# 35

CATALOG

CONTENTS

INTRODUCTION

Teletype Corporation's model 35 line is an established product with years of dependable service already to its credit. For proven durability and flexibility you won't find a better terminal.

The 35 terminal features a typewriter-like keyboard, changeable character set, page copy, optional punched tape input-output, and optional station identification answer-back capability. Configurations are available with some or all of these capabilities; plus the mode controls that permit the operator to select the send, receive, and local combinations that best meet both her convenience and traffic conditions.

Terminals are available with a current interface or integrated modem for compatibility with nearly any switched or private line system. Our modem interface, for example, operates over voice grade channels and has facilities for manual originate and either manual or automatic answer.
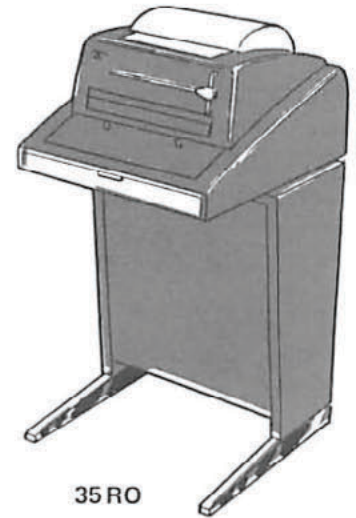
This catalog gives you the general and technical information you want to know about the 35 line. And there are easy to use selection guides to help you choose the right terminal for your application.
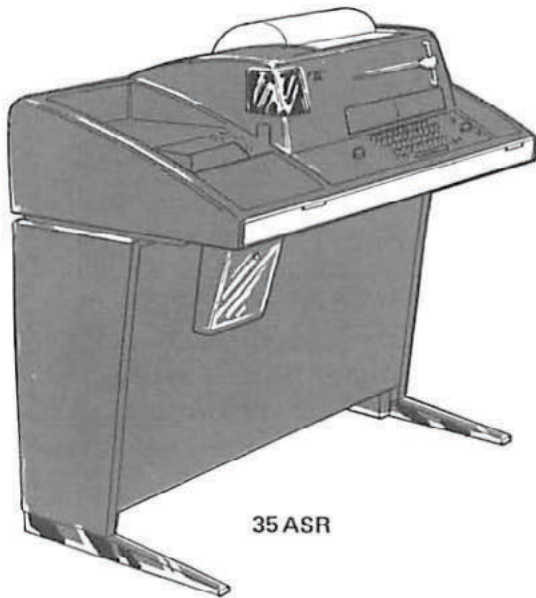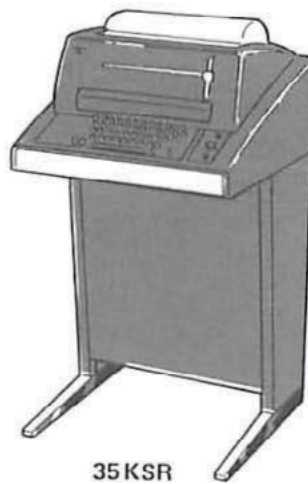
35 ASR   35 KSR   35 RO

HEAVY DUTY LINE

The model 35 is a heavy-duty line of terminals for entering, transmitting, receiving, and recording data in communications systems. The terminals are available in several configurations with various combinations of keyboard entry, printed page copy, and paper tape facilities.

The terminals operate at ten characters per second (110 baud) and feature a four-row keyboard capable of generating 97 characters and controls of the American Standard Code for Information Interchange (ASCII). Model 35 terminals also feature impact printing using an interchangeable typebox with interchangeable typepallets.

There is a choice of 8½-inch wide friction or pin fed printers for printing on plain rolled paper or continuous fan-folded forms. Pin fed printers include horizontal and vertical tabulation with form feed capabilities.

Several different interfaces are available. One terminal arrangement provides facilities for DC current interface or customer installed EIA (Electronic Industries Association) voltage interface. Another provides a built-in modem with facilities for manual originate-manual answer or manual originate-automatic answer.

Terminals are available for operation on either 60 or 50 Hz power. Underwriter's Laboratory (UL) and Canadian Standards Association (CSA) listings are pending for 60 Hz terminals.

THREE BASIC CONFIGURATIONS

35 ASR Automatic Send-Receive Terminal

ASR terminals offer the widest range of operational features in the 35 line. They provide keyboard data entry, printed page copy, and paper tape facilities. With the ASR terminal, you can transmit data manually by keyboard or automatically by punched tape, and simultaneously print local page copy for visual reference with or without punched tape. Or you can punch tape off-line from the keyboard or tape reader while printing local page copy. The terminal receives data as printed page copy and/or punched tape. Tape transmitting and receiving can be controlled manually or automatically.

35 KSR Keyboard Send-Receive Terminal

KSR terminals provide keyboard data entry and printed page copy facilities. You can transmit data manually on the KSR keyboard while printing local page copy. The terminal receives data as printed page copy.

35 RO Receive-Only Terminal

RO terminals receive data as printed page copy. They have a limited transmitting capability with the optional answer-back feature which enables them to transmit station identification sequences.

CHOICE OF HALF OR FULL DUPLEX

All of the 35 terminal configurations have the option of operating in the half or full duplex transmission mode. In half-duplex, the terminal can either send or receive, but it cannot do both at the same time. In full duplex, it can transmit (e.g. by keyboard or paper tape) and receive (e.g. on page copy or punched tape) simultaneously. Full duplex operation lets you nearly double your traffic volume.

EXPANDABLE CAPABILITIES

A number of accessories, features, and configurations, other than those covered in this catalog, are available. Accessories include a wide variety of paper and tape handling devices to simplify media handling, and parity error detectors to improve data accuracy.

If you have a large volume of data to transmit on-line, you can add Teletype®4210 magnetic tape terminal and increase on-line speed to 1050, 1200, 2000, or 2400 baud.

Model 35's with Teletype 9100 station controllers can be used in private line selective calling systems which save you line charges by having a number of stations share a single communication channel. These controllers provide such functions as motor control, parity error detection and indication, and polling and address recognition and response.

PAGE COPY

IMPACT PRINTING

35 data terminals use an impact printer with a removable typebox containing removable typepallets. This permits substitution of the typebox with another typebox containing a different character set, or the same character set in a different typestyle. And it permits typepallets to be substituted for other typepallets, to permit substitution of a Ø for a 0 for example.

FRICTION OR PIN FEED

Model 35 terminals are available with either pin (sprocket) or friction paper feed. Your choice will depend on whether your system requires pre-printed business forms or plain paper. Both are for 8½-inch wide paper.

Pin (Sprocket) Feed

If your system requires business forms, you should choose a pin feed terminal. Holes along the edge of the form engage pins on the printer platen to move the form and maintain positive alignment.

To bring a new form into position depress the CTRL (control) key and then the FF or FORM (form feed) key. A standard form (11" long) or a half-size sheet (5-½") can be handled. Other lengths are available as special options.

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THIS IS A SAMPLE OF MODEL 35 PAGE COPY:

THERE ARE MANY BENEFITS TO PRINTED
COMMUNICATIONS--BENEFITS THAT
IMPROVED AND MORE PROFITABLE BUSINESS O
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(Size slightly reduced)

Friction Feed

If only plain paper is required in your system, choose a friction feed terminal. These terminals use pressure from the platen and rollers to move the paper after each line feed code.

Paper comes in continuous 400-foot rolls so there is virtually no restriction on the length of copy which can be printed.

MULTIPLE COPIES

The terminal's impact printer will produce an original and up to two carbon copies if it is a friction feed printer, and an original and up to seven carbon copies if it is a pin (sprocket) feed printer.

CHOICE OF CHARACTER SETS

Typeboxes have a maximum of 63 printing characters plus the non-printing graphic "space". The two combinations offered in the selection guide are shown on page 8. The typebox character set (the graphics printed on the page) is shown immediately above its associated keytop arrangement.

Note that the selection includes an arrangement conforming to the earlier 1963 ASCII code as well as the 1968 ASCII code, to permit the replacement or addition of terminals to systems still using 1963 ASCII.

CHARACTER AND LINE SPACING

Terminals are factory adjusted for a 72 character line and have 10 character per inch horizontal spacing. Line spacing is adjustable to single or double line (6 or 3 lines to the vertical inch).

HORIZONTAL AND VERTICAL TABULATION WITH FORM FEED OPTION

Pin (sprocket) feed terminals are equipped with horizontal and vertical tabulation and form feed features. To move the printer typebox to the next tab stop location, depress the CTRL (control) key and then the TAB (horizontal tabulation) or the VT (vertical tabulation) key to cause a horizontal or vertical tabulation, respectively.

Horizontal and vertical tab stops can be set by a maintenance man at any character and line location, respectively.

END OF LINE INDICATION

The approach of the end of line is indicated by the illumination of an end of line lamp.

LOCAL CR AND LF

The local CR and LF keys are provided so your operator can return the print mechanism to the left margin and feed paper thru the terminal without using the regular keyboard as this would cause electrical signals to be transmitted and could affect a remote terminal's page copy alignment.

These controls are located next to the space bar on the keyboard.

