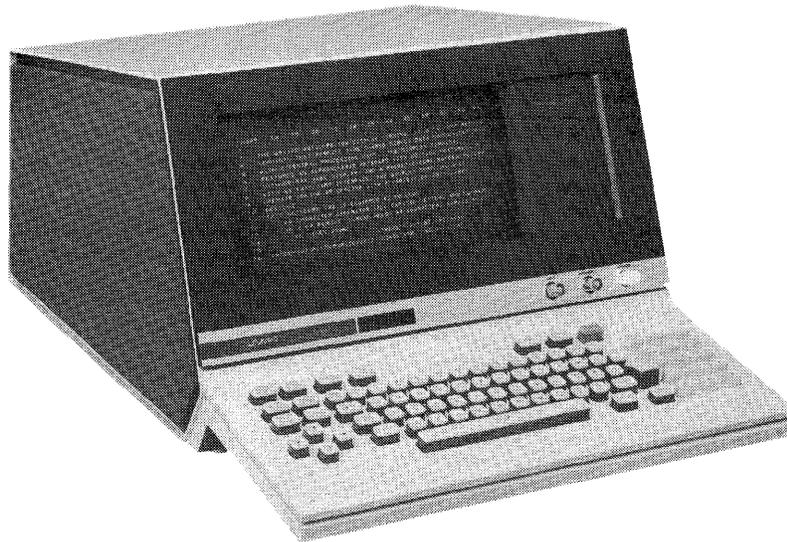
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# I. INTRODUCTION

## 1.1. GENERAL

The UNISCOPE 100 Display Terminal (Figure 1-1) is an economical, desk-top, alphanumeric display terminal. It is designed for a broad range of applications requiring direct operator interaction with a central data-processing system.



*Figure 1-1. UNISCOPE 100 Display Terminal*

The presentation formats available provide the terminal with a display capacity of 960 or 1024 ASCII characters. The complete ASCII set of 96 characters, including uppercase and lowercase alphabets, can be displayed. Editing capabilities enable the operator to edit completely any message prior to transmitting the message to the processor. Similar editing capabilities are provided for the processor and auxiliary devices.

Operationally self-contained, the terminal can be used either as a data entry device or as a display device. It can be located at the central processor site connected by way of an appropriate communications adapter, or at a remote site, where it can be connected to the system by way of communications lines (Figure 1-2).

The display screen of the terminal is a cathode-ray tube (CRT) with a viewing area 5 inches high by 10 inches wide. The visual display consists of alphanumeric characters (green on a dark background) individually drawn on the CRT screen. A keyboard and small control panel on the face of the terminal provide all of the operator controls and keys required to operate the terminal and to initiate data transfers. Also included in the terminal is a storage area, a character generator, control logic, and a communications interface. Special interfaces for direct connection to suitable communications equipment also are available. Speed of operation can be as high as 9600 bits per second. Auxiliary devices also can be connected via a suitable interface.

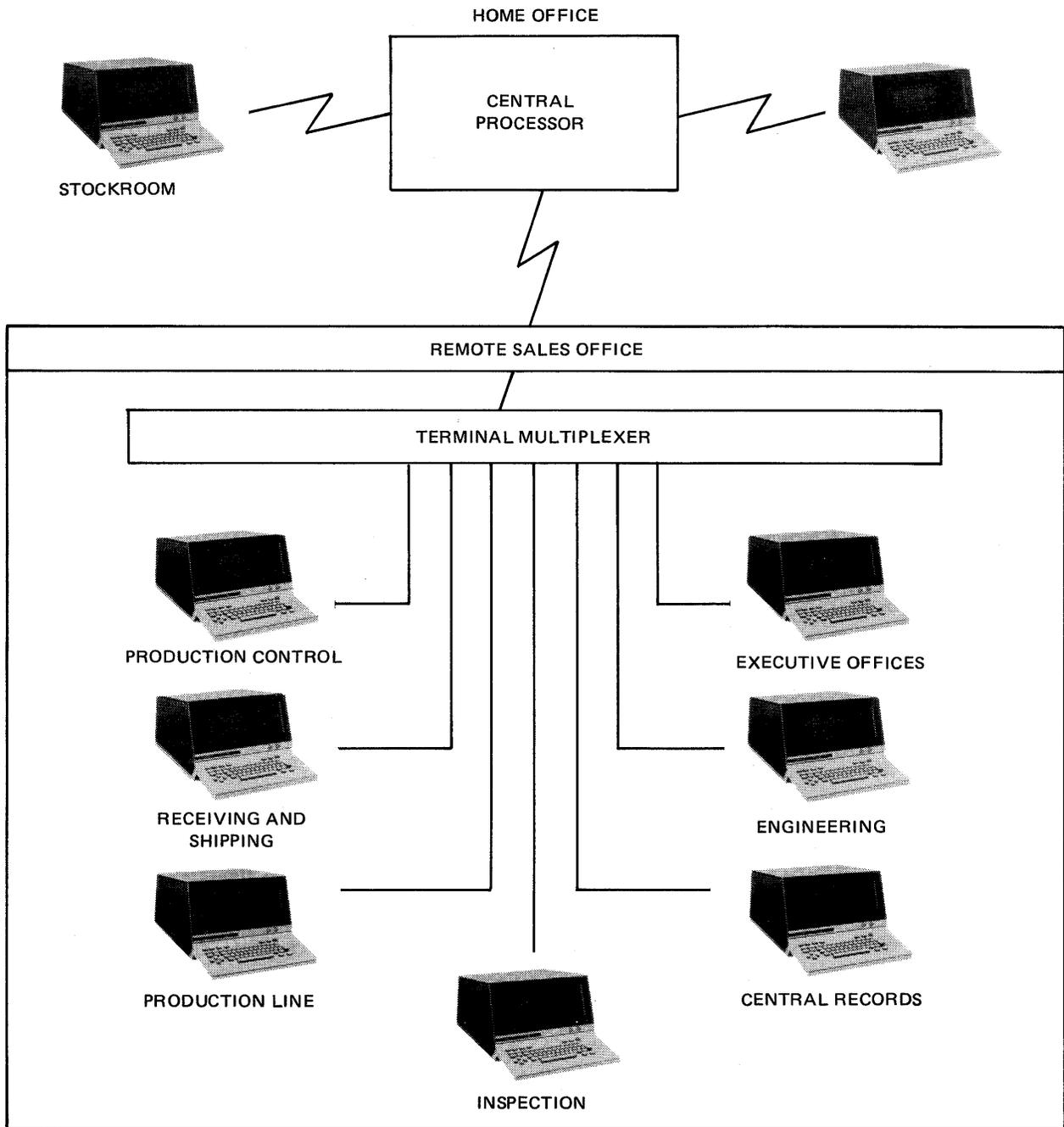


Figure 1-2. Network of Control Points

## **1.2. LINE CONNECTIONS**

Up to 16 terminals may be connected to a single communications-line modem or to suitable communications equipment by means of a UNIVAC terminal multiplexer. More extensive networks are possible with terminals and multiplexers in various combinations, including multidropping and cascading.

## **1.3. TERMINAL FEATURES**

The terminal is designed to fulfill marketing requirements for a general purpose alphanumeric display subsystem oriented towards minimizing system cost and to provide a quality display and an efficient communications device. Major features that help achieve these design objectives are summarized in the following paragraphs.

### **1.3.1. Design Philosophy**

Sperry Univac experience with time-sharing systems played an important role in the design philosophy of the terminal because the unit was developed to be an integral part of a processor communications system. One of the major considerations in designing an integrated system is the line cost of telephone company facilities, which may account for as much as one-third of the total cost of the system. The line costs are minimized by keeping the number of telephone lines to a minimum. The terminal techniques are designed to maximize the efficiency of transmission. Additionally, the transmission from the terminal contains only significant spaces; nonsignificant spaces are automatically stripped out (suppressed).

### **1.3.2. Method of Display**

The terminal uses digital concepts, which provide two major advantages to the user:

- The digital scanning technique used in the terminal provides excellent linearity and consistent character spacing.
- The characters are generated by a read-only storage digital stroke generator that produces large, clear characters recognizable at a glance.

### **1.3.3. Human Factors**

Recognizing that the total processor communications system operates efficiently only if the operator of the system functions effectively, Sperry Univac made extensive human-factor studies, evaluations, and experiments on the terminal and its man/machine interface. The resulting design facilitates operation without requiring awkward head movements or body positions. The operator, seated at the keyboard, has a viewing angle and a viewing distance to the display surface that remain almost constant; in addition, the field of view is well within the normal eye span.

Characters are displayed on a nonglare screen. A character-brightness control enables the operator to establish a desirable level according to his own preference.

The entire display is flicker free. All characters are sharp and bright and closely resemble conventional printed characters. Each character is made up of continuous lines without separations, even at the corners; all lines are of equal thickness and appear with equal brightness.

The size and shape of each character are the same on all parts of the screen. The result is excellent legibility and clarity of presentation at all times. (An example of the display presentation is given in Figure 1-1.)

Because of the keyboard similarity to that of a typewriter, little additional training is required to operate the terminal. All variations of the terminal keyboard include cursor controls and editing keys. The overall keyboard layout incorporates proper right-left assignment balance, which efficiently distributes the work load; the key sets are grouped for maximum ease of access with touch typing techniques.

### **1.3.4. Configuration Adaptability**

The terminal is basically a single-station unit. Each terminal contains its own refresh buffer, to allow flexibility in arranging station configurations. The multiplexer option permits several terminals to share a single modem device and thus reduces the overall costs of the system. (See Figure 1-2.)

### **1.3.5. Keyboard Adaptability**

The terminal can be used with any of several available keyboards (Figures 1-3 through 1-8), which are easily interchanged. (Functionally, each keyboard must be used with a unit containing the same type of character generator.) This keyboard interchangeability enhances adaptability of the terminal to the exact and demanding needs of individual users. See Table 1-1 for keyboard types and characteristics.

### **1.3.6. Protected Format**

The terminal may contain the protected-format selection, which protects processor-specified data fields. The keyboard used with the terminal may or may not provide protected-format keys. Those keyboards not including protected-format keys (Figures 1-3 through 1-6) allow the operator to alter only unprotected data. Pressing the TRANSMIT key results in only unprotected data being transmitted to the processor (following polling). The protected data fields are identified by the SUB character in the text message.

