

**SPERRY UNIVAC**

**Series 600**

**Tape Cassette System**

**Concept and Applications**

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**SPERRY UNIVAC  
SERIES 600  
TAPE CASSETTE SYSTEM**

**Concept and Applications**



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Figure 1. SPERRY UNIVAC Series 600 Tape Cassette System

# Introduction

## THE CONCEPT

Here's an addition to your data terminal that's really a workhorse — the SPERRY UNIVAC Series 600 Tape Cassette System!

Compatible with either the UNISCOPE Display Terminals or the SPERRY UNIVAC DCT 500 Series printer terminals, the tape cassette system gives you large storage capacity, operational simplicity, and high-speed data access.

The system provides easy, offline data preparation; dual cassettes for vast storage capacity; full edit capability; and identifier and address searches — to reduce search time and data access directory size. And because of the higher data transfer rate, it sharply reduces time online.

At your terminal, you can select either transport to read or write, reposition the tape backward one block, search at high speed in either direction, rewind at high speed — or your processor can do the same things for you with simple coded procedures. You can print data received earlier from the communications line, and you can copy the data onto a second cassette. You can even merge data already on one cassette with variable data entered from the keyboard and place the composite onto a second tape cassette.

## THE TAPE CASSETTE SYSTEM

The SPERRY UNIVAC Series 600 Tape Cassette System (Figure 1) is designed to fill the need for a versatile, compact, and easily used information storage device.

Specifications of the tape cassette system include the following sophisticated provisions:

- Write and read operation on each of two tape cassette transports
- Two standard methods of search to tape position or data position plus two optional methods of search to specific data information
- Character and block parity generation and checking plus an optional provision for read-after-write checking

- Tape repositioning for rewrite, reread, or editing by backward-one-block control
- High-speed rewind
- Two-track recording on standard, computer-grade magnetic tape cassettes, providing storage of up to 720,000 characters per tape cassette – dual-cassette capacity of 1,440,000 characters
- Fully compatible with processor-controlled data communications networks
- Completely addressable as a terminal auxiliary device

Besides its operational competence, the tape cassette system is small, attractive, and low-cost.

Users are taking full advantage of the data communications functions available to them in their tape cassette systems. Also, they are filing their business, scientific, educational, and management information on the rugged, inexpensive, and easily stored tape cassettes and are using and reusing the cassettes on their tape cassette systems to review, update, and rewrite. You can read in the back of this book how some of these users have applied the tape cassette system to their activities.



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*Figure 2. Tape Cassette System With UNISCOPE 200 Display Terminal*

## Configurations

The tape cassette system is a desk-top auxiliary device to a SPERRY UNIVAC UNISCOPE Display Terminal (Figure 2) or SPERRY UNIVAC DCT 500 Series Data Communications Terminal (Figure 3). The tape cassette system and the terminals are self-contained, requiring only interconnecting cables for an operating connection. All functions performed on the cassette system are controlled through the display terminal or data communications terminal. The cassette system connection is through an auxiliary interface which is mounted in the terminal.

Additional configuration and description information is given later in this book.

## Designations

Two versions of the tape cassette system are available: type 0866-00 (or -01 for 50 Hz) and type 0866-02 (or -03 for 50 Hz). Type 0866-02 (or -03) contains additional features designed for the increased display capacity of the UNISCOPE 200 terminal and the enhancements of the auxiliary interface (feature 1247-01) used with the UNISCOPE 200 terminal and later models of the UNISCOPE 100 terminal.



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*Figure 3. Tape Cassette System With DCT 524 Data Communications Terminal*

## USER DOCUMENTS

The information in this book is general in nature. Written to describe the functions and applications of the tape cassette system, the book is not intended to supply specific operating or programming information. For this information, refer to the current version of the manuals associated with the terminal with which the tape cassette system is used as an auxiliary device:

- *SPERRY UNIVAC UNISCOPE Display Terminal Operator's Guide, UP-8147*
- *SPERRY UNIVAC UNISCOPE Display Terminal Programmer Reference, UP-7807*
- *SPERRY UNIVAC DCT 500 Series Data Communications Terminals Operator Reference, UP-7832*
- *SPERRY UNIVAC DCT 500 Series Data Communications Terminals Programmer Reference, UP-7836*

### Related Planning Information

The following manuals will also be useful in planning the data communications system which incorporates the tape cassette system:

- *SPERRY UNIVAC UNISCOPE Display Terminal Concept and Applications, UP-8155*
- *SPERRY UNIVAC DCT 500 Series Data Communications Terminals General Description, UP-7804*

### Processor-Control Reference

For convenience, the data communications concept in this book is expressed in terms of terminal–processor communications. However, since the DCT 500 series terminals can also communicate with other terminals of the series, the concept should be qualified when these terminals, rather than the display terminals, are being considered.

# Equipment Description

## AN OVERVIEW

The SPERRY UNIVAC Series 600 Tape Cassette System is a self-contained device, approximately the size of an electric typewriter. The unit weighs about 34 pounds. The components are housed in a rugged, specially-built plastic case that surrounds a front panel containing operator controls and indicators. Snap-open doors on the two tape transports permit easy loading and unloading of the tape cassettes. A 5-digit address indicator located between the transports provides a clear readout of tape track and address location.

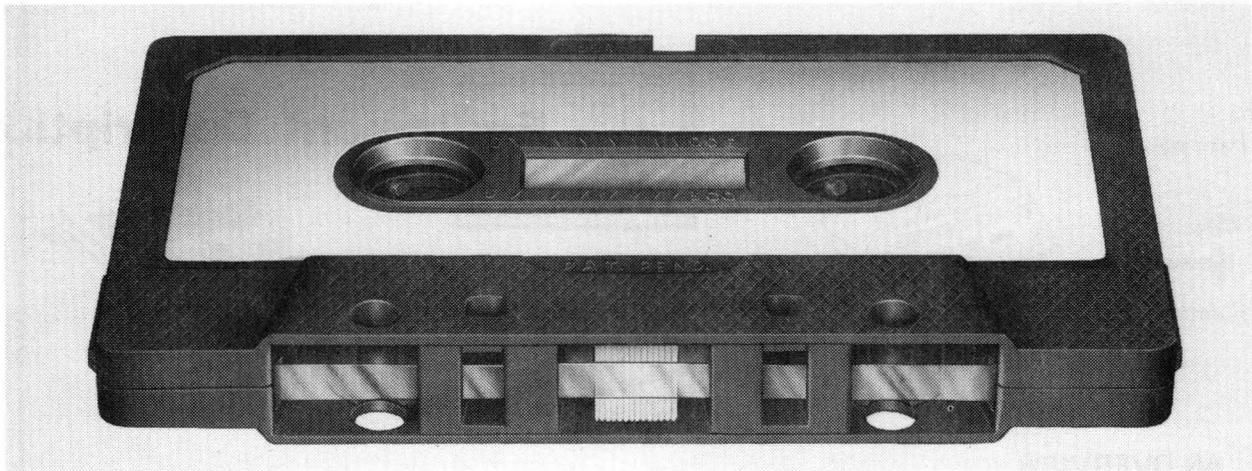
Each transport has its own 2-track read/write head and its own electronic circuitry. All operations performed on one transport can be performed on the other; however, certain applications may designate one transport for writing and the other for reading. In any case, both cassettes can be placed in the unit at the same time and either transport selected for operation. Transports are selected one at a time for operation except during the optional edit and copy function, when both transports are selected automatically in an alternate sequence.

The unit is equipped with visual and audible alarms which warn the operator that a problem needs correcting.