PAPER ALARM

The paper supply is constantly monitored by a low paper sensor. For terminals equipped with current interface, the sensor furnishes a set of "dry" contacts which may be used to turn on an audible or visual alarm which is customer supplied and installed. If your terminal has a TELETYPE® modem, the reaction to an alarm condition is indicated visually by the "CLEAR ALARM" control button being lighted.
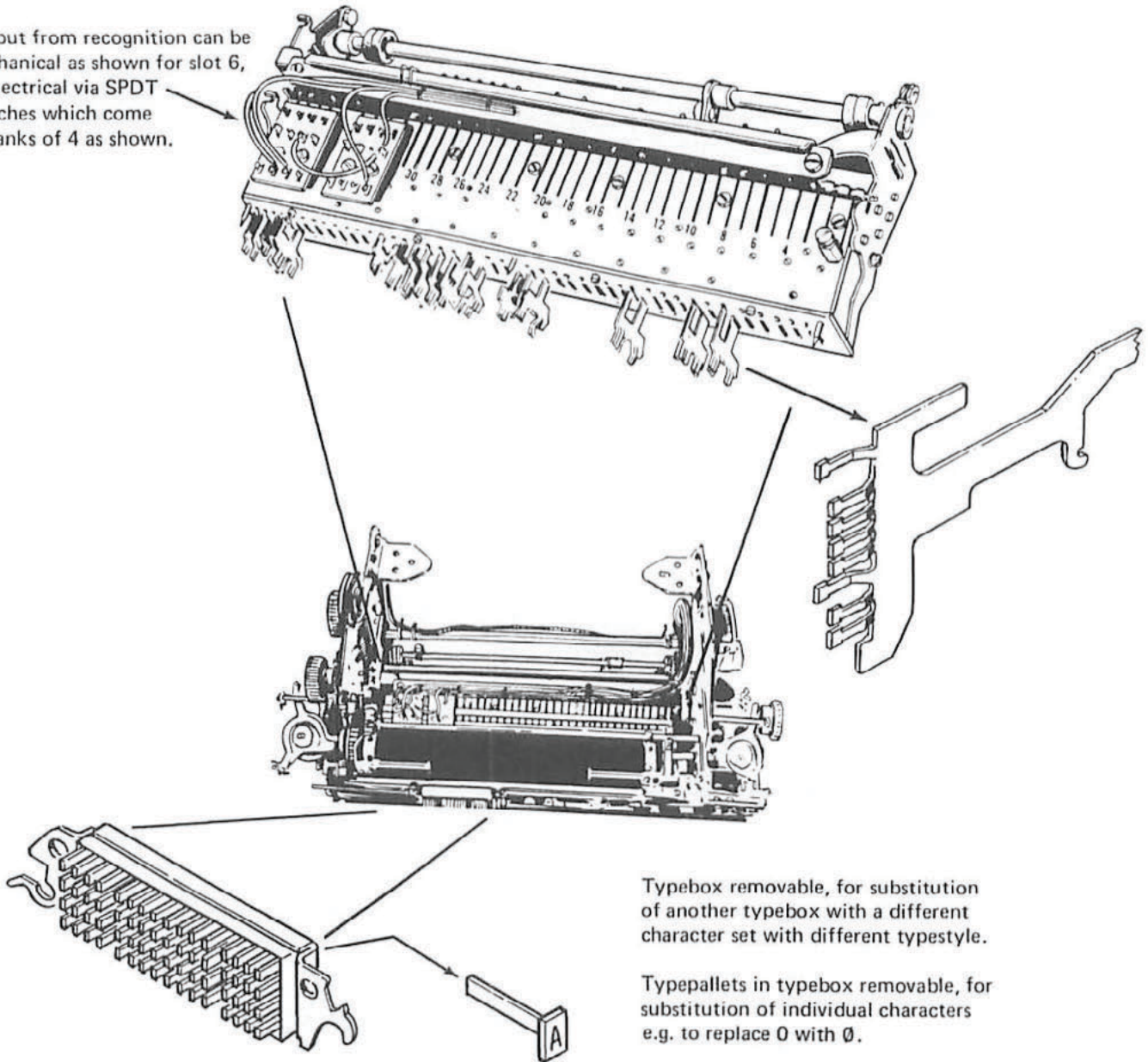
CONTROL OF NON-PRINTING FUNCTIONS

A stunt box initiates a number of non-printing actions such as carriage return, line feed, space, etc in response to specific control codes.

There is room in the stunt box for up to 42 individual control and/or character recognitions. Should you wish to add to your terminal's remote control repetoire, you need only to utilize the open positions in the stunt box to recognize whatever controls and/or characters you desire, to initiate whatever actions you may want performed.

Printer Stunt Box can be programmed to mechanically recognize up to 42 characters and controls, individually or in predetermined sequences, for the purpose of controlling the printer and other components at the terminal location.

Output from recognition can be mechanical as shown for slot 6, or electrical via SPDT switches which come in banks of 4 as shown.

Typebox removable, for substitution of another typebox with a different character set with different typestyle.

Typepallets in typebox removable, for substitution of individual characters e.g. to replace 0 with Ø.

Character A typepallet appearance

KEYBOARD

Keyboards on 35 terminals can generate 97 characters and controls of the ASCII code, which includes upper case alphabet and non-printing functions. All characters and controls are generated in even parity but can be optioned for eight level always marking. In appearance and general layout, the keyboards are similar to conventional office typewriters, so training of new or inexperienced operators is easy and fast.

PRINTING AND NON-PRINTING CHARACTERS

The keyboard generates both printing characters and non-printing controls, i.e., in some cases a code is transmitted but printing does not occur. It's easy to tell one from the other. Refer to the typebox character set above the keyboard on page 8. Only the characters shown will print.

Lower keytop character (Unshift Row on Layout)

Characters shown on the lower-half of the keytops are printed when the keyboard is in the unshifted mode -- just depress the key. Alpha characters are printed in upper case.

Upper keytop character (Shift Rows on layout)

The graphics printed in the shift mode are obtained by holding the SHIFT key depressed while operating the associated character key, as with a standard typewriter.

Control Codes (Non-Printing)

Neither printing nor spacing occur when controls are selected; instead, an electrical signal is generated which results in:

1. Communication Controls (e.g. ENQ)
2. Format Effectors (e.g. LF, HT)
3. Device Controls (e.g. DC1, DC2)
4. Information Separators (e.g. FS, GS)

The 35 keyboard generates all of the ASCII control codes. These are identified by the ASCII designation on the upper half of the keytop.

To generate most control codes, hold the CTRL key depressed while operating the associated key once for each control code desired. For those codes with a separate key, i.e. CR, use of the CTRL key is not required.

Control-Shift Codes

The following keyboard generated control codes are obtained by holding both the CTRL and SHIFT key depressed while operating the specified key once for each control code desired:

NUL...Shift, CTRL-P	GS...Shift, CTRL-M
ESC... Shift, CTRL-K	RS...Shift, CTRL-N
FS......CTRL-L	US.. Shift, CTRL-O

Fold Over Printing

When model 35 terminals receive the ASCII codes for lower-case characters, they print the upper case equivalents. See "Technical Facts" page 18.
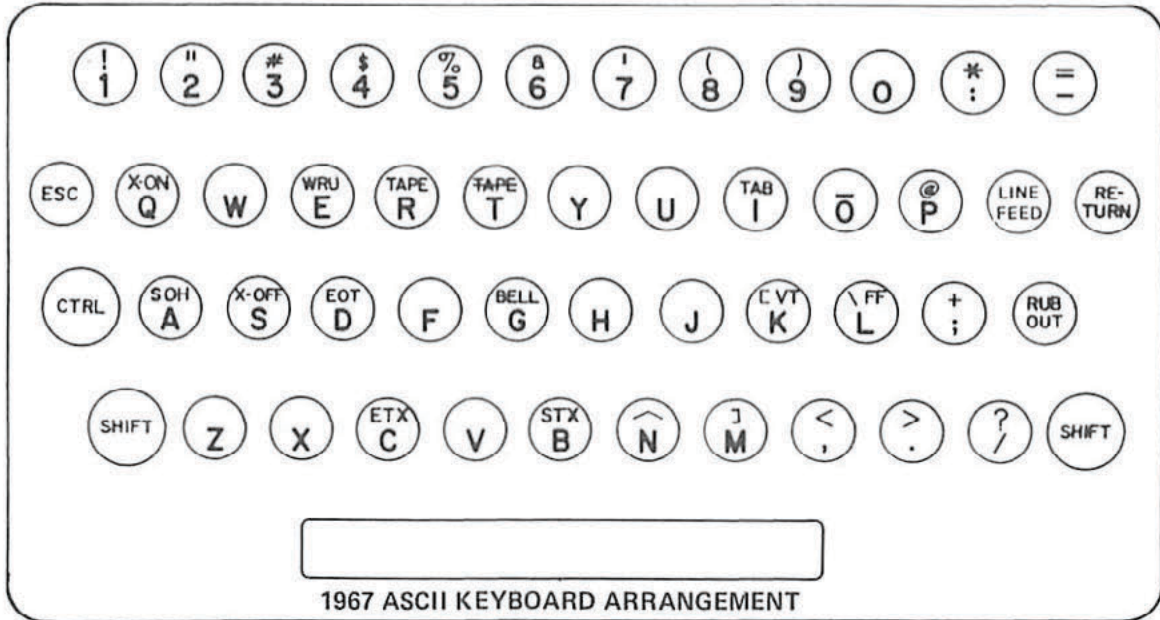
CHOICE OF ARRANGEMENTS

Terminals are available with either of the two typebox character set-keytop configurations shown on page 8. Note that one arrangement conforms to 1963 ASCII code and the other to 1968 ASCII code. This is to permit the replacement or addition of new terminals to system still using 1963 ASCII as well as the selection of new terminals for new systems.

