

OPERATOR'S MANUAL

TermiNet[®]

300 & 1200 PRINTERS



GENERAL  ELECTRIC

The information contained herein does not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to General Electric Company, USA.

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TermiNet[®] DATA
COMMUNICATION
PRODUCTS

TermiNet

300 and 1200 Printers

Operator's Manual - GEK-36150

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PREFACE

This manual shows the operator how the TermiNet Printers are operated. Sections 1 through 5 describe what the controls and indicators do, the operation of the keyboard, the loading of paper and ribbon, and other information pertaining to the operation and care of the TermiNet Printer.

Because of the many communication systems that exist, no attempt is made to show how the TermiNet Printer may be used in a specific system. Consult your supervisor or application specialist for special instructions on how to use the TermiNet Printer with your communications system. Section 6 is primarily for the application specialist who must know certain operating characteristics of the TermiNet Printer in order to understand how it should operate in your communications system.

This manual covers both the TermiNet 300 and 1200 Printers. Information that pertains only to a specific model Printer will be identified.

The term "jumper" will appear occasionally in the following text. Basically, the removal or installation of a jumper is an optional wiring change that will change particular operating characteristics of the TermiNet Printer. Most jumpers can be installed and removed by a TermiNet Printer serviceman at the TermiNet Printer site.

Because many TermiNet Printer problems are simple and can be easily avoided or corrected by the operator, read Section 5, "TAKING CARE OF YOUR TermiNet PRINTER," before calling for service. You may avoid an unnecessary interruption of your operation and an unnecessary service call.

In most cases, the word "Printer" will be used instead of "TermiNet Printer" in the following text.

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SECTION 1

INTRODUCTION

Your TermiNet Printer is a high speed data communications printer used primarily for communicating with computer systems or other printers. The TermiNet Printer is compact for operation on a desk top or on its optional Pedestal. Operation is quiet compared to similar equipment. The Printer can print and transmit information that is received from its keyboard or from an external source (for example, a paper tape reader).

NOTE

For convenience, reference to the TermiNet Printer, in most cases, will be "Printer".

Your Printer will be one of two basic models; the TermiNet 300 or TermiNet 1200 Printer (Figures 1-1 and 1-2). The TermiNet 300 and 1200 Printers print maximum speeds of 30 and 120 characters per second respectively.

The KSR (Keyboard, Send, and Receive) version of the Printer has a keyboard similar to a standard office typewriter. The KSR Printer can print and transmit information generated locally by the keyboard or a local device (e.g., paper tape reader). It can receive and print information from a remote terminal, computer, or other communication device.

NOTE

When a KSR Printer is combined with a recording and reading device such as a paper tape punch and reader, the combined configuration is normally called an ASR.

The SR (Send and Receive) version of the Printer has no keyboard. The SR Printer operates similar to the KSR except for the absence of the keyboard.

The RO (Receive Only) version of the Printer has no keyboard and can print received information only.

Although this manual is written primarily for the KSR Printer, the SR and RO Printers operate in a similar manner except for the major differences previously explained.

The general operating characteristics of the TermiNet Printer are as follows:

PRINTABLE CHARACTERS

All of the 94 printable characters in the American Standard Code for Information Interchange (ASCII) can be printed by the TermiNet Printer.

PRINTING SPEEDS

- 300 Printer, the standard front panel RATE switch will select speeds of 10, 15, and 30 characters per second (cps). An optional speed of 20 cps is available as a substitute for one of the standard speeds.
- 1200 Printer, the standard front panel RATE switch will select speeds of 10, 30, or 120 characters per second. Optional speeds of 15, 20 or 60 cps are available as a substitute for one of the standard speeds.

HORIZONTAL CHARACTER SPACING

10 characters per inch (2.5 cm).

VERTICAL LINE SPACING

6 lines per inch (2.5 cm) with the LINE SPACE switch in the "1" position. 3 lines per inch (5.1 cm) with the LINE SPACE switch in the "2" position.

PRINT LINE LENGTHS

300 Printer - 75, 80 or 118 print positions.

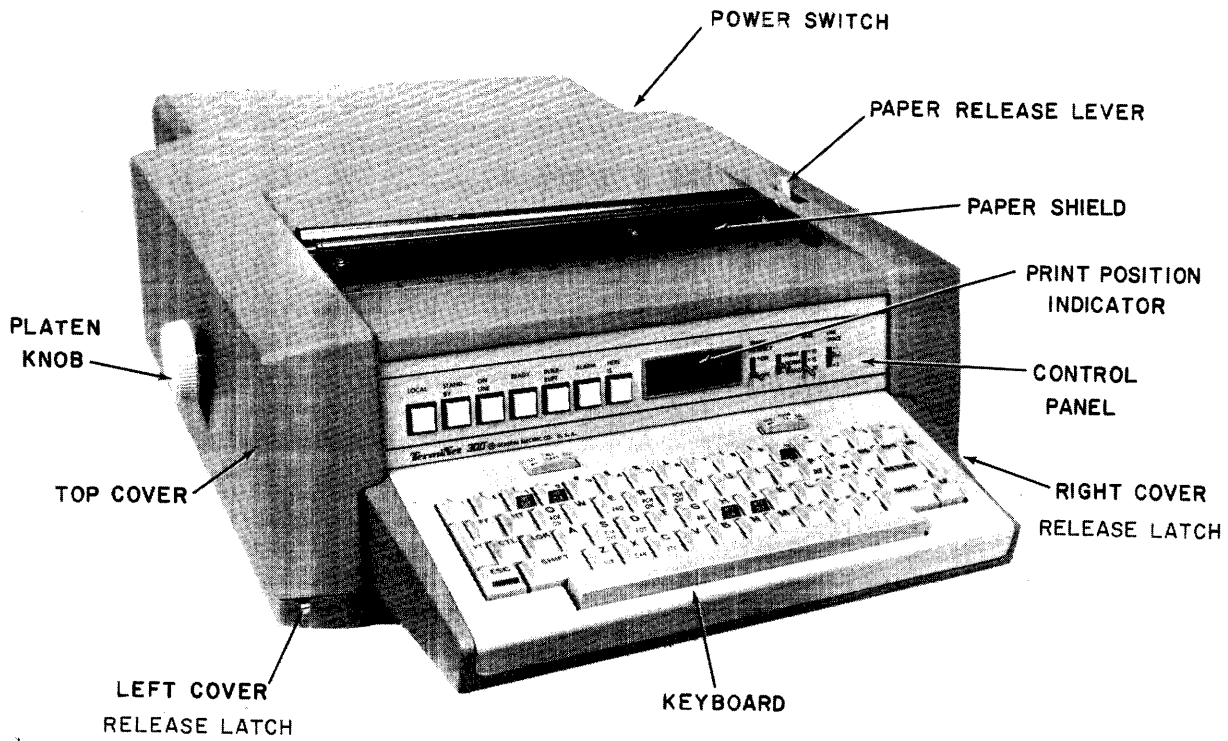
1200 Printer - 80 or 120 print positions.

COPY

The Printer is capable of handling up to a six-part form set with a maximum form set thickness of 0.025" (0.64 mm). Recommended paper weights are:

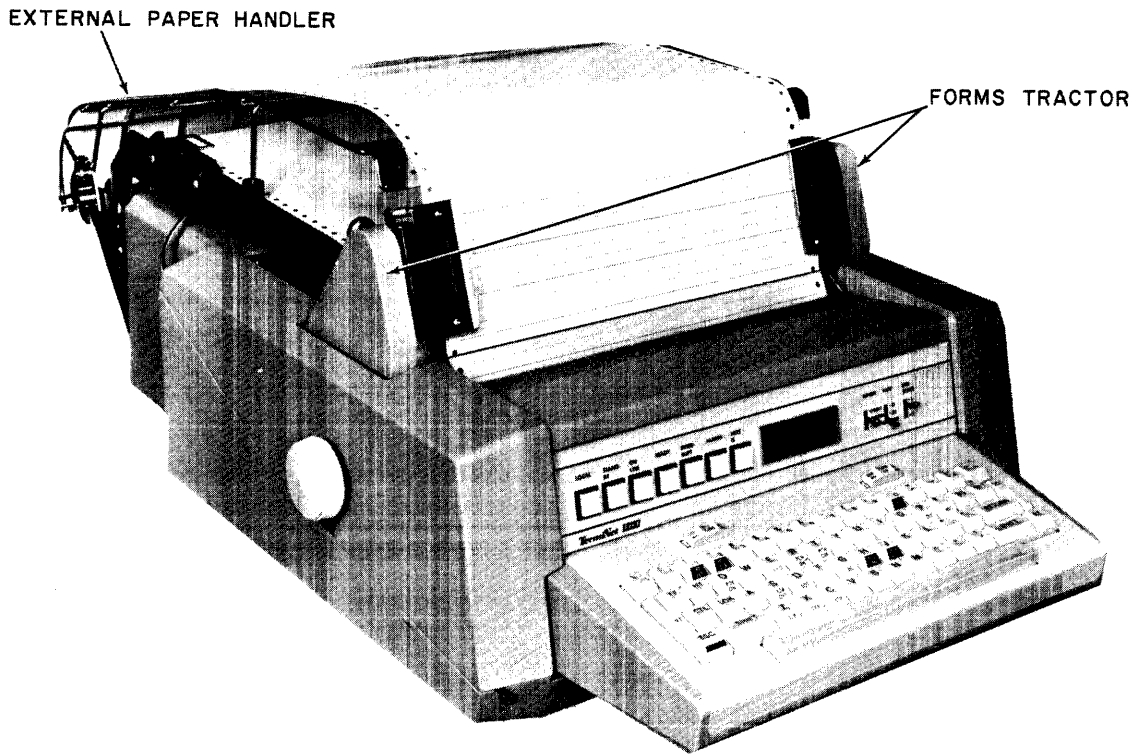
1 part	15 lb. paper
2, 3 or 4 part	13.5 lb. paper, 8 lb. carbon
6 part	12 lb. paper, 8 lb. carbon

Multiple copies are only possible with pin or tractor feed paper.