## A DETAILED LOOK

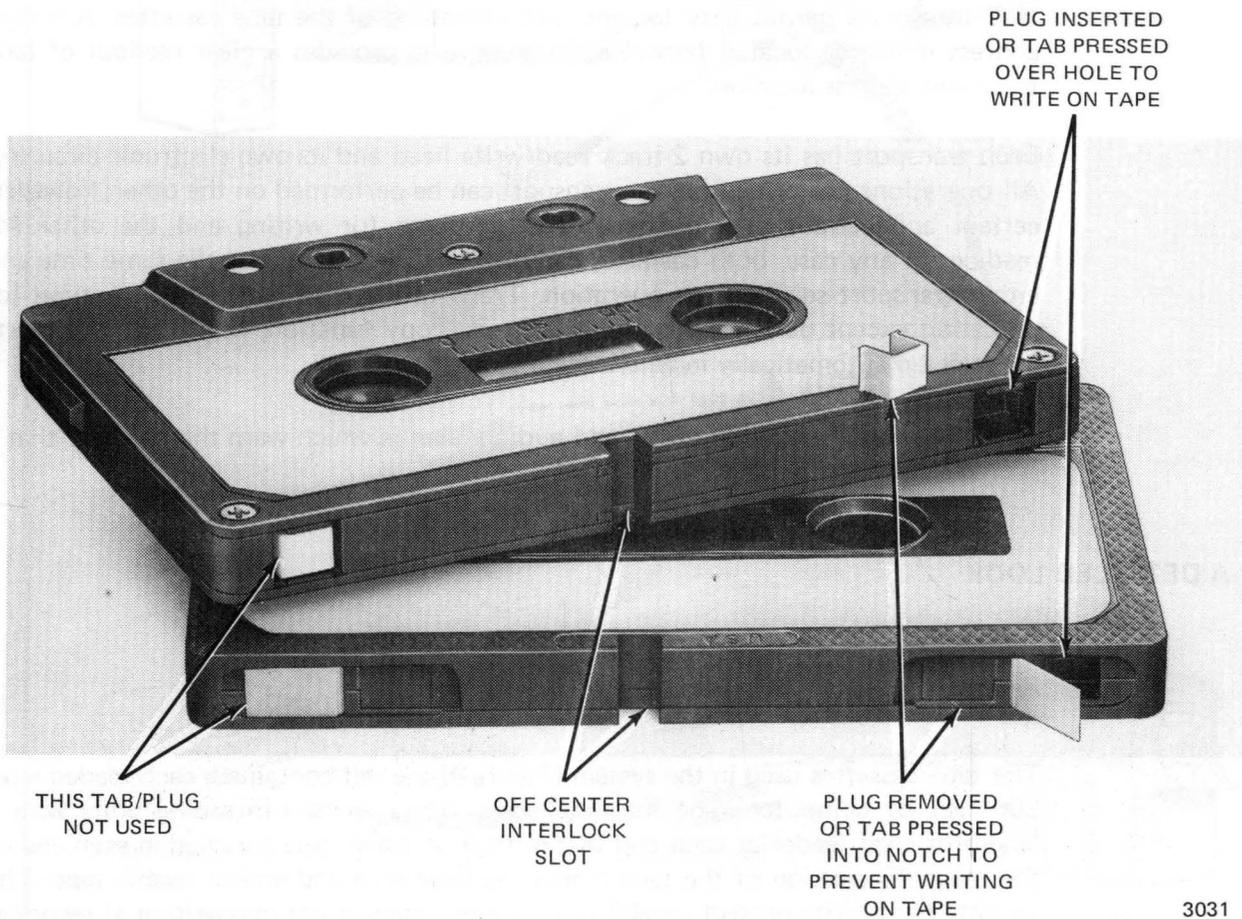
### Tape Cassettes

The tape cassettes used in the system (Figure 4) are self-contained, each loaded with 300 feet of computer-grade magnetic tape. They are self-threading units with a length of clear leader at each end of the tape. A small hole punched in each end of the magnetic portion of the tape marks the beginning and end of usable tape. The cassette has a write protect capability to prevent inadvertent overwriting of recorded data. Figure 5 illustrates two types of write-protected cassettes (plug or tab). Tape specifications and qualified tape vendors are given at the end of this book.



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Figure 4. Tape Cassette Showing Clear Leader



THIS TAB/PLUG  
NOT USED

OFF CENTER  
INTERLOCK  
SLOT

PLUG INSERTED  
OR TAB PRESSED  
OVER HOLE TO  
WRITE ON TAPE

PLUG REMOVED  
OR TAB PRESSED  
INTO NOTCH TO  
PREVENT WRITING  
ON TAPE

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Figure 5. Write-Protect Provision in Tape Cassette

## Standard Features

All tape cassette systems are equipped to perform the following functions:

- Write and read operation
- Character and block parity generation and checking
- Error detection, reporting, and recovery
- Tape positioning search
- Backward-one-block tape repositioning
- Address search
- Address reporting
- High-speed rewind

These functions are described in the next section of this book.

## Optional Features

Several optional features may be added to the tape cassette system to enhance its basic capabilities. Features which are available on all systems are:

- *Read-After-Write* – allows character parity and block parity to be checked as the block is being written
- *Protected Format* – allows data to be written on tape as protected data
- *List* – an offline function which allows a printer to make a copy of the tape contents
- *Edit* – an offline function which allows the operator to sequentially edit data on one tape and create a new tape containing the edited information, or to directly copy one tape to another
- *Record Separator* – allows record separator characters to be written on tape
- *Identifier Search* – expands the standard address search capability to include a comparison of search identifier characters with actual data block characters

Additional features which are available only on type 0866-02 (or -03) of the cassette system are:

- *HT Control Character (Tab Stop)* – allows the HT control character to be used simultaneously as the tab stop function and as a translation character for the protected-format SO (shift out) or SI (shift in) function

- *Print Transparent* – enhances the list feature by allowing the printer to print tape data in line lengths determined by the printer format
- *Copy-to-Address* – provides the capability to terminate a copy mode at a specified tape address

The optional features are described in the next section of this book.

## CONFIGURATIONS

### Tape Cassette System Configuration

The tape cassette system configuration is determined by the type of tape cassette system used and the optional features desired with the unit. The optional features are added to the cassette system in two groups: feature groups A and B for tape cassette system type 0866-00 (or -01), and two corresponding groups, D and E, for tape cassette system type 0866-02 (or -03). The features associated with these groups are shown in Figure 6.

### Device/Terminal Configuration

The cassette system is connected to the controlling terminal through an auxiliary interface which is part of the terminal. For online selection of the device, the cassette system is designated by four device identifiers (DIDs). Each tape cassette transport uses two DIDs – one for the read mode and one for the write mode. The number of tape cassettes connected to a terminal is therefore dependent on the available DIDs. (Refer to the applicable terminal documentation for complete configuration details.)

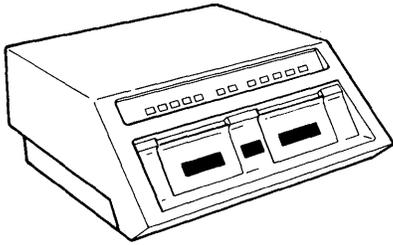
When the optional list feature is used in a UNISCOPE terminal/cassette system configuration, a printer is also connected to the auxiliary interface of the terminal.

If the communications system configuration contains a UNISCOPE 200 terminal, tape cassette system type 0866-02 (or -03) must be used. This tape cassette system is designed to accommodate the larger display capacity of the UNISCOPE 200 terminal and can also be adjusted by the Sperry Univac customer engineer for operation with the UNISCOPE 100 terminal.

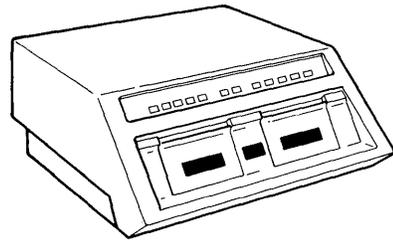
## CONTROLS AND INDICATORS

The tape cassette system contains easily used controls and indicators for selecting and performing offline operations. The following tables summarize the control and indicator functions. Complete operator instructions are contained in the operator references listed earlier in the book.

