

## "COMM-STOR\*" II COMMUNICATIONS STORAGE UNIT DESCRIPTION AND OPERATION

### 1. GENERAL

**1.01** This section covers the COMM-STOR II Communications Storage Unit manufactured by Sykes Datatronics, Incorporated. This unit performs the following five functions: message entry, storage, retrieval, editing, and communications.

**1.02** Whenever this section is reissued, the reason(s) for reissue will be listed in this paragraph.

**1.03** The interfacing requirements of COMM-STOR II Communications Storage Units conform with Electronic Industries Association (EIA) RS-232C.

**1.04** The description and operation of the COMM-STOR II Communications Storage Unit are contained in the attached reprint of the practice prepared by Sykes Datatronics, Incorporated.

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# Comm-Stor II COMMUNICATIONS

## STORAGE UNIT

### DESCRIPTION AND OPERATION

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RAM MEMORY EXPANSION .....	7	1.01 This section covers the description and operation of the Comm-Stor® II Communications Storage Unit, hereafter referred to as the Comm-Stor II unit. The unit performs the following five functions: message entry, storage, retrieval, editing, and communications.	
Comm-Stor DISKETTES .....	8	1.02 Whenever this section is reissued, the reason for the reissue will be listed in this paragraph.	
A. Configuration Diskettes .....	8	1.03 The Comm-Stor II unit provides full ASR (automatic sending and receiving) capabilities to DATASPEED® 40/1, 40/2, 43 Teleprinters, and other asynchronous terminals with Electronic Industries Association (EIA) interfaces. The Comm-Stor unit consists of a microprocessor based controller and one or two flexible diskette drives (floppy disks) that are able to store up to 256,000 characters	
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Fig. 1—Front View of the Comm-Stor II Unit

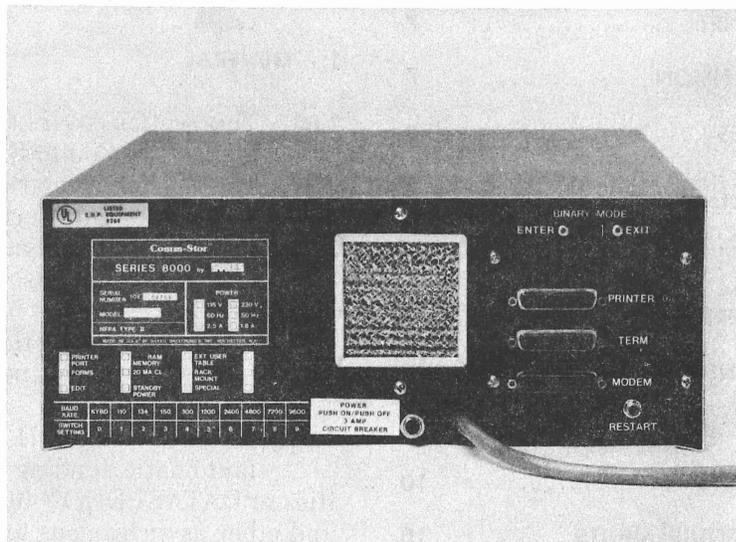


Fig. 2—Rear View of the Comm-Stor II Unit

each on a single-sided, standard density, soft sectored diskette. In a station arrangement, the Comm-Stor unit is positioned between the data set and the terminal, and, optionally, the printer.

- 1.04** The interfacing requirements of the Comm-Stor conform with EIA RS-232C.

## 2. DESCRIPTION

- 2.01** Comm-Stor is available in two models: Model 8120A (Single Drive) and Model 8220A (Dual Drive). Options include:

Printer Port

Standard Forms/Extended Forms Operation

3740 Format Conversion

Rack Mount Cabinet

RAM Memory Expansion

A label on the back of each unit indicates those options that are included in the unit.

- 2.02** The front panel of the Comm-Stor unit has several indicators to assist the operator. Two of the indicators, READY and BUSY, are duplicated in a dual drive unit to provide information about each drive. The function of each indicator (Fig. 1) is as follows:

### FRONT PANEL INDICATORS

**RESTART:** A switch/indicator to show when power is turned on to the unit. It also recycles the system when necessary during operations.

**READY:** An indicator which signifies that a diskette has been properly inserted in the drive (when not in Standby Mode).

**BUSY:** An indicator which signifies that data is being transferred to or from the diskette. A diskette should not be removed when the BUSY indicator is illuminated. To interrupt an operation, a RESET command should be entered. The operator should wait until the BUSY lamp extinguishes before removing the diskette.

**CARRIER:** Provides an indication of the presence of a Carrier Detect Signal from the modem. When

the modem is in use in the Full Duplex mode, the indicator should remain illuminated.

**STATUS:** This indicator has a dual purpose. First, it indicates that data is being transferred to or from any of the ports. The lamp will glow at half brilliance when data is being transferred. Second, it indicates the presence of a parity error. If a parity error occurs and data is not being transferred through any of the ports, it will illuminate at full brilliance. When a parity error occurs and data is being transferred through a port, the lamp will illuminate at half brilliance, but will return to full brilliance after completion of the data transfer. After a parity error, the lamp is turned off by entering a RESET command.

### PERIPHERAL DEVICE CONNECTIONS

- 2.03** A terminal, printer, and data set may be connected to the Comm-Stor unit through industry standard ports on the rear of the unit (Fig. 2). No special wiring of the cables is necessary and all leads are wired pin-for-pin.

- 2.04** The cable from the terminal is connected to the port labeled TERM. This cable should have a male plug in accordance with industry standard procedures. If the user has the printer port option, the cable from the printer is connected to the port labeled PRINTER. This cable should also have a male plug in accordance with industry standard procedures. If the printer port is installed but not presently in use, the connector may be left unterminated. The cable from the modem is connected to the port labeled MODEM. This cable should have a female plug in accordance with industry standard procedures.

### INTERNAL HARDWARE

#### The Comm-Stor Controller

The Comm-Stor controller (Fig. 3) is designed around a microprocessor with all operating software contained in ROM (Read Only Memory). All operational features are available when the unit is powered on; programs cannot be loaded into the system from diskette. In addition to the ROM memory, four other subsystems are directly accessed by the microprocessor during normal operation: RAM memory, CMOS-RAM memory, diskettes, and the communications interfaces.