PKM-4007

Figure 1-1. TermiNet 300 Printer (KSR). Friction Feed



PKH-4005

Figure 1-2. TermiNet 1200 Printer (KSR) with External Paper Handler

SECTION 2

PREPARING THE PRINTER FOR OPERATION

PAPER INSTALLATION

FRICITION FEED (300 PRINTER)

- a. Press the Printer cover release latches and lift cover (Figure 2-1).

WARNING

POWER IS STILL ON WHEN THE COVER IS LIFTED. KEEP YOUR HANDS ONLY IN AREAS NEEDED TO INSTALL THE PAPER.

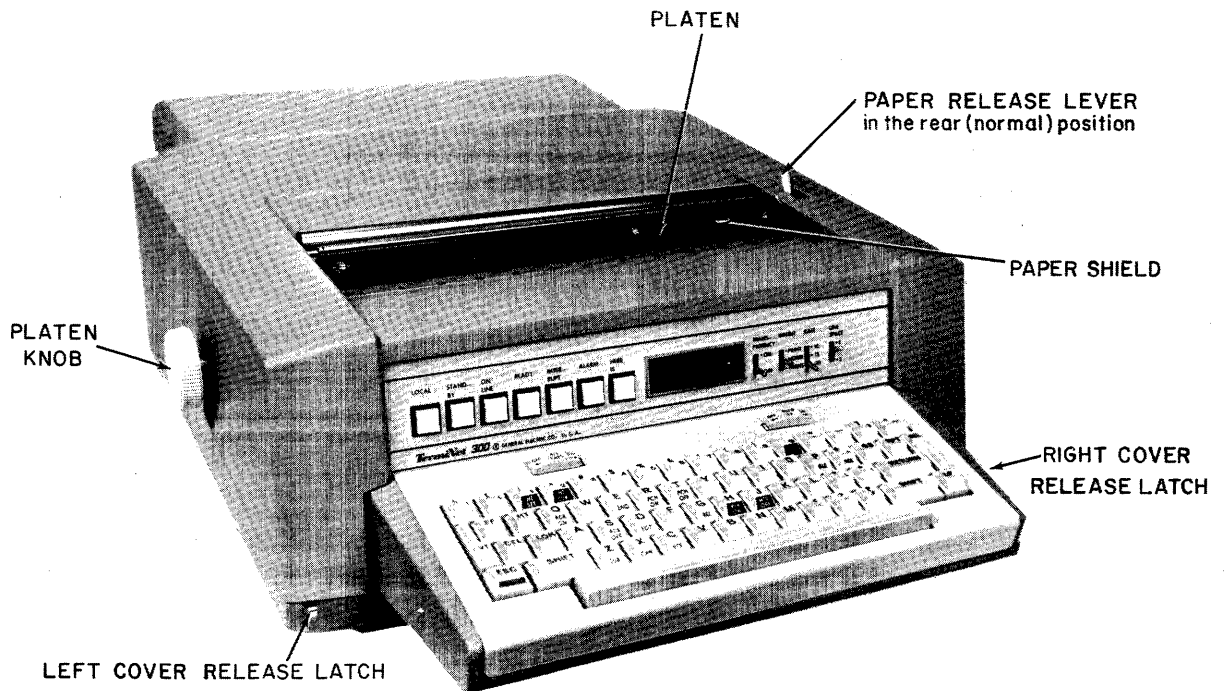
- b. Remove paper tube (Figure 2-2) from Printer.
- c. Place the paper tube in the center of the new paper roll.

- d. Set the paper roll and tube in place.
- e. Lift the paper shield (Figure 2-1).
- f. Feed the paper from the bottom of the roll, over the tension limiter, and under the platen (Figure 2-3).

NOTE

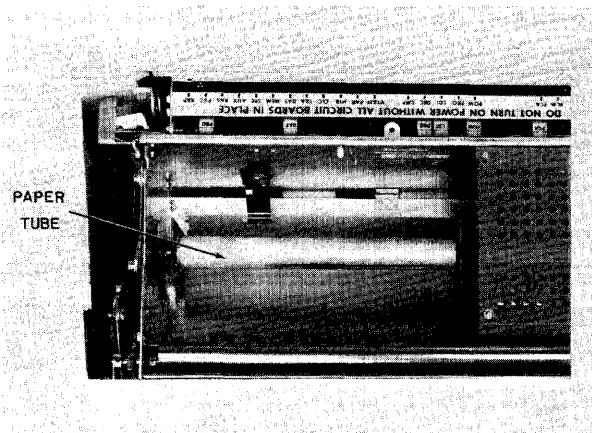
It may be necessary to press the tension limiter down while routing the paper under the platen. Make certain the anti-curl device (Figure 2-4) is positioned in the middle of the paper width.

- g. Push the Platen Knob (Figure 2-1) in and rotate to advance the paper.



PKM-4008

Figure 2-1. Paper Handling



PKM-4009

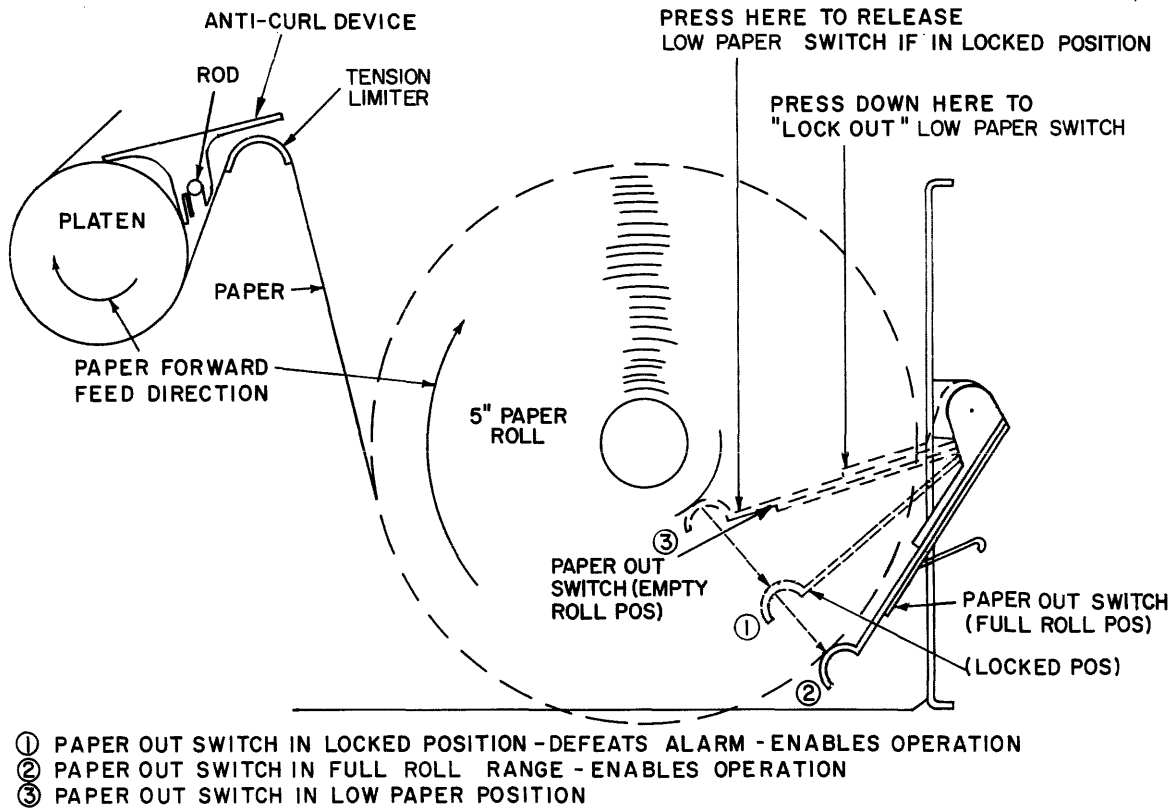
Figure 2-2. Paper Tube

- h. Lower the paper shield carefully. Do not let the shield snap down.

- i. To align the paper, move the Paper Release Lever (Figure 2-1) to its forward (toward the keyboard) position and align the left edge of the paper with the vertical line on the paper shield.
- j. Move the Paper Release Lever to its most rear (toward the bustle) position.

PIN FEED (300 PRINTER)

- a. Align the paper supply container, holder, etc., behind the Printer. The paper supply should be lower than the Printer's top surface.
- b. Route the paper over the back of the Printer toward the platen.
- c. Insert the paper under the platen and align paper holes with the sprocket pins.



PKM-4010

Figure 2-3. Paper Installation - Friction Feed

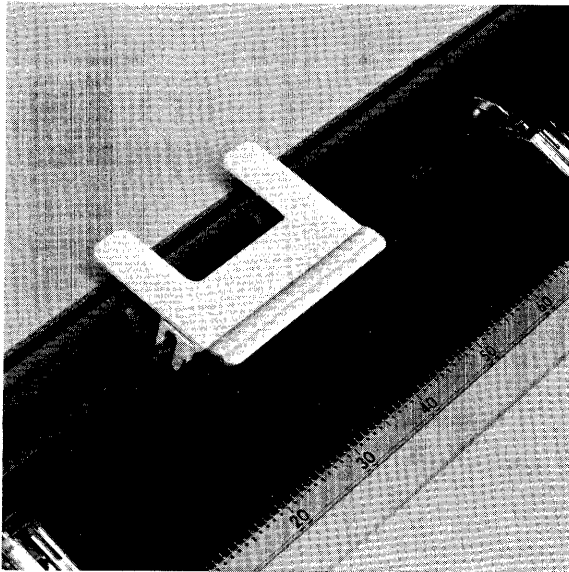


Figure 2-4. Anti-Curl Device

PTM-3009

- d. Advance the paper with the platen knob.

PIN FEED PAPER ON FORMS TRACTOR (See Figures 2-5, 2-6, and 2-7)

- a. Place the paper supply at the rear of the TermiNet 300 Printer so that the paper will feed over the paper pan. If multiple form sets are used, the shiny side of the carbon paper must face up as the paper feeds over the paper pan. Adjust the paper pan for width of paper, allowing approximately 1/16" (1.6 mm) clearance on each side. The paper guides, mounted above the bustle, are adjustable to a maximum paper width of 12 27/32" (32.6 cm).
- b. Slide the paper behind and underneath the platen. (When using thick, multiple copy sets, it may be necessary to push the platen knob in and manually turn platen to assist the paper around the platen.)