TYPE 0866-00 (OR -01)

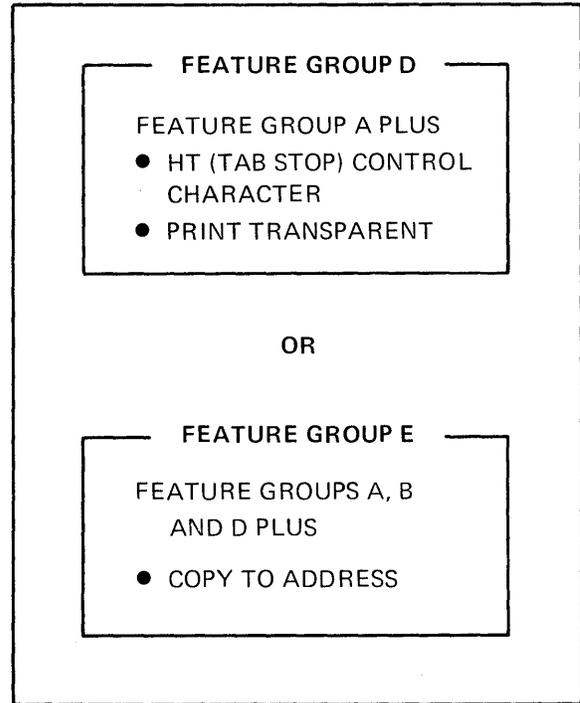
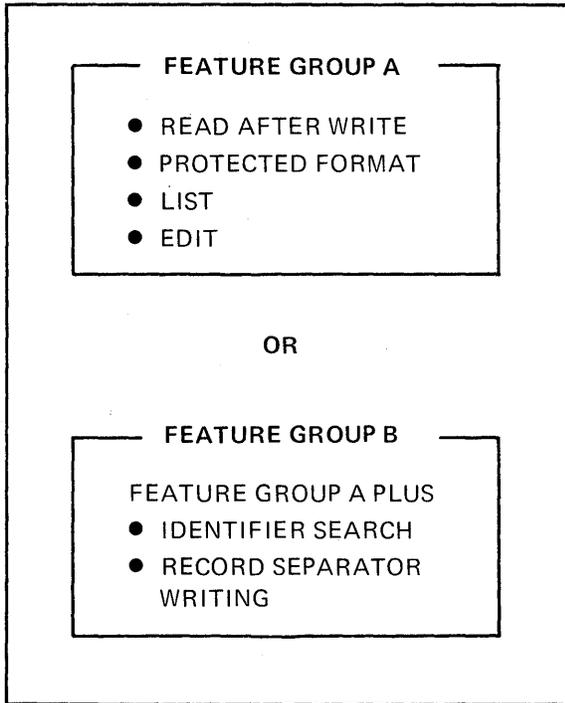


TYPE 0866-02 (OR -03)



INCLUDES STANDARD FEATURES PLUS OPTIONAL

INCLUDES STANDARD FEATURES PLUS OPTIONAL



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Figure 6. Tape Cassette System Configurations

### Operator Controls

Tape cassette system controls are listed in Table 1. Unless otherwise indicated in the table, the controls are located on the front face of the cassette system. (See Figures 7 and 8.) Except for the PRINT TRNSPRNT switch, the controls for optional features appear on every unit. The print transparent feature is offered only with tape cassette system type 0866-02 (or -03).

### Indicators

The cassette system indicators, their colors, and their purposes are summarized in Table 2. These indicators are located above their associated switches. (See Figure 7.) The indicators for optional features appear on every unit but are functional only on units equipped with the optional features.

Table 1. Operator Controls (Part 1 of 2)

Control	Function
<b>STANDARD FEATURES</b>	
<b>READ</b>	Selects the operator-controlled read operation.
<b>WRITE</b>	Selects the operator-controlled write operation.
<p><i>NOTE:</i></p> <p><i>Except in edit mode, all push-type controls are electrically interlocked so that only one function can be selected at a time. Edit and list switches are the only functions that can be selected concurrently.</i></p>	
<b>SEARCH</b>	Puts the cassette system into an operator-controlled search mode.
<b>REWIND</b>	Causes the selected tape transport (CASS 1 or CASS 2) to position its tape by rewinding at 120 inches per second to clear leader, homes the tape address circuitry, and automatically deselects the cassette system.
<b>STOP</b>	Terminates operation of the selected tape transport, aborting any function in progress, and provides a master clear of the cassette system.



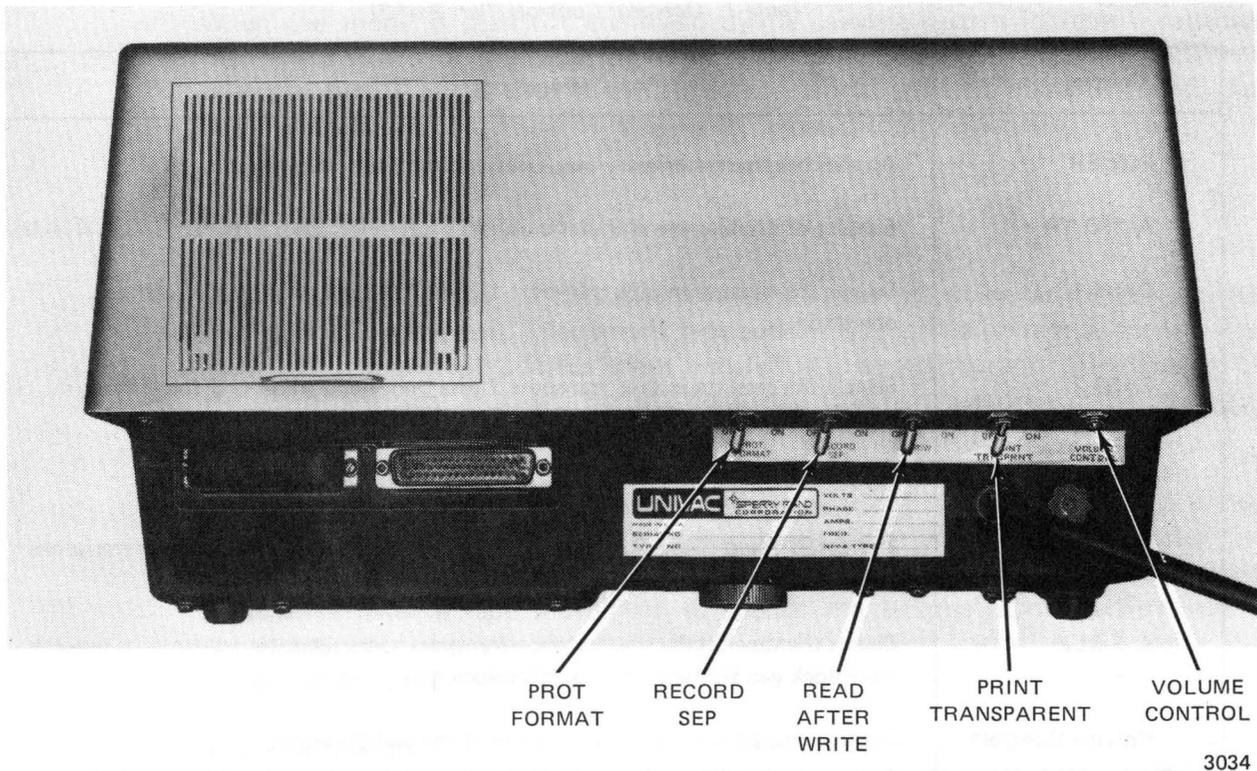
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Figure 7. Operator Controls and Indicators (front view of tape cassette system)

Table 1. Operator Controls (Part 2 of 2)