**RAM (Random Access Memory)**—RAM memory provides temporary storage of data received through the ports, and storage locations for internal information required by the microprocessor. The standard Comm-Stor II unit is equipped with 2048 bytes of RAM, half of which is accessible to the user and may be assigned as a real time buffer at either the terminal or modem port. The Configuration diskette is used to assign RAM memory for buffering.

**CMOS-RAM Memory**—CMOS memory is a non-volatile type of RAM memory which stores user defined equipment configuration. When the Comm-Stor II unit is turned off, the contents of CMOS-RAM memory are maintained by a 4.5 volt battery. The current requirement of this memory is so low that battery life is approximately equal to normal shelf life (one year). All operating parameters such as commands, control codes, communications protocol, answerback messages, and operating modes are stored in CMOS-RAM memory. The parameters remain in memory as long as the battery is not removed when the unit is powered off. The information stored in CMOS-RAM memory may be altered by the operator using the terminal keyboard with a Configuration diskette in the drive.

**Diskette Drive(s)**—The microprocessor has direct control of the diskette drive(s) (one or two) installed in the Comm-Stor II unit. Data is read from or written to the diskette(s) as required by the user.

**Communications Interface**—All data transfers through the data communications interfaces occur through the microprocessor. The microprocessor has the ability to control the outgoing EIA leads and senses the incoming activity and control line transitions at the three ports. The ports are separate from each other, and are accessed by specific distinct commands. (Refer to Table A.)

The Comm-Stor controller comprises a minimum of four and a maximum of five printed circuit (PC) cards. These are inserted into a base card assembly and held in place by a wire-form card retainer. The five PC cards are: the Microprocessor Card, the EIA Interface Card, the ROM Memory Card, the Disk Interface Card, and a card for optional features.

The optional feature card may be one of the following: Printer Port/4K RAM, Printer Port only, or 4K Expanded RAM only.

### 3. OPERATIONAL FEATURES

#### MESSAGE STORAGE

**3.01** The Comm-Stor unit has the ability to store new files. The ENTER command prepares Comm-Stor to receive these files from the terminal; the RECEIVE command prepares Comm-Stor to receive data entered through the modem port. Line Cancel and Character Delete editing functions are available when entering data from the terminal.

**3.02** A file which is no longer needed is deleted from the diskette by using the CANCEL command. This provides available space for new files. Files may also be copied from one diskette to another in a dual drive system. When a file is CANCELLED, the appropriate file name is deleted from the Directory.

#### DISKETTE DIRECTORY

**3.03** As files are stored, the operator assigns each a FILE NAME which is automatically entered into a Directory. This Directory may be displayed on the terminal, printer, or sent to a remote computer via the modem port. All or portions of the Directory may be listed, either in the sequence the names appear in the Directory or in alpha-numerical order.

**3.04** A single file name or a group of file names may also be displayed or printed in sequential or alpha-numerical order upon the operator's request. By using the SEND command, file names may be sent to the remote computer via the modem port.

#### VARIABLE BIT RATE SETTINGS

**3.05** Operators who frequently change the bit rate settings at different ports, may do so using commands from either the terminal or computer. Any one of the 15 bit rate settings in Table B may be selected.