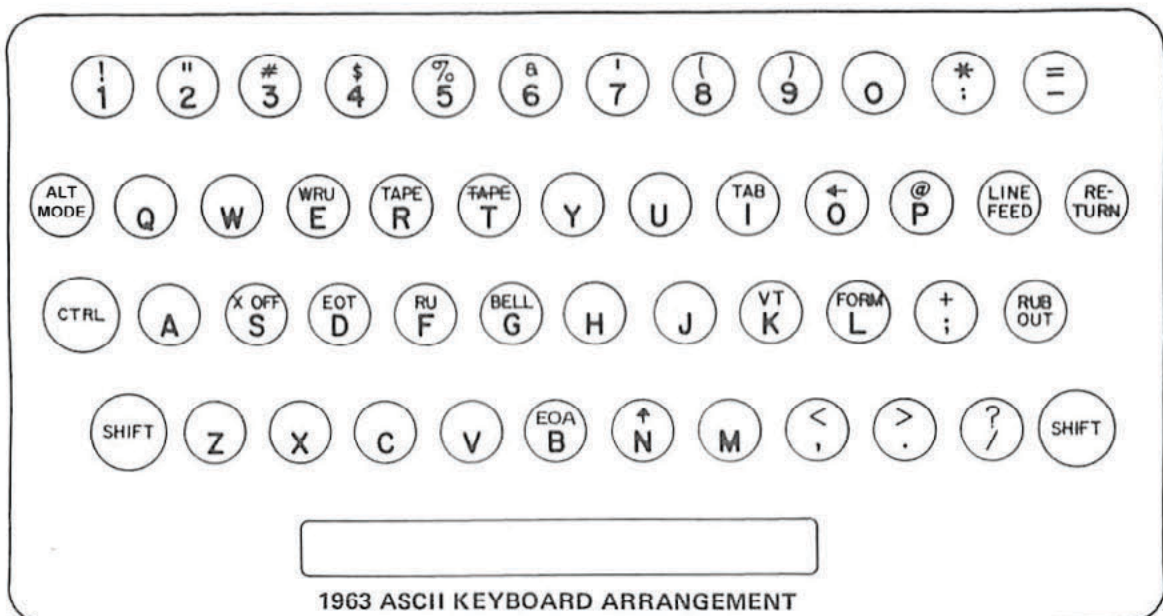## 1967 ASCII TYPEBOX CHARACTER SET

UNSHIFT A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 1 2 3 4 5 6 7 8 9 0 / . - , ; :
SHIFT   [\ ] ⌢ _ @   ! " # $ % & ' ( )   ? > = < + *

1967 ASCII KEYBOARD ARRANGEMENT

1963 ASCII TYPEBOX CHARACTER SET

UNSHIFT A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 1 2 3 4 5 6 7 8 9 ∅ / . - , ; :
SHIFT   [\ ] ↑ ← @   ! " # $ % & ' ( )   ? > = < + *

1963 ASCII KEYBOARD ARRANGEMENT

EVEN PARITY (For Error Detection)

The 35 keyboard generates code combinations with even parity, i.e., there are an even number of marking bits over the sum of the 8 bits in the code. This can be used for error control if the receiver is equipped to detect parity. To meet varying system requirements, the keyboard can be clipped to make the 8th bit of keyboard generated signals always marking.

REPEAT KEY

The repeat key next to the space bar makes it possible to repeat a series of any character desired. By depressing and holding the repeat key, and then a character key, the character will be generated continuously until the repeat key is released.

NON-REPEAT FEATURE

Only one character can be generated per keystroke, unless the repeat key is used.

KEY INTERLOCK

The keyboard is designed to prohibit action of two keys being depressed simultaneously. When one key reaches a certain point in the downstroke, all other keys are locked out until the depressed key returns to the unoperated position.

END OF LINE FORMAT

At the end of each line of copy you should insert the three character sequence RETURN, LINE FEED, DELETE. Following this format you are assured that the printing mechanism will have sufficient time to completely return to the left hand margin before the first character of the next line is printed.

MORE ECONOMY WITH TAPE

INCREASE SYSTEM SPEED AND ACCURACY

A paper tape punch and reader are integral components of 35 ASR terminals. They offer a number of time and labor saving benefits as well as adding greater flexibility and accuracy to data communication systems. You can prepare error-free data on tape, for example, and send it at maximum terminal speed, and you can send and receive automatically at hours when line charges are lower.

PRINTING ON TAPE

Another advantage of punched tape is available with the selection of the printing punch option. Data printed on tape can serve as an alternative to producing page copy, as a way of locating blocks of data on tape, or as a way of monitoring tape preparation when the printer is not used.
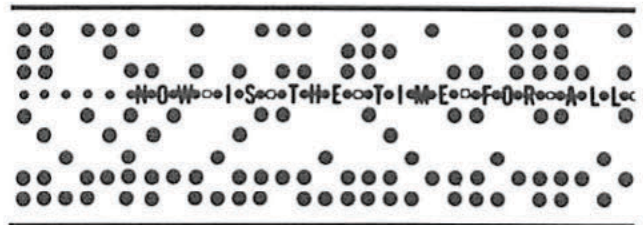
MANUAL/AUTOMATIC READER AND PUNCH CONTROL

To meet varying requirements, the reader and the punch are available to be operated either manually or as an option automatically through on line controls. Terminals equipped for automatic operation can be manually controlled as well.

Manual Operation

The reader and punch are turned on and off in combination with other components by use of the K-KT-T-TTS-TTR mode control, located to the left of the keyboard as described on page 12.
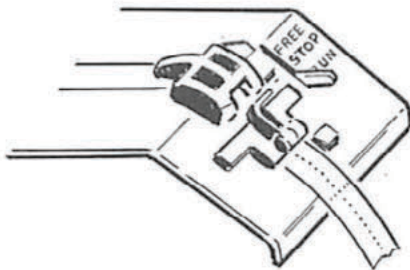
In addition, on terminals equipped for manual operation only, the reader is equipped with RUN-STOP-FREE controls which operate as follows:

FREE-STOP-RUN—Tape can be positioned in the reader when the lever is in the FREE position. STOP stops the reader. RUN starts the reader, if the terminal is in the KT, T, or TTS mode.

LOCAL BACKSPACE — A red local backspace key is located on the keyboard. This key is primarily used for correction. Each time the pushbutton is depressed the tape moves one character space in reverse direction.

Automatic Operation

1963 ASCII terminals equipped for automatic punch and reader control are controlled by the K-KT-T-TTS-TTR mode switch plus the MANUAL READER CONTROL OFF-ON control on the same panel to the left of the keyboard.

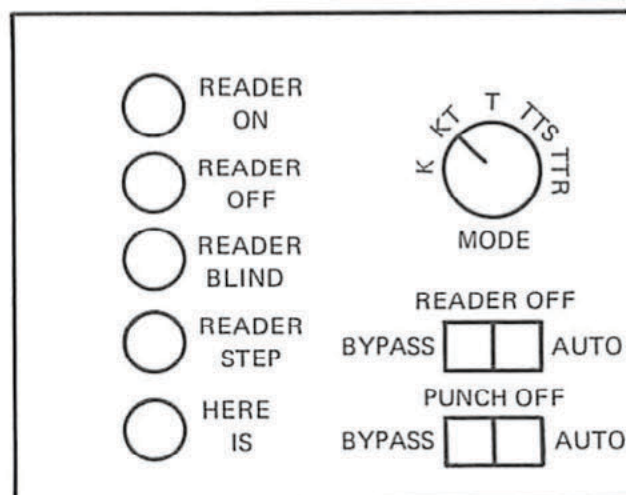Operation of these controls is as follows:

The reader is placed in the automatic mode by placing the MANUAL READER CONTROL OFF-ON in the OFF position. The reader is then under control of the function box. It is
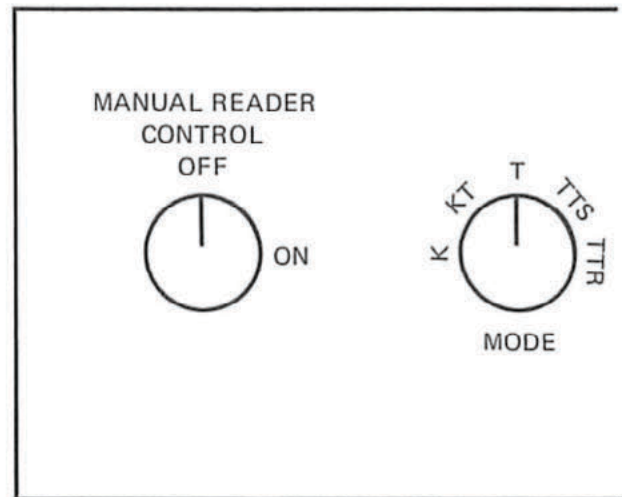
turned on upon receipt of DC1 and off upon receipt of DC3.

On these terminals the reperforator is under control of the printer stunt box. It is turned on upon receipt of DC2 and off upon receipt of DC4.

1968 ASCII terminals equipped for automatic punch and reader control are controlled by the K-KT-T-TTS-TTR mode switch plus the READER ON, READER OFF, READER BLIND, READER STEP, READER OFF BYPASS AUTO, and PUNCH OFF BYPASS-AUTO pushbuttons on the same panel to the left of the keyboard.