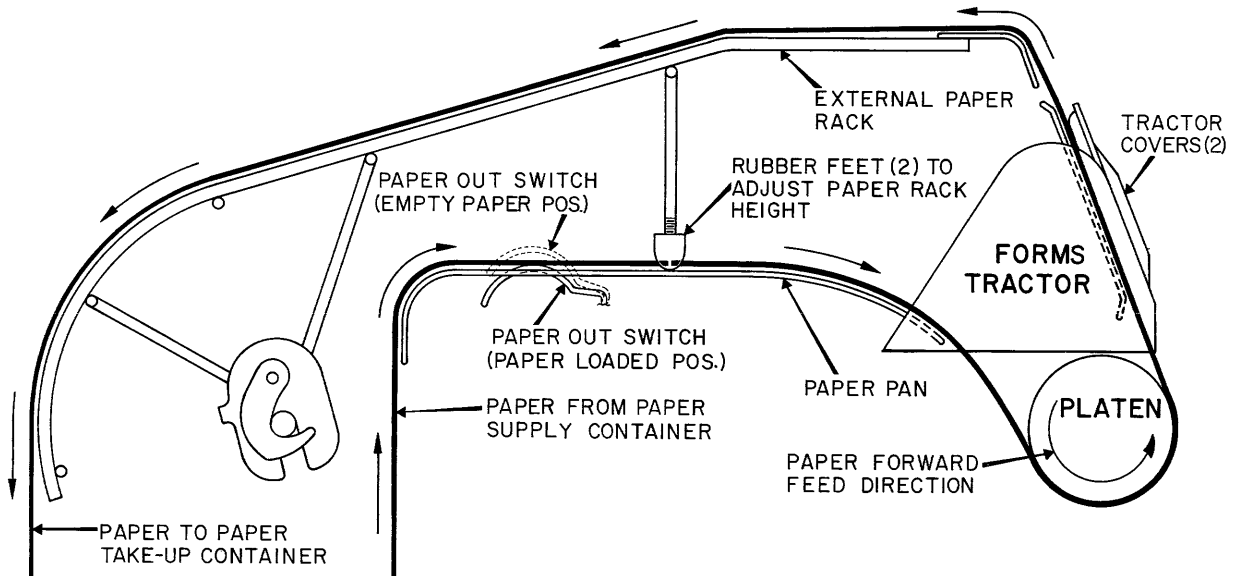
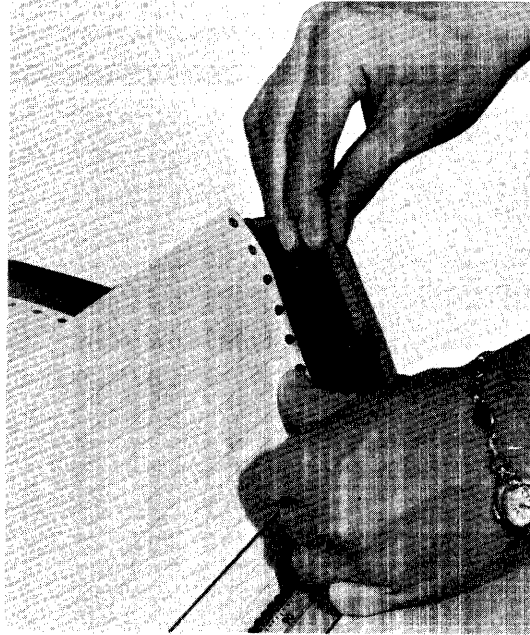


Figure 2-5. Paper Installation - Pin Feed on Forms Tractor

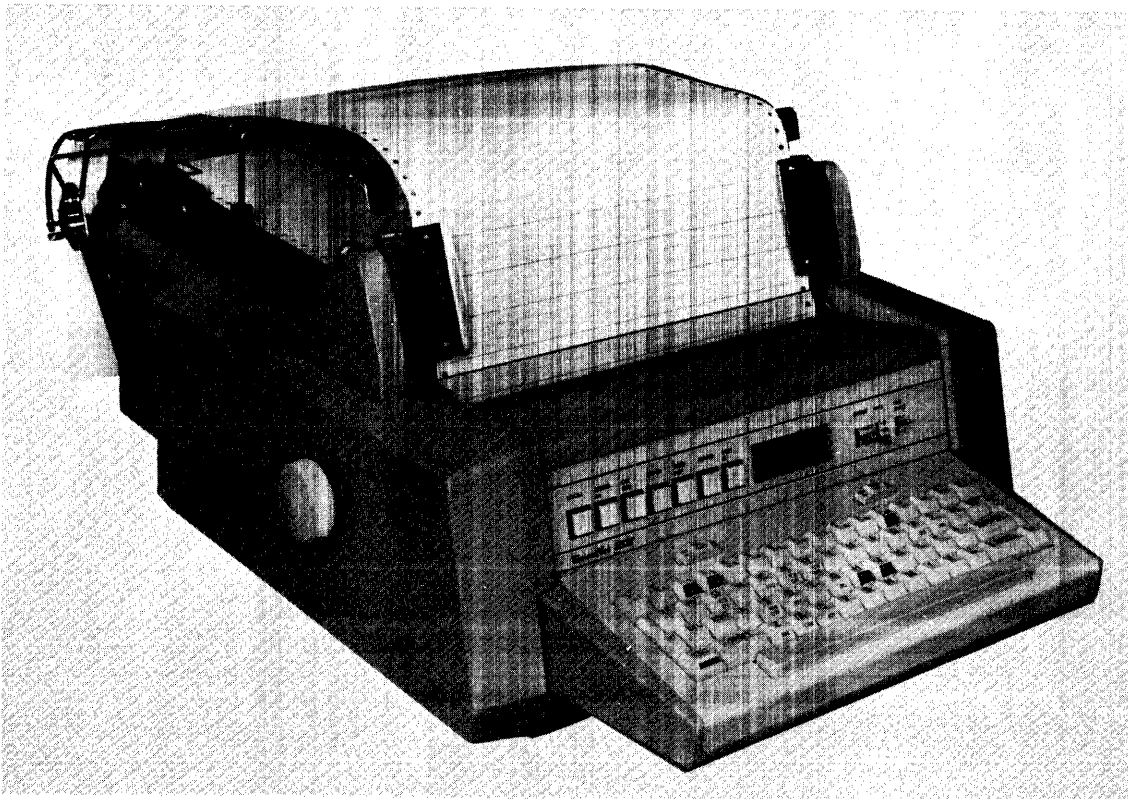
PTR-4005

- c. Adjust the two tractors on the forms tractor assembly setting above and just behind the paper shield by loosening the knurled knob located behind each tractor. Slide tractors horizontally to the left or right as required to line up with the paper width being used. Lock tractors in this position by tightening the two knurled knobs.
- d. Open the covers on the tractors and fit the holes in the edges of the paper over the tractor pins as illustrated in Figure 2-6.
- e. Close covers on the tractors and rotate platen with the Platen Knob until the paper is over the top of the external paper rack.
- f. Make sure the paper passes through the paper out switch housing located to the left rear of the paper pan so the paper out switch is pressed by the paper. The paper out switch senses when incoming paper is no longer at the top of the bustle and causes an "Alarm" condition. Approximately 16" (40.6 cm) of paper remain available when the "Alarm" occurs.



PTR-3003

Figure 2-6. Fitting Paper Over Tractor Pins



PTH-4011

Figure 2-7. Pin Feed Paper Installed On Forms Tractor

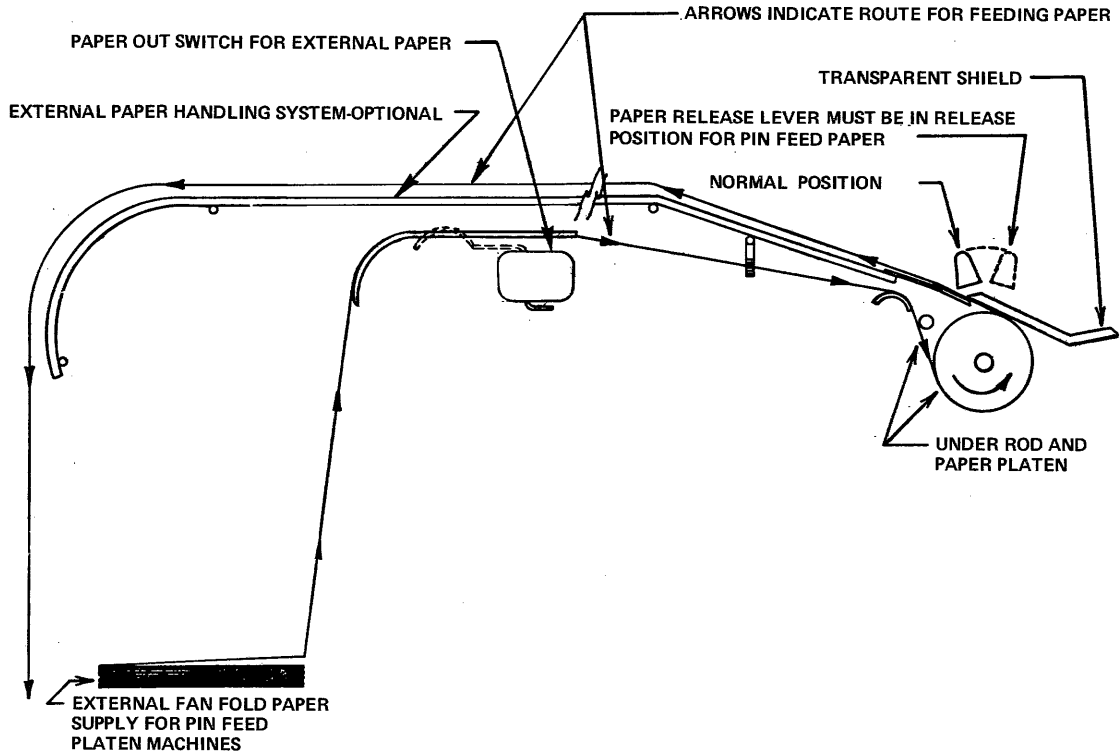
EXTERNAL PAPER HANDLER (OPTION)

Similar to Forms Tractor except use Figure 2-8 as a reference.