Control	Function
POWER	Applies or removes primary input power to the cassette system.
AUTO TR	Enables or disables the automatic transmit function.
CASS 1	Selects the cassette in tape transport 1 (the left-hand transport) for offline operation.
CASS 2	Selects the cassette in tape transport 2 (the right-hand transport) for offline operation.
	<p><i>NOTE:</i></p> <p><i>The CASS 1 and CASS 2 switches are interlocked so that only one tape transport can be selected at a time.</i></p>
< 1 BLK	Causes the tape on the selected tape transport to be repositioned from its present interblock gap to the preceding interblock gap.
Volume Control*	Turning this control varies the volume of the audible alarm.
<b>OPTIONAL FEATURES</b>	
PRINT TRSNPRNT* (Types 0866-02 or -03)	Enables or disables the print transparent function. If the switch is in the ON position, the carriage return characters generated by the UNISCOPE terminal are suppressed (become transparent to a printer).
R/W*	Enables or disables the read-after-write capability. If the switch is in the OFF position, a normal write sequence will occur. If the switch is in the ON position, a normal write sequence will occur and a simultaneous internal read sequence will verify character parity and block parity of the data just written.
PROT. FORMAT*	Enables or disables the writing of data as protected information. If the switch is in the ON position, designated characters will be replaced by characters SO and SI, and the data enclosed between the designated characters will be protected. If the switch is in the OFF position, a normal write sequence will occur.
RECORD SEP.*	Enables or disables the writing of record separators. If the switch is in the ON position, record separators will be written in place of designated characters. If the switch is in the OFF position, a normal write sequence will occur.
LIST	Enables or disables the ability of the cassette system to initiate an auxiliary interface data transfer following a read sequence. When the switch is pressed on, a print command is inserted into the input data stream of an offline read operation immediately ahead of the end-of-text (ETX) character. If the switch is in the off position, a normal read sequence will occur.
EDIT	Puts the cassette system into a dual transport mode for editing and copying.

\*These controls are located on the rear of the unit.



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Figure 8. Operator Controls (rear view of tape cassette system)

Table 2. Indicators (Part 1 of 2)

Indicator	Purpose
<b>READ</b> (white)	Lights as a result of either an operator-controlled or processor-controlled read selection, and stays on as long as the read function is selected.
<b>WRITE</b> (white)	Lights as a result of either an operator-controlled or processor-controlled write selection, and stays on as long as the write function is selected.
<b>SEARCH</b> (white)	Lights as a result of either an operator-controlled or processor-controlled selection of the search function, and stays on until successful completion of the search sequence.
<b>POWER</b> (green)	When lit, indicates that primary input power is applied to the cassette system.
<b>AUTO TR</b> (white)	When lit, indicates that the automatic transmit function is enabled.
<b>CASS 1</b> (white)	Lights as a result of either an operator-controlled or processor-controlled selection of cassette 1 (left-hand tape transport) for operation and stays on until cassette 2 is selected.

Table 2. Indicators (Part 2 of 2)

Indicator	Purpose
<b>CASS 2</b> (white)	Lights as a result of either an operator-controlled or processor-controlled selection of cassette 2 (right-hand tape transport) for operation and stays on until cassette 1 is selected.
<b>Address indicators</b>	These five indicators, located between the two tape transport doors, show the current tape address for whichever cassette is in operation. The first digit specifies the tape track and the last four digits indicate the tape address on that track.
<b>PROCEED</b> (green)	Lights to indicate that an operation (such as read, write, or search) can be attempted; goes out when an operation is in process; and relights when the operation has been successfully completed, indicating that another operation can be accepted.
<b>WRITE 1 PROTECT</b> (white)	Lights when a write-protected cassette is in tape transport 1 with the transport door closed, indicating that write selection is inhibited. Stays on until the transport door is opened.
<b>WRITE 2 PROTECT</b> (white)	Lights when a write-protected cassette is in tape transport 2 with the transport door closed, indicating that write selection is inhibited. Stays on until the transport door is opened.
<b>CHECK</b> (red)	<p>Lights when any one of the following conditions occurs:</p> <ol style="list-style-type: none"> <li>1. A parity error is detected during a read operation.</li> <li>2. A timing error is detected during a read or write operation.</li> <li>3. A character parity or block parity error is detected during a write operation with the read-after-write function enabled.</li> <li>4. A write selection is attempted when the tape is positioned at the end-of-tape hole.</li> <li>5. A selection is attempted without a cassette in the tape transport with the transport door opened.</li> <li>6. A selection is attempted with a cassette inserted backwards (side 2 out).</li> <li>7. A write selection is attempted on a write-protected cassette.</li> </ol> <p>In offline operation, the indicator stays on until any one of the following switches is pressed: STOP, READ, &lt; 1 BLK, REWIND, SEARCH, LIST, EDIT.</p> <p>In online operation, the indicator stays on until a new selection is made.</p>
<b>LIST</b> (white)	Lights whenever the list function is enabled.
<b>EDIT</b> (white)	Lights whenever the edit function is enabled.

## Functional Description

The tape cassette system accepts characters of the American Standard Code for Information Interchange (ASCII) code set, entered by way of a SPERRY UNIVAC terminal. Data is recorded on either of the two magnetic tape cassettes. When the recorded data is needed, an operator or a processor command retrieves the information from the tape cassette system.

The basic tape cassette system operations of reading and writing data are enhanced by the capability to search for the data at high speed, move backward one block, or rewind, all under processor or operator control. These functions and the optional read-after-write, protected-format, record-separator, list, edit, print-transparent, identifier-search, and copy-to-address features are described in the following paragraphs.

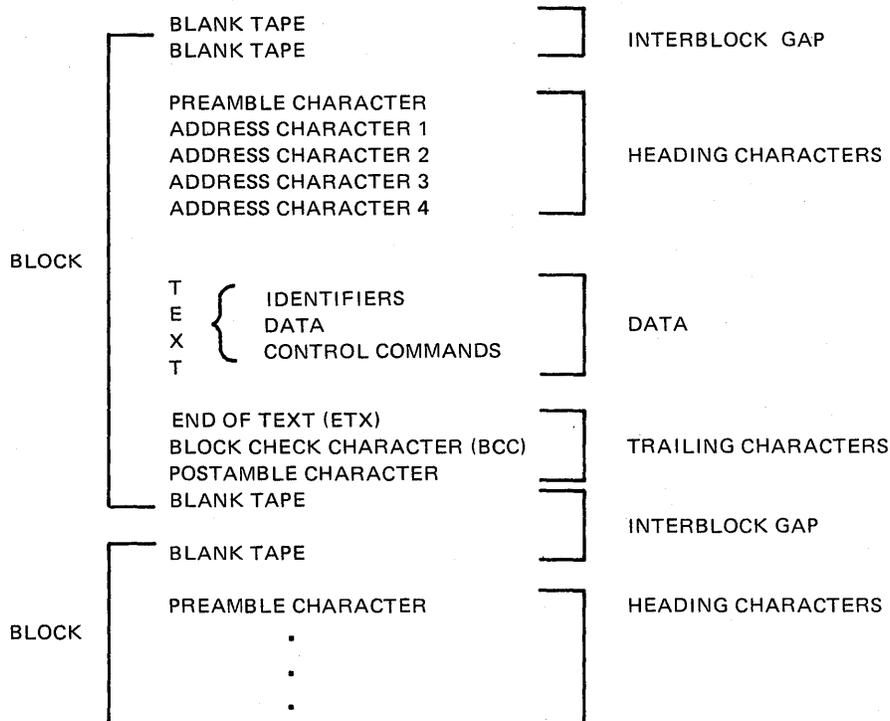
### WRITE/READ IMPLEMENTATION

To write and read tape information, the cassette system uses a specialized tape format and certain starting and stopping conventions.

#### Tape Format

The cassette system writes data in the tape format shown in Figure 9. The heading and trailing characters, generated by the cassette system itself, are essential for communications procedures and locating tape data. The text in any one block consists of the data characters entered by way of the terminal. The amount of text, or length of any one data block, corresponds to the data stored in the buffer of the terminal and transmitted to the cassette system.

The pinch roller on the tape cassette system disengages at the end of each block of data and then reengages for the next block; the amount of tape passed in the pinch roller disengage/engage operation is the interblock gap. One-half of the interblock gap is passed before the disengage operation and one-half after the engage operation.