Those keyboards that provide protected-format keys (Figures 1-7 and 1-8) allow the operator a certain amount of control over protected data, as well as the normal control over unprotected data. Pressing the TRANSMIT UNPROT DISPL key results in only unprotected data being transmitted to the processor (following polling), as with the TRANSMIT key on keyboards without protected-format keys. Pressing the TRANSMIT DISPL key results in both protected and unprotected data being transmitted to the processor (following polling). No distinction is made between the protected data and the unprotected data.

### **1.3.7. Special Function Keys**

The four special function keys provide the subsystem with handy, economical message generators that can be designated, by the program, to carry any desired meaning. These special messages can be transmitted with only one key depression, and the information transmitted is as short as possible to convey the necessary intelligence (terminal address, a 1-letter code for the message, and the end-of-the-message indication). An alternative form of the special function keys provides three special function keys and a hang-up (disconnect) key intended for use in a switched telephone network to provide the operator with a means of disconnecting the terminal from the line.

### **1.3.8. Field Blinking**

The terminal includes a blinking capability that enables the blinking of special markers at the beginning and ending of a word or series of words. These blink markers can be activated as part of a processor message only, not at the terminal keyboard.

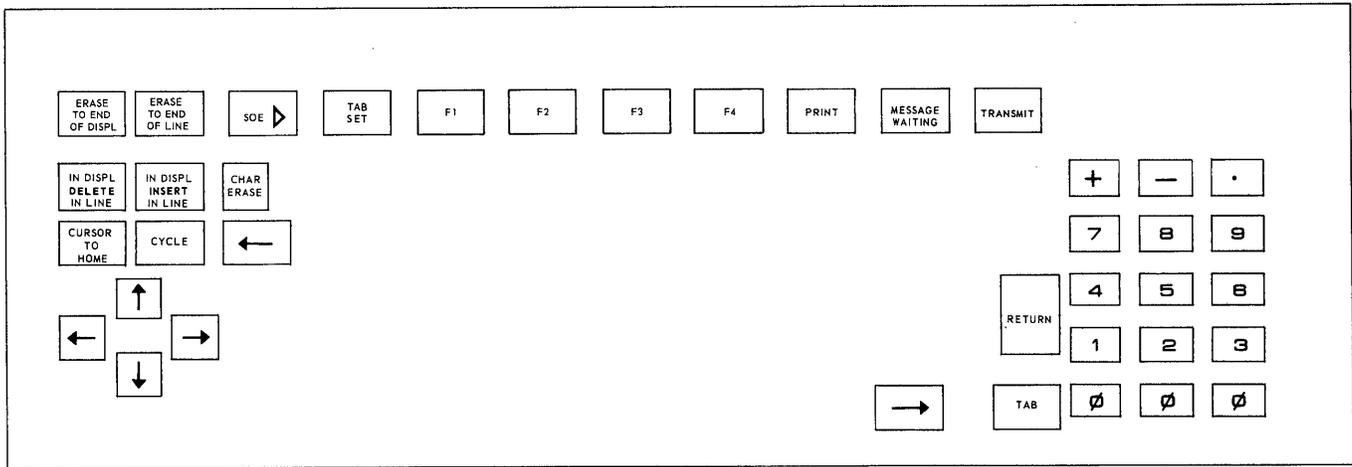


Figure 1-3. UNISCOPE 100 Terminal Keyboard (With Numeric Keys) for Unprotected-Format and Protected-Format Units

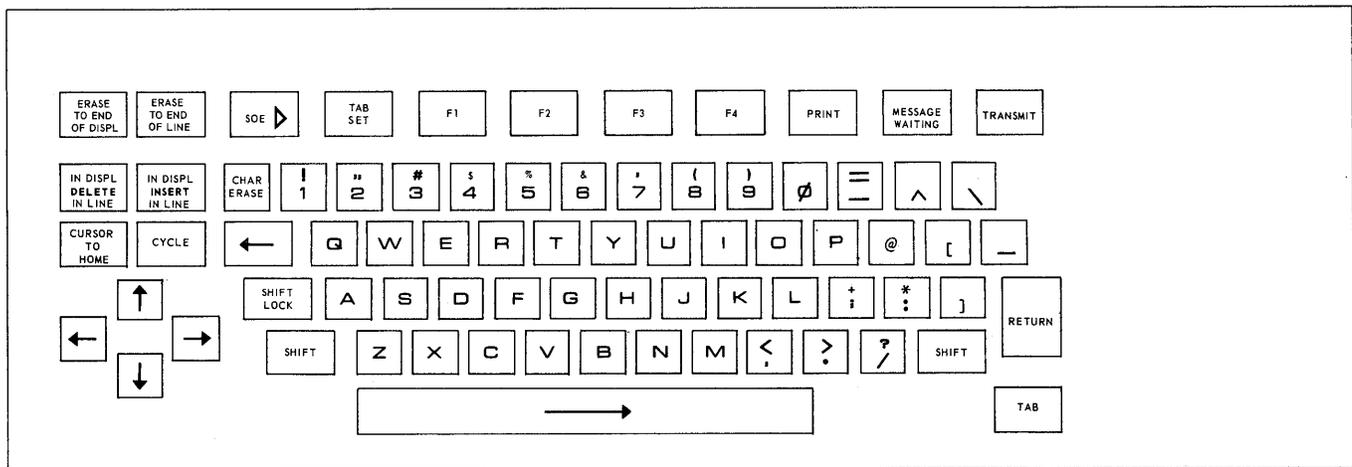


Figure 1-4. UNISCOPE 100 Terminal Keyboard (Uppercase With Alphanumeric Keys) for Unprotected-Format and Protected-Format Units

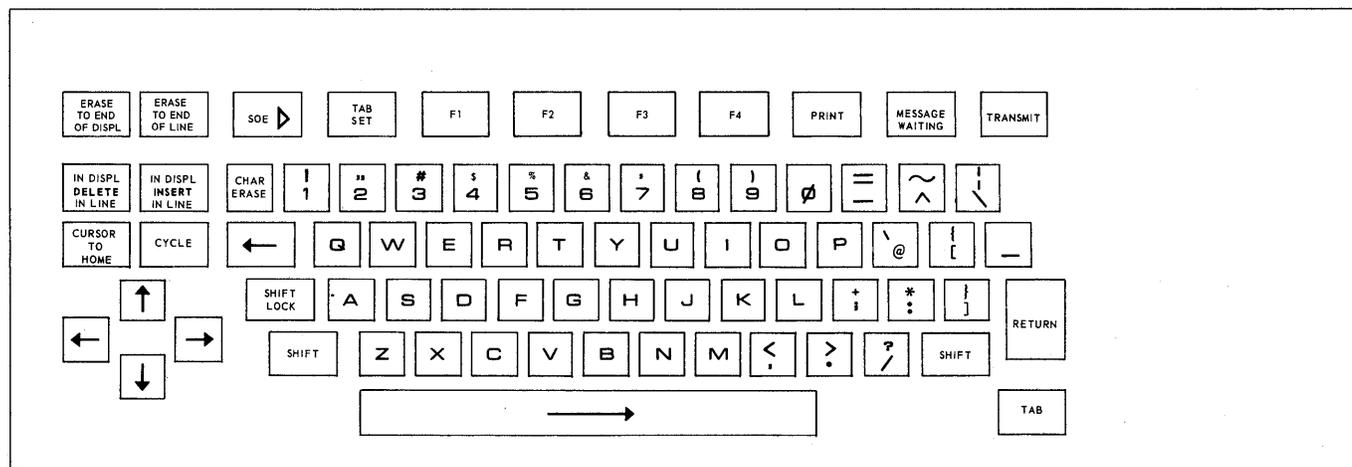


Figure 1-5. UNISCOPE 100 Terminal Keyboard (Uppercase/Lowercase With Alphanumeric Keys) for Unprotected-Format and Protected-Format Units

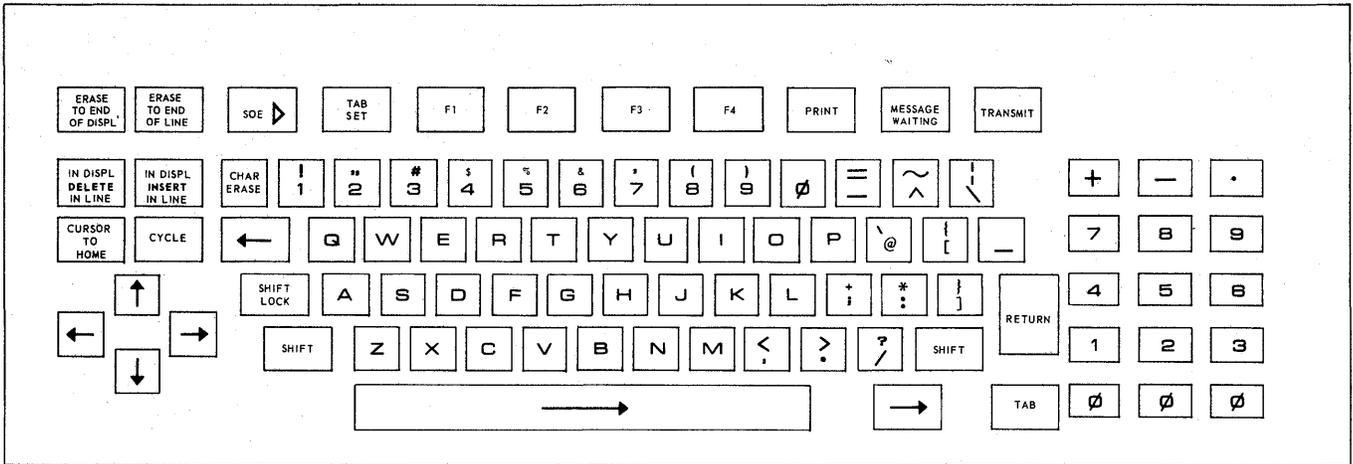


Figure 1-6. UNISCOPE 100 Terminal Keyboard (Uppercase/Lowercase With Alphanumeric and Numeric Keys) for Unprotected-Format and Protected-Format Units