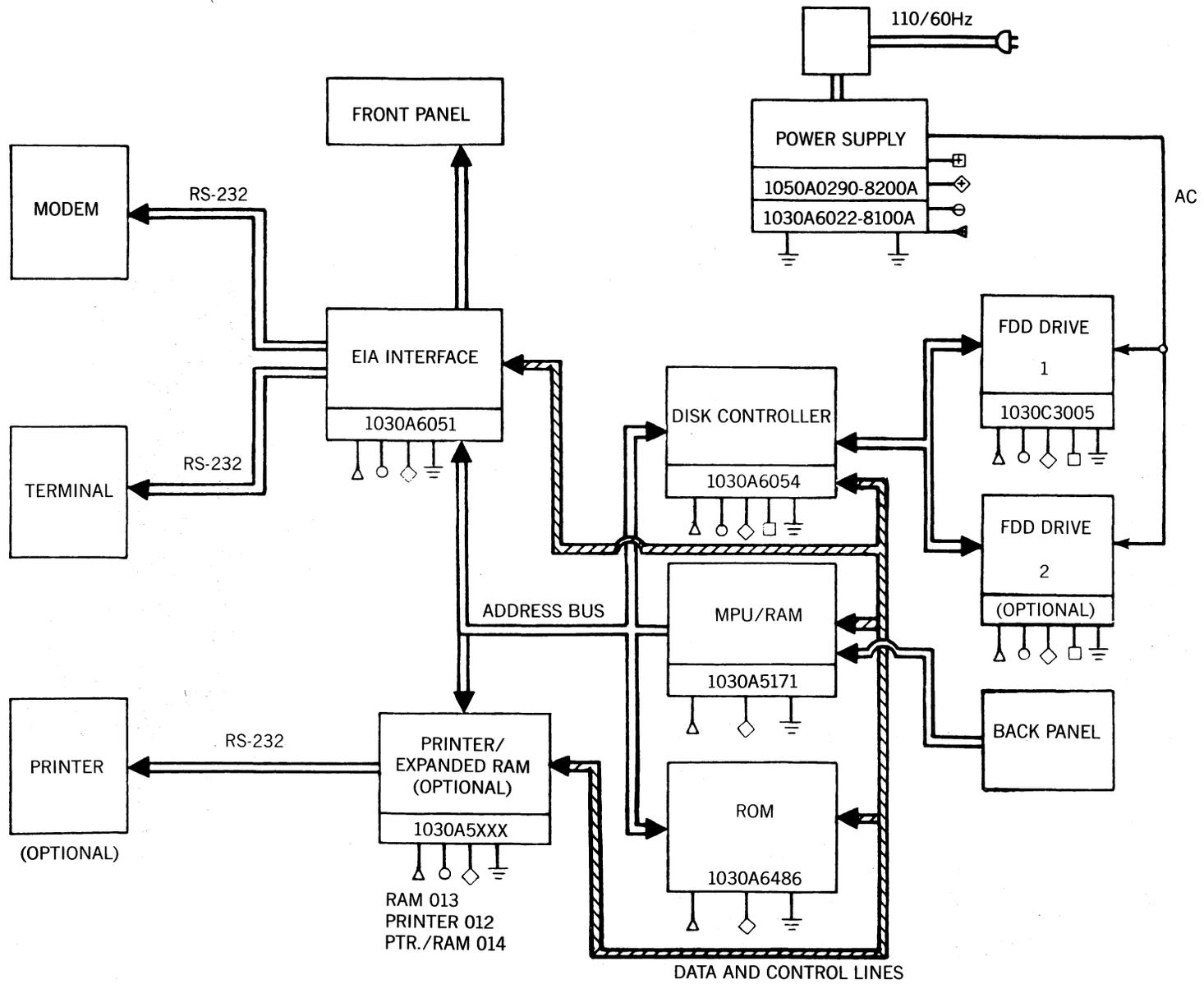


Figure 3—Comm-Stor II Block Diagram

TABLE A

## EIA RS-232C CONNECTIONS

PIN	DESCRIPTION	TERMINAL PORT		MODEM PORT		PRINTER PORT	
		USED	DIRECTION	USED	DIRECTION	USED	DIRECTION
1	Chassis Ground	X	—	X	—	X	—
2	Transmitted Data	X	in	X	out		
3	Received Data	X	out	X	in	X	out
4	Request to Send	X	in	X	out		
5	Clear to Send	X	out	X	in		
6	Data Set Ready	X	out	X	in	X	out
7	Circuit Ground	X	—	X	—	X	—
8	Carrier Detect	X	out	X	in	X	out
11	Secondary Request to Send	X	in	X	out	X	in
12, 19	Secondary Carrier Detect	X	out	X	in		
20	Data Terminal Ready	X	in	X	out	X	in
22	Ring Indicator	X	out	X	in		

**Note:** Direction refers to signal direction with respect to the Comm-Stor unit at each port (e.g., transmitted data is out of Comm-Stor on Pin 2 at the modem port).



Figure 4—Comm-Stor II Rack Mount Installation

**TABLE B**  
**AVAILABLE BIT RATES**

50	300	2400
75	600	3600
110	1200	4800
134	1800	7200*
150	2000	9600*

\*All Comm-Stor II ports are limited to 4800 bps batch input. However, they can output and receive conversationally at 7200 bps or 9600 bps.

#### **EXTENDED USER COMMAND TABLE**

**3.06** The User Command Table is a portion of memory in which the user may store frequently used sequences of commands which are normally executed by the operator. The command sequences are executed when a trigger character is received at either the terminal or modem port. This allows the operator to execute a frequently used sequence of commands using one or two keystrokes. Optionally, the command sequence may be initiated during the power-up operation.

**3.07** When the trigger character (usually a control code) is entered, the Comm-Stor searches the User Command Table and selects that series of commands associated with that character; the operation is then executed automatically.

**3.08** Each string of commands and its respective trigger character are placed in the Comm-Stor's memory during the configuration process.

#### **FILE EDITING**

**3.09** The Editor allows the operator to edit an entire file instead of using only Line Cancel and Character Delete functions. This feature provides character string searches and replacements, as well as "line-oriented" editing capabilities. Line editing operations consist of LIST, NUMBER AND LIST, INSERT, DELETE, REPLACE, APPEND, and CLEAR BUFFER.

**3.10** A file to be edited is stored in a temporary "scratch pad" area on the diskette. After the file is edited, it is placed in permanent storage on the diskette. The file may be recalled to the scratch pad area at any time for additional editing. The size of the scratch pad area is specified when the User Diskette is created. It may contain a maximum of 254 lines of text at any one time.

#### **STANDARD/EXTENDED FORMS**

**3.11** The Standard Forms option provides operator prompted "forms fill-in" capability. Once a form is created by the user and stored on diskette, it may be recalled at any time by the operator for data entry or editing. Each form consists of fixed information which gives the form its structure and information entered by the operator which may vary with each form and file. The entire form, or just the information entered by the operator, may be sent to a remote computer, displayed on a terminal, or printed.

**3.12** The Extended Forms option greatly increases forms fill-in capabilities. Comm-Stor automatically checks and verifies the accuracy of operator information and assists the operator in other ways which significantly increase the rate of data entry.

#### **3740 FORMAT OPTION**

**3.13** The 3740 Format option provides the user with complete compatibility between Comm-Stor formatted diskettes and IBM formatted diskettes. The user may write, cancel, or display IBM data set labels; convert Comm-Stor files from ASCII to EBCDIC, and vice versa.

#### **STANDBY DISK POWER**

**3.14** Standby Disk Power allows the operator to turn off the disk drive motors if the Comm-Stor unit is to be idle for an extended period. This is useful for those times when the unit is unattended and is used only when a computer calls for a data transfer. When the Comm-Stor performs the Auto-Answer operation, it automatically starts the disk drive motors. The diskette is up to speed in 2 seconds and ready before the line connection sequence is completed.

#### **RACK MOUNT CABINET**

**3.15** This option provides standard 19 inch rack mount with the RESTART and BINARY switches relocated to the front panel (Fig. 4).

#### **RAM MEMORY EXPANSION**

**3.16** In order to utilize the 3740 Format option, this expanded memory must be installed. The expanded 4K of RAM Memory also allows the user to create a form of 5120 characters as compared

to the 1024 character size available with the standard package. Two additional increments of 4K are available for use with Extended Forms.

**3.17** All or part of the 4K RAM may be allocated by the operator for terminal or modem input buffering. A description of buffering is provided in the "How to Configure... Comm-Stor II" manual.

**Comm-Stor DISKETTES**

**A. Configuration Diskettes**

**3.18** The Configuration diskette allows the user to create User and Refresh diskettes, as well as vary the configuration of the Comm-Stor unit (refer to part 6).

**B. Refresh Diskettes**

**3.19** Once the Comm-Stor unit is configured, it is possible to store this configuration on a diskette called a Refresh diskette. After a Refresh diskette has been created, another Comm-Stor unit can be identically configured by inserting the Refresh diskette and pressing the RESTART button.

**C. User Diskettes**

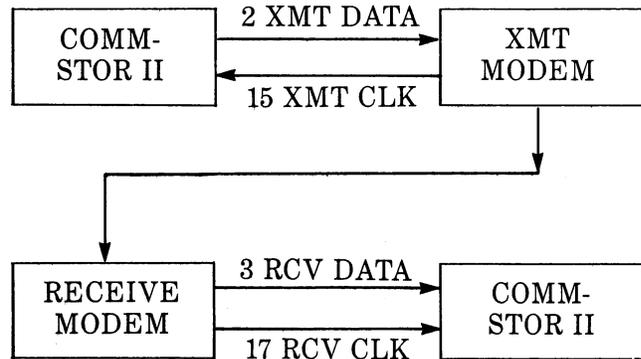
**3.20** The User diskette contains a Directory and is used for all user storage operations. It is created with the Configurator and is initialized with such parameters as the maximum number of characters in the file name and the maximum file length.