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Figure 9. Tape Format

### Beginning-of-Tape and End-of-Tape Detection

A small hole is punched in the magnetic-oxide-covered tape a short distance from the clear leader at each end of the magnetic tape. These holes are sensed by the cassette system and are used to identify the beginning of tape (BOT) and end of tape (EOT). The tape must contain BOT and EOT holes for proper operation of the cassette system.

### Load Point

The cassette system begins reading and writing at a position, called the load point, which is a measured distance beyond the BOT hole. The load point address is somewhere between 0025 and 0032; the read load point is slightly closer to the BOT hole than the write load point.

### Selection

To initiate a tape cassette function, the device must first be selected. Selection is a process of designating one of the two tape transports for operation and indicating whether a read or write operation is desired. In offline operation, the operator makes these selections by pressing the appropriate controls. In online operation, the processor sends a selection message through the terminal.

## Write Operation

Data is first entered in the terminal memory or buffer either by way of the processor or by the operator typing the text on the terminal keyboard. After the data has been entered in the terminal, a print command, issued by the processor or initiated by the operator from the keyboard, transfers the data from the terminal or buffer to the tape. The tape cassette system receives and writes the data a character at a time until the auxiliary interface in the terminal signals the cassette system that the end of data has been reached. The cassette system then writes the trailing characters of the data block, including the end-of-text (ETX) character, and stops the tape transport.

If there is no intervening selection of another operation, the next print command is interpreted as a write operation and the cassette system writes another block of data.

## Read Operation

After the desired transport and the read function have been selected, a print command, initiated by the processor or by the operator from the keyboard, transfers the data from the tape to the memory of the terminal. The data is presented to the terminal a character at a time until the entire block has been read back to the terminal. At the end of the data block, the cassette system sends the ETX character to the terminal and stops the transport in the interblock gap.

If there is no intervening selection, the next print command is interpreted as a new read operation and the cassette system retrieves the next block of data from the tape.

## SEARCH

Four types of search can be commanded, in either online or offline operation, to position the tape at a specified location. Combined with the backward-one-block and online report-address functions (described in this section), the search modes give the cassette system an extremely versatile data manipulation and retrieval capability. Search modes are designated as the mode @, mode A, mode B, and mode C searches. Each search mode is started by a search information statement entered in the terminal by way of the processor or by the operator using the keyboard of the terminal.

### Mode @ Search

This search mode is a very convenient and quick method for positioning the tape prior to a write operation. In this search mode, the tape is driven backward or forward at high speed to the tape position indicated by the address supplied in the search information statement. The transport stops when the address in the search

statement matches the address of the cassette system address indicator. Since the physical length of tape associated with the address counting method (tachometer count) will vary from the beginning of tape to the end of tape, this search is not as accurate in search positioning as the other modes.

### **Mode A Search**

In this mode, the cassette system actually reads the tape address recorded in the data block heading. However, prior to the address search, the tape is driven forward or backward at high speed to a tachometer address count of 20 preceding the address indicated in the search information statement. Then the system changes to read speed and compares the tape heading addresses with the search statement. When the address and search statement match, the tape cassette system automatically reads the data block at that location and the transport stops at the next interblock gap on the tape.

This search mode can be useful in determining unknown heading addresses; a search to a nonexistent address results in all of the heading addresses on the tape being displayed in the address indicator in sequential order. The operator may then copy them.

### **Mode B Search**

Used with the optional identifier-search feature, this mode expands the address-search capability to include a search for data characters within the first 16 characters of text. This search is particularly useful when searching for information recorded in a specific format, such as a loan application. The search statement, for example, could contain the loan applicant's name (or up to 16 characters of the name).

To initiate this search, the cassette system drives the tape forward or backward at high speed to an address count of 20 preceding the address in the search statement, and then the search continues at read speed to compare the identifier characters (the applicant's name) with the information recorded on the tape. The search continues until a match is found. From 1 to 16 identifier characters may be supplied in the search statement in addition to the address or approximate address of the data. When the search is complete, the block is read and the transport is stopped at the next interblock gap.

### **Mode C Search**

This is a read-speed-only search for use with the optional identifier-search feature. No tape address is required in the search information, only the track number and the identifier characters. Although the mode C search is slower, it provides a search capability which can be used without building and saving an extensive tape directory.

When the mode C search is commanded, the cassette system initiates a forward read-speed search of the tape track indicated to compare the identifier characters with the first 1 to 16 data characters in the blocks. When a match is found, the block is read and the transport is stopped at the next interblock gap.

## ADDRESS REPORTING

Tape-position addresses are displayed, as they are counted by the tachometer, on the face of the cassette unit. The current tape address is recorded on tape as the block is written, but this block address is not transferred in a read operation. However, with the use of a special processor control command (the report-address command), the block addresses written by the cassette system can be supplied to the processor.

If the address is requested following a write operation, the address reported is the one recorded in the heading of the block just written. Any subsequent report-address command after the same write operation will still give the same address. It takes a tape movement to change the address reported. However, a report-address command issued during a read or search operation will cause the current address to be reported.

The report-address command would probably be used most often to build a tape directory. Offline, such a directory must be determined from the address indicators.

## REWIND

The tape cassette system is capable of performing a high-speed rewind in offline or online operation. When the REWIND switch is pressed (offline), all other functions are deselected and the tape rewinds at high speed to the clear leader at the beginning of tape. Online, a high speed rewind is accomplished by performing a mode @ search to address 0000.

## BACKWARD-ONE-BLOCK POSITIONING

This function can be commanded online or offline. Pressing the < 1 BLK (backward one block) switch offline or initiating the command online causes the tape to move from its present interblock gap to the first preceding interblock gap. If no data is encountered, the tape moves to the interblock gap preceding the first data block encountered, or until the beginning of tape is encountered or timing circuitry stops the operation. After the tape is repositioned, the cassette system is automatically placed in the read mode; a print command will then initiate a read operation.

The backward-one-block function is extremely useful in tape cassette operation. The function can be used for simply rereading data or for a quick search of bypassed data. It is especially useful in error detection. Written data in which an error is detected can be quickly and easily rewritten, online or offline, by performing a backward-one-block function and rewriting the data.

## **PARITY GENERATION AND CHECKING**

Parity generation and checking are standard in the tape cassette system. Both character parity and block parity are used to check the accuracy of data transfers from the auxiliary interface in the terminal.

## **ERROR DETECTION, REPORTING, AND RECOVERY**

Errors detected by the cassette system are identified with a special error code in the data and with audio and visual indications in the cassette system. The special error code, which is usually a blinking symbol, can be selected by the user and will be installed at the factory or at the operating site by the Sperry Univac customer engineer.

Complete error reporting and recovery procedures are contained in the operator and programmer reference manuals noted earlier in this book.

## **OPTIONAL FEATURES**

The optional features available for the tape cassette system are being used by many customers to help them perform their data collection operations. The features are provided in two groups: feature groups A and B for tape cassette system type 0866-00 (or -01) and feature groups D and E for tape cassette system type 0866-02 (or -03). The packaging of these features is explained in the preceding section. A functional description of what these features do is provided in the following paragraphs.

### **Read After Write (Group A)**

The read-after-write feature allows the cassette system to verify character parity and block parity on a block of data as the data is being written. Data is written as the tape passes over the write head; the tape then passes over the read head and is read. Any error found in character parity or in the block check character causes the write operation to stop, the CHECK indicator to light, and the error status to be retained by the cassette system. Error reporting and recovery procedures allow the tape to be repositioned for correction of the erroneous data.

## **Protected Format (Group A)**

This feature allows data entered from a UNISCOPE display terminal, either manually or by processor control, to be recorded on tape as protected data. Two characters, selected by the user, are specified to bracket this data. These characters are decoded and translated by the cassette system to SO (shift out) and SI (shift in) characters for recording on tape. The first character, representing SO, is placed on the terminal screen immediately before the data to be protected, and the second character, representing SI, is placed immediately after the data to be protected. When the data bracketed by SO and SI is read from the tape to the UNISCOPE display terminal, that data will be protected on the terminal.

The protected-format feature is used to create "forms" for routine data entry. The forms are entered on the tape cassette ahead of time and placed in a filing cabinet, or other storage container, for use when the form information is collected.