PAPER REQUIRED

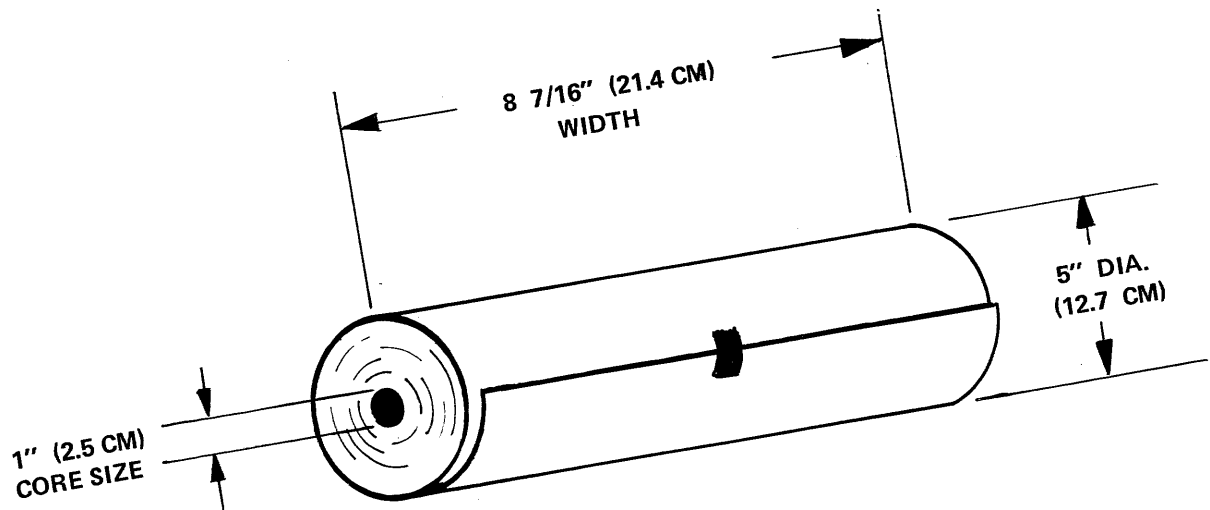
ROLL (300 PRINTER)

Figure 2-9 shows the dimensions of the paper roll required for the Printer.



OPH-4003

Figure 2-8. Paper Installation with External Paper Handler



PTM-4025

Figure 2-9. Paper Roll Dimensions

SINGLE SHEET

A single sheet with a minimum length of 5 inches (12.7 cm) may be used in Printers using paper rolls.

FAN FOLD

Your Printer may have a pin feed option which consists of either a platen having a row of pins around each end, or a forms feed tractor mounted on top of the Printer. A pin feed Printer will use fan-fold paper in one of the sizes shown in the table. A forms feed tractor Printer can use any paper width from 3 inches (7.6 cm) to 12 27/32 inches (32.6 cm). You can determine the size your Printer uses by measuring the distance across the width of the platen between pins. Use "overall" size when ordering (see Figure 2-10). Paper hole dimensions are shown in Figure 2-11. Multiple copy paper consisting of an original and up to five copies not exceeding 0.025 in. (0.64 mm) thick may be used.

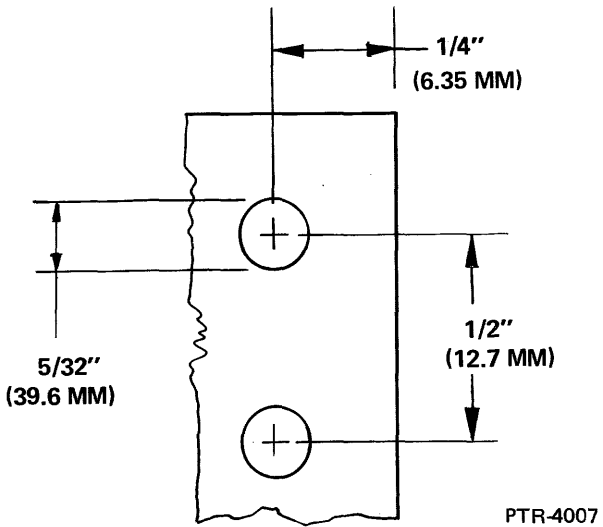
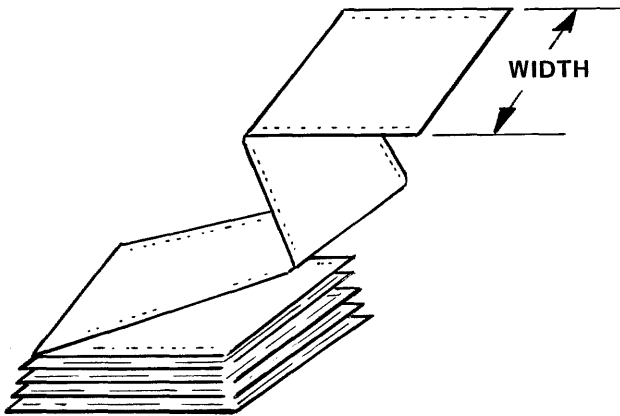


Figure 2-11. Paper Hole Dimensions



PIN FEED PAPER WIDTHS	
Pin-to-Pin	Overall
8" (20.3 cm)	8 1/2" (21.6 cm)
8 1/2" (21.6 cm)	9" (22.9 cm)
9" (22.9 cm)	9 1/2" (24.1 cm)
12 11/32" (31.3 cm)	12 27/32" (32.6 cm)
Split Platen - Right Hand	
3" (7.6 cm)	3 1/2" (8.9 cm)

PTR-4006

Figure 2-10. Fan-Fold Paper Widths

RIBBON REQUIRED

Replacement Ribbons must have 150 FS Underwood type double spools. (Figure 2-12 shows ribbon and spool dimensions.) The following ribbons are recommended.

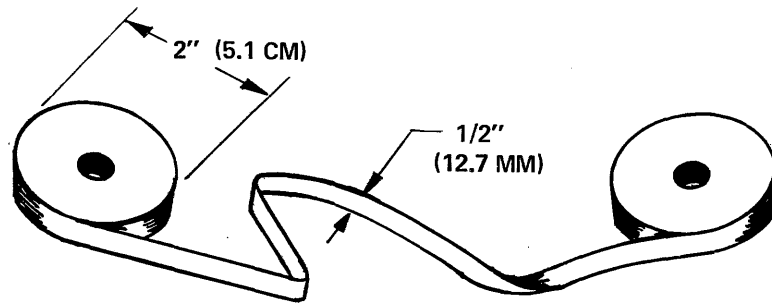
- Columbia #3202-2005
- Curtis Young DUO PAK, Nylon 44, Black Medium #4
- Labelon Underwood Scriptor Duet, Black Medium, #430 Nylon
- Buckeye #130-2070-115 Paquette, Black Record #5
- General Ribbon, G. E. TermiNet 300, Silk, Computer Black, Heavy

RIBBON INSTALLATION

Install ink ribbons as shown by Figure 2-13, using technique shown pictorially by steps 1 through 6 in Figure 2-14.

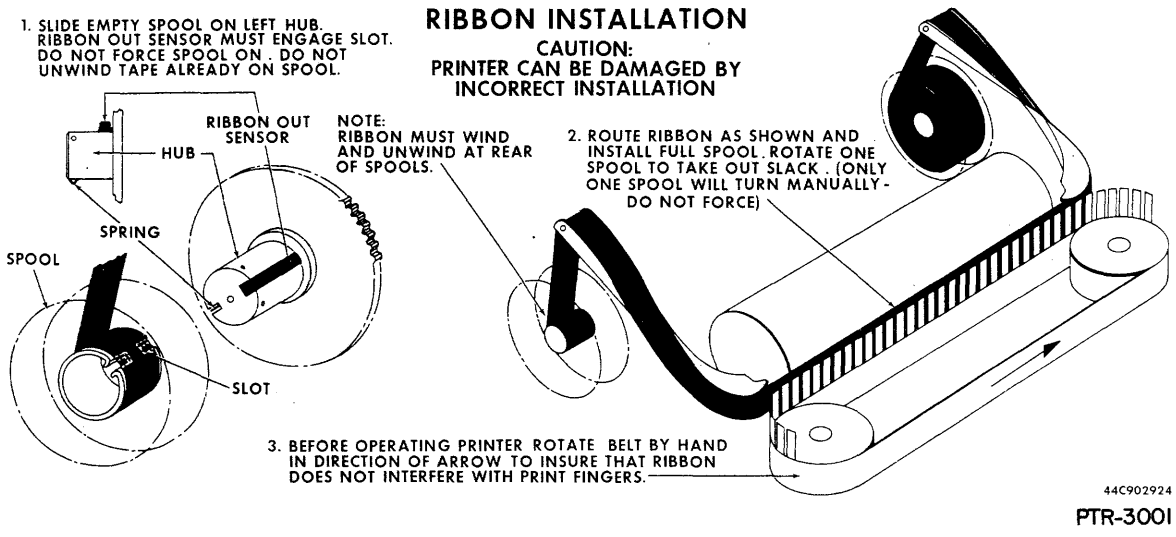
NOTE

On Printers with a forms tractor, make certain the ribbon is not routed between the platen and the anti-snap device paper holder (metal tab holding the paper against the platen).