**ISOCHRONOUS INTERFACE**

**3.21** Isochronous operation allows transmission and reception of 10 bits, including Start/Stop data characters, through Bell 201 and 208 data sets. This provides an Asynchronous character structure through Synchronous hardware. The start of each character is arbitrarily relative to the character preceding it and following it. The 10 bits of the character are synchronized to the data set clock. This mode of transmission is considered to be "Bit Synchronous/Character Asynchronous".

**3.22** In isochronous operation, there is one master clock (the transmitting data set clock) and all other clocks are synchronized to it. The Comm-

Stor unit receives its clock signals on Pins 15 and 17 of the cable to the data set. Figure 5 provides an illustration of the clock and data signal flow between two Comm-Stor units with the unit on the left transmitting data to the right.



**Figure 5—Clock and Data Signal Flow**

**Comm-Stor COMMANDS**

**3.23** The following commands are available on the standard Comm-Stor II system.

- .E Enter (File).** Prepare the unit to accept a file from the terminal. As the file is entered the current line being input may be edited using the Standard Editing Characters. The file is terminated with the ETX character.
- .R Receive (File).** Prepare the unit to receive a file at the modem port. The file name must be included in the command string. Any attached instruction will be sent out the modem port after Comm-Stor is ready to receive file data.
- .EA Enter Automatic.** Same as the .E command, except the unit automatically assigns the current value of the Auto-Name (see .LI) as the file name. The Auto-Name is then internally incremented.
- .RA Receive Automatic.** Same as the .R command, except the unit automatically assigns the current value of the Auto-Name (see .LI) as the file name. The Auto-Name is then internally incremented.

- .LI Load Initial <Name>**. Load the initial value of the Auto-Name. The Auto-Name is automatically assigned to files when using the .EA and .RA commands. The bracketed portion will be incremented after each assignment.
- .LE Load Extension**. Load an extension into Comm-Stor. New files will be assigned this extension. If an extension is not specified in the command string, the current extension loaded in Comm-Stor will be cleared.
- .WP Write-Protect**. Magnetically mark files or the entire diskette as write-protected. Write-protected diskettes cannot be canceled; write-protected diskettes cannot be written on.
- .WE Write-Enable**. Remove write-protection from either files or the diskette.
- .CN Cancel**. Cancel (delete) selected files from the diskette. If a range of files is specified, the word "SURE?" is displayed before the function is performed. Type "Y" (yes) to start the function, or any other character to void it.
- .AM Alpha Mode**. Cause file names to be acted on in alphabetical order when using .D, .S, .P, .DD, .SD, .PD, .C, and .CN (also see .SM).
- .SM Sequential Mode**. In this mode, files and file names are handled in sequential order (the order in which they are stored on the diskette) when using .D, .S, .P, .DD, .SD, .PD, .C, and .CN (also see .AM).
- .D Display (File)**. Display on the terminal one or more files in either alphabetical or sequential order, depending on the current mode.
- .S Send (Files)**. Send one or more files out the modem port.
- .P Print (File)**. Display one or more files on the printer. Similar to .D command.
- .DD Display Directory**. Display (on the terminal) part or all of the Directory in either alphabetical or sequential order, depending on the current mode.
- .SD Send Directory**. Send a part or all of the Directory out the modem port.
- .PD Print Directory**. Display the Directory on the printer. (Similar to the .DD command.)
- .DS Display System Status**. Display the status of the Comm-Stor unit on the terminal. If a diskette is loaded, certain diskette parameters will also be displayed (Fig. 6).
- .DS S Display Directory Status**. Display the size of the largest free space and total free space of the diskette Directory. The output may be directed to the printer by specifying .DS S/P.
- .SS Send System Status**. Send Comm-Stor system status out the modem port. If a User diskette is loaded, certain diskette parameters will also be displayed.
- .SS S Send Directory Status**. Send the size of the largest free space and total free space of the diskette Directory (similar to .DS S).
- .BM Bit Rate Modem** Used to set bit rates from
- .BP Bit Rate Printer** keyboard when bit rate
- .BT Bit Rate Terminal** switch is set to 0.
- .BM I Isochronous Command**. Bit rate at the modem port will be controlled by the data set. The modem bit rate switch must be set to 0.
- .EM/.EX Echo Mode/Echo Mode Exit**. This mode causes data sent from the terminal to a remote unit (via the modem port) to be displayed (echoed) on the terminal.
- .MM/.MX Monitor Mode/Monitor Mode Exit**. This mode causes all data sent from diskette or received onto diskette through the modem port to be displayed on the local terminal.
- .IM/.IX Included Mode/Included Mode Exit**. This mode causes the file name to become the initial text of the file when using .E or .EA commands.
- .SB Standby Mode**. Entering this mode removes power from the drive motor(s). Power is restored when:
1. a character is input from the local terminal, or
  2. an incoming telephone call is detected when the data set is in the AUTO ANSWER mode.

**.RE Restore.** If a file name and/or extension is not specified, this command is interpreted as a Restore command. It is used to combine all of the free space on a diskette into one contiguous area following the last file.

**.RE Rename.** If a file name and/or extension is specified, the .RE is interpreted as a Rename command. It is used to modify the name and/or extension of an existing file.

**.C Copy.** Copy one or more files from Drive 1 to Drive 2 either sequentially or alphabetically, depending on the current mode.

**RUBOUT Character (Delete).** Delete characters in reverse order, starting with the last one, one character for each depression of the RUBOUT key. On various terminals this key may be called DEL, BS, or RUB.

**Control X, Line Cancel.** Cancel entry of the current line.

**Control C, End of Text.** An ETX character is used to terminate the Enter or Receive modes (unless in the Binary mode, which uses the Binary Switch). A Control C is also used to close a "Forms" file on diskette.

**Control S, Hold.** Pause during execution of the current operation. Execution is resumed by using the Resume character, Control Q, or canceled by using the Reset character, Control T.