## **Protected-Format Enhancements**

Tape cassette systems operating with UNISCOPE 200 terminals are provided with significant enhancements to the protected-format feature. These enhancements are associated with auxiliary interface feature 1247-01, which is always used with the UNISCOPE 200 terminal interfaced with a cassette system, and may be used with later models of the UNISCOPE 100 terminal. The Sperry Univac customer engineer can provide further information for UNISCOPE 100 terminal users.

When operating online by way of auxiliary interface feature 1247-01, the cassette system does not require translation characters to bracket protected data because the auxiliary interface is capable of transferring the actual SO and SI characters to the cassette system. Thus, processor-generated SO and SI characters may be used as protected-format limiters. When the protected data is sent to the cassette system, actual SO and SI characters are transferred through the auxiliary interface and placed on tape.

Offline, translation characters are used as format limiters as usual. (SO and SI cannot be entered from the terminal keyboard.) However, protected data transferred from tape to the terminal will not only be protected on the terminal, but may be recorded on tape again without the use of additional translation characters. The transfer process can be repeated as many times as necessary to copy additional formatted tapes for use in other tape cassette system locations.

## **List (Group A)**

This feature is for use offline to permit the cassette system to initiate a print operation automatically, after each read operation, on a printer connected to a UNISCOPE display terminal. In this way a printed copy of the tape contents can be produced by pressing the PRINT key on the terminal once, at the beginning of the listing, rather than once per block.

### **Edit (Group A)**

This feature is also for use only in offline operation. The edit function permits the cassette system operator to use both transports to edit and modify one tape and copy the edited result onto the other tape. One block of data is read from tape and displayed on the UNISCOPE terminal screen or printed on the printer. The operator edits the data on the screen and presses the key to transfer the edited data to the tape cassette system, which writes it on the other tape cassette. The next block is automatically read and displayed after the first block is transferred.

This function can also be used to copy the data blocks from one tape to another tape continuously, simply by entering the copy command on the terminal and then transferring the command to the cassette system. Thereafter, the cassette system automatically inserts the print command at the end of each block.

### **Record Separator (Group B)**

This feature allows the ASCII record separator codes FS, GS, RS, and US to be written within a data block. The separators may be written any number of times within a block. Four user-selected characters, specified to represent these codes, are decoded and translated by the cassette system to the four record separators. The characters selected to represent the record separator codes will be installed by the Sperry Univac customer engineer.

When the record separators are read from tape onto the UNISCOPE terminal screen, the FS and GS characters produce special UNISCOPE symbols, the start-blink and end-blink symbols. The RS character produces a start-of-entry (SOE) symbol. The US character is nondisplayable.

### **Identifier Search (Group B)**

This feature extends the standard address-search capability so that up to 16 data identifier characters may be specified for comparison with the first equal number of characters in a data block for block identification.

### **HT (Tab Stop) Control Character (Group D)**

This feature enhances the protected-format feature on tape cassette system type 0866-02 (or -03). With this feature installed, the HT control character (tab stop) can be designated as a translation character for the SO or SI function. A tab stop location is then set by the operator or through processor control. Pressing the tab key moves the cursor to the tab stop location and defines the SO or SI location. When data is transferred to tape, the HT character is decoded and written on tape as an SO or SI character.

### **Print Transparent (Group D)**

This feature enhances the list feature by allowing the printer to print tape data in line lengths determined by the printer format, rather than the format determined by the terminal line length.

When the optional circuitry is provided for this feature, the print transparent function can be selected by a switch on the back of the cassette system. With the switch activated and the cassette system in list mode, the cursor-return characters generated by the UNISCOPE terminal at the end of each line of data are suppressed (become transparent to the printer).

### **Copy to Address (Group E)**

The copy-to-address feature, used only in offline operation, provides the capability to terminate a copy mode at a specific heading address.

# Applications

SPERRY UNIVAC Series 600 Tape Cassette Systems are finding applications in many types of industry, businesses, service organizations, and education. In all of these varied applications, however, the basic design function — offline use by an operator during hours when the processor is busy — is proving the tape cassette system to be an economical and efficient means of data storage. Offline use by the operator not only saves operator time, but communications line and processor time. When an operator completes the daily input of data to the cassette system, the tape cassette containing the information is left in the transport and the cassette system is turned on. Then, during low-traffic periods or during a second shift, the information is transferred across the data communications lines for processing.

In many applications involving the UNISCOPE display terminal, the data on the tape cassette used for final transfer of information to the processor is compiled from a previously formatted tape. The tape is prepared using the protected-format features of the display terminal and the tape cassette system. The recommended method of recording a protected-format tape, and the data collection and transmission procedure used in many customer applications, is illustrated in Figure 10.

Types of businesses and the applications in which they are using the tape cassette system are described in the following paragraphs.

## APPLICATIONS EXAMPLES

### Manufacturing and Distribution

A lumber company uses the Series 600 Tape Cassette System for preparing order information. A previously formatted tape is placed in the left tape transport (CASS 1) of the unit and displayed on a UNISCOPE terminal. Order information is entered in the format on the screen and the completed form is transferred to tape in the right tape transport (CASS 2). This second tape is stored temporarily and later placed in CASS 1 for unattended transmission to a central processor. The order information is processed, integrated with order information from a second location (also entered from a tape cassette system), and the finalized information returned to a data tape in CASS 2. The cassette system is then placed in the list mode, and the data is printed on a SPERRY UNIVAC Communications Output Printer for use by