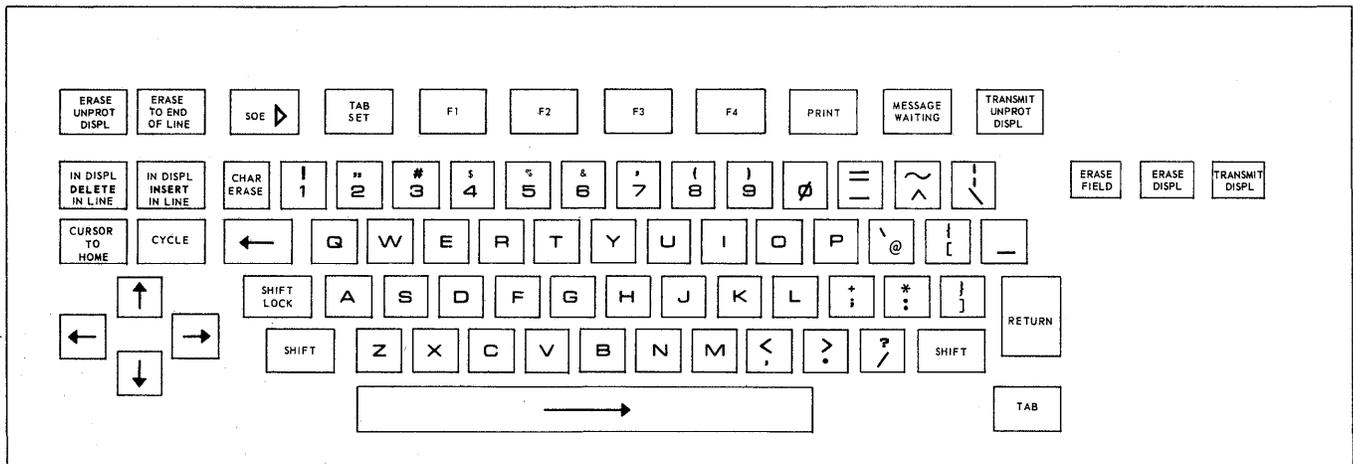


Figure 1-7. UNISCOPE 100 Terminal Keyboard (Uppercase/Lowercase With Alphanumeric Keys) for Protected Format With Operator Control

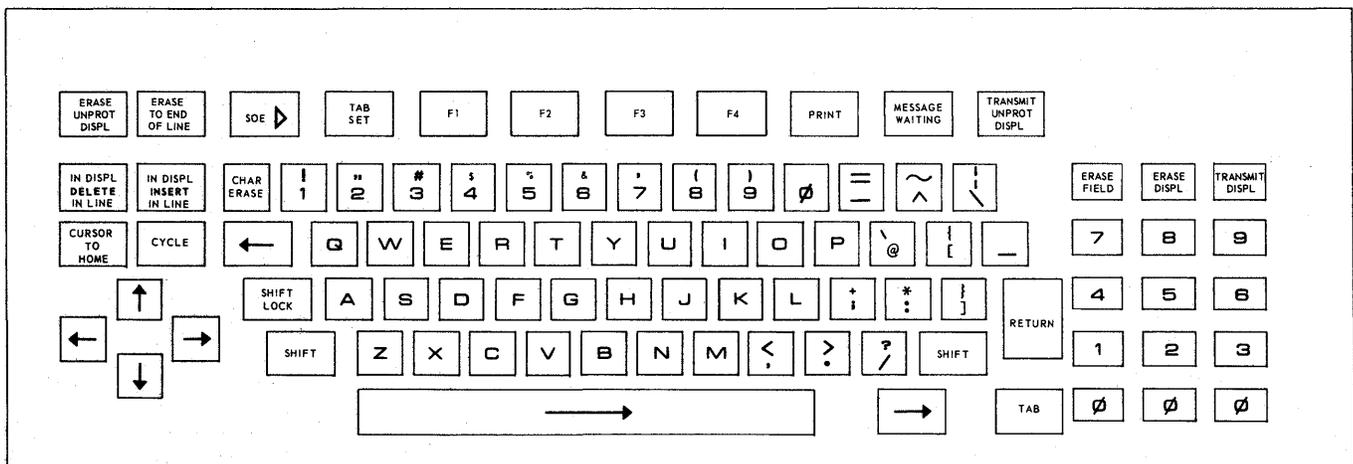


Figure 1-8. UNISCOPE 100 Terminal Keyboard (Uppercase/Lowercase With Alphanumeric and Numeric Keys) for Protected Format With Operator Control

Table 1-1. Keyboard Types

Figure Reference	Keyboard Type	Description
1-3	Numeric	This keyboard includes keys for the numerics 0 through 9, three symbols ( +, -, and .), normal editing, cursor control, space, tab, cursor return, three message-control keys, and four special-function keys.
1-4	Uppercase alphanumeric	This is an uppercase/lowercase keyboard. It provides a full alphanumeric keyboard (26 alphabetic characters, 10 numeric characters, 27 symbols, and a space bar) with normal editing, cursor control, three message-control keys, and four special-function keys.
1-5	Uppercase/lowercase alphanumeric	This is an uppercase/lowercase keyboard. It is the same as the uppercase alphanumeric keyboard above except that lowercase alphabetic characters and five additional symbols are provided. Character generator expansion is required for this keyboard.
Not illustrated	Uppercase alphanumeric and numeric	This is an uppercase and numeric keyboard. It combines the uppercase alphanumeric keyboard and the numeric keyboard described previously.
1-6	Uppercase/lowercase alphanumeric and numeric	This is an uppercase/lowercase and numeric keyboard. It combines the uppercase/lowercase alphanumeric and numeric keyboards described previously. Character generator expansion is required for this keyboard.
Not illustrated	Uppercase alphanumeric with protected-format control	This is an uppercase keyboard. It is the same as the uppercase alphanumeric keyboard previously described except that two keys are relabeled and three keys are added to give the operator control of protected format.
1-7	Uppercase/lowercase alphanumeric with protected-format control	This is an uppercase/lowercase keyboard. It is the same as the uppercase/lowercase keyboard previously described except that two keys are relabeled and three keys are added to give the operator control of protected format.
Not illustrated	Uppercase alphanumeric and numeric with protected-format control	This is an uppercase and numeric keyboard. It is the same as the uppercase and numeric keyboard except that two keys are relabeled and three keys are changed in the numeric section to give the operator control of protected format.
1-8	Uppercase/lowercase alphanumeric and numeric with protected-format control	This is an uppercase/lowercase and numeric keyboard. It is the same as the uppercase/lowercase and numeric keyboard previously described except that two keys are relabeled and three keys are changed in the numeric section to give the operator control of protected format.

### **1.3.9. Embedded Messages**

The embedded message provision allows a message being sent to one terminal to be interrupted so that an appropriate message may be sent to a second terminal. The original message to the first terminal is resumed immediately thereafter. This is a processor-controlled function and cannot be directed or changed at the terminal keyboard.

### **1.3.10. Display Rolling**

The display can be made to roll upward or downward by control of the processor line-insert and line-delete capabilities to produce a moving scroll effect. Keyboard controls can be designated by the program to initiate this function and to regulate the roll rate.

### **1.3.11. Split Screen**

With the split-screen capability, portions of the screen can be used for active message interchange without disturbing the remainder of the display. This capability permits the operator to put multiple messages on the screen at one time. The processor and the operator can exchange message segments instead of resending the entire contents of the display. During split-screen operation, the active area of the screen is that area between the cursor and the first start-of-entry symbol to the left of the cursor. Splitting the screen into an active area and a reference area normally is done horizontally; program provisions and use of protected format could make different splitting formats possible, however.

## **1.4. USER DOCUMENTS**

The information in this manual is general in nature. It is intended primarily as a general description and for use in planning a data communications system; it is not intended to take the place of specific instructions for operation and other user information. Information pertaining to specific use of the terminal is contained in *UNISCOPE 100 Display Terminal Operator Reference, UP-7788* (current version), *UNISCOPE 100 Display Terminal Programmer Reference, UP-7807* (current version), and *UNISCOPE 100 Display Terminal Preinstallation Planning Guide, SP-2012* (current version).

Information pertaining to use of the communications output printer as an auxiliary printing device for the terminal is given in *UNIVAC Communications Output Printer Functional Description, UP-7939* (current version).

Information pertaining to use of the terminal multiplexer is given in *UNIVAC Terminal Multiplexer Functional Description, UP-7916* (current version).

Information pertaining to use of the direct connection module is given in *UNIVAC Direct Connection Module Functional Description, UP-7932* (current version).

The user also is expected to have access to the appropriate manuals for the system on which the terminal is being used.

## **1.5. INPUT/OUTPUT DEFINITION**

Throughout this manual, input and output are relative to the terminal; that is, the terminal receives input messages and sends output messages.

The term "transmission" is used to describe the sending of information from the terminal to the processor. The term "transfer" is used to describe the input/output activity between the terminal and a device via the terminal auxiliary interface.

## 2. CONFIGURATIONS

### 2.1. GENERAL

A variety of UNISCOPE 100 Display Terminal system configurations is available so that the terminal can be adapted to a wide variety of applications. Single-terminal options are illustrated in Figure 2-1. In an operating environment, there are three basic types of terminal configurations:

- Single-station operation over a direct communications interface or on a communications line to the processor (A and B, Figure 2-2).
- Multistation operation with terminals multiplexed over a direct communications interface or on a communications line to the processor (C and D, Figure 2-2).
- Mixed single-station and multistation connections sharing the same communications line to the processor (D, Figure 2-2).

System configurations can be as variable as the applications for which they are intended. A typical system configuration with a UNIVAC processor is illustrated in Figure 2-3. A similar configuration could be shown with an IBM\* System/360 or System/370 processor and the IBM-related interfaces along with all other equipment included in Figure 2-3.