PTR-4008

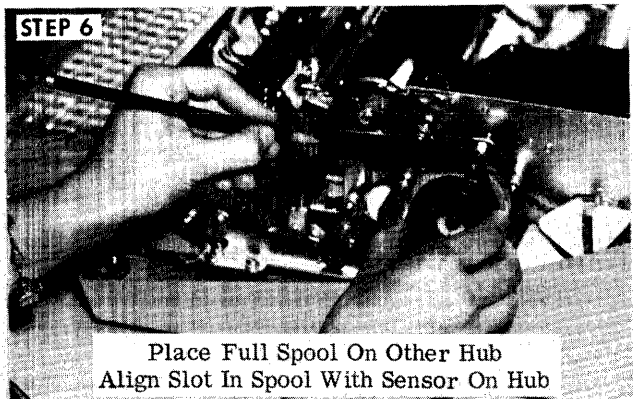
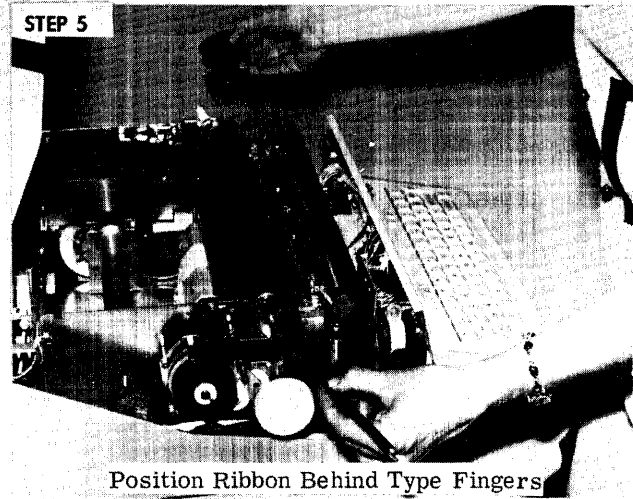
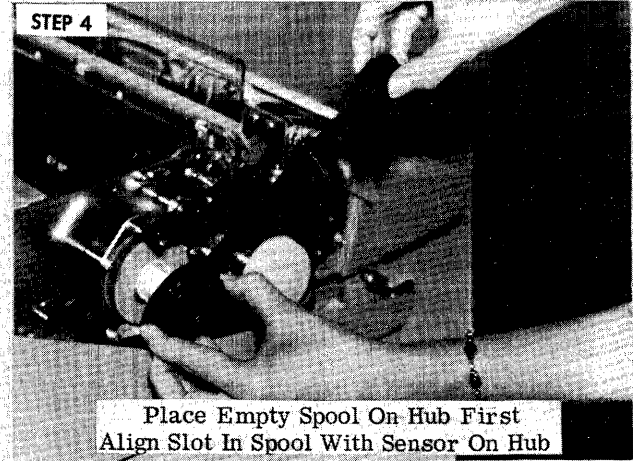
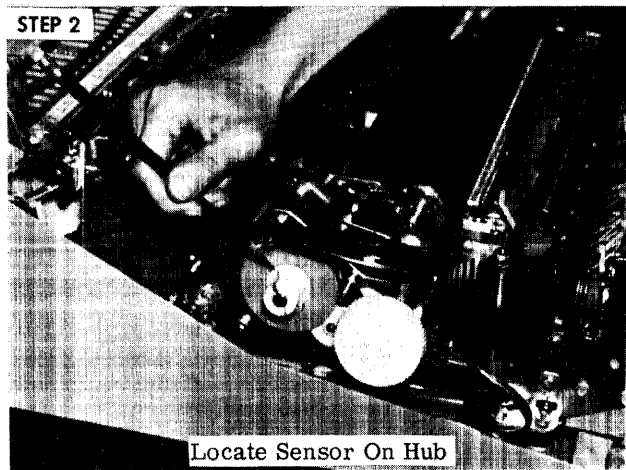
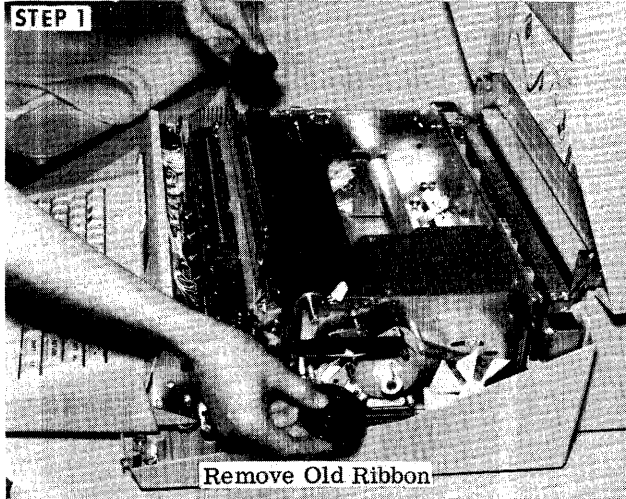
Figure 2-12. Ribbon and Spool Dimensions



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PTR-3001

Figure 2-13. Ribbon Installation



PTR-4009

Figure 2-14. Ribbon Installation Procedure

SECTION 3

OPERATION

SWITCHES, CONTROLS, AND INDICATORS

Figures 3-1, 3-2, and 3-3 point out the locations of the switches, controls, and indicators and explain their basic functions.

AUDIBLE INDICATORS

- Beep tone each time a key is pressed.
- High pitch tone when ALARM indicator lights.
- High pitch tone when INTERRUPT indicator lights.
- High pitch tone indicating near end of line and end of line. The tone will sound at print positions 67, 72, 110, and 112 on 75, 80, 118, and 120 print position Printers respectively. The tone will also sound after the last print position of the Printer.

NOTE

The volume of all the audible indicators is adjustable by the serviceman if the preset volume does not satisfy your particular need.

KEYBOARD OPERATIONS

The keyboard is similar to that on a standard electric typewriter. The keyboard has a total of 62 keys including the space bar, and is capable of generating all 128 ASCII characters. The keys are electronically interlocked so that it is not possible to generate two or more codes simultaneously. A beep tone sounds each time a key is pressed (with the exception of the SHIFT, LOK, CTL, and RPT keys). Because actual printing may not occur at the same instant you press a key (as with most typewriters), the beep tone allows you to maintain your normal typing rhythm. For descriptions of the Printer operation keys, see Figure 3-5.

ALARM - The ALARM lamp lights when the following alarm conditions occur (remains on until the alarm condition has been corrected):

- Low paper or paper out
- Paper Shield up (not on forms tractor model)
- Paper punch out of paper or end of magnetic tape in "Write" mode if in optional ASR configuration.
- Problem in the Printer.

Also, when the ALARM lamp lights, the following occurs:

- An Alarm tone sounds
- An Interrupt or Break is automatically transmitted to alert the other end of the line (if on line)
- The motor turns off

The following are alarm conditions that do not light the ALARM lamp but sounds the Alarm tone, causes an Interrupt or Break to be transmitted, and turns off the motor.

- Cover up (300 Printers only)
- Undervoltage to Printer.
- Print belt underspeed.

When the Alarm condition is corrected, LOCAL or ON LINE must be pressed to start the motor.

INTERRUPT - See INTERRUPT CONDITION TABLE 3-1.

HERE IS - triggers Printer answerback code if the Printer has the answerback option.

PRINT POSITION INDICATOR - Shows position of next character to be printed

LOCAL - Lights when pressed. Starts motor and enables local Printer operation but does not allow the transmission or reception of data.

STANDBY - Lights when pressed. Turns motor off but leaves electronics turned on which enables the transmission and reception of data.

ON LINE - Lights when pressed. Turns Printer motor on and enables the transmission and reception of data.

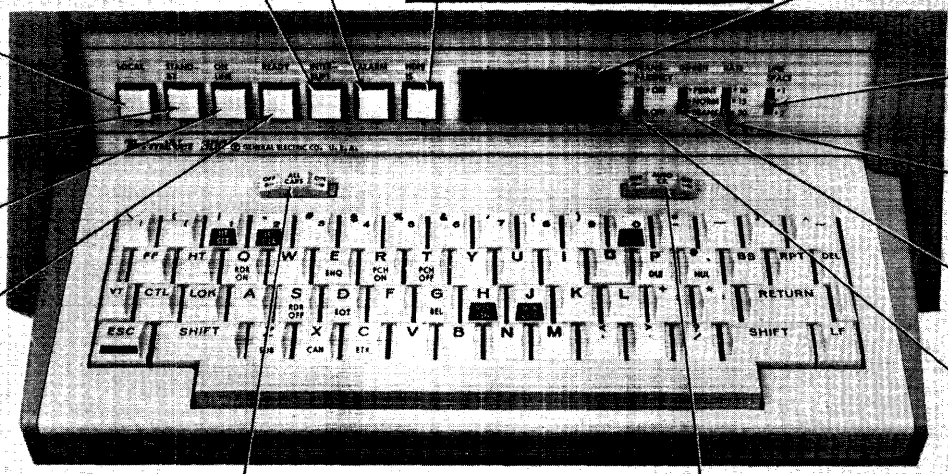
READY - Indicates data set is ready for transmission. Held off if INTERRUPT lamp is on.
1200 Printer only - Used as lamp self test. When pressed, all lamps should light. The **HERE IS** pushbutton does not have a lamp.

LINE SPACE -
Set on "1", single line-space.
Set on "2", double line-space. (Only 1 line-feed character sent externally for each generated L.F.)

RATE - Selects the Printing, Transmitting and Receiving speed of the Printer and optional tape equipment.

INHIBIT -
PRINT position, inhibits printing and paper punching from local source.
NORM position, printing is normal.
TRANS position, inhibits transmission of data; incoming data not affected.

TRANSPARENCY (Option) - Allows the Printer to process (receive or transmit) codes other than ASCII but inhibits printing.



ALL CAPS - When placed in the ON position, all alphabetic printing caused by the keyboard only will be upper case.

AUTO L.F. - When in the ON position, the paper is advanced automatically when the RETURN key is pressed. (Has no effect on incoming data.)

PKM-4011

Figure 3-1. Switches and Indicators, KSR Printer

TABLE 3-1
INTERRUPT CONDITION TABLE

CONDITION OF INTERRUPT LAMP	RESULTS FROM PRESSING INTERRUPT PUSHBUTTON
Unlit	An "Interrupt" or "Break" signal is transmitted. INTERRUPT lamp does not light.
Lit	<ol style="list-style-type: none"> 1. INTERRUPT lamp goes out. 2. "Interrupt" or "Break" is not transmitted. 3. KEYBOARD is unlocked (KSR Printer). 4. READY lamp is restored to normal.

CONDITION OF INTERRUPT LAMP	RESULTS FROM RECEIVING AN INTERRUPT SIGNAL
Unlit	<ol style="list-style-type: none"> 1. INTERRUPT lamp lights. 2. Alarm sounds. 3. Keyboard is locked out (KSR Printer). 4. Optional Reader (if on) is turned off. 5. Optional Reader may then be restarted either locally or remotely. 6. Data may still be received. 7. Motor does not turn off. 8. READY lamp is held off.
Lit	<ol style="list-style-type: none"> 1. Optional Reader (if on) is turned off. 2. Optional Reader may then be restarted either locally or remotely. 3. Data may still be received. 4. Motor is not turned off. 5. READY lamp is held off.