Operation of these controls is as follows:

1968 ASCII terminals equipped for automatic punch and reader control have READER ON, READER OFF, READER BLIND, and READER STEP controls as shown earlier.

READER ON—Turns on the reader, if the terminal is in the KT, T, TTS mode.

READER OFF—Turns off the reader.

READER BLIND—Suppresses signal output from reader as long as pushbutton is held depressed.

READER STEP—One character is read each time the pushbutton is depressed.

Reader Off-By Pass, Auto

In the AUTOMATIC mode, and if the terminal is in the KT, T, or TTS mode, the reader will respond to ASCII control codes as follows:

DC1 — Turns on the reader

DC3 — Turns off the reader

ENQ — Stops the reader and trips the remote answer back. To automatically start reader after ENQ, the last answer-back character must be DC1.

EOT — Turns reader off.

In the BYPASS mode the reader will not respond to the DC3 code.

1968 ASCII terminals equipped for automatic punch and reader control have a RUN-FREE control on the reader instead of RUN-FREE-STOP as discussed under *manual operation.*
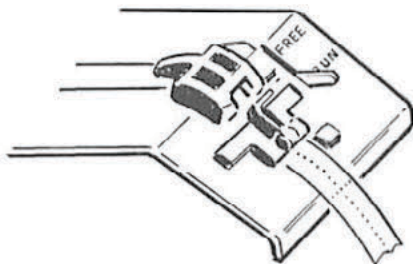
FREE - RUN — Spring held in the RUN position. Tape can be positioned in the reader when the lever is held at FREE.

Punch Off-By Pass Auto

The punch is placed in the automatic mode by placing the PUNCH OFF BYPASS-AUTO control in the AUTO position.

In the AUTO mode, if the terminal is in the KT or T mode, the punch will respond to ASCII control codes as follows:

DC2—Turns punch on.
DC4—Turns punch off.

A remote terminal sending the DC2 code can turn the punch of the receiving terminal on without an operator being present. Data then can be received. The transmitting terminal can turn the receiving terminal's punch off at the end of the transmission by using the DC4 code.

Only the DC4 code will appear in the punched tape.

In the BYPASS position the punch is turned on and cannot be turned off by the DC4 code.

When preparing tape for subsequent transmission, all control codes with the exception of information separators should be followed by one DELETE character. This will allow the terminal to perform the control action before additional data is transmitted.

TIGHT TAPE AND END OF TAPE FEATURES

These features guard against tearing the tape and needless reader operation. The reader will automatically stop if the tape becomes tight or tangled or the end of tape is sensed.

Easy Error Correction

Correcting paper tape is easy. You use the LOC BSP control to move the tape back one character at a time. When the errored character is in position, you use the DELETE key to overpunch it and any characters that follow. When a terminal receives the delete characters, no printing or spacing will occur, and page copy will be in the proper format.

Tape Storage and Chad Collection

A tape storage container (under the terminal cover) can store a standard 8-inch diameter roll of tape. A chad box that attaches to the terminal pedestal is used to collect paper particles produced by the punch. This box is easily removed for periodic cleaning.

See Technical Facts, page 21 for tape specifications.

ASR MODE CONTROLS
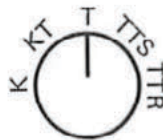
ASR terminals with either the DC current (or optional EIA) or the modem interface both have a K-KT-T-TTS-TTR MODE knob which is used to activate various combinations of keyboard, page printer, tape punch, and tape reader for sending, receiving and preparing data. The result of operating this control depends on the operation of the ON LINE-OFF-LOC knob on current interface terminals or the CLEAR, LOCAL, and ORIG pushbuttons on modem interface terminals; which control whether the terminal is off, local, or on-line. It also depends on whether the terminal is in the half or full duplex mode.

Half-Duplex

K mode — Couples terminal keyboard and page printer to each other, and to the line if the terminal is on-line. Permits operator to practice typing the data and its format prior to either preparing a tape to send or sending.

KT mode — Couples keyboard, printer, punch and reader to each other, and to the line if the terminal is on-line. In this mode the operator can send prepared data punched into tape from the reader alternately with data from the keyboard and have a printed and punched tape record of all data sent.

T mode — Couples tape reader to printer, and to the line if the terminal is on-line. It also couples the keyboard to the tape punch, on their own separate circuit which cannot be placed on-line. This mode permits the sending of data punched into tape from the reader at the same time that the operator is preparing another tape using the keyboard and punch. The printer monitors the transmission from the reader as a record of what was sent.

TTS and TTR modes — These modes are only useful with the terminal on-line. TTS couples the tape reader to the line; TTR couples the punch to the line. This permits a tape to be sent from a terminal in the TTS mode to a terminal in the TTR mode without producing a printed copy at either end when it is not desired.
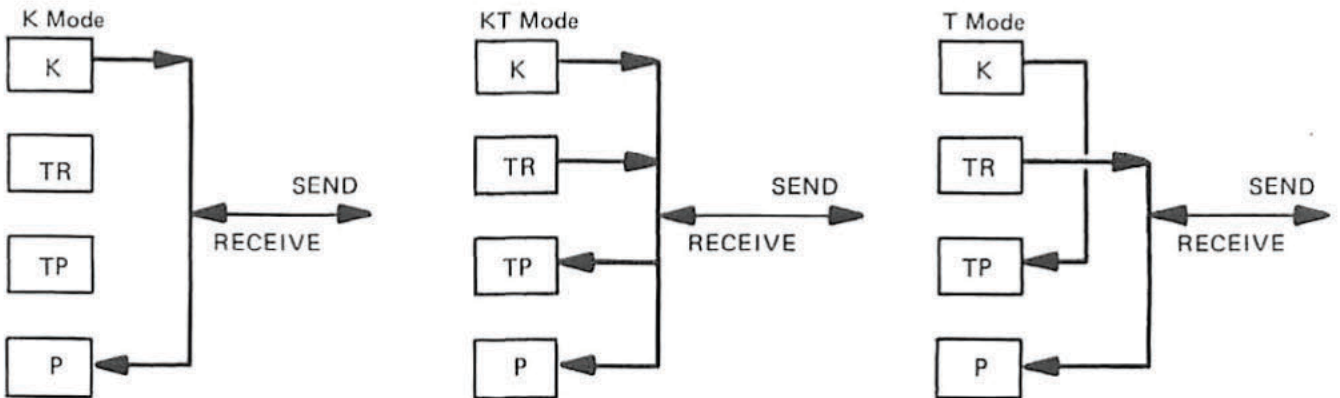
Full-Duplex

Operation of the above controls when the terminal is in the full-duplex mode is identical except that the on-line side of the terminal is divided into two halves: send and receive; with the keyboard and/or reader coupled to the send side and the printer and/or punch coupled to the receive side when the terminal is on-line.

K – Keyboard   TR – Tape Reader   TP – Tape Punch   P – Printer
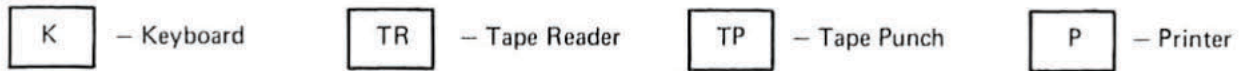
ON-LINE:

Half-Duplex (Alternate Send—Receive)

K Mode

K
TR
TP
P

SEND
RECEIVE

KT Mode

K
TR
TP
P

SEND
RECEIVE

T Mode

K
TR
TP
P

SEND
RECEIVE

Full-Duplex (Simultaneous Send—Receive)

K Mode

K
TR
TP
P

SEND
RECEIVE

KT Mode

K
TR
TP
P

SEND
RECEIVE

T Mode

K
TR
TP
P
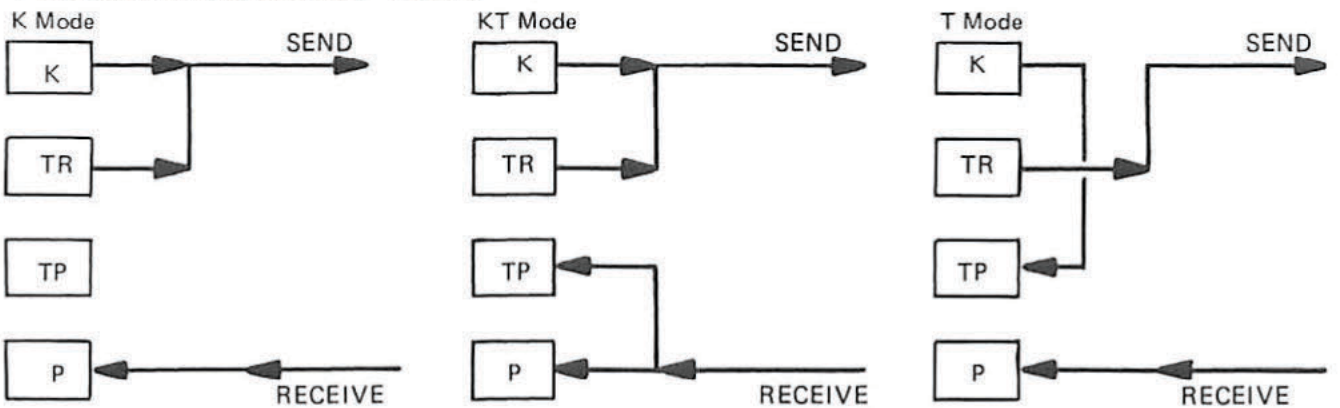
SEND
RECEIVE

Half or Full-Duplex
TTS Mode

K
TR
TP
P

SEND

TTR Mode

K
TR
TP
P
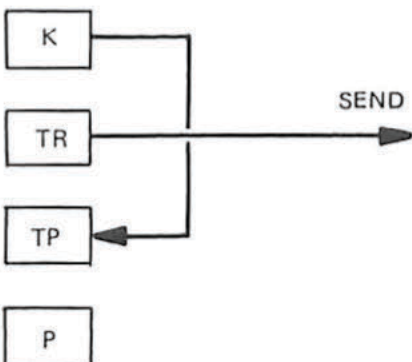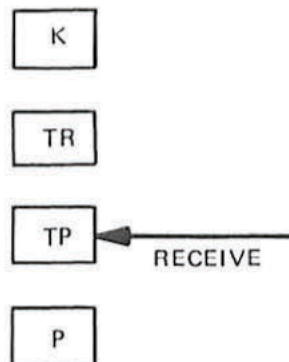
RECEIVE

OFF-LINE: same as above except SEND & RECEIVE paths are absent.