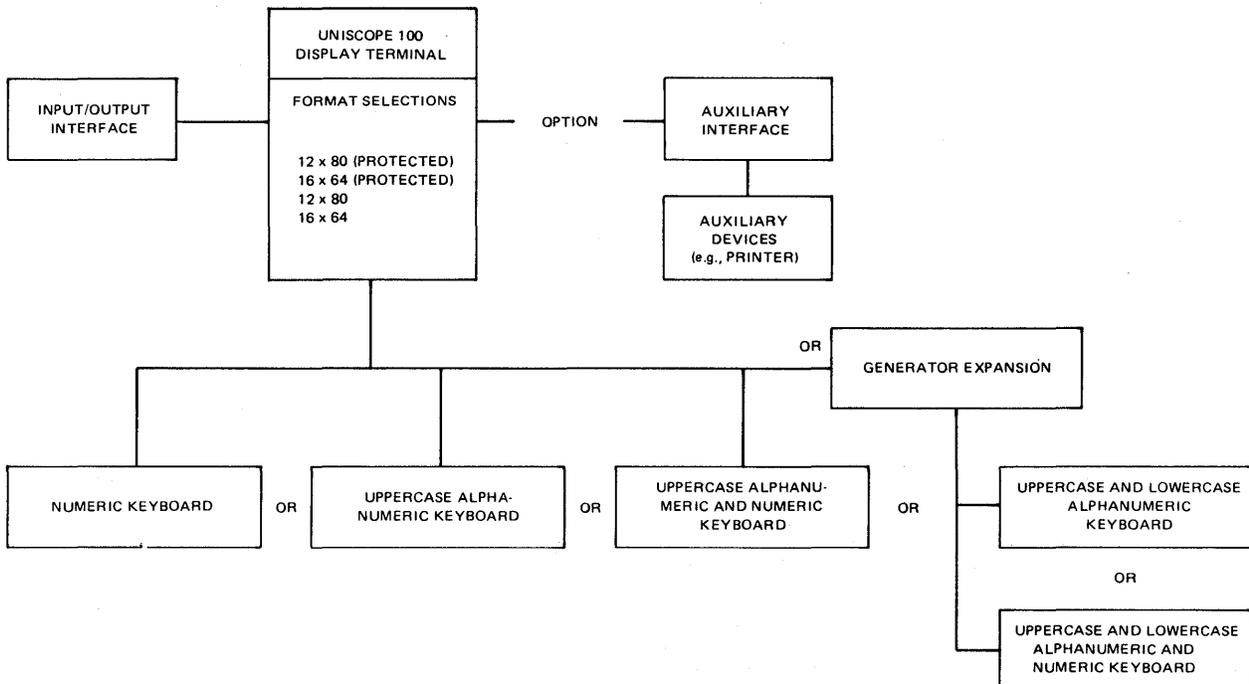
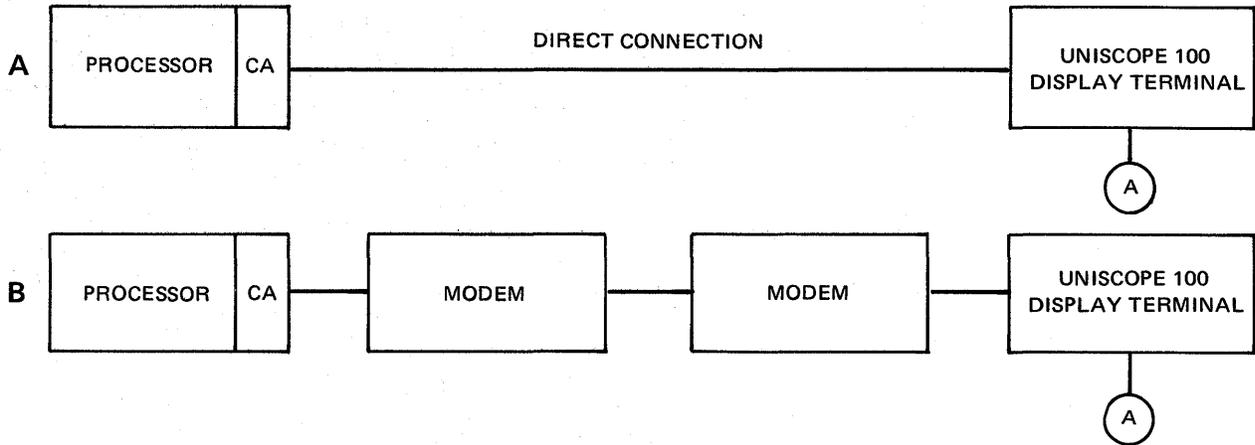
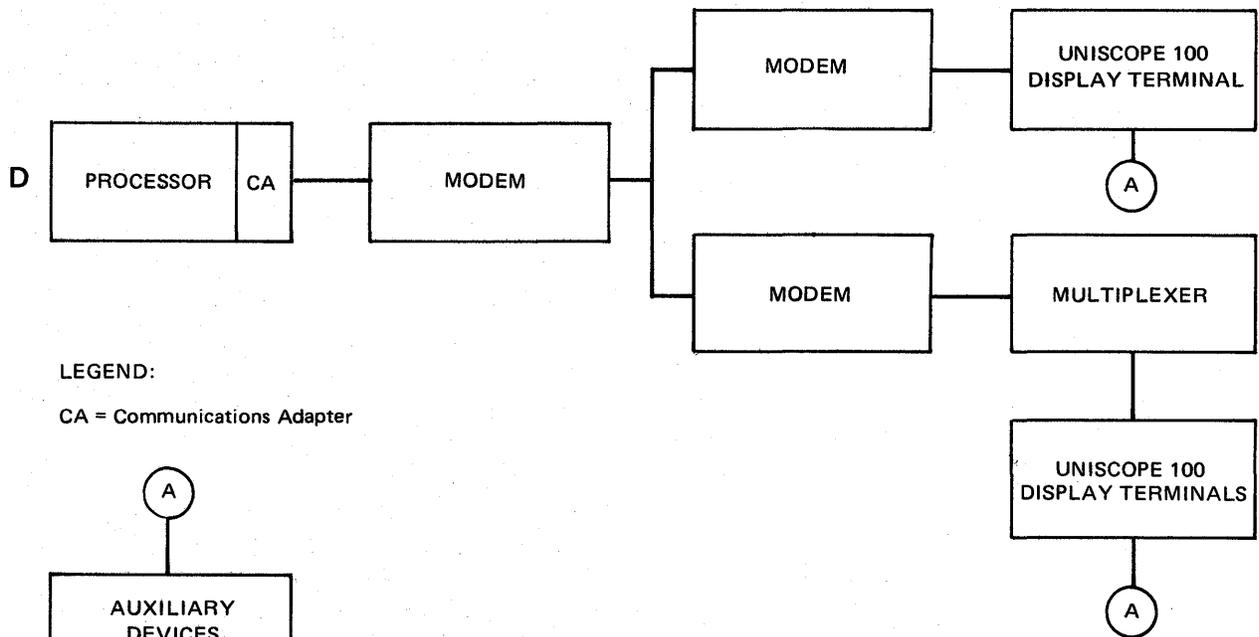
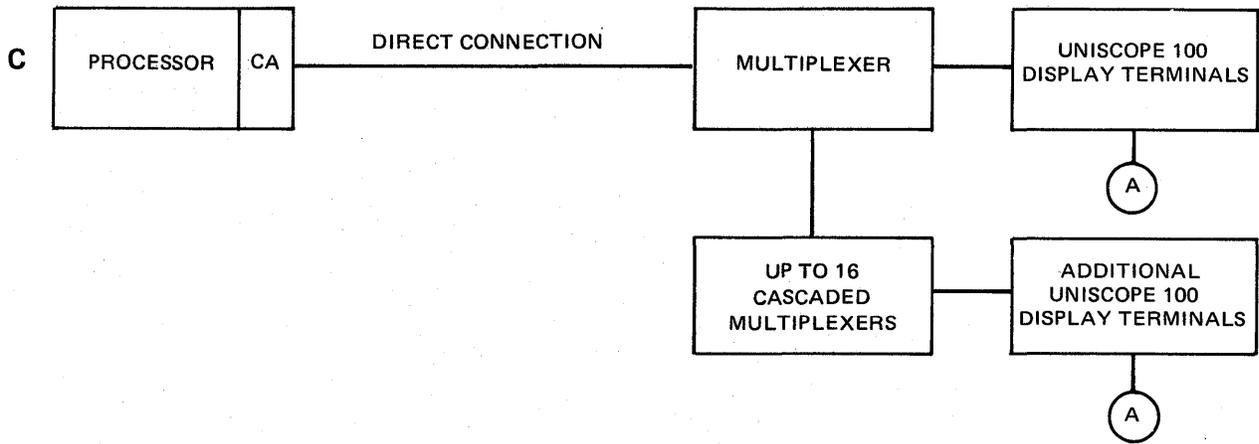