NOTE

An "INTERRUPT" or "Break" signal transmitted by a TermiNet Printer is always 268 milliseconds long. (It is a constant zero (spacing) condition.)

The minimum duration of a received "INTERRUPT" or "Break" signal must be 240 milliseconds to insure detection by a TermiNet Printer.

ALARM - The ALARM lamp lights when the following alarm condition occurs (remains on until the alarm condition has been corrected):

- Low paper or paper out
- Paper shield up (not on forms tractor model)
- Problem in Printer

Also, when the ALARM lights, the following occurs:

- An Alarm tone sounds
- An Interrupt or Break is automatically transmitted to alert the other end of the line
- Motor turns off

The following are alarm conditions that do not light the ALARM lamp but sound the Alarm tone, cause an Interrupt or Break to be transmitted (SR Printer only), and turn off the motor.

- Cover up (300 Printer only)
- Undervoltage to Printer
- Print belt underspeed

When the Alarm condition is corrected, MOTOR ON must be pressed to start the motor.

INTERRUPT - See INTERRUPT CONDITION TABLE 3-1.

READY - Indicates data set is ready for reception of data. Held off if INTERRUPT lamp is on.

1200 Printer Only - Used as lamp self test. When pressed, all lamps should light. The FORM FEED and LINE FEED pushbuttons do not have lamps.

MOTOR ON - Lights when pressed. Turns motor on.

MOTOR OFF - Lights when pressed. Turns motor off but leaves electronics turned on.

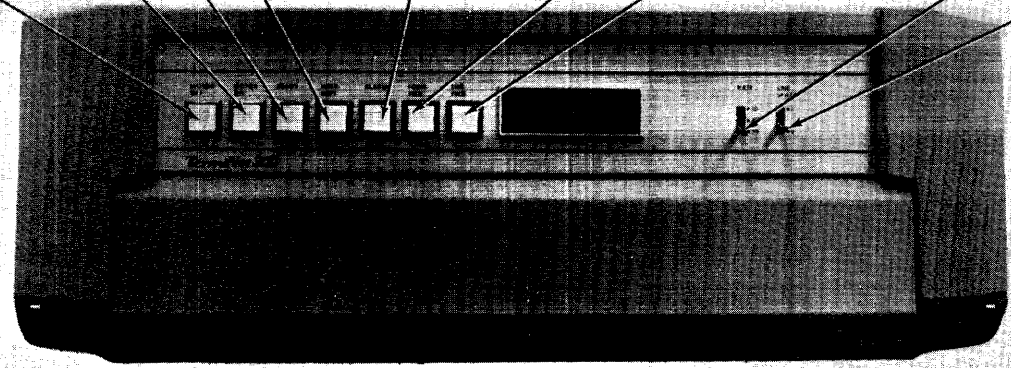
FORM FEED (OPTION) - When pressed, causes paper to feed continuously to the beginning of the next new form.

LINE FEED - Will cause paper to feed one line each time it is pressed and quickly released. When pressed and held, paper will continue to line feed incrementally.

RATE - Selects printing speed.

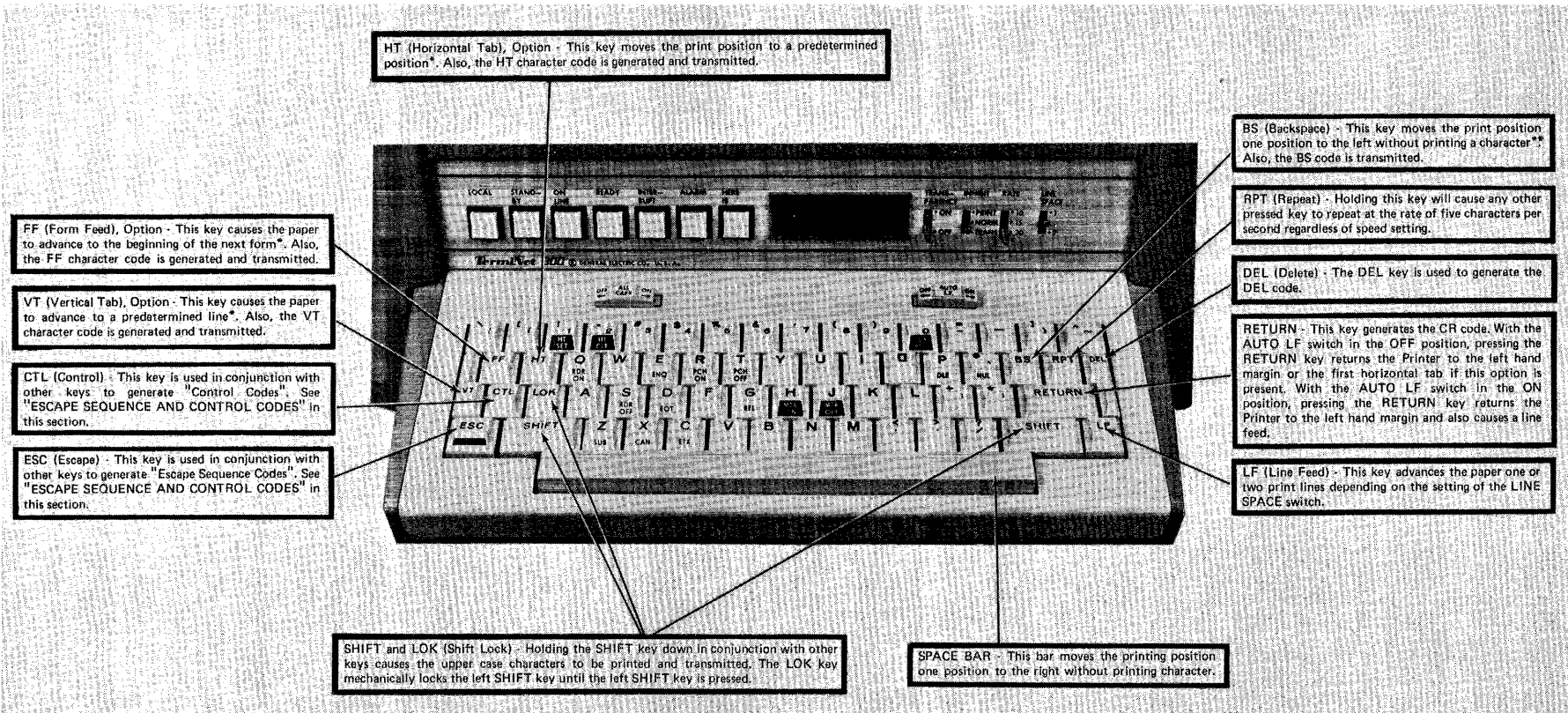
LINE SPACE

- Set on "1", single line-feed.
- Set on "2", double line-feed.



PTR-4010

Figure 3-2. Switches and Indicators, RO and SR Printers



*Refer to page 3-9 for a more detailed description on the use of these keys.

**If it is a Split Platen Printer, pressing the BS key moves the print position to the first print position on the right platen. The normal backspacing function is not operable.

Figure 3-5. Operation Keys

PTM-4026

ESCAPE SEQUENCE AND CONTROL CODES

GENERATING ESCAPE SEQUENCE CODES

By momentarily pressing the ESC (Escape) key and then momentarily pressing the appropriate related key, an escape sequence code is generated (the character following the ESC code does not print). The ESC key and its related keys are shaded on their front edges. The Printer can react to escape sequence codes from the keyboard or received from a remote source.

NOTE

To generate escape sequence codes with early production 300 Printers, press and hold the ESC key, then simultaneously press the related key. Release the keys.

GENERATING CONTROL CODES

To generate a control code, press and hold the CTL (control) key, then simultaneously press the desired control function key. Release the keys. Most control function keys are identified on their front edges.

DESCRIPTION OF ESCAPE SEQUENCE AND CONTROL CODES

In the descriptions following, "receipt" or "when received" refers to codes received, not those generated at the keyboard or on local tape. "Recognition" refers to codes received or to codes generated locally. The following is a list of codes most encountered in the average system.

NOTE

In some cases, the codes are stored. There is no permanent memory in the TermiNet Printer, and stored codes will be lost if power is completely removed from the Printer.

ESCAPE SEQUENCE CODES

The ESCAPE code is used in sequence (Escape is first code) with other codes to accomplish the following:

ESC 0 (Zero) RDR REV - This code when recognized causes an optional reading device to reverse.

ESC 1 - HT Set (Option) - If the horizontal tab option is present, recognition of ESC 1 will set a tab at the print column position where this code is recognized.

ESC 2 - Horizontal Tab Clear (Option) - If the horizontal tab option is present, recognition of ESC 2 will clear all tabs which have been set.

ESC 3 - In a Split Platen Printer, recognition of ESC 3 causes the right platen to advance paper when the LF code is recognized.

- When the Red and Black Printing option is installed, recognition of ESC 3 will raise the ribbon to allow red printing (Red and Black Printing option is not available on the Split Platen Printer).

ESC 4 - In a Split Platen Printer, recognition of ESC 4 causes the left platen to advance paper when the LF code is recognized.

- When the Red and Black Printing option is installed, recognition of ESC 4 will lower the ribbon to allow black printing (Red and Black Printing option is not available on the Split Platen Printer).

ESC ; - When received, this code places the Printer in a suppress print mode and allows two-way simultaneous data flow. Locally generated data is transmitted but not printed while received data is being printed. A jumper change can be made so that the Printer will respond to a recognized ESC ;.

ESC : - Receipt of this code cancels the effect of ESC ; and restores the Printer to its normal condition. That is, printing occurs whether data is being received or locally generated. Normal operation may be restored under local control by momentarily moving the INHIBIT switch on the front panel to the PRINT or TRANS position, by pushing the LOCAL pushbutton, or by turning off AC power.

ESC H (h) - Printer Motor On - Used, when recognized, to turn the Printer motor ON. A jumper change can be made so that only a received ESC H will turn the motor on.

ESC J (j) - Printer Motor Off - Used, when recognized, to turn the Printer motor OFF. A jumper change can be made so that only a received ESC J will turn the motor off.