DC CURRENT, EIA, MODEM INTERFACE

COMPATIBILITY WITH MOST SYSTEMS

Several different interfaces are available with 35 terminals to make them compatible with a wide range of system requirements.

There are two series of 60-Hertz 35 terminals: one series provides current interface at 20maDC, convertible to 60 maDC or to EIA voltage interface by customer installable option. The other series provides a modem interface with manual-originate and either manual- or automatic- answer, again as a customer option. There is also a series of 50-Hertz terminals: They provide a current interface at 20maDC, convertible to 60 maDC or to EIA voltage interface by customer installable option.

DC CURRENT OR EIA VOLTAGE INTERFACE

The DC current interface provides 20 maDC neutral signal. It is often used on local loops and for mini-computer consoles. Terminals are wired for 20 ma at the factory; 60 ma is a customer installable option.

The voltage interface is a customer installable option. It lets you connect to any device specifying the EIA standard RS-232-C, including business machines, common carrier data sets, and customer owned modems.

MODEM INTERFACE

Choice of Manual or Automatic Answer

Model 35 built-in modem provides for operation on voice-grade channels in switched network and private line systems. It offers exceptional operational flexibility for computer access and conversational applications. This FSK (frequency shift keying) modem can provide manual originate/manual answer or manual originate/automatic answer when connected to the appropriate Bell System Data Access Arrangement (DAA). The modem is code insensitive, transmits asynchronously in serial form, and is compatible with Bell System 101, 103, and 113 data sets or their equivalents.

With manual originate-manual answer, a call is established by using the telephone provided with the DAA, and the operators exchange voice communications before going to the data mode by lifting the exclusion key on the phone. Then the terminals can send to each other, in either direction. The operators can return to voice communications at any time, by depressing the telephone exclusion key. All communications is ended by hanging up the telephone.

With manual originate-automatic answer, the terminal can receive a call whether the operator is present or not. It automatically answers the call and switches to the data mode. Terminals can then send to each other, in either direction. Should both operators be present they may switch to voice communications by lifting the exclusion key on their telephones.

## Total Terminal Arrangement from a Single Source

Terminals with the built-in modem are performance-tested as a package by Teletype Corporation. This means you can have a complete terminal arrangement—checked-out and simple to install—from a single source. The only installation adjustment that may be required is setting the signal level so that it matches the telephone line.

Data Access Arrangements (DAA)

The data access arrangements required are:

| Manual Originate/ Manual Answer | Bell System 1000A CDT or equivalent |
| Manual Originate/ Automatic Answer | Bell System 1001B CBT or equivalent |

Refer to pages 19 and 20 for modem and DAA specifications.
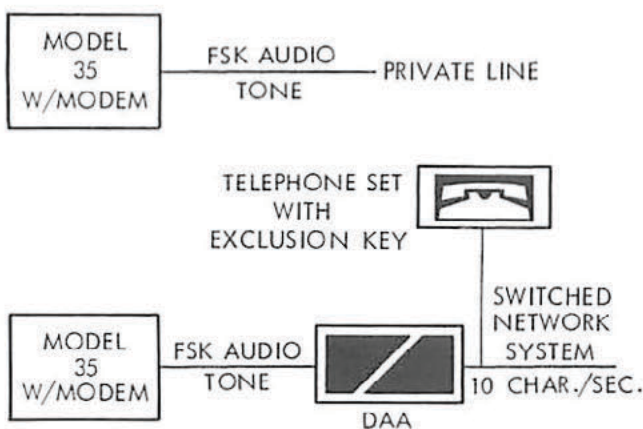
For the arrangement shown above, a Bell 502-type telephone set with exclusion key is required for network signaling and voice communication and to perform the voice-data transfer on the telephone line.

The data access arrangement required for connection of a data terminal to the telephone network and the 502-type telephone set must be ordered separately from your local telephone company.

For information on ordering the proper DAA, refer to Teletype® model 33, 35 and 38 Technical Reference, Part 2, Article 2, "Data Coupler Arrangements Used with Teletype Corporation's Cataloged Model 33, 35, and 38 Terminals with Built-In Modem." Or you can refer to the following two Bell System References for ordering information and the methods of connecting your terminals to the DAA's: "Data Access Arrangement CDT for Manual

Originating and Answering Terminals," PUB 41801, May, 1971 and "Data Couplers CBS and CBT for Automatic Terminals," Aug. 1970 and the addendum 1 March, 1971. There are a number of modem options. Refer to page 20 for a complete listing.

FULL CONTROL CAPABILITIES

Pushbuttons and knobs located to the right and left of the keyboard give you full and easy control of the 35's versatile functions.

DC CURRENT INTERFACE

On terminals with current (or customer installed EIA voltage) interface, a three-position rotary switch turns the terminals's motor on and off and selects the mode of operation.
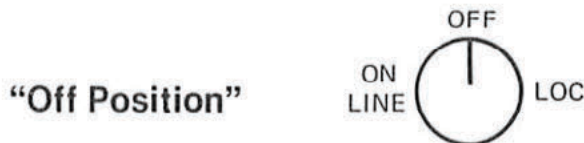
"Off Position"

Motor is off. Terminal is ready to be switched to the LOCAL of LINE position.
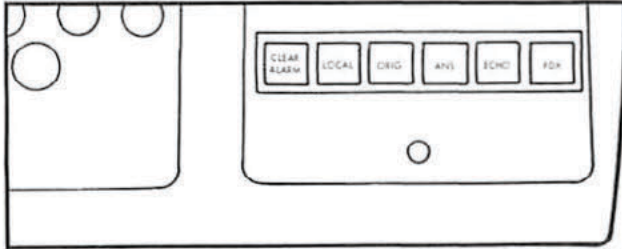
"Local" Position (not on RO's)

Motor is on. Terminal has full capabilities (e.g., to print copy and punch and read tape), but it cannot send or receive on the signal line. Used for operator practice, maintenance and, in case of ASR, to prepare tape off line.

"Line" Position

Motor is on. Terminal has full capabilities and can send or receive on the signal line.
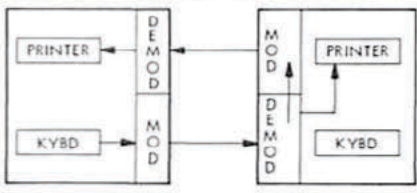
MODEM INTERFACE

The terminal controls with modem interface are six push buttons found on the lower right side adjacent to the keyboard. Their function is described below:

MODEM INTERFACE CONTROL FUNCTIONS

PUSH BUTTON CONTROL	Manual Originate/Manual Answer DAA 1000A CDT	Manual Originate/Automatic Answer DAA 1001B CBT
CLEAR ALARM (Red Cap)	CLEAR turns terminal motor and transmit carrier off. Telephone must be disconnected manually by the operator. Terminal responds to the manual answer routine in the normal manner. Illuminates in ALARM. Telephone is functional, terminal will respond to ANS. push button when depressed.	CLEAR turns terminal motor and transmit carrier off. Terminal will automatically disconnect. Terminal responds to the automatic answer routine in the normal manner. Illuminates in ALARM. Terminal will automatically answer an incoming call.
LOCAL (Green Cap)	Turns terminal motor on. Terminal has complete local capability, but can not send or receive on signal line.	Terminal will not automatically answer an incoming call. An incoming call is indicated by ringing of the telephone set and by flashing of the ANS. push button.
ORIG. (Clear Cap)	Turns terminal motor on and allows transmit mark frequency (F1m) to turn on after receipt of receive mark frequency (F2m). When lighted, indicates presence of receive carrier. Motor and carrier will turn off if carrier is not received within 25 seconds.	
ANS. (Clear Cap)	Depressing the ANS. push button turns the terminal motor and F2m carrier on. Illuminates when receive carrier is present. Motor and carrier will turn off if carrier is not received within 25 seconds. Answer-back will operate automatically (if terminal is so equipped and this feature is enabled). Note: Telephone must be disconnected by the operator.	The ANS. push button flashes in response to ringing when telephone is on hook. The call is automatically answered when terminal is in the data mode. This turns the terminal motor and F2m carrier on. ANS. push button illuminates when receive carrier is present. Answer-back will automatically operate (if terminal is so equipped and this feature is enabled). The call will automatically disconnect if carrier is not received within 25 seconds.
ECHO (Clear Cap)	Conditions terminal for error-checking or on-line testing. Originating terminal goes to FDX mode. Called terminal goes to ANS. and ECHO modes. Transmitted data is "echoed" back from answering terminal to originating terminal's printer. Correct data on originating terminal's printer gives substantial assurance that the message was received correctly	Originates Full Duplex (FDX) / Answers ECHO
FDX (Clear Cap)	When depressed and lighted, this push button electrically separates the send and receive circuits for full duplex operation. When not depressed and unlighted, the terminal is in the half duplex mode.	