Figure 2-1. UNISCOPE 100 Display Terminal Selections

**SINGLE-STATION CONFIGURATIONS**



**MULTISTATION CONFIGURATIONS**



**LEGEND:**

CA = Communications Adapter

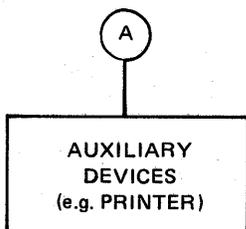


Figure 2-2. System Configurations

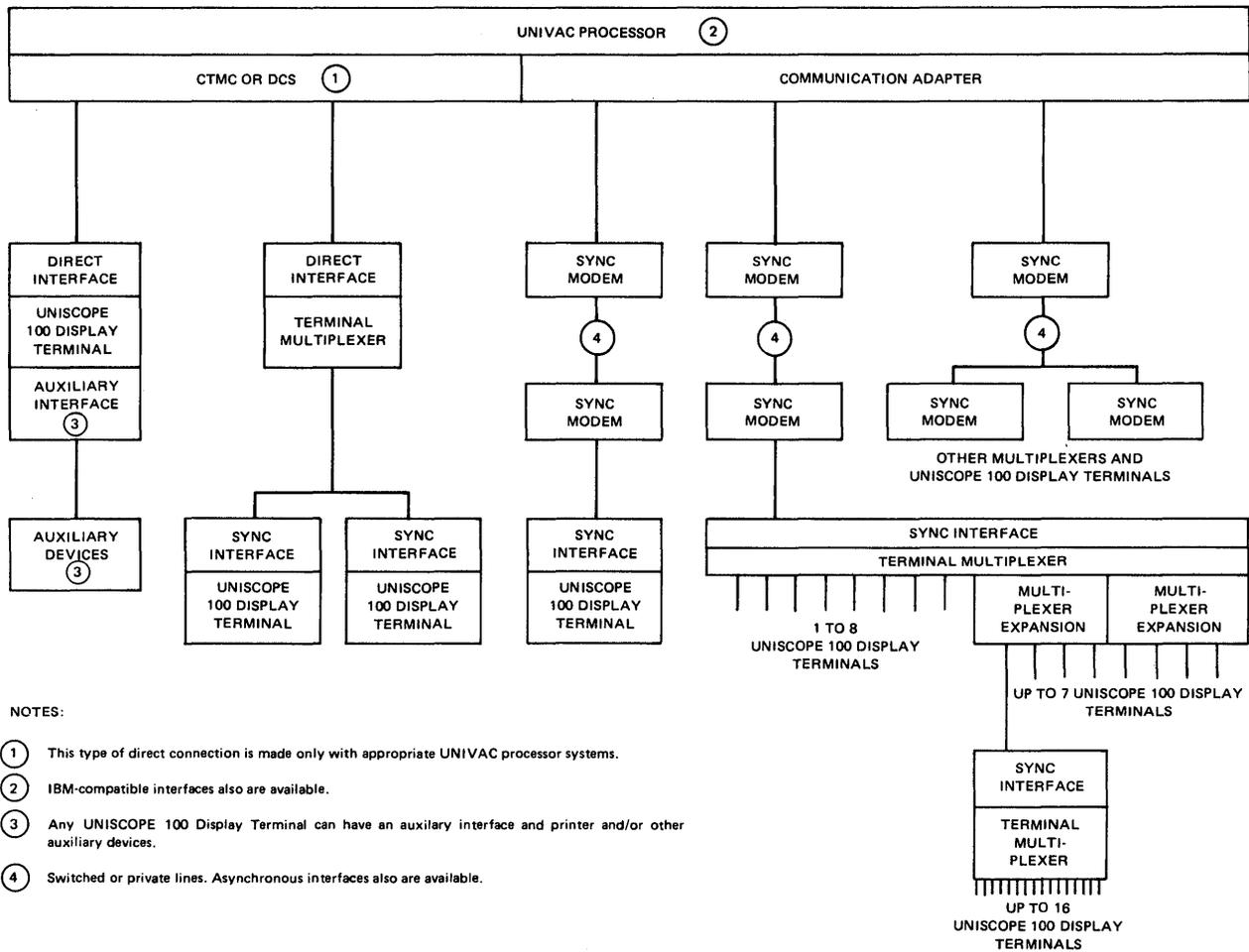


Figure 2-3. Typical System Configuration

## 2.2. CABLING

Standard cable lengths for connecting the terminal to modems and to multiplexers or directly to the UNIVAC Communications Terminal Synchronous Subsystem (CTMC) or UNIVAC Data Communications Subsystem (DCS) are available. Additional cabling can be assembled up to 5000 feet for a single terminal-to-multiplexer connection. Cabling considerations are discussed in detail in the preinstallation planning guide referenced in 1.4.

## 3. TERMINAL APPLICATIONS

The UNISCOPE 100 Display Terminal is designed for a broad range of applications requiring direct operator interaction with a central data processing system. The applications are so varied and numerous – covering virtually every type of business and industry – that it is beyond the scope of this document to describe them in detail. In all applications, however, part or all of the following broad ideas are involved in using the terminal.

- Information retrieval
- Direct data input
- Dialogue

### 3.1. INFORMATION RETRIEVAL

Immense benefits can be realized by a business through the use of the terminals in a processor communications system for information retrieval. Information handled by such a communications system is streamlined, concise, and to the point; the data gathering function is standardized; and selected data is reduced. This development of such concise information makes possible the manipulation of data to derive timely comparisons, relationships, analyses, and other informational comparisons. Some applications in which this type of information retrieval can be used gainfully with respect to management problems, services, and file inquiry are:

- Management Reports

The terminal presents a timely summary of financial reports, competitive position, program milestones, inventory status, deliveries, and product development (Figure 3–1).

- Services

For banking, insurance, hotel, travel, rental, and numerous other service industries, the terminal presents information in response to customer inquiries or to show space availability; it centralizes records and provides immediate confirmation of a transaction.

- File Inquiry

The terminal presents immediate retail credit or inventory status, medical case histories and references, library applications, and account status.

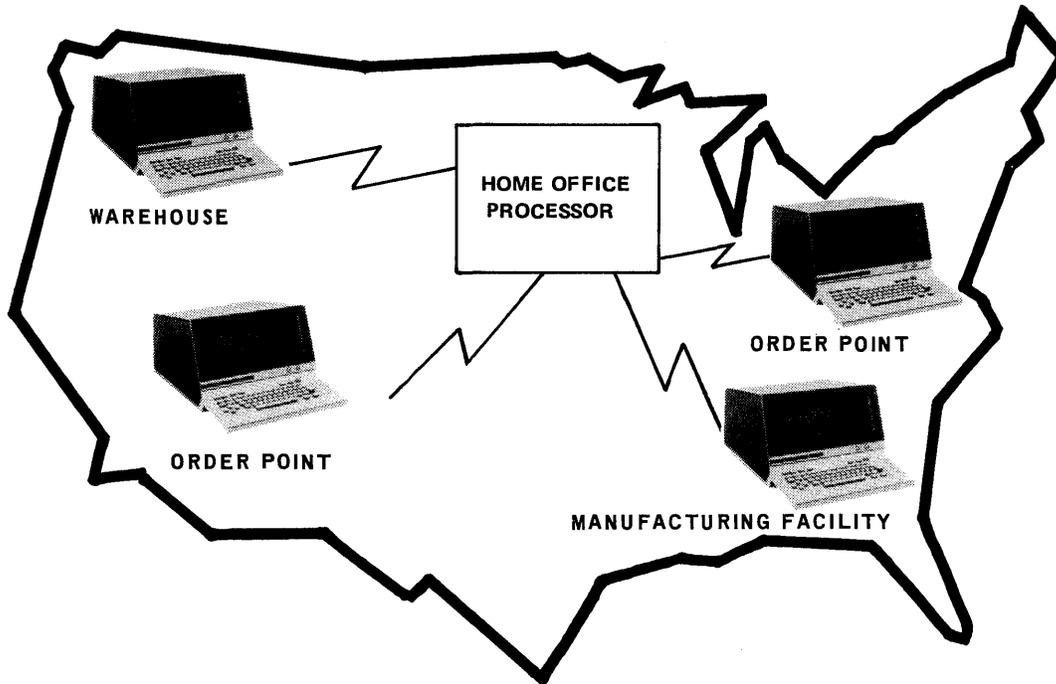


Figure 3-1. Network of Single Control Points Geographically Dispersed

### 3.2. DIRECT DATA INPUT

To a large degree, direct data input is possible because access to mass storage and processor power can be accomplished through multiaccess communications systems. Accuracy and real-time access are outstanding capabilities of the terminal. The terminal operator can key in the input data, immediately proofread and verify his input statement upon completion, and edit and rearrange it before he transmits it. The ease of direct data input can provide:

- Simplified file maintenance

This provision permits updating of a data base in real time so that subsequent inquiries or continuous changes to records are made immediately; it effects rapid changes in book publishing and simplifies hospital accounting and recording procedures.

- New data entry

This provision permits new input data to be taken directly from the source, deletes several entry steps, and avoids the possibility of human error. It also omits the necessity for intermediate storage of bulky source material and eliminates the need for expensive offline data manipulation machines.

### 3.3. DIALOGUE

Dialogue is a combination of direct data input and information retrieval. However, in the case of dialogue, time is a much more important factor because the interaction between man and the processor must be immediate for the information to be meaningful. Input action immediately affects the data base, produces a reaction, and modifies the output. Dialogue varies with the exact application, but basically the terminal provides immediate answers to queries or provides solutions to presented problems. Practical examples of this can be found in the following areas:

- Simulation

Simulation provides for the real-time testing of scientific information, sales data, advertising effectiveness, budget information, and operation efficiency through the use of a processing system.

- Inventory and Sales

This application gives immediate information to prevent both overselling and underselling of space, time, or material. Each transaction modifies the data base, results in up-to-date inventory records, and provides information related to alternate solutions to customer problems. (See Figure 1-2.)

- Training, Education, and Programming

Efficient student training and self-testing are possible with the terminal. In a similar application, the terminal can act as a scientific conversational programming terminal to construct, verify, and transmit code to the processor for execution or compilation.

## 4. EQUIPMENT DESCRIPTION

### 4.1. GENERAL

The desk-top UNISCOPE 100 Display Terminal is a completely self-contained communications device, with the operator on one side and the communications line on the other. Basically, the terminal consists of a display screen, display storage, control section, input/output section, a character generator, and the operator controls.

### 4.2. DISPLAY SCREEN

The display screen is a cathode-ray tube (CRT). (See Figure 1—1.) The viewing surface is 5 inches high and 10 inches wide. Characters are produced in a green color, the brightness of which is controlled by the operator. Display formats permit either 960 or 1024 ASCII characters to be displayed. The digital scanning technique used provides excellent linearity. Spacing between characters is consistent from one end of the screen to the other, and the size and shape do not change relative to the character position on the screen. The character style (uppercase alphanumeric or uppercase/lowercase alphanumeric) and character size produce maximum legibility and readability. Flicker-free presentation is accomplished by regenerating the displayed character images 60 times each second (50 times for 50-Hz models).

### 4.3. DISPLAY STORAGE

The display storage has a maximum capacity of 1024 seven-bit characters. It contains a processor-type storage area and therefore provides the same reliability, speed, and random access that is built into UNIVAC processor systems. Because the display is regenerated 60 times per second (50 times for 50-Hz models) from the display storage, the traffic between the terminal and the processor is used only for the transfer of new data; the communications lines are not burdened by regenerating directly from the processor storage.

### 4.4. CONTROL SECTION

The control section of the terminal directs all operations of the unit. The control section interprets all instructions and generates commands to various sections of the unit. In particular, the control section sequences input/output operations, positions the cursor, addresses storage for producing the characters, and directs block moves of data (erase, insert, and delete).

## 4.5. INPUT/OUTPUT SECTION

The input/output (I/O) section is the interface between the terminal and external devices (other than auxiliary devices). The three basic configurations are:

- direct connection to UNIVAC Communications Terminal Module Controller (CTMC) or UNIVAC Data Communications System (DCS);
- operation through a modem; and
- operation through a terminal multiplexer to one of the aforementioned.

The I/O section performs the following major functions according to the type of operation:

- converts information exchanged through the modem into the required format;
- performs parity checks, automatic error detection, and program-controlled retransmissions;
- maintains the unit address; and
- provides line procedure functions and operational status information.