**Control Q, Resume.** Used after a Hold command to resume execution of the current operation.

**Control T, Reset.** Cancel the current output operation.

**4. TECHNICAL DATA**

**POWER REQUIREMENTS**

**4.01** Power requirements of the Comm-Stor unit are shown in Table C. The standard unit requires 60 ±1 Hz power.

**ENVIRONMENTAL REQUIREMENTS**

**4.02** The diskette media require an allowable ambient temperature of 40.25°F-95.25°F or 4.25°C-35.25°C.

**4.03** The allowable ambient humidity is 20%-80% relative humidity.

**TABLE C**

**POWER REQUIREMENTS**

MODEL	VOLTAGE	CURRENT
8120A	115 VAC	2.5 amp
	230 VAC	1.8 amp
8220A	115 VAC	2.5 amp
	230 VAC	1.8 amp

**WEIGHT AND DIMENSIONS**

**4.04** Weight and dimensions of the Comm-Stor unit are shown in Table D.

**5. ERROR MESSAGES**

**5.02** Table E lists the most common Comm-Stor error messages.

**TABLE D**

**WEIGHT AND DIMENSIONS**

MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
8120A	5.25 in.	13.75 in.	20 in.	35 lbs.
	13.34 cm.			
8220A	9.6 in.	13.75 in.	20 in.	55 lbs.
	24.38 cm.			

**TABLE E**  
**ERROR MESSAGES**

MESSAGE	DESCRIPTION
NOT RDY	Indicates an attempt to access a drive when a diskette was either not inserted or improperly inserted, or an attempt to access Drive 2 in a single drive system.
DISKETTE	Indicates the system was unable to locate the proper location on a diskette where a file is stored or will be stored. The probable cause of this error is a bad diskette.
BAD READ	Indicates a file or part of a file could not be read without CRC errors in eight attempts to read the file.
PROTECT	Indicates an attempt to write on a protected diskette or cancel a protected file.
WRONG DK	Indicates the diskette is not a User diskette or it is a bad User diskette.
PREP SYS	Indicates the bit rate switch was not set to the KYBD position when a bit rate command was input.  or  A form was not properly loaded by the operator prior to using Forms operations.
FULL DSK	Indicates the Directory is full. Either a file must be cancelled from the diskette before entering a new file or a new diskette must be used.
NO FIND	Indicates a requested file does not exist in the Directory. Check to see that file name and extension completely agree with the Directory entry,  or  A search string was not found in the Forms Mode.
ILLEGAL	An illegal operation has been attempted.  Examples:  Edit (.ED) a binary file; or, when in the Forms Mode, attempting to Enter a non-forms file; or, Requesting an Edit or Forms operation without the option installed; or, Don't Care or Reject character used while in Alpha Mode; or, An Enter Automatic command was issued without an Auto-Name (.LI command) loaded.
BAD SIZE	In Edit Mode:  There was an attempt to Save a file with no data.  In Forms Mode:  The number of entries in the data file exceeds the number of variable fields in the form. The wrong form was probably loaded into the forms buffer, or  The form is too big for the buffer.

**TABLE E (Cont)**  
**ERROR MESSAGES**

MESSAGE	DESCRIPTION
USR TABL	Indicates the system detected an improper command from the User Command Table. The User Command Table must be corrected using the Configuration diskette.
MODEM	Indicates an improper condition has been detected at the modem interface. One of the following conditions exist:  Clear to Send was not asserted within 400 msec. after Request to Send was asserted, or,  Data Set Ready was not asserted when attempting to perform a Send, Send Directory or Send Status command.
NO ROOM	Indicates a file being Edited or Saved from the Scratch Pad is larger than the configured maximum file length, or,  An attempt was made to exceed the capacity of the Scratch Pad with an Edit, Insert, Replace, or Append command, or  When merging a file in the Forms Mode, the forms data field is too small for the forms data, or  An attempt was made to Edit a file on a diskette which was not configured to have a Scratch Pad, or  A Search/Replace operation results in a line length exceeding the configured value.
OVERRUN	Input data in either the Enter or Receive mode has exceeded the input rate or file capacity of the system and data is lost.
SYSTEM	Indicates that the system has detected an equipment problem, or,  There is a diskette with a bad Directory.  If the error occurs when another diskette is used, the operator should note the conditions which created the error and contact maintenance personnel.  An improper command has been entered. Example: .CM was entered instead of .CN, or,  A variable length file command (.DS S, .SS S, or .RE with no file name/extension) was entered for a fixed length file diskette.
Bell	A character was entered at the terminal and sent to the modem port when Data Set Ready was not present. This error usually occurs when the operator forgets to enter a period to symbolize the start of a command.  <i>Note:</i> The bell signal is also used to indicate the completion of an Enter or Enter Automatic operation.

## 6. CONFIGURATION PARAMETERS

**6.01** The following parameters are configurable in Comm-Stor II systems using the Configuration diskette. The default values are given in parentheses. For further information refer to the "How to Configure... Comm-Stor II" manual (Bell system No. 988-302-150).