CONTROL CODES

CTL-C, ETX (End-of-Text) - This code causes an action only if the Printer has the Line Control option. When the Printer is in a transmit mode, local generation of ETX places it in a receive mode. ETX, when received, turns the Printer to the transmit mode. A jumper change can be made so that ETX code has no effect.

CTL-D, EOT (End-of-Transmission) - When recognized, this code causes the Printer to go to "Standby" if the Printer was "On Line". If the Printer was in "Local", the EOT code will stop the Printer. If the Printer has the line control option, a jumper change can be made so that EOT will cause the same action as ETX. Also, a jumper change can be made so that EOT has no effect.

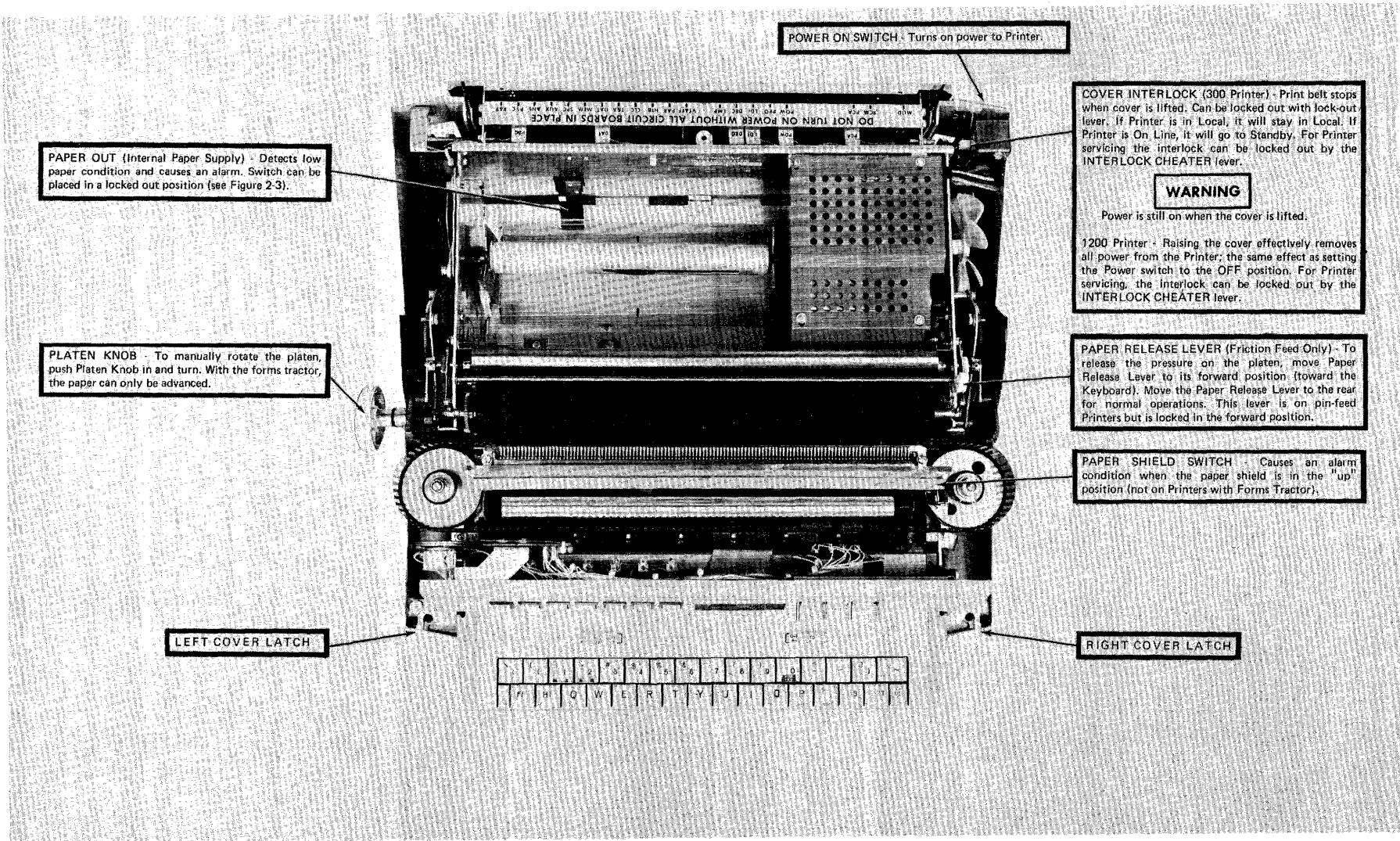
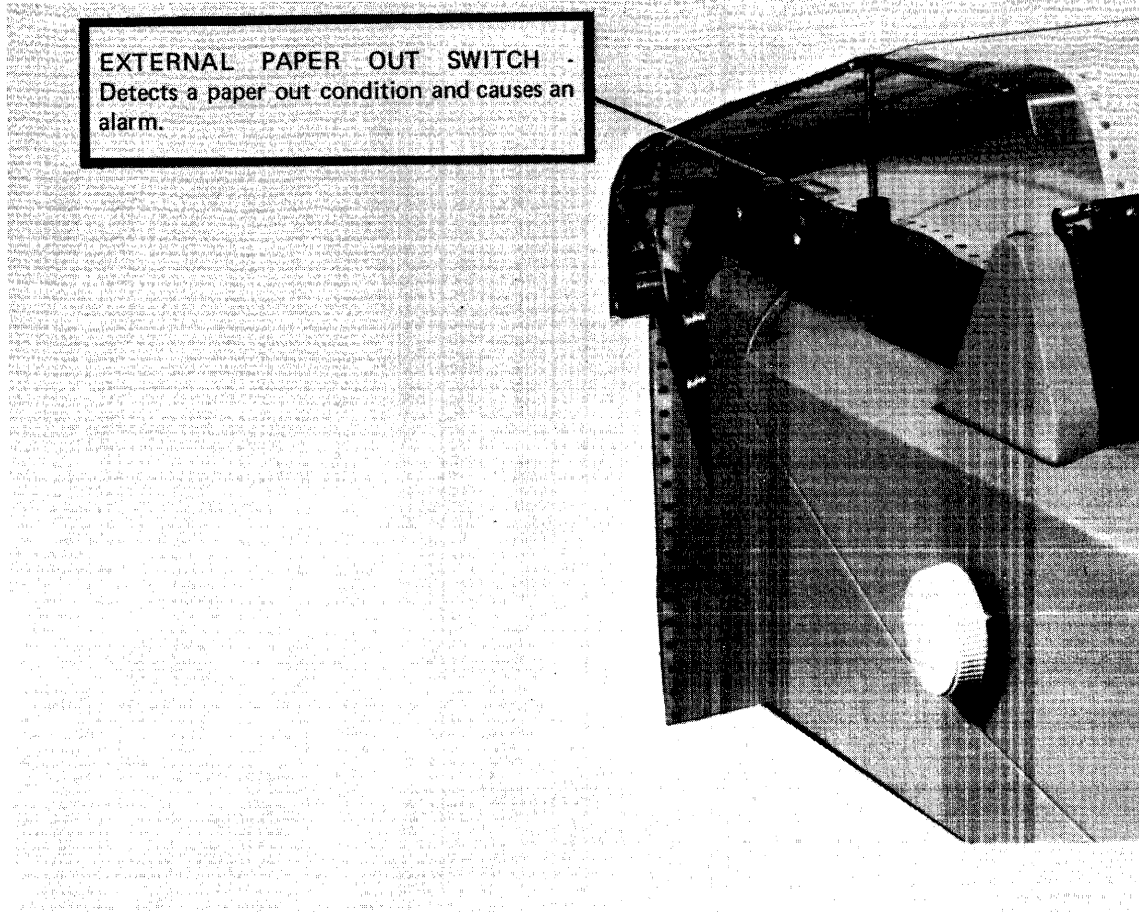


Figure 3-3. Switch Locations and Manual Controls

PTR-4011



PTR-4012

Figure 3-4. External Paper Out Switch

CTL-E, ENQ (Enquiry) - This code causes an action if your Printer has the Answerback or Line Control option. Receipt of ENQ triggers the answerback message that can contain up to 20 characters. If the Printer has the Line Control option, the status of the Printer is indicated by the transmission of the ACK or NAK code (following the Answerback message) and the line turns around. Status excludes the "Motor Off" state of the Printer.

CTL-F, ACK (Acknowledgment) - This code causes an action only if the Printer has the Line Control option. Recognition of ACK turns the line around. A Printer transmits ACK as a response to ENQ if the Printer is not out of paper, and it is capable of receiving a message.

CTL-G, BEL (Bell or Alarm) - When recognized, this code causes an audible alarm to sound for approximately 0.5 seconds. Any BEL code received during the 0.5 second alarm will be ignored; i.e., successive BEL codes do not generate a cumulative time value of tone.

CTL-P, DLE (Data Link Escape) - DLE is used in combination with the following codes. These codes cause an action only if the Printer has the Line Control option.

- DLE EOT - When recognized, these codes initiate the automatic disconnect, and the Printer is placed in the "Standby" mode. (Data Terminal Ready signal (circuit CD) to the Data Set turns off for 67 milliseconds.)
- DLE ? - When these codes are received, the Printer assumes a "Wait Before Transmit" condition, and the READY lamp goes out. The Printer automatically responds to DLE ? with the code ENQ. Subsequent receipt of ACK lights the READY lamp.

CTL-Q, RDR ON, DC1 (Reader On) - The Reader On code is used, when received, to turn on an optional reader device.

CTL-R, PCH ON, DC2 (Punch On) - The Punch On code is used, when received, to turn on an optional recording device.

CTL-S, RDR OFF, DC3 (Reader Off) - The Reader Off code is used, when received, to turn off an optional reading device. A jumper change can be made so that DC3 is ignored when received.

CTL-T, PCH OFF, DC4 (Punch Off) - The Punch Off code is used, when received, to turn off an optional recording device.

CTL-U, NAK (Negative Acknowledgment) - This code causes an action only if the Printer has the Line Control option. Receipt of NAK turns the line

around, lights the INTERRUPT lamp, and de-activates the keyboard. The Printer transmits NAK on receipt of ENQ if the Printer is out of paper and is used with a data set which does not disconnect when the Data Terminal Ready lead (circuit CD) is turned OFF.