When the terminal is connected directly to a CTMC (UNIVAC 418, 490, or 1100 Series Systems) or DCS (UNIVAC 9000 Series Systems), the interface includes a clock that eliminates the need for a modem. Terminal operation through a modem is accomplished via an interface selected for the particular modem. In multistation terminal applications, the UNIVAC terminal multiplexer is used to couple one or more terminals to a single modem.

## 4.6. CHARACTER GENERATOR

The binary-coded characters in the display storage must be converted to characters that can be displayed on the CRT screen. This translation is accomplished by the character generator. The basic character generator can generate 64 unique symbols and is expandable to 96 symbols. A character from the display storage addresses the character generator once every storage cycle. The character generator paints the character by causing a succession of strokes of variable length, direction, and intensity to form the visible character on the screen. The stroke method of generating characters produces characters that are more easily recognized than other methods, such as the dot matrix method. Because as many as eight strokes are available for producing one character, each character has its own unique shape. (See Figure 4-1.)

## 4.7. OPERATOR CONTROLS

The terminal operator controls are essential for proper interface with the processing system. The full range of operator controls consists of an alphanumeric keyboard, controls and indicators, cursor control keys, editing keys, message control keys, and special function keys.

### 4.7.1. Keyboard

The keyboard is the operator's interface with the terminal and with the processor. From the keyboard, the operator can control the terminal, can input data to the display storage, and can request data from the processor. Each time a key is pressed, a unique code is sent to the keyboard control section, which examines this code to determine if the code represents data or a function. If the code represents data, the data is entered in the position indicated by the cursor and the cursor is advanced one character position.

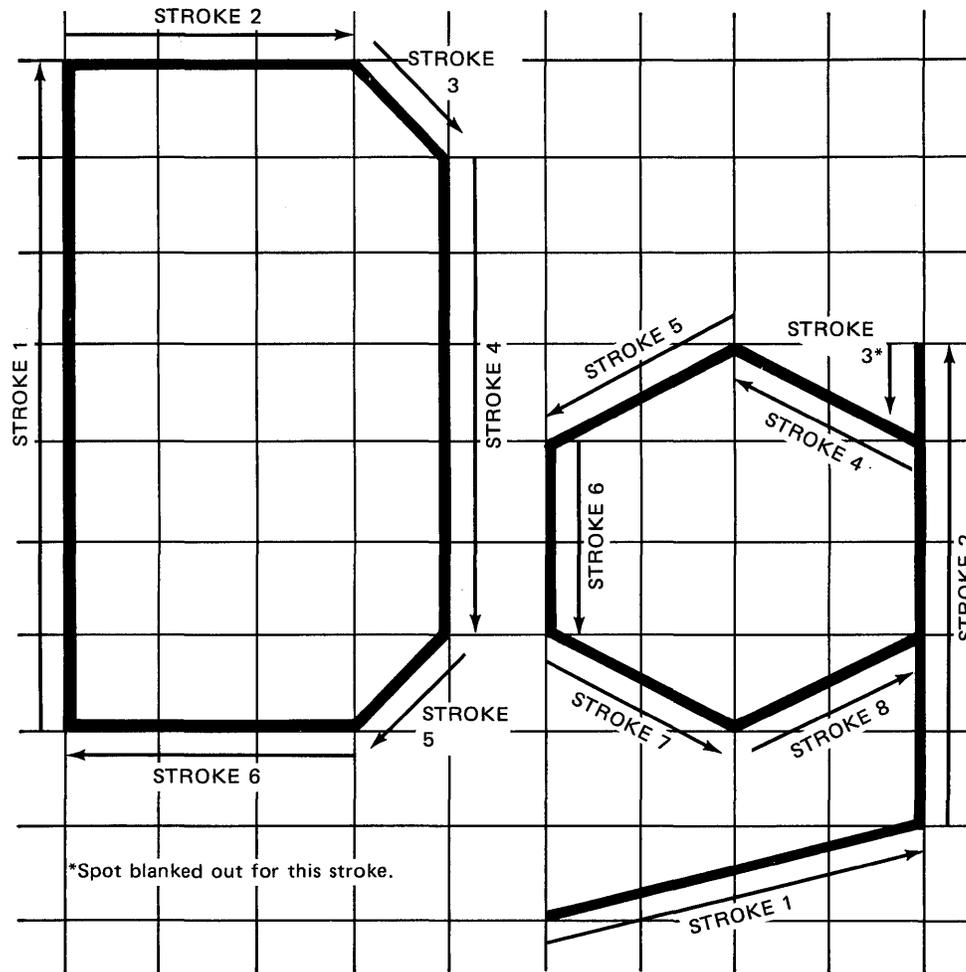


Figure 4-1. Stroke Generation Method Example (Characters D g Shown)

The keyboard (Figure 4-2) is used to compose messages that will be transmitted to the processor. As the character keys are pressed, the data is supplied to the display storage. The data remains in the display storage and is displayed on the CRT to allow the operator to edit and verify the data before it is transmitted at the operator's command.

#### 4.7.2. Controls and Indicators

Three data control keys are located in the right end of the top row of keys (not part of the numeric pad). The TRANSMIT key causes data to be transferred to the processor (following polling), starting from the start of entry (SOE) symbol nearest to the left of the cursor and continuing to the cursor. (For units having protected format, this key is labeled TRANSMIT UNPROT DISPL and is discussed in 4.7.8.) If no SOE symbol is on the screen in a position preceding the cursor position, data transmission starts from the upper left corner of the screen. The keyboard is locked (disabled) to prevent further data entry until it is unlocked by processor action. The MESSAGE WAITING key is pressed when the operator is ready to accept unsolicited messages. (This is the usual function. However, specific applications may assign different functions to this key.) The PRINT key initiates data transfer to and from the display storage via the auxiliary interface.

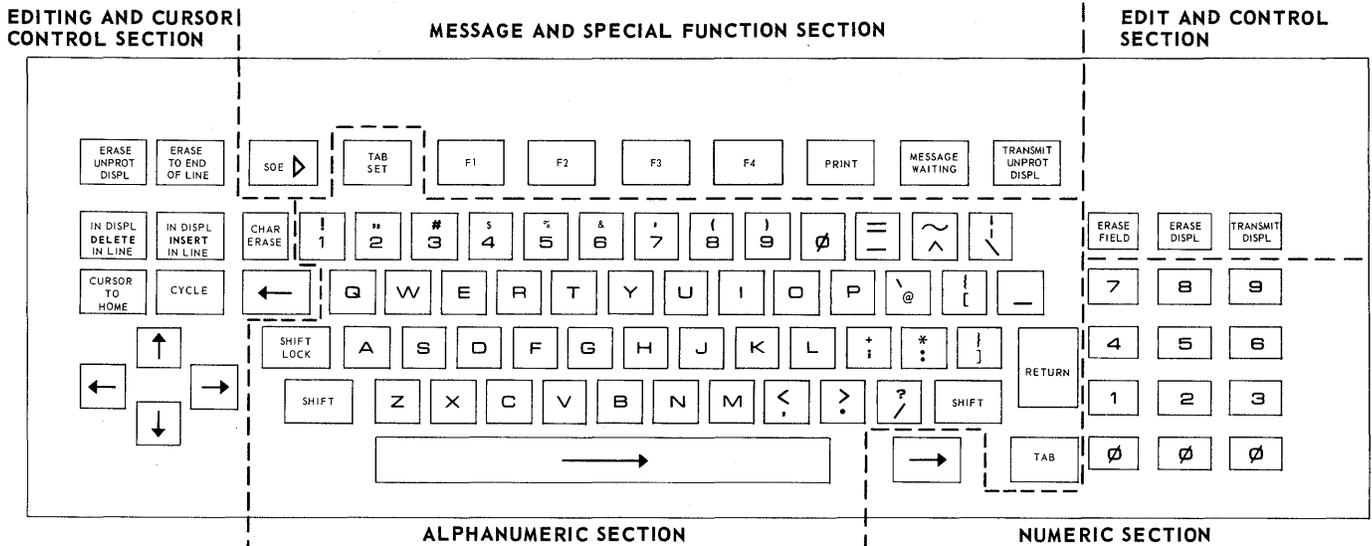


Figure 4-2. UNISCOPE 100 Display Terminal Keyboard Showing the Various Functioning Sections

Two indicators are located below the screen just left of center:

- MESSAGE INCOMPL

This indicator lights during reception of a text message by the terminal and remains lit until a complete message has been received.

- MESSAGE WAIT

This indicator lights when the processor sends the BEL code in a specially formatted message. This normally indicates that there is an unsolicited message from the processor to the terminal.

An audible alarm is incorporated into the terminal to alert the operator to three conditions. A single beep is sounded when the cursor moves into the eighth character position from the end of any line and also when the cursor moves into the last line (in any character position). The alarm also sounds intermittently during the time that the MESSAGE WAIT indicator is lighted. The alarm is turned off when the MESSAGE WAIT indicator is turned off.

Three terminal controls are located below and to the right of the screen:

- POWER

When this switch/indicator is in the ON position, it is lit to show that the terminal is in an operating state. When the switch/indicator is in the OFF position, it is extinguished to show that the power is removed from the terminal.

- WAIT

This switch/indicator lights during the time a text message is being transmitted to or from the terminal or while an auxiliary interface data transfer is taking place. It indicates that the keyboard is locked. The switch provides a manual unlock for the keyboard and a master clear for the terminal.

- INTENSITY

This control varies the brightness of the characters being displayed.

An additional switch, located inconspicuously under the right side of the unit, permits the terminal to remain online but blanks the screen and logically disables the keyboard on the terminal. (This switch allows the operator a measure of security control for the terminal when it is necessary to leave the terminal unattended for short periods of time.)

### 4.7.3. Cursor (␣)

The cursor is an indispensable display indicator used by the operator in preparing data for transmission, used by the processor and auxiliary devices when placing data in display storage, and used in identifying the end of terminal output. It is a unique character that is displayed on the CRT at all times except, briefly, during transmission or during an auxiliary interface transfer. The cursor, which advances sequentially when data keys are pressed, indicates the location at which the next data character will be entered. It also indicates the end position of data transmitted to the processor or transferred via the auxiliary interface. When the cursor is positioned over a displayable character, the character and cursor blink alternately. (The cursor also blinks when positioned over all nondisplayable characters except spaces.) The blinking helps the operator keep track of the cursor when it is positioned over a character. The cursor advances one step for each character that is entered and can be positioned by the cursor control keys. The cursor is nondestructive; that is, it does not affect the information in the display storage.