BREAK—BREAK RELEASE

Both the current and modem interface terminals have a means of interrupting the remote sending terminal from the receiving terminal when reception becomes suddenly poor at the receiving terminal or the terminal becomes unable to continue receiving.

The control consists of a BREAK—BREAK-RELEASE toggle switch or BREAK and BREAK RELEASE pushbuttons.
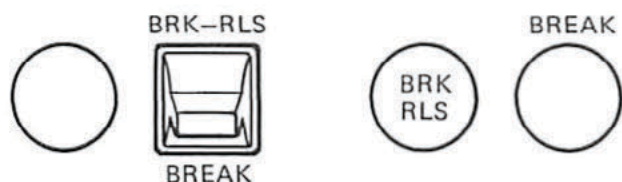
Terminals using the 1968 ASCII code recognize receipt of a state 0 (space) condition 86.5 msec or longer as a break condition.

Terminals using 1963 ASCII code recognize receipt of 2 or more NULLs in sequence or a state 0 (space) condition lasting for the same length of time (200 msec or longer on 10 char/sec terminals) as a line break condition.

ANSWER-BACK

TRANSMITS STATION IDENTIFICATION

Answer-back is a simple device that permits a called station to automatically identify itself by transmitting a programmed sequence of characters. This saves time and prevents costly transmission charges due to misdirected data.

EASY CODING

You can easily encode the answer-back message on a plastic drum which has a capacity of 20 characters. You can choose either one-, two-

or three-cycle operation with 20, 9 or 6 characters per cycle, respectively. If multiple-cycle operation is chosen, the identical message is normally used in each cycle.

NON-CONTENTION

The answer-back feature is turned on when the terminal receives ENQ or WRU. To prevent two answer-back devices from operating simultaneously, the device at the transmitting terminal is not activated when the ENQ or WRU is sent from its keyboard or reader. You can operate the answer-back locally by pressing the HERE-IS key.

SELECTABLE OPERATION ON CALL CONNECTION

Terminals equipped with answer-back and modem have the option of automatically tripping the answer-back on call connection. This feature may be enabled or disabled by the user. Terminals are factory-wired with this feature *enabled*.

SIGNAL REGENERATOR

Signal regenerator is available on certain terminals which limits the transmitted distortion to less than 5%.

DEPENDABLE CONVENIENT SERVICE

Teletype Corporation's products are fully supported by our Product Service Organization. For your convenience, centers are located in various areas across the country. Services include on-site maintenance and repair on an agreement or "on-call" basis, initial installation and check-out, installation of factory approved modification kits, exchange repair and overhaul. Special services are also available on request. Contact Teletype Corporation for additional information (see back cover).

TECHNICAL FACTS

CODE

ASCII Code with 1963 Version Shown on Right.

7 →		0				1			
6 →		0		1		0		1	
5 →	0	1	0	1	0	1	0	1
BITS (4 3 2 1)									
0 0 0 0	NUL	DLE	SP	0	@	P	`	p
0 0 0 1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0	STX	DC2	"	2	B	R	b	r
0 0 1 1	ETX	DC3	#	3	C	S	c	s
0 1 0 0	EOT	DC4	$	4	D	T	d	t
0 1 0 1	ENQ	NAK	%	5	E	U	e	u
0 1 1 0	ACK	SYN	&	6	F	V	f	v
0 1 1 1	BEL	ETB	'	7	G	W	g	w
1 0 0 0	BS	CAN S_0	(	8	H	X	h	x
1 0 0 1	HT	EM S_1	)	9	I	Y	i	y
1 0 1 0	NL	SUB S_2	*	:	J	Z	j	z
1 0 1 1	VT	ESC S_3	+	;	K	[	k	{
1 1 0 0	FF	FS S_4	,	<	L	\	l	| (ACK)
1 1 0 1	CR	GS S_5	−	=	M	]	m	} (ALT MODE)
1 1 1 0	SO	RS S_6	.	>	N	^	n	~ (E_{SC})
1 1 1 1	SI	US S_7	/	?	O	−	o	DEL

All characters in these two rows + SP (space) and DEL (delete) are non-printing

"Fold-over Printing" means that lower case characters received by Model 35's are actually printed as their upper case equivalent. Codes shown in Columns 6 & 7 of the chart "fold-over" into columns 4 & 5 respectively, (except for "DEL").

Parity (Keyboard Generated Characters)

Terminals are factory-wired for even parity over the eight bit, but may be clipped optionally for eight bit always marking (state 1).

Current Interface

Signal Line Current — 20 maDC, Customer installable option for 60 maDC.

Signal Waveform

8-Level 11 Unit Code Signal Waveform

Mark-Logic 1   Space-Logic 0
(Current)   (No Current)
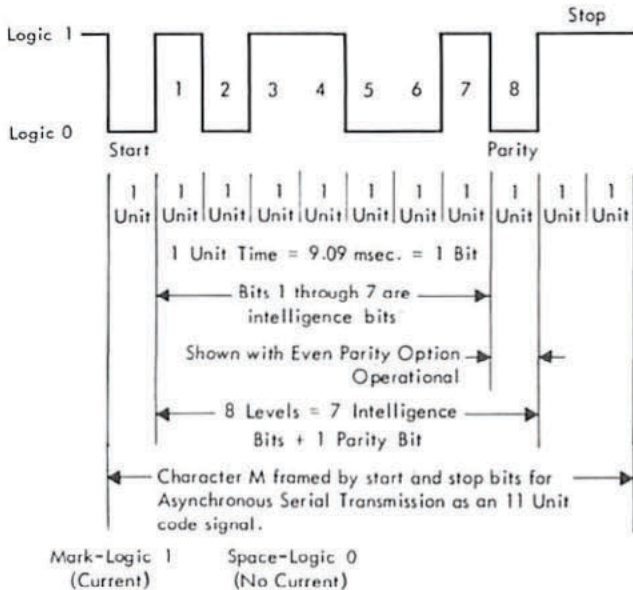
Transmitting and Receiving Margins

The following design criteria is met by model 35 terminals:

Receiving — Will accept a signal with a maximum of 38% bias distortion, 35% end distortion.

Transmitting — Signals from these terminals will have no more than 5% distortion if equipped with a signal regenerator, less than 12% without.

SPEED

10 characters/sec, 11 unit code, 110 baud
100 words/min (word consists of 5 characters + space)
600 operations/minute

MODEM OPTIONS

The following modem options are available. The factory wire options for the specified data access arrangements are indicated by an asterisk (*).

	DAA 1000 CDT Manual Answer	DAA 1000 CDT Automatic Answer
1. Paper Alarm		
*Only ALARM button lights.	X	X
Same condition as above, except subsequent data connections are prevented until alarm is cleared.	X	X
2. ANSWER-BACK TRIP		
Occurs automatically at called terminal on call connection. (Terminal must have answer-back feature and modem.)		
*Enabled	X	X
Disabled	X	X
3. ECHO MODE		
Output of distributor and break key in ECHO mode.		
*Blinded	X	X
Unblinded	X	X

The terminal provides a 7 conductor cable for interfacing to the data access arrangement. The following leads from the cable connect to the respective DAA's:

Interface Cable Lead	Manual Originate/Manual Answer (Daa 1000A CDT or Equivalent)	Manual Originate/Automatic Answer (DAA 1001B CBT or Equivalent)
Red	DR (Data Ring)	DR (Data Ring)
Orange	DR (Data Tip)	DT (Data Tip)
Yellow		RI (Ring Indicator)
Black		DA (Data Transmission)
Green		OH (Off Hook)
White		+V (positive DC Power)
Blue		- V (Power Return)

Modem

Mode	— Half Duplex (HDX) Full Duplex (FDX)
Transmission Method	— Serial by bit.
Modulation	— Frequency shift keying (FSK)
Timing	— Asynchronous
Signal Level	— 0 to 12 dBm transmit (adjustable to match transmission network)
	— 0 to 50 dBm receive (under control of carrier detect circuitry)
Echo Suppressor Disable	— Receipt of answering terminal's carrier disables echo suppressors on transmission facilities.

Compatible with	— Bell System 101, 103, 108, 113 data set or equivalent.
Carrier Detect Indication	— The ORIG or ANS button will light when depressed if received carrier is present.