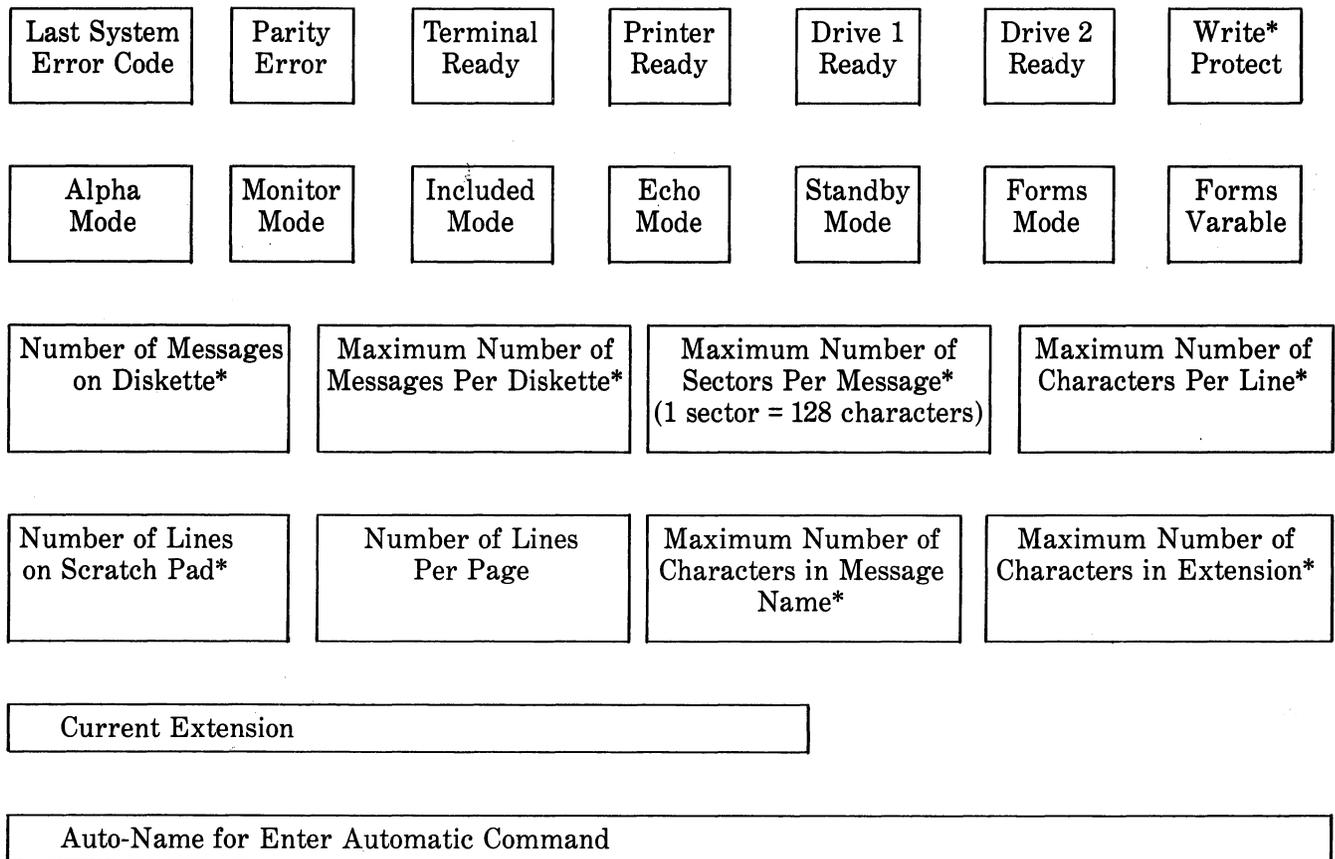
- |     |  |     |  |
|-----|--|-----|--|
| 1:  | ASCII DATA? (YES)                                    | 25: | SPECIAL OUTPUT CHARACTER #3 ([CR])                               |
| 2:  | SEND EOT AFTER EACH MODEM REQUEST? (NO)              |     | PORTS (NONE)   |
| 3:  | END OF LINE CHARACTER ([CR])                         |     | DELAY FACTOR/SUBSTITUTION (1)                                    |
| 4:  | SYSTEM TO ADD LINE FEED AFTER CARRIAGE RETURN? (YES) | 26: | SPECIAL OUTPUT CHARACTER #4 ([CR])                               |
| 5:  | LINE FEED CHARACTER ([LF])                           |     | PORTS (NONE)   |
| 6:  | CARRIAGE RETURN CHARACTER FOR SYSTEM MESSAGES ([CR]) |     | DELAY FACTOR/SUBSTITUTION (1)                                    |
| 7:  | LINE FEED CHARACTER FOR SYSTEM MESSAGES ([LF])       | 27: | "DELETE" CHARACTER ENTERED ([RUB])                               |
| 8:  | END OF TEXT CHARACTER ([ETX])                        | 28: | "DELETE" CHARACTER ECHOED ([BS])                                 |
| 9:  | TRANSMIT "END OF TEXT" CHARACTER? (NO)               | 29: | "LINE CANCEL" CHARACTER ([ ^ X])                                 |
| 10: | TRANSMIT "END OF TRANSMISSION" CHARACTER? (NO)       | 30: | NUMBER OF LINES ON PAGE (23)                                     |
| 11: | "END OF TRANSMISSION" CHARACTER ([ ^ D])             | 31: | STOP DISPLAY AFTER EACH PAGE? (NO)                               |
| 12: | "RESET" CHARACTER ([ ^ T])                           | 32: | SUBSTITUTE TERMINAL PARITY ERRORS WITH ERROR SYMBOL? (YES)       |
| 13: | SPACE CHARACTER FOR SYSTEM MESSAGES ( )              | 33: | MODEM OFF-LINE ALERT CHARACTER ([ ^ G])                          |
| 14: | FIRST CHARACTER OF ESCAPE SEQUENCE ([ESC])           | 34: | INHIBIT ECHO TO TERMINAL? (NO)                                   |
| 15: | PARITY ERROR SYMBOL (?)                              | 35: | IGNORE "NULL" CHARACTER FROM TERMINAL? (YES)                     |
| 16: | "STOP SEND/START SEND" OPTION (0)                    | 36: | TERMINAL "NULL" CHARACTER ([NULL])                               |
| 17: | "STOP SEND" CHARACTER (TO COMPUTER) ([ ^ S])         | 37: | NORMAL TERMINAL DATA PARITY—EVEN/ODD/NONE (NONE)                 |
| 18: | "START SEND" CHARACTER (TO COMPUTER) ([ ^ Q])        |     | NUMBER OF DATA BITS INCLUDING FIXED BITS (IF ANY) (8)            |
| 19: | "HOLD" CHARACTER (FROM COMPUTER/TERMINAL) ([ ^ S])   |     | EIGHTH DATA BIT (0)  |
| 20: | "RESUME" CHARACTER (FROM COMPUTER/TERMINAL) ([ ^ Q]) | 38: | BINARY TERMINAL DATA PARITY—EVEN/ODD/NONE (NONE)                 |
| 21: | OUTPUT NUMERICAL ERROR MESSAGES? (NO)                |     | NUMBER OF DATA BITS INCLUDING FIXED BITS (IF ANY) (8)            |
| 22: | SEND ERROR MESSAGES TO MODEM? (NO)                   | 39: | TERMINAL INTERFACE CONTROL (11110)                               |
| 23: | SPECIAL OUTPUT CHARACTER #1 ([CR])                   |     | 40/1 TERMINAL? (NO)  |
|     | PORTS (NONE)   | 40: | DOES TERMINAL PROVIDE "DATA TERM READY"? (NO)                    |
|     | DELAY FACTOR/SUBSTITUTION (1)                        | 41: | HALF DUPLEX MODEM? (NO)  |
| 24: | SPECIAL OUTPUT CHARACTER #2 ([CR])                   | 42: | **FOR HDX ONLY** TURN AROUND LINE AFTER EVERY CHARACTER? (YES)   |
|     | PORTS (NONE)   | 43: | **FOR HDX ONLY** MODEM TURN AROUND CHARACTER ([CR])              |
|     | DELAY FACTOR/SUBSTITUTION (1)                        | 44: | **FOR HDX ONLY** SECONDARY (SUPERVISORY) CHANNEL AVAILABLE? (NO) |
|     |  | 45: | ** FOR HDX ONLY** "REQUEST TO SEND" TIMEOUT [MILLISECONDS] (200) |