### 4.7.4. Cursor Control Keys

The operator uses the following nine cursor control keys (Figure 4–2) when composing or editing messages on the display.

- Scan Forward 

This positioning key moves the cursor forward (to the right) one space at a time; the cursor keeps moving as long as the key is pressed.

- Scan Backward 

This positioning key moves the cursor backward (to the left) one space at a time; the cursor keeps moving as long as the key is pressed.

- Scan Up 

This positioning key moves the cursor up one line at a time; the cursor keeps moving as long as the key is pressed.

- Scan Down 

This positioning key moves the cursor down one line at a time; the cursor keeps moving as long as the key is pressed.

For units with protected format, these scan keys operate normally (when pressed). If the key is released with the cursor over an unprotected character, the cursor remains over that character; however, when any scan key is released with the cursor positioned over a protected character, the cursor moves to the right (forward) to the first unprotected character. When the key is released and all characters on the screen are protected, the cursor scans to the right (forward) through all positions and returns to the home position; the keyboard is then locked.

- CURSOR TO HOME

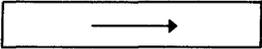
This key repositions the cursor to the first character position (home) on the display.

For units with protected format, pressing this key causes the cursor to return to home and then to advance to the first unprotected character position on the screen; however, if all characters on the screen are protected, the cursor stops at the home position and the keyboard is locked.

- RETURN

The RETURN key positions the cursor to the first position of the next line.

For units with protected format, if the first character on the next line is protected, the cursor moves to the right until it locates the first unprotected character.

- Space 

The space bar moves the cursor forward one space each time it is pressed. When the keyboard contains the numeric section, a short space bar is provided to the right of the main space bar position so that the controls normally used with a numeric keyboard (space, tab, carriage return) are available immediately adjacent to the numeric section.

- TAB

The TAB key is a special cursor-positioning key that moves the cursor forward until a special tab-stop character is detected in the display storage. If a tab-stop character is detected, the cursor stops one character beyond it. If no tab-stop character is found, the cursor returns to the home position. For units with protected format, if the character next to the tab stop is protected, the cursor does not stop on it but moves to the first nonprotected character.

- TAB SET

This key inserts tab stop codes into display storage for use with the TAB key.

#### 4.7.5. Editing Keys

The editing keys are used by the operator to correct or change data input from the keyboard or received from the processor or the auxiliary interface. (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.)

- CHAR ERASE

Pressing this key erases the character in the cursor position and enters a space in that position of the display. The cursor moves one space to the right. When this key is pressed on units with protected format, if the space to the right is protected, the cursor will move to the right to the first unprotected character.

- ERASE TO END OF LINE

Pressing this key replaces with spaces all characters from, and including, the cursor position to the end of the line. The cursor remains in the same position (it does not move) during this operation.

For units provided with protected format, pressing this key causes spaces to replace all the characters from the cursor to the end of the unprotected field in which the cursor is positioned or to the end of the line on which the cursor is positioned, whichever occurs first. If the software places the cursor in a protected field and this key is pressed, the cursor will not move and the erase-to-end-of-line function will not occur. The cursor must be moved into an unprotected field by using the cursor control keys (or by the software) before the key will function properly.

- **ERASE TO END OF DISPL**

When pressed, this key erases all the characters from, and including, the cursor position to the end of the display. Spaces are inserted in all the erased positions. The cursor remains in the same position (does not move) during this operation.

For units with operator control of protected format, this key is labeled ERASE UNPROT DISPL and is discussed in 4.7.8.

- **IN DISPL  
INSERT  
IN LINE**

When this key is pressed, all the characters to the right of the cursor position and any character under the cursor (including a space) will shift one space to the right (leaving a space under the cursor). If the key is pressed with the SHIFT key in the lowercase position, only the characters in the line containing the cursor will shift to the right, and any character in the last position of the line will be discarded. If the key is pressed with the SHIFT key in uppercase position, then all the characters from the cursor position to the end of the display will be shifted to the right, characters at the end of the lines will be shifted to the first position of the next line, and any character in the last position of the display will be discarded.

For units provided with protected format, this key (when pressed) operates as previously described except it operates only on unprotected data and only in one unprotected field. For example, if the field ends before the end of the line, the area shifted will stop at the beginning of the protected area following the unprotected field. Any following unprotected fields in the same line will not be shifted.

- **IN DISPL  
DELETE  
IN LINE**

Pressing this key causes the deletion of the character in the cursor position, and all the characters to the right of the cursor will shift one position to the left. If the keyboard is in lowercase mode, only the characters in the line containing the cursor will move to the left, and a space will be inserted at the end of the line. If the keyboard is in uppercase mode, all the characters from the cursor to the end of the display will shift to the left, and a space will be inserted in the last position in the display. (Characters in the first position of each line are moved to the last position of the line above.)

For units provided with protected format, this key (when pressed) limits the code sequence to one unprotected field rather than to the end of the line or display. This permits the operator to shift a single line (lowercase mode) or several lines (uppercase mode) within one unprotected field, but does not allow the shifting of more than one unprotected field at a time.

- **CYCLE**

Pressing this key causes the next character or function chosen by the operator to be repeated as long as both the CYCLE key and the other key are pressed. This key operates with all keys except the ERASE, DELETE, INSERT, SHIFT, SHIFT LOCK, PRINT, RETURN, MESSAGE WAITING, TRANSMIT, CURSOR TO HOME, TAB, TAB SET, SOE, and the special function keys (F1, F2, F3, F4).

### 4.7.6. Message Control Keys

These keys are used to control the location, transmission, and reception of messages.

- **SOE ▷**

This key places the start-of-entry symbol (▷) on the screen at a position corresponding with the cursor. It designates the starting point of the message; the cursor determines the end of the message.

- **TRANSMIT**

When this key is pressed, transmission of unprotected data to the processor (following polling) takes place. (For units providing operator control of protected format, this key is labeled TRANSMIT UNPROT DISPL and is discussed in 4.7.8.) In the case of terminals without the protected format selection, all data is unprotected. Terminals with protected format identify the protected data fields with the SUB character in the text message.

- **PRINT**

When pressed, this key routes data presented on the display between the SOE and the cursor to an output device on the auxiliary interface, or it allows an input device on the auxiliary interface to supply information to the terminal.

- **MESSAGE WAITING**

When this key is pressed, a special message is sent to the processor on the next poll; it usually indicates that a waiting unsolicited message may be sent. (Its actual meaning depends on software interpretation.)

### 4.7.7. Special Function Keys

Pressing one of the special function keys causes a special message to be transmitted in response to the next suitable poll. This message contains the start of heading (SOH), address functions (RID, SID, DID), special function character, end of text (ETX), and block check character (BCC). It may contain an acknowledge or busy signal. These keys are located in the center of the top row and are labeled F1, F2, F3, and F4. (See Figure 4–2.) When one special function key is pressed, it and the others are locked and remain locked (independent of keyboard lock) until unlocked via processor action. On the alternative form of the special function keys, key F4 is labeled HANG UP. Pressing this key causes a disconnect message (DLE EOT or DLE EOT ETX BCC) to be transmitted and the momentary dropping of the data terminal ready (DTR) signal. This function causes the modem to disconnect from the line.

### 4.7.8. Protected Format Keys

Certain keyboards provide protected format keys. (See 1.4.1) For keyboards providing operator control of protected format, two of the regular keys are relabeled and three other keys are added. The two keys that are relabeled provide the operator access to and transmission of only unprotected format. They are:

- **ERASE UNPROT DISPL**

This key, when pressed, replaces with spaces all unprotected data from the cursor to the end of the display. (For units without operator control of protected format, this key is labeled ERASE TO END OF DISPL and is discussed in 4.7.5.)

- TRANSMIT UNPROT DISPL

This key, when pressed, permits the transmission of only the data within the unprotected areas on the screen. No protected data except the SOE symbol can be transmitted. The area to be transmitted is defined by the SOE symbol and the cursor. All unprotected data between the cursor and the first SOE symbol to the left of the cursor is transmitted (along with SUB characters marking the protected fields). If no SOE symbol is used, all unprotected data from the beginning of the screen display to the cursor is transmitted. (For units without operator control of protected format, this key is labeled TRANSMIT and is discussed in 4.7.2.)

The three keys that are added permit an operator access to and transmission of protected format; thus, there is some degree of operator control over both protected and unprotected information. These keys are:

- ERASE FIELD

This key, when pressed, replaces with spaces all data from the cursor to the end of the unprotected field (or the end of the display if the end of the display occurs first) within which the cursor is positioned. If, at the end of a transmission, the processor leaves the cursor positioned within a protected field, this key (when pressed) will not cause the cursor to move and the erase-to-end-of-field will not occur. The cursor must be moved into an unprotected field via the I/O or auxiliary interface or by keyboard action before this ERASE FIELD key will function.

- ERASE DISPL

This key (when pressed) replaces with spaces all of the data, protected and unprotected, between the cursor position and the end of the display.

- TRANSMIT DISPL

This key (when pressed) permits both protected and unprotected data to be transmitted to the processor. No distinction is made between the protected and unprotected fields.

When the numeric pad is included on the keyboard, these three keys take the place of the plus (+), minus (–), and decimal point (.) keys comprising the top row of the numeric array.

## 5. FUNCTIONAL DESCRIPTION

### 5.1. BASIC OPERATION

The UNISCOPE 100 Display Terminal is designed to operate in a polling environment; all transmissions between the processor and the terminal are initiated by the processor. Line protocol requires that most message types between the terminal and processor be acknowledged by the recipient.

Terminals can be connected to the communication line either singly or in multiplexed clusters, or a combination of these two methods can be used on a single communication line. All terminals contain their own storage and control logic; the multiplexer serves only to provide the electrical interface to the communication line and to resolve contention when more than one terminal tries to send.

Each terminal operates in half-duplex mode, but the sharing of a full-duplex line by several terminals can result in efficient utilization of the full-duplex line. Provisions are included in the control logic of the terminals that allow the processor to interrupt transmission to one terminal in order to poll and initiate data transmission from another terminal (or cluster) connected to the full-duplex communication line.