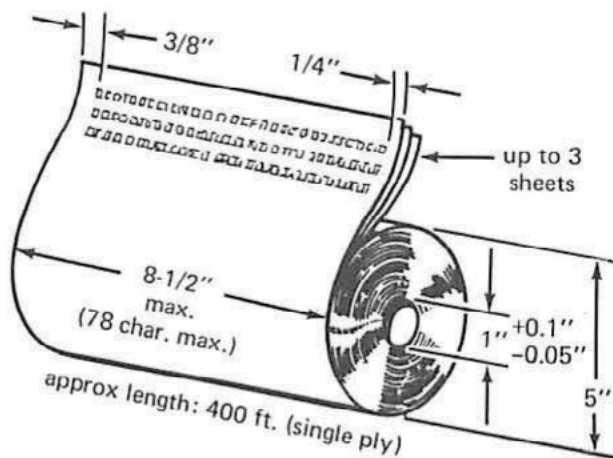| Frequencies (Hz):			Receive	Transmit
Originate Mode	Mark		2225	1270
	Space		2025	1070
Answer Mode	Mark		1270	2225
	Space		1070	2025

NOTE: F1m = 1270   F2m = 2225
       F1s = 1070   F2s = 2025

CURRENT INTERFACE WITH MODEM

A 187156 modification kit adds flexibility to modem equipped terminals by permitting them to operate in both switched-network and dc current oriented systems. Solid-state circuitry operates on high or low voltage at 20 or 60 ma, half or full duplex.
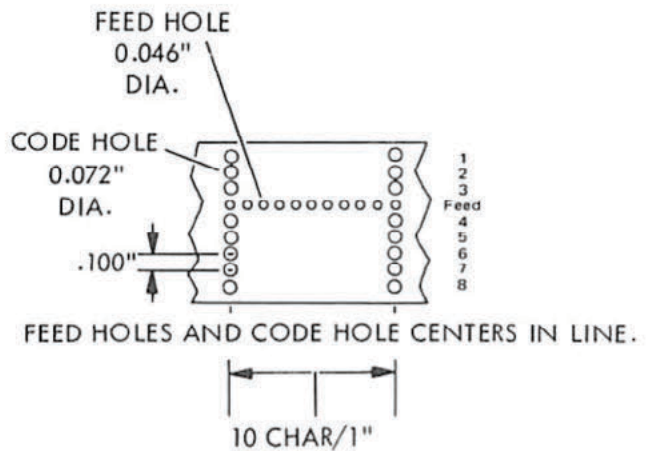
PAGE COPY SPECIFICATIONS

Rolled Paper

3/8"
1/4"
up to 3 sheets
8-1/2" max.
(78 char. max.)
$1'' \begin{smallmatrix} +0.1'' \\ -0.05'' \end{smallmatrix}$
5"
approx length: 400 ft. (single ply)

Sprocket (Pin) Feed Forms

1/4"
3/8"
1/2"
1/4"
5-1/2" or 11'
up to 8 sheets
5/32"
8"
8-1/2"
(73 char. max.)

RIBBON

7835 cotton ribbon.

PAPER TAPE SPECIFICATIONS

Type of Paper ....oiled stock, rolled
Width...1 inch
Thickness...0.004 inch
Max. diameter of roll ....8 inches
Length per roll (approx.).....................1000 feet
Core diameter of roll ....2 inches

FEED HOLE
0.046" DIA.

CODE HOLE
0.072" DIA.

.100"

1
2
3
Feed
4
5
6
7
8

FEED HOLES AND CODE HOLE CENTERS IN LINE.

10 CHAR/1"
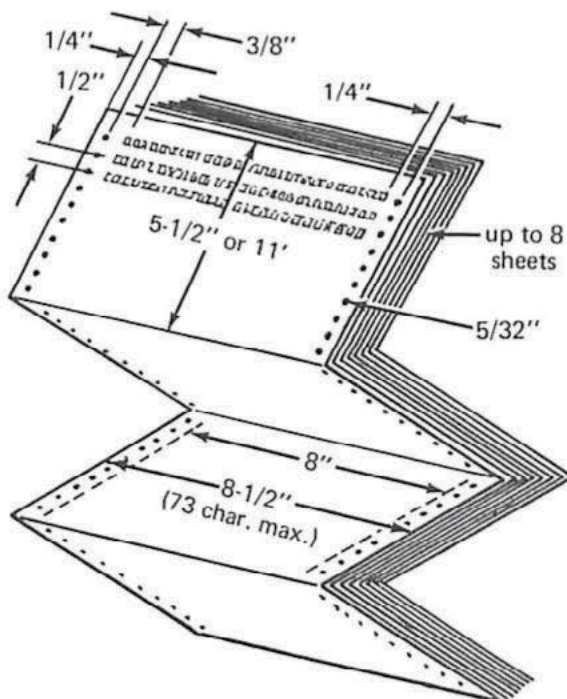
Depression of the keys (below) . . .	. . . generates the character or control (below)		Depression of the keys (below) . . .	. . . generates the character or control (below)	
	ASCII 1963	ASCII 1966–67		ASCII 1963	ASCII 1966–67
SHIFT CTRL P	NULL	NUL	CTRL P	DC_0	DLE
CTRL A	SOM	SOH	CTRL Q		DC_1
CTRL B	EOA	STX	CTRL R		DC_2
CTRL C	EOM	ETX	CTRL S		DC_3
CTRL D	EOT		CTRL T		DC_4
CTRL E	WRU	ENQ	CTRL U	ERR	NAK
CTRL F	RU	ACK	CTRL V	SYNC	SYN
CTRL G	BELL	BELL	CTRL W	LEM	ETB
CTRL H	FE_0	BS	CTRL X	S_0	CAN
CTRL I	HT		CTRL Y	S_1	EM
LINE – FEED	LF		CTRL Z	S_2	SUB
CTRL K	VT		SHIFT CTRL K	S_3	ESC
CTRL L	FF		SHIFT CTRL L	S_4	FS
RE – TURN	CR		SHIFT CTRL M	S_5	GS
CTRL N	SO		SHIFT CTRL N	S_6	RS
CTRL O	SI		SHIFT CTRL O	S_7	US
			(space – bar)		SP
			RUB – OUT		DEL
			CNFM		-

KEYBOARD
GENERATION
OF ASCII
CONTROL CODES

ESC S_3 ESC

WEIGHTS AND DIMENSIONS

ASR

24"

38-1/2"

40"

ASR: 225 lbs.

KSR or RO—Narrow

38-1/2"

24"

20"

KSR: 136 lbs.
RO: 130 lbs.

KSR or RO—Wide

38-1/2"

24"

24"

KSR: 136 lbs.
RO: 130 lbs.
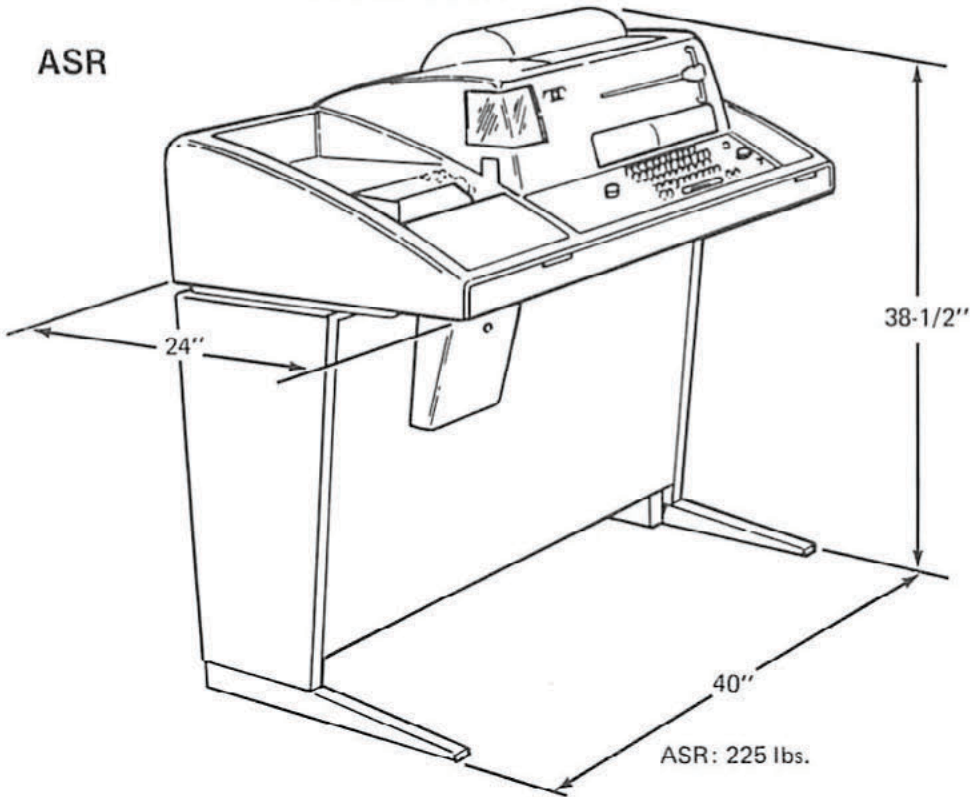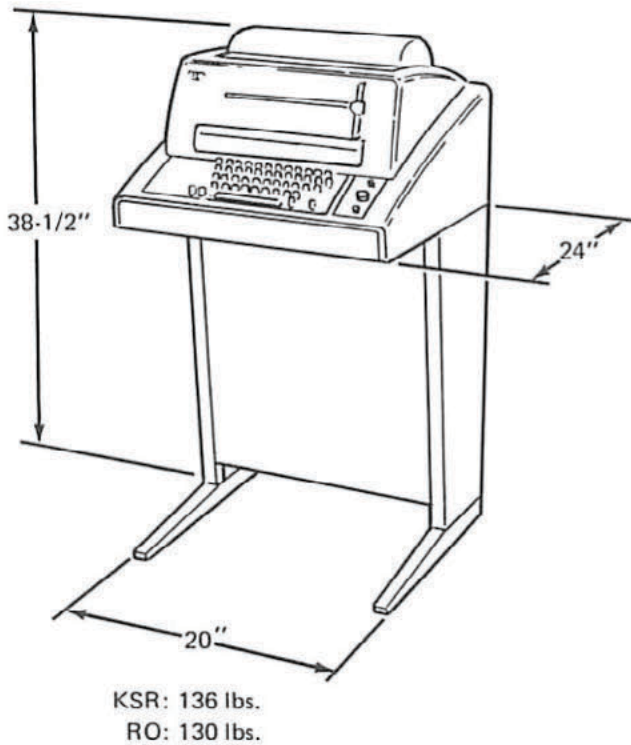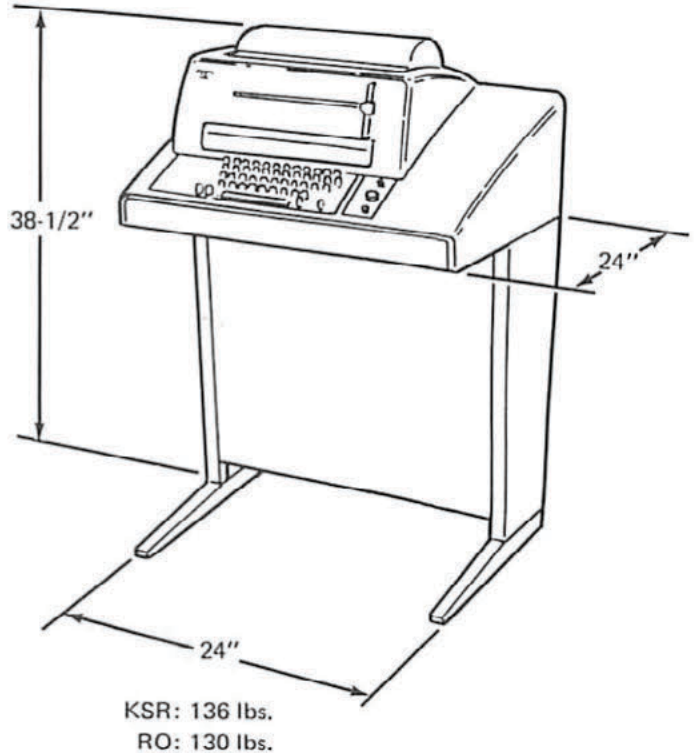
ELECTRICAL REQUIREMENTS