- 46: \*\*FOR HDX ONLY\*\* "SECONDARY CARRIER DROPPED" OPTION (0)
- 47: WAIT AFTER EOL FOR PROMPT OR AFTER ETX FOR ACK? (NO)
- 48: CHARACTER TO INITIATE WAIT PERIOD ([ETX])
- 49: WAIT FOR PROMPT BEFORE STARTING TRANSMISSION? (NO)
- 50: "PROMPT" OR "ACKNOWLEDGE" CHARACTER ([ ^ F])
- 51: "RETRANSMIT FILE" CHARACTER ([ ^ U])
- 52: IGNORE "NULL" CHARACTER FROM MODEM? (YES)
- 53: MODEM "NULL" CHARACTER ([NULL])
- 54: IS ATTACHED INSTRUCTION ECHOED? (NO)
- 55: SUBSTITUTE MODEM PARITY ERRORS WITH ERROR SYMBOL? (YES)
- 56: CHECK FOR MODEM FRAMING ERRORS? (NO)
- 57: INACTIVITY TIMEOUT [SECONDS] (INACTIVE)
- 58: NORMAL MODEM DATA  
PARITY—EVEN/ODD/NONE (NONE)  
NUMBER OF DATA BITS INCLUDING FIXED BITS (IF ANY) (8)  
EIGHTH DATA BIT (0)
- 59: BINARY MODEM DATA  
PARITY—EVEN/ODD/NONE (NONE)  
NUMBER OF DATA BITS INCLUDING FIXED BITS (IF ANY) (8)
- 60: DOES MODEM PROVIDE "DATA SET READY"? (YES)
- 61: PRINTER PORT INSTALLED? (YES)
- 62: PRINTER DATA  
PARITY—EVEN/ODD/NONE (NONE)  
NUMBER OF DATA BITS INCLUDING FIXED BITS (IF ANY) (8)  
EIGHTH DATA BIT (0)
- 63: PRINTER INTERFACE CONTROL (11110)
- 64: DOES PRINTER PROVIDE "DATA TERM READY"? (NO)
- 65: DOES PRINTER PROVIDE "SEC. REQUEST TO SEND"? (NO)
- 66: DOES PRINTER REQUIRE "LINE FEED" AFTER "CARRIAGE RETURN"? (YES)
- 67: CHARACTER TO SEPARATE COMMAND AND ARGUMENT ( )
- 68: CHARACTER TO SEPARATE FILE NAMES (/)
- 69: CHARACTER TO START "ENTER AUTOMATIC" INCREMENTING FIELD (<)
- 70: CHARACTER TO END "ENTER AUTOMATIC" INCREMENTING FIELD (>)
- 71: CHARACTER TO SEPARATE FILE NAME AND EXTENSION (+)
- 72: CHARACTER TO SEPARATE COMMAND AND ATTACHED INSTRUCTION (#)
- 73: DIRECTORY BOUNDARY SPECIFICATION CHARACTER (\*)
- 74: "DON'T CARE" CHARACTER FOR EXTENSION (?)
- 75: \*\*\* UNUSED \*\*\*
- 76: USER RESPONSE TO "SURE?" MESSAGE (Y)
- 77: SYSTEM COMMAND CHARACTER—TERMINAL AND MODEM (.)
- 78: SYSTEM COMMAND CHARACTER—MODEM ONLY (,)
- 79: "SELECT DRIVE 1" CHARACTER (1)
- 80: "SELECT DRIVE 2" CHARACTER (2)
- 81: "BAUD MODEM" COMMAND (BM)
- 82: "BAUD PRINTER" COMMAND (BP)
- 83: "BAUD TERMINAL" COMMAND (BT)
- 84: "COPY" COMMAND (C)
- 85: "CANCEL" COMMAND (CN)
- 86: "DISPLAY" COMMAND (D)
- 87: "DISPLAY DIRECTORY" COMMAND (DD)
- 88: "DISPLAY STATUS" COMMAND (DS)
- 89: "ENTER" COMMAND (E)
- 90: "ENTER AUTOMATIC" COMMAND (EA)
- 91: "ECHO MODE" COMMAND (EM)
- 92: "ECHO EXIT" COMMAND (EX)
- 93: "INCLUDE MODE" COMMAND (IM)
- 94: "INCLUDE MODE EXIT" COMMAND (IX)
- 95: "LOAD EXTENSION" COMMAND (LE)
- 96: "LOAD INITIAL VALUE" COMMAND (LI)
- 97: "MONITOR MODE" COMMAND (MM)
- 98: "MONITOR MODE EXIT" COMMAND (MX)
- 99: "PRINT" COMMAND (P)
- 100: "PRINT DIRECTORY" COMMAND (PD)
- 101: "RECEIVE" COMMAND (R)