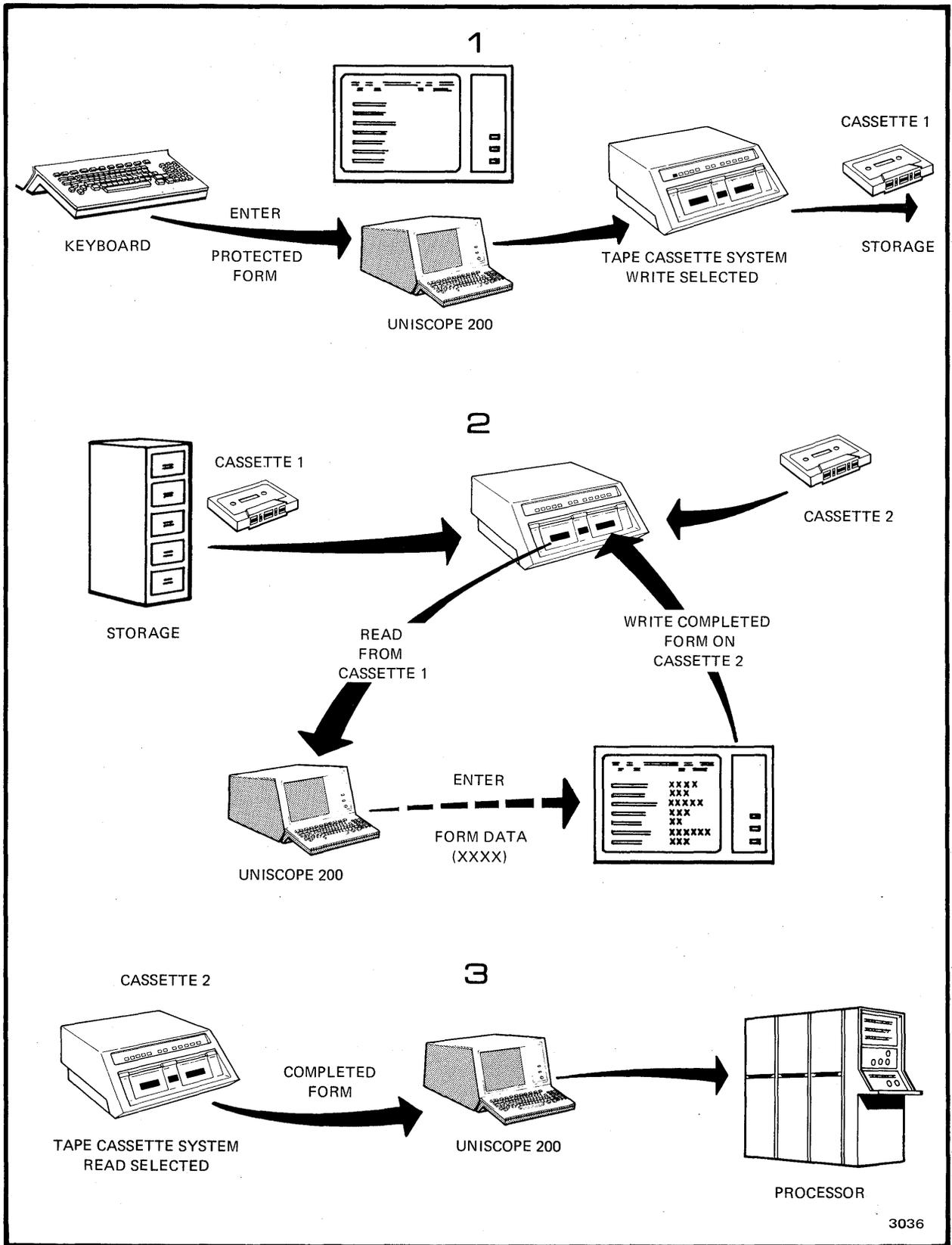
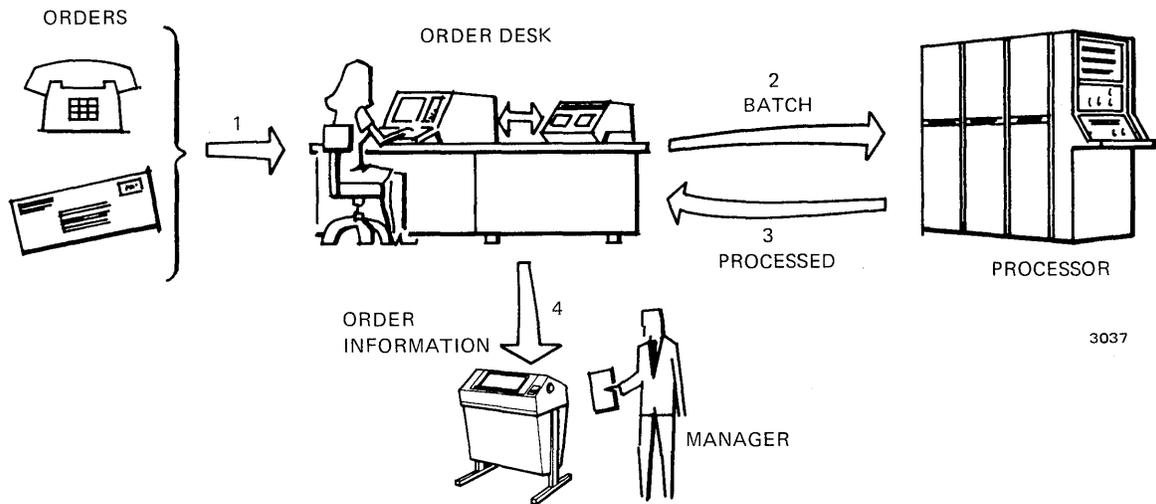


Figure 10. Protected-Format Tape Recording Method and Application

plant managers. In the near future, it is planned to use the system to print bills of lading in addition to the report information described.

An envelope manufacturer and distributor uses 12 cassette systems, located at remote sites, for offline data collection. Data stored on the tape cassettes is transmitted to the central processor, and report data is returned to the tape cassette in print format. The list feature of the cassette system is used to obtain a final printout of the data on a SPERRY UNIVAC Communications Output Printer. Several daily and weekly reports are obtained in this manner.

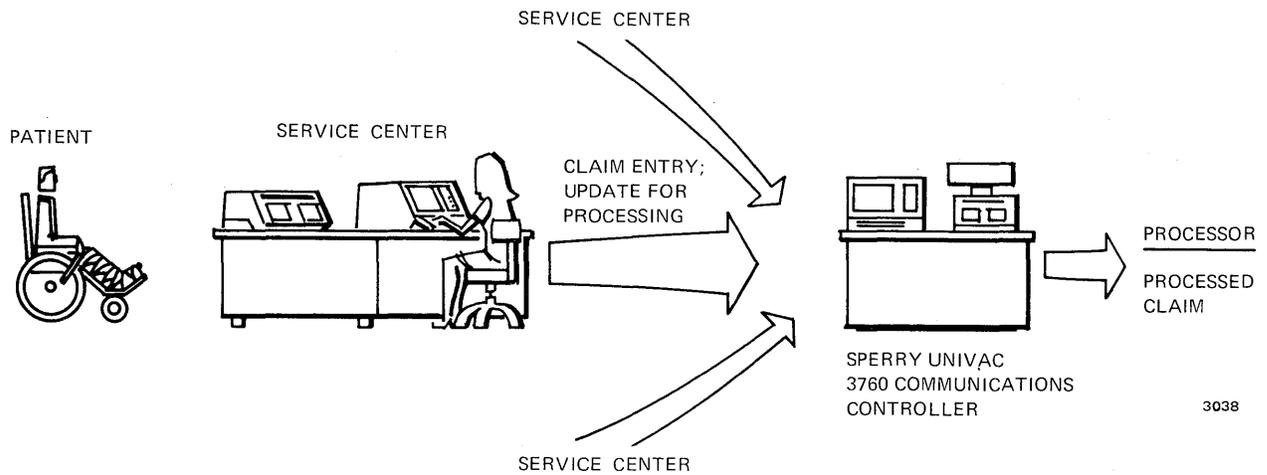


## Banking

A large bank uses 16 Series 600 Tape Cassette Systems in three locations to provide data storage for updating personal trust accounts. Information to update the accounts is collected offline using the UNISCOPE terminal keyboard and the tape cassette system. The collected data is sent in large "batch-like" transmissions to a SPERRY UNIVAC 3760 Communications Controller which performs verification and checking of the data. This information is returned to a data tape on the cassette system. The data is then available for recall by the processor during low-traffic periods. The information on the data tape is used by the central processor to update the trust accounts.

Another bank is using display terminal/tape cassette systems placed in over 150 separate locations to process agricultural loans. Offline, a previously formatted tape containing the loan application is inserted in CASS 1 and displayed on the terminal screen. Loan data is entered on the form in the terminal and the completed form is recorded in CASS 2. Information is transmitted to a central bank location for final processing of the loan.

The tape cassette system is also being used by a bank as a backup for the central processor. If the central processor is unavailable, data is entered in the tape cassette system for later transmission to the processor.



### Medical Care

A medical service company uses a network of 30 UNISCOPE Display Terminals and Series 600 Tape Cassette Systems to process medical claims for Medicare beneficiaries. When a claim is made at one of the terminal locations, a previously formatted tape is placed in the tape cassette system, a search is performed for the proper form, and the claim information is entered in the form on the display screen. Previously entered information can be corrected or updated at this time. The new information is then entered on CASS 2. Data is accumulated on CASS 2 on a daily basis. At the end of the day, the terminal and cassette system are prepared for unattended transmission to a processor through a SPERRY UNIVAC 3760 Communications Controller.

In this application, the previously formatted data is prepared using the protected-format feature of tape cassette system type 0866-02. With this unit, a master tape containing protected information is copied as many times as required and the protected-format codes are transferred to each of the copied tapes. These tapes are then distributed among each of the 30 locations requiring the tapes.