Input Voltages:

115 VAC±10% 60 Hz ±3/4% single phase
115 VAC±10% 50Hz ±3/4% single phase

Nominal Power Requirements:

ASR 360W   KSR and RO 250W

A convenience outlet is available on the electrical service unit which permits up to 100 watts of additional load.

Maximum Motor	ASR	KSR	RO
Starting Surge:	10a	8a	8a

MAINTENANCE

Initial Lubrication	— After 100 to 200 hours operation
Maintenance Interval	— Every 1500 hours or 6 mos whichever occurs first.

The following maintenance manuals are shipped with each terminal along with appropriate wiring diagrams:

Description, Lubrication, Adjustments, Disassembly, Reassembly, Troubleshooting
ASR...No. 280
KSR, RO..No. 281
Parts
ASR...No. 1187
KSR, RO...No. 1201

ENVIRONMENTAL REQUIREMENTS

Operating: 40° to 110°F at 2 to 95% rh ambient measured outside of terminal cover.

Storage: +40° to 150°F at 2 to 95% rh

FINISH

Spattered vinyl gray paint

MODEL 35 ASR DATA TERMINALS

STANDARD FEATURES	Input Power Freq.	ASCII Code	Interface	Type of Paper Feed	Punch and Reader Control	Printing Punch	Answer Back Feature	Sig. Regen.	Relay* Rack	Catalog Number
ASCII Code 10 char/sec (100 WPM) 11 Unit Code Even Parity Keyboard Paper Alarm	60 Hz	1968	20 Ma. D.C. Neu. Sig. Line Interface	Fric.	Manual			●	●	3520/3GA
						●		●	●	3520/5GA
					Automatic		●			3520/3GC
						●	●			3520/5GC
				Spkt. (Pin)	Manual			●	●	3520/4GA
						●		●	●	3520/6GA
					Automatic		●			3520/4GC
						●	●			3520/6GC
			Modem w/ Man'l Orig. and Manual or Auto Ans.	Fric.	Automatic		●			3520/3GD
						●	●			3520/5GD
				Spkt. (Pin)	Automatic		●			3520/4GD
						●	●			3520/6GD
		1963	20 Ma. D.C. Neu. Sig. Line Interface	Fric.	Manual					3520/3AA
						●				3520/5AA
								●		3520/3AB
						●		●		3520/5AB
					Automatic					3520/3AC
				Spkt. (Pin)	Manual					3520/4AA
						●				3520/6AA
								●		3520/4AB
						●		●		3520/6AB
					Automatic					3520/4AC
	50 Hz	1963	20 Ma. D.C. Neu. Sig. Line Interface	Fric.	Manual					3520/3NA
					Automatic					3520/3NB
				Spkt. (Pin)	Manual					3520/4NA
					Automatic					3520/4NB

*Relay Rack permits ready installation of additional equipment, such as Data Sets.

MODEL 35 KSR DATA TERMINALS

STANDARD FEATURES	Input Power Freq.	ASCII Code	Interface	Type of Paper Feed	Answer Back Feature	Sig. Regen.	Narrow or Wide Cabinet	Relay Rack	Catalog Number
ASCII Code 10 char/sec (100 WPM) 11 Unit Code Even Parity Keyboard Paper Alarm	60 Hz	1968	20 Ma. D.C. Neu. Sig. Line Interface	Fric.		●	Wide	●	3510/1GA
					●				3510/1GB
				Spkt. (Pin)		●		●	3510/2GA
					●				3510/2GB
			Modem w/ Man'l Orig. or Auto Ans.	Fric.	●				3510/1GC
				Spkt.	●				3510/2GC
		1963	20 Ma. D.C. Neu. Sig. Line Interface	Fric.			Narrow		3510/1AA
						●			3510/1AB
				Spkt. (Pin)					3510/2AA
						●			3510/2AB

MODEL 35 RO DATA TERMINALS

STANDARD FEATURES	Input Power Freq.	ASCII Code	Interface	Type of Paper Feed	Answer Back Feature	Narrow or Wide Cabinet	Catalog Number
ASCII Code 10 char/sec (100 WPM) 11 Unit Code Paper Alarm	60 Hz	1968	20 Ma. D.C. Neu. Sig. Line Interface	Fric.		Narrow	3500/1GA
					●	Wide	3500/1GB
				Spkt. (Pin)		Narrow	3500/2GA
					●	Wide	3500/2GB
			Modem w/ Man'l Orig. or Auto Ans.	Fric.	●	Wide	3500/1GC
				Spkt.	●	Wide	3500/2GC
		1963	20 Ma. D.C. Neu. Sig. Line	Fric.		Narrow	3500/1AA
				Spkt.		Narrow	3500/2AA

ACCESSORIES & OPTIONS

INTERFACE

182631, 305460 60maDC Interface Card

Replaces 20 maDC circuit card with one providing 60 maDC current interface.

312350 Current to EIA Converter

Converts 20 or 60 maDC current to EIA RS-232-C.

PRINT-OUT

Friction to Pin Feed Conversion

Modification kits include pin feed platen for desired form width to replace friction platen already in terminal, and includes form guide.

172625 plus;

For Form Width	
9 Inches	306702
8-1/2 Inches	306701
8 Inches	306700
7-1/2 Inches	306699
7 Inches	306698
6-1/2 Inches	306697
6-3/8 Inches	306696
6-1/4 Inches	306695
6 Inches	306694
5-3/4 Inches	306693
5-1/2 Inches	306692
5 Inches	306691
4-1/2 Inches	306690
4-5/16 Inches	306689
4-1/4 Inches	306688
4 Inches	306687
3-5/8 Inches	306686

305037 Pin Feed 9½ inch Platen

Converts 8½ inch pin feed platen to 9½ inch pin feed platen.

153440 Stunt Box Function Bar

Can be coded for the 7 ASCII code bits plus suppression feature of printer.

321099 Automatic New Line

Returns printing head to left hand margin of line below when adjustable preset location is reached on the printing line.

Two-Color Printing Ribbon Shift

Provides red-black ribbon and mechanism for shifting. *179724* (not compatible with 198500). solenoid controlled.

198500 On-line Printer Control

Provides solenoid controlled mechanism for shifting printer to print-suppressed condition. In this condition printing is prevented, and the recognition of all characters and controls loaded in the stunt box is prevented, unless specifically programmed to be independent of this condition.

Typepallets

Wide variety available, write for Bulletin 1164B.

Typeboxes

TD 179814
DC 321983

TELETYPE®

For further information on any Teletype Corporation product lines, or for the location of your nearest sales or product service representative, please contact:

Sales headquarters—
5555 Touhy Ave.
Skokie, Illinois 60076

Product Service headquarters—
9930 Derby Lane
Westchester, Illinois 60153

or call TERMINAL CENTRAL—(312) 982-2500

TELETYPE CORPORATION   *the computercations people*
GENERAL OFFICES: 5555 Touhy Avenue, Skokie, Illinois 60076 Telephone: (312) 982-2000—TWX: 910-223-3611
and TELEX: 25-4051 (both have 24 hour automatic answering service)