- 102: "RECEIVE AUTOMATIC" COMMAND (RA)  
 "RENAME" COMMAND (RE)
- 103: "SEND" COMMAND (S)
- 104: "SEND DIRECTORY" COMMAND (SD)
- 105: "SEND STATUS" COMMAND (SS)
- 106: "SEQUENTIAL MODE" COMMAND (SM)
- 107: "ALPHA MODE" COMMAND (AM)
- 108: "STANDBY MODE" COMMAND (SB)
- 109: "WRITE-ENABLE" COMMAND (WE)
- 110: "WRITE-PROTECT" COMMAND (WP)
- 111: EDIT OPTION INSTALLED? (YES)
- 112: EDITOR LINE NUMBER SEPARATOR (.)
- 113: EDITOR CHARACTER STRING DELIMITER (/)
- 114: EDIT COMMAND CHARACTER (:)
- 115: PREPARE TO "EDIT" COMMAND (ED)
- 116: "SAVE FILE" COMMAND (SV)
- 117: EDITOR "APPEND" COMMAND (A)
- 118: EDITOR "DELETE" COMMAND (D)
- 119: EDITOR "INSERT" COMMAND (I)
- 120: EDITOR "LINE COUNT" COMMAND (=)
- 121: EDITOR "CLEAR" COMMAND (Q)
- 122: EDITOR "LIST" COMMAND (L)
- 123: EDITOR "LIST-NUMBERED" COMMAND (N)
- 124: EDITOR "REPLACE" COMMAND (R)
- 125: EDITOR "SEARCH" COMMAND (S)
- 126: FORMS OPTION INSTALLED? (YES)
- 127: CHARACTER TO START FORMS VARIABLE FIELD ([ ^ Y])
- 128: CHARACTER TO END FORMS VARIABLE FIELD ([ ^ Z])
- 129: "FORMS COMPLETE" COMMAND (FC)
- 130: "FORMS VARIABLE" COMMAND (FV)
- 131: "FORMS EXIT" COMMAND (FX)
- 132: FORMS MODE STRING SEARCH CHARACTER ([ ^ Y])
- 133: FORMS MODE-UTILITY CHARACTER ([ ^ L])
- 134: FORMS "LINE RE-ENTER" CHARACTER ([ ^ Z])
- 135: FORMS MODE—FILL IN FROM DRIVE 1 ([ ^ O])
- 136: FORMS MODE—FILL IN FROM DRIVE 2 ([ ^ N])
- 137: FORMS "TAB" CHARACTER ([CR])
- 138: ANSWERBACK MESSAGE (\*\*NONE\*\*)
- 139: CHARACTER TO INITIATE ANSWERBACK MESSAGE ([ ^ E])
- 140: USER COMMAND TABLE (\*\*NONE\*\*)
- 141: SELF-START ON POWER-UP OR RESTART? (NO)
- 142: SEND ANSWER BACK MESSAGE AFTER INITIAL CONNECTION? (NO)
- 143: INHIBIT AUTO LINEFEED TO MODEM PORT? (NO)
- 144: TERMINAL/MODEM BUFFER SIZES (00)
- 145: LOWER DSR DURING STANDBY? (NO)
- 146: USE EIA LINES TO CLOSE FILES? (NO)
- 147: SELF-START ON AUTO-ANSWER? (NO)
- 148: INHIBIT MONITOR MODE ON SEND? (NO)  
 ENABLE MONITOR MODE AT PRINTER? (NO)
- 149: RAISE RTS AFTER RECEIVING EOT? (NO)
- 150: "FORMS COMPLETE" COMMAND (SAME AS #129) (FC)
- 151: "FORMS VARIABLE" COMMAND (SAME AS #130) (FV)
- 152: "FORMS EXIT" COMMAND (SAME AS #131) (FX)
- 153: AUTO LOAD MODE ENABLED? (NO)
- 154: DOES TERMINAL HAVE CURSOR CONTROL? (NO)
- 155: PREPRINT PAGE? (NO)
- 156: PREPRINT LINE? (NO)
- 157: SKIP INTERMEDIATE LINES? (NO)
- 158: "SKIPPED LINE" CHARACTER (—)
- 159: ENABLE REDISPLAY? (NO)
- 160: "GO TO TOP OF PAGE" CHARACTER #1 ([ ^ A])  
 "GO TO TOP OF PAGE" CHARACTER #2 ([ ^ A])
- 161: "CLEAR AND RESTART PAGE" CHARACTER ([ ^ L])
- 162: "BACKFIELD" CHARACTER #1 ([ ^ B])  
 "BACKFIELD" CHARACTER #2 ([ ^ B])
- 163: "CLOSE FIELD" CHARACTER #1 ([CR])  
 "CLOSE FIELD" CHARACTER #2 ([CR])
- 164: "TAB" CHARACTER #1 ([TAB])  
 "TAB" CHARACTER #2 ([TAB])
- 165: "AUTO TAB" CHARACTER ([ ^ Z])
- 166: "ERROR OVERRIDE" CHARACTER ([ ^ K])
- 167: "CLOSE PAGE" CHARACTER ([ ^ P])
- 168: "VERIFY PAGE" CHARACTER ([ ^ V])
- 169: "VERIFY BYPASS" CHARACTER ([ ^ Y])
- 170: "CLOSE FORM" CHARACTER (SAME AS #8) ([ETX])
- 171: FILL IN FROM DRIVE 1 CHARACTER (SAME AS #135) ([ ^ O])

- 172: FILL IN FROM DRIVE 2 CHARACTER  
(SAME AS #136) ([ ^ N])
- 173: CURSOR RIGHT CHARACTER  
ENTERED #1 ([ ^ R])  
ENTERED #2 ([ ^ R])
- 174: CURSOR LEFT CHARACTER  
ENTERED (SAME AS #27) ([RUB])
- 175: CURSOR LEFT OUTPUT CHARACTER  
( )
- 176: CURSOR RIGHT OUTPUT CHARACTER  
( )
- 177: CURSOR UP OUTPUT CHARACTER  
([ ^ K])
- 178: CURSOR DOWN OUTPUT CHARACTER  
([LF])
- 179: CARRIAGE RETURN OUTPUT  
CHARACTER ([CR])
- 180: CURSOR HOME OUTPUT CHARACTER  
([ ^ ^ ])
- 181: CLEAR SCREEN OUTPUT  
CHARACTER ([ ^ Z])
- 182: LITERAL FIELD FRAMING  
CHARACTER ([ ^ W])
- 183: SECURITY FIELD FILL  
CHARACTER (\*)
- 184: DECIMAL POINT CHARACTER (.)
- 185: PLUS SIGN CHARACTER (\*\*NONE\*\*)
- 186: MINUS SIGN CHARACTER (-)
- 187: FIELD MISMATCH ERROR  
CHARACTER (?)
- 188: NUMERIC ERROR CHARACTER (#)
- 189: EMPTY FIELD FILL CHARACTER (|)
- 190: OUTPUT FIXED LENGTH FIELDS?  
(NO)
- 191: OUTPUT WITH DELIMITERS? (YES)
- 192: MID-LINE OUTPUT DELIMITER ([CR])
- 193: END-OF-LINE OUTPUT DELIMITER  
([CR])
- 194: SUBSTITUTION TABLE MINOR  
DELIMITER (,)
- 195: SUBSTITUTION TABLE AND  
ALLOWABLE ENTRY TABLE MAJOR  
DELIMITER (;)
- 196: END OF PAGE INDICATION OPTION  
(0, 1, 2, OR 3) (2)
- 197: VARIABLE FIELD INDICATOR  
CHARACTER #1 (<)  
CHARACTER #2 (>)
- 198: INHIBIT OUTPUT ON SKIPPED  
PAGES (NO)

**STATUS DISPLAY FORMAT**  
(For Both Send Status and Display Status)



\*These items are controlled by the User diskette in use.

**Figure 6—Status Display Format**