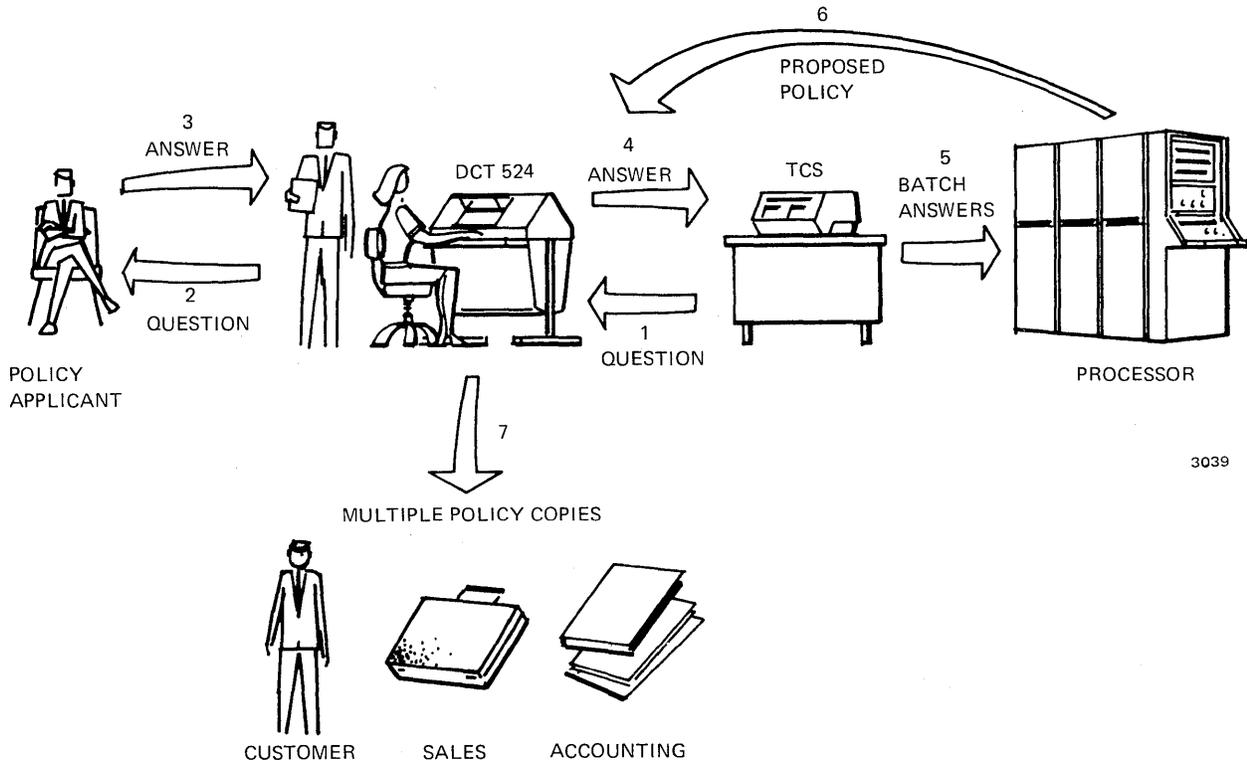
### Wholesale/Retail

A large seed supplier uses the tape cassette system and UNISCOPE 100 terminal to handle an order entry situation at a remote location. Inventory status is placed in the tape cassette system from a central processor and is updated during low-traffic periods at night. The next day, a sales clerk, sitting in front of the terminal and tape cassette system, answers telephone inquiries regarding availability of stock orders. The clerk uses the offline search capabilities of the tape cassette system to locate the stock information and answer the order inquiry.

## Insurance

An insurance company is using the Series 600 Tape Cassette System with a SPERRY UNIVAC DCT 524 in a question/answer mode to develop proposed pension plans for their customers. In the question/answer mode of operation, a series of questions is stored on the left cassette (read station) of the cassette system. As answers are keyed into the terminal, they are stored on the right cassette (write station) for later transmission to a central processor.

An agent, interviewing a prospective pension plan buyer, answers the questions obtained from the read cassette, either in series or a question at a time. The answers are entered on the write cassette and transmitted to the host for processing. The information is used to develop a pension plan tailored to meet the customer's needs. When the proposed plan is returned to the DCT 524, it is stored on the read cassette for later printout. Multiple copies are printed on the terminal for use by the customer and the company in reviewing the proposed plan.



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## Education

A group of large universities has established a network of processors and terminals for screening and processing undergraduate applicants. Application information is entered in the Series 600 Tape Cassette System and then placed online to a central processor for analysis of all applications according to category. Information is returned to the cassette system for printout on a SPERRY UNIVAC Communications Output Printer.

## Industry

An international pipeline company uses four UNISCOPE 100 Display Terminals and Series 600 Tape Cassette Systems for a remote payroll and accounting operation. Current payroll information is stored in the tape cassette system by way of the terminal. When all of the data has been collected, the tape is placed in CASS 1 for transmission to the processor. The payroll is prepared by the processor from the tape cassette information, and the processed data is returned to CASS 2 of the cassette system. The list mode is used to print payroll checks offline using a SPERRY UNIVAC Communications Output Printer.

## OTHER SUGGESTED APPLICATIONS

Some other areas and applications where the Series 600 Tape Cassette System is being used, or is planned for use, are:

Stock broker	Used to record transactions that occur between New York opening time and local office time. Transactions recorded on tape are viewed on a UNISCOPE display screen after the broker comes into his office.
Insurance	Used in all phases of data collection in the insurance business. Ideally suited for storing application and claim forms for offline data entry.
City government	Recording tax and property records.
State government	Maintaining driver license files at remote locations, tax information, and welfare services information.
Schools	Stores programmed learning texts for offline use on the display terminal.
Prescription services	Records patient drug allergy histories for recall by pharmacists.
Grocery store	Prepares daily orders offline for later online transmission.
Bootstrap loader (data processing)	Provides storage for a large number of programs, all of which can be accessed rapidly using the unit's search capability. Tapes are also smaller and more easily stored than the paper tapes previously used.

# Specifications

## FUNCTIONAL CHARACTERISTICS

Read/write speed	6 inches (15.24 centimeters) per second
Search/rewind speed	120 inches (304.8 centimeters) per second, average
Recording density	800 bits per inch (2.54 centimeters)
Throughput across auxiliary interface	600 characters per second or 4800 bits per second
Storage capacity per cassette	720,000 characters (with no interblock gaps) 5.76 million bits (with no interblock gaps) 630 data blocks (assuming the maximum block length of 1024 characters for UNISCOPE 100 terminal) 360 data blocks (assuming the maximum block length of 1920 characters for UNISCOPE 200 terminal)
Recording technique	Phase encoding
Recording tracks	Two per transport
Error checking	Character and block parity (odd parity)
Maximum operating distance from controlling terminal	200 feet (61 meters)

## PHYSICAL CHARACTERISTICS

Height	8-1/8 inches (20.64 centimeters)
Width	16-1/4 inches (41.27 centimeters)
Depth	19-3/4 inches (47.62 centimeters)
Weight	34 pounds (15.42 kilograms)

## ENVIRONMENTAL REQUIREMENTS

Ambient temperature	40 to 105 degrees F (4.4 to 40.5 degrees C)
Humidity level	5 to 95 percent

### NOTE:

*Magnetic tape characteristics can limit the specified environmental limits. Consult the Sperry Univac customer engineer for further information.*

## POWER REQUIREMENTS

Frequency	50 or 60 Hz Type 0866-00 or 0866-02 required for 60 Hz Type 0866-01 or 0866-03 required for 50 Hz
Voltage (power supply can be tapped for one of the operating voltages by Sperry Univac customer engineer)	100 volts AC, 50 or 60 Hz 120 volts AC, 50 or 60 Hz 220 volts AC, 50 or 60 Hz 240 volts AC, 50 or 60 Hz
Power required	120 watts

## TAPE CASSETTE DATA

Tape length	300 feet (91.44 meters)
Tape width	0.150 inch (3.81 millimeters)
Tape thickness	0.001 inch (0.025 millimeter)
Approved sources	Information Terminals Corp. Sunnyvale, California 94086  Minnesota Mining and Manufacturing Co. St. Paul, Minnesota 55101  Amperex Electronics Corp. Slaterville, Rhode Island 02876
Tape cassette part number	Sperry Univac Part Number 2891001-00 (recognized by approved sources)

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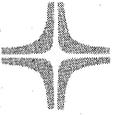
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