### 5.2. DATA TRANSMISSION

Data can be transmitted over the public telephone network, leased common-carrier voice-grade lines, or directly over a communication-line interface. The transmission code is standard 7-level ASCII (Figure 5-1) plus character parity. Transmission between the processor communications equipment and the terminal is bit serial.

The following data transmission functions are standard on all terminal communications interfaces:

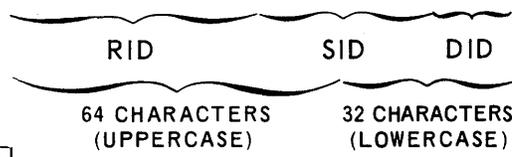
- **Status Poll**

The processor can issue a status poll to a terminal and receive a reply indicating the status of the terminal (e.g., traffic, no traffic, busy). This allows the processor to continue to poll at times when the processor is not ready to accept data.

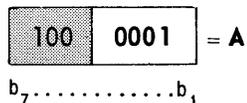
- **Embedded Message Transmission**

During the time the processor is sending a long message to one terminal, the terminal logic permits the processor to break into the message, insert a poll message to another terminal, and resume the original message at the point of the break. This provision permits improved system performance in systems involving substantial processor output volume.

		CONTROL CHARACTERS		GRAPHIC CHARACTERS						
		COL.	0	1	2	3	4	5	6	7
ROW	BITS	000	001	010	011	100	101	110	111	
0	0000	NUL	DLE	SP	0	@	P			p
1	0001	SOH	DC1	!	1	A	Q	a		q
2	0010	STX	DC2	"	2	B	R	b		r
3	0011	ETX	DC3	#	3	C	S	c		s
4	0100	EOT	DC4	\$	4	D	T	d		t
5	0101	ENQ	NAK	%	5	E	U	e		u
6	0110	ACK	SYN	&	6	F	V	f		v
7	0111	BEL	ETB	'	7	G	W	g		w
8	1000	BS	CAN	(	8	H	X	h		x
9	1001	HT	EM	)	9	I	Y	i		y
10	1010	LF	SUB	*	:	J	Z	j		z
11	1011	VT	ESC	+	;	K	[	k		{
12	1100	FF	FS	,	<	L	\	l		
13	1101	CR	GS	-	=	M	]	m		}
14	1110	SO	RS	.	>	N	^	n		~
15	1111	SI	US	/	?	O	_	o		%



**Example:**



NOTES:

1. The specific address identifiers (RID, SID, and DID) are chosen from the columns as indicated.
2. The general address identifiers (GID) are designated SP for RID, P for SID, and P for DID.
3. The % key (column 7) replaces the ASCII delete key (DEL).

Figure 5-1. UNISCOPE 100 Display Terminal Code, Based Upon ASCII

- **Cursor Addressing**

This function allows the processor to place the cursor at any point on the screen for efficient formatting and transmission of data. Because of this function, the processor is able to change individual characters, words, or blocks of data without disturbing the rest of the display.

- **Parity**

Character parity and message parity are used in all terminal communications. The terminal checks parity on received data and provides an appropriate acknowledgment. The terminal generates parity for transmitted data.

### **5.3. MESSAGE CONFIGURATION**

Several different types of messages are transmitted between the terminal and the central processor; these can occur singly or in combination. Except for the no-traffic-without-acknowledge message, all messages begin with a message heading followed by a variable-length message or control sequence and are terminated by a message trailer.

- The message heading consists of a start of heading (SOH) code and a 3-character address. This heading is preceded by four sync characters in synchronous systems.
- Message content is variable depending on the message type and may be arbitrarily long if it contains text. (However, because the display can wrap around, messages should not exceed the maximum capacity of the screen from the SOE to the end of the display. If it is longer, the cursor will return to home position, and the received data will be written sequentially over any data existing at the beginning of the display.) Text messages may contain format control characters.
- The message trailer consists of an end-of-text (ETX) character followed by a block check character (BCC).

All message heading, trailer, and control characters are automatically inserted by the terminal when composing and transmitting a message.

The no-traffic-without-acknowledge message is an exception to the preceding format. Because this is a message that is frequently sent, it is made as brief as possible. It consists of two end-of-transmission (EOT) characters (preceded by four sync characters in synchronous systems). A longer form which includes ETX BCC following the EOT characters is an option used with the UNIVAC Communications Terminal Module Controller Subsystem (CTMC).

#### **5.3.1. Terminal-to-Processor Message Types**

Message types transmitted from the terminal to the processor are:

- **Text**

This is a data message transmitted in response to a traffic poll; it may include an acknowledgment.

- **Traffic**

This message is sent in response to a status poll. It indicates that the terminal has text to send; it may include an acknowledgment.

- **No Traffic**

This message is sent in response to a traffic or status poll. It indicates that the terminal has no text to send and is not missing an acknowledgment for text transmitted; it may include an acknowledgment. When this message is sent without an acknowledgment, it does not include an address; when the no-traffic response contains an acknowledgment, the normal format with address is used.

- **Request Processor Message**

The usual purpose of this message is to inform the processor that the operator is ready to receive an unsolicited message. (Its actual meaning depends on software interpretation.) This message is transmitted via poll response when the operator presses the MESSAGE WAITING key.

- **Busy**

The busy response indicates that the terminal is in a processor-controlled auxiliary interface transfer and is not immediately available. It is also an implied acknowledgment.

- **Reply Request**

The reply request from the terminal solicits the acknowledgment for the last acknowledgeable transmission by the terminal to the processor. If a terminal that is owed an acknowledgment does not receive an acknowledgment within the next good poll that it recognizes, the terminal sends the reply request to the processor.

- **THRU (Not Busy)**

The THRU message indicates that the terminal has completed a processor-controlled auxiliary interface transfer and is now available for further activity.

- **Special Function Messages**

These messages are single-character messages conveyed with address and trailer (and, when appropriate, an acknowledgment). The meaning of the message is established by the program. The special function keys (F1, F2, F3, and F4) generate the message character, and the terminal provides the heading and trailer information.

- **Device Status**

This is an auxiliary interface response to a poll; it indicates the condition of the device selected by the processor.

### **5.3.2. Processor-to-Terminal Message Types**

Message types sent from the processor to the terminal are:

- **Status Poll**

The status poll solicits status information from the terminal; it may include an acknowledgment.

- **Traffic Poll**

This message solicits text from the remote terminal; it may include an acknowledgment.

- **Retransmission Request**

This message causes the terminal to retransmit its last message.

- **Break — Resume (Embedded Message)**

This is a special provision that permits the processor to interrupt a text transmission to one terminal, embed a poll to a different terminal, and then immediately resume the transmission.

- **Text**

Text is a data message to the terminal. It contains a heading, data (text), and control characters. This message may lock the keyboard, display text, or command an auxiliary interface transfer.

- **Processor Message Waiting**

This message is sent to inform the operator that the processor has an unsolicited message waiting for his terminal.

## **5.4. ERROR DETECTION AND RECOVERY**

Character parity and block parity are generated with each message transmitted by the terminal (except for the short form no-traffic-without-acknowledge) and are checked for every message received by the terminal.

If no errors are detected in a message (other than a no-traffic-without-acknowledge message) transmitted to the processor, a positive acknowledgment indication is sent to the originating terminal. If an error is detected, the processor can ask for a retransmission.

If no transmission errors are detected in a received text message, a positive acknowledgment is included in the next message to the processor from that terminal or group of terminals on a multiplexer.

If an error is detected in a poll, the terminal will not respond. If an error is detected in text, the affected terminal will not accept any more data in that message, the partial message will remain on the screen, and the MESSAGE INCOMPL indicator will remain lighted. The absence of an acknowledgment in the next response from that terminal tells the processor that an error occurred in the message.

## **5.5. OPERATING PROCEDURE**

A message to be transmitted from a terminal is composed by the operator who positions the cursor and enters the desired data from the keyboard beginning with the start-of-entry (SOE) character (or the home position). The operator then presses the TRANSMIT key and waits for a poll message. The message is transmitted to the processor when the terminal is traffic polled. Waiting time is a function of the programming and of the activity of the processor; normally there would be only a momentary delay. If the message is to be manually transferred to an auxiliary interface device, the PRINT key is pressed; if the device is properly conditioned to accept the transfer, the message is immediately transferred. Use of auxiliary interface devices can be either manually accomplished in offline mode or automatically accomplished under processor control.

If a processor-message-waiting message is sent to the terminal while the operator is composing a message, the operator is alerted but continues forming the message to be transmitted. After the operator's message is sent, the operator presses the MESSAGE WAITING key and accepts the unsolicited processor message. The processor can override any actions by the operator and can cause an urgent message to be displayed immediately.

## 6. SPECIFICATIONS

### 6.1. DISPLAY

Capacity	960 or 1024 characters
Viewing area	10 inches wide by 5 inches high
Format and character size	64 characters per line by 16 lines, or 80 characters per line by 12 lines
Character size	
Height	0.14 inch, nominal
Width	0.10 inch, nominal
Refresh rate	60 times per second (50 times per second for 50-Hz models)
Scan method	Digital
Character set	64 or 96 symbols (ASCII)
Character generation	Closed stroke, maximum of 8 per character

### 6.2. KEYBOARD

Character keys	Alphanumeric and numeric
Cursor control	9 keys
Editing	6 keys
Special function	4 keys
Protected format control	5 keys (replace existing keys)

### 6.3. STORAGE

Code 7-bit ASCII

### 6.4. INTERFACES

Communication line RS-232C/CCITT V.24 synchronous  
RS-232C/CCITT V.24 asynchronous  
MIL-188B synchronous  
MIL-188B asynchronous  
UNIVAC Communications Terminal Module Controller Sybsystem (direct) synchronous  
UNIVAC Data Communications Subsystem (direct) synchronous

Multiplexer Types compatible with the  
communication line interfaces

Auxiliary Bit parallel

### 6.5. POWER

Voltage 120 (220 for 50-Hz models)

Frequency 60 Hz (or 50 Hz)

Phase Single

### 6.6. SIZE

Width 18 inches

Height 13 inches

Depth 27 inches

Weight 91 pounds

Comments concerning this manual may be made in the space provided below. Please fill in the requested information.

System: \_\_\_\_\_

Manual Title: \_\_\_\_\_

UP No: \_\_\_\_\_ Revision No: \_\_\_\_\_ Update: \_\_\_\_\_

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