HORIZONTAL TABULATION (OPTION)

TAB SET

A tab is set when the "Escape" and "1" (HT set) codes are generated from the keyboard or received from a remote source. Any number of tabs can be set on a print line.

TAB CLEARING

All tabs are cleared when the "Escape" and "2" (HT CLR) codes are generated from the keyboard or received from a remote source.

NOTE

When AC input power is turned off, all tabs are cleared. The tabs do not clear when the Printer goes to the "Standby" status.

OPERATING CHARACTERISTICS

When the HT key is pressed or a Horizontal Tab control code is received, the print position moves to the next tab set to the right. If no tabs are set, the print position moves to one position past the last print position.

When the RETURN key is pressed or a Carriage Return control code is received, the print position moves to the tab set farthest left. This tab becomes the left margin. If no tabs are set, the print position moves to 1 (one).

VERTICAL TAB AND FORM FEED (VTFF), OPTION

DESCRIPTION

This option allows the Printer to rapidly feed paper (6 3/4 inches per second) to a predetermined line position upon recognition of a locally or remotely generated form feed (FF) or vertical tabulation (VT) code.

A programmable disc is used to program the VTFF. The Printer can have VTFF for use with forms of 8, 8 1/2, or 11 inches. The corresponding discs contain 48, 51, and 66 divisions respectively. Figure 3-6 shows the disc for use with the 11 inch form. It has 66 divisions corresponding to the number of print lines on a 11 inch sheet of paper (6 print lines per inch).

For form-feed operation, this disc can be punched with the disc punch (see Figure 3-6) so that the recognition of a FF code causes the line feed drive to run quickly to the first line of printing on a new form.

The vertical tabulation operates in the same manner as the form feed. The programmable disc controls the response of the Printer to a recognized VT code. This operation is used for rapid consecutive line-feeds within a particular form.

The VTFF is designed to help prevent mis-indexing of a form if you should inadvertently press the VT rather than the FF key. Recognition of a VT code causes either vertical tabulation or form feed indexing, depending on which hole appears next on the programmed disc. If there are no holes punched in the disc or there is a malfunction in the sensing mechanism, a timer will stop paper feeding within a few seconds.

PROGRAMMING THE DISC

- a. Mount the disc on the punch so that the disc-key protrudes through the disc key hole (see Figure 3-7).
- b. By rotating the disc, set the desired number in line with the VT and FF holes. This number should coincide with the line position where the form is to be started.
- c. Press the punch in the FF hole to punch a hole in the disc in line with the desired numbered position.
- d. Rotate the disc and punch a hole at each VT position where the form is to have a vertical tab stop.

OPERATING THE VTFF OPTION

- a. Press a pre-punched disc over the keyed hub of the disc wheel until it can be rotated (see Figure 3-8). Rotate the disc until the key on the wheel protrudes through the disc keyhole.
- b. Press the FF key (or FORM FEED pushbutton on RO or SR Printer). The Printer will line feed to the first line position that is to be printed.
- c. Using the Platen Knob, advance the form so the first line to be printed is under the embossed characters on the fingers. The Printer is now ready to print.

SPLIT PLATEN PRINTER

The Split Platen (Pin Feed) Printer configuration (Figure 3-9) is available with the TermiNet 300 KSR, SR, RO and ASR Printers. This Printer configuration is capable of printing dissimilar information on two separate, standard size forms by using two independently operated platens. The left hand platen prints up to 75 columns on 8 1/2-inch wide paper and the right hand platen prints up to 26 columns on 3 1/2-inch wide paper. Each platen has its own independently-operated manual paper advance knob, paper supply and paper out sensor.

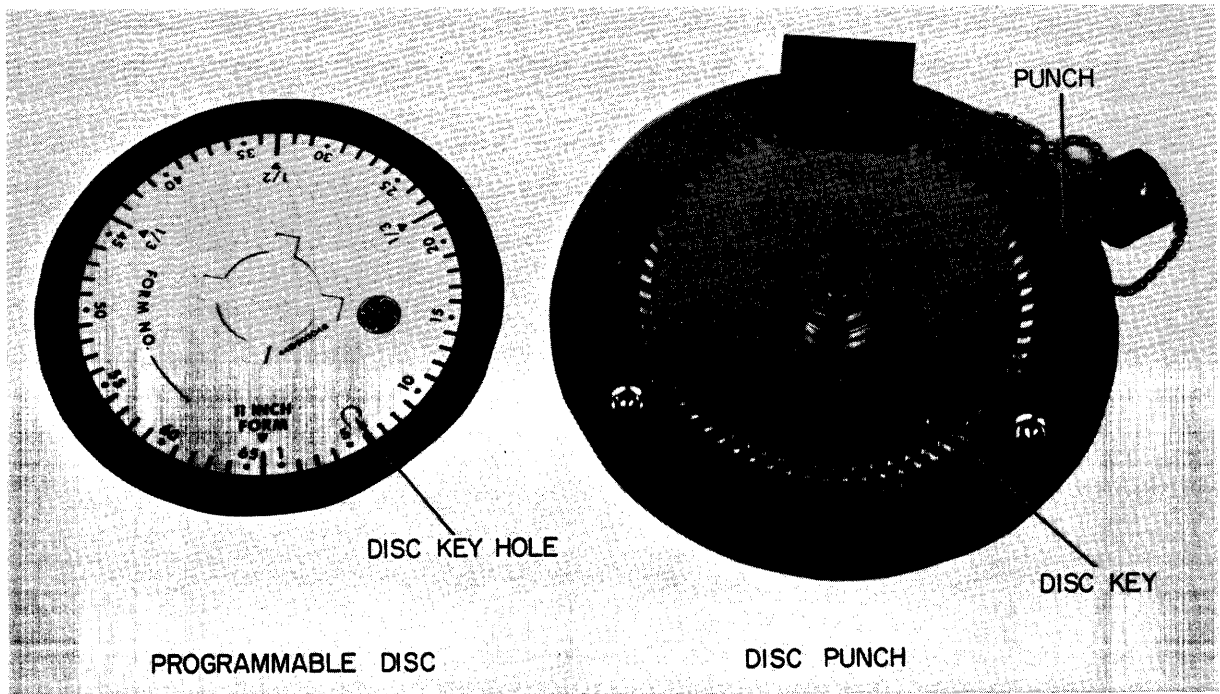
When the Split Platen Printer is first placed in ON LINE or LOCAL mode, the left hand platen is energized first while the right hand platen remains idle.

In this mode, when the linefeed (LF) key is pressed, only the left hand form will advance. Upon recognition of the character sequence ESC 3 (from local or remote source), the left hand platen will be deactivated and the right hand platen will be energized; linefeed will now advance the right hand form only. To return to left hand platen operation, the Printer must recognize the character sequence ESC 4. All normal Printer operations and standard option functions (except Backspace (BS), as noted below) remain operable in conjunction with the Split Platen Printer configuration.

Pressing the BS key moves the print position to the first print position on the right platen regardless of current column location. This use of the BS character provides a method to automatically tab to the right hand platen. THEREFORE, ON THE SPLIT PLATEN PRINTER, THE NORMAL BS BACKSPACING FUNCTION IS NOT OPERABLE.

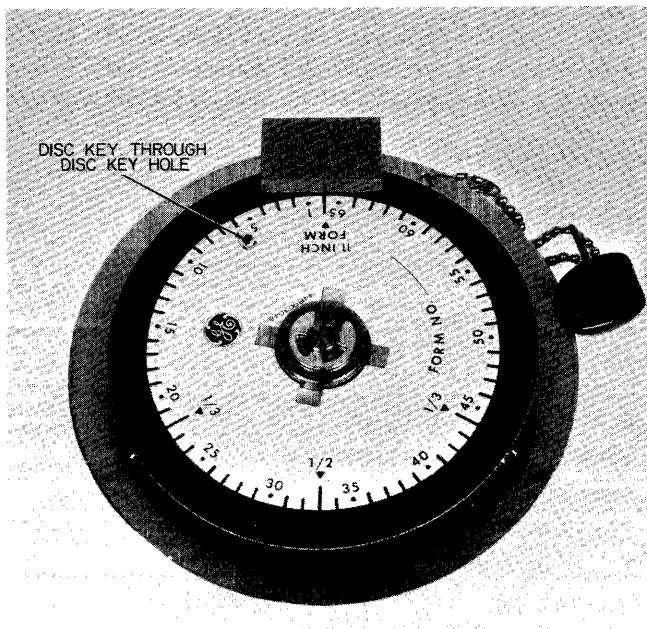
Whenever the Printer is turned off briefly, then on again (or whenever power is interrupted), the left hand platen is automatically energized when power is restored, regardless of which platen was energized previously.

On Printers employing the Vertical Tab and Form Feed (VTFF) option, the VTFF controls the left hand platen only.



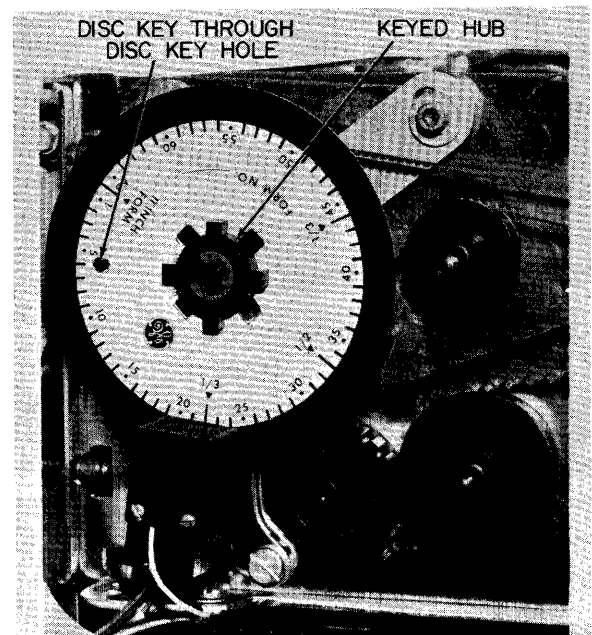
OVT-3002

Figure 3-6. Programmable Disc and Disc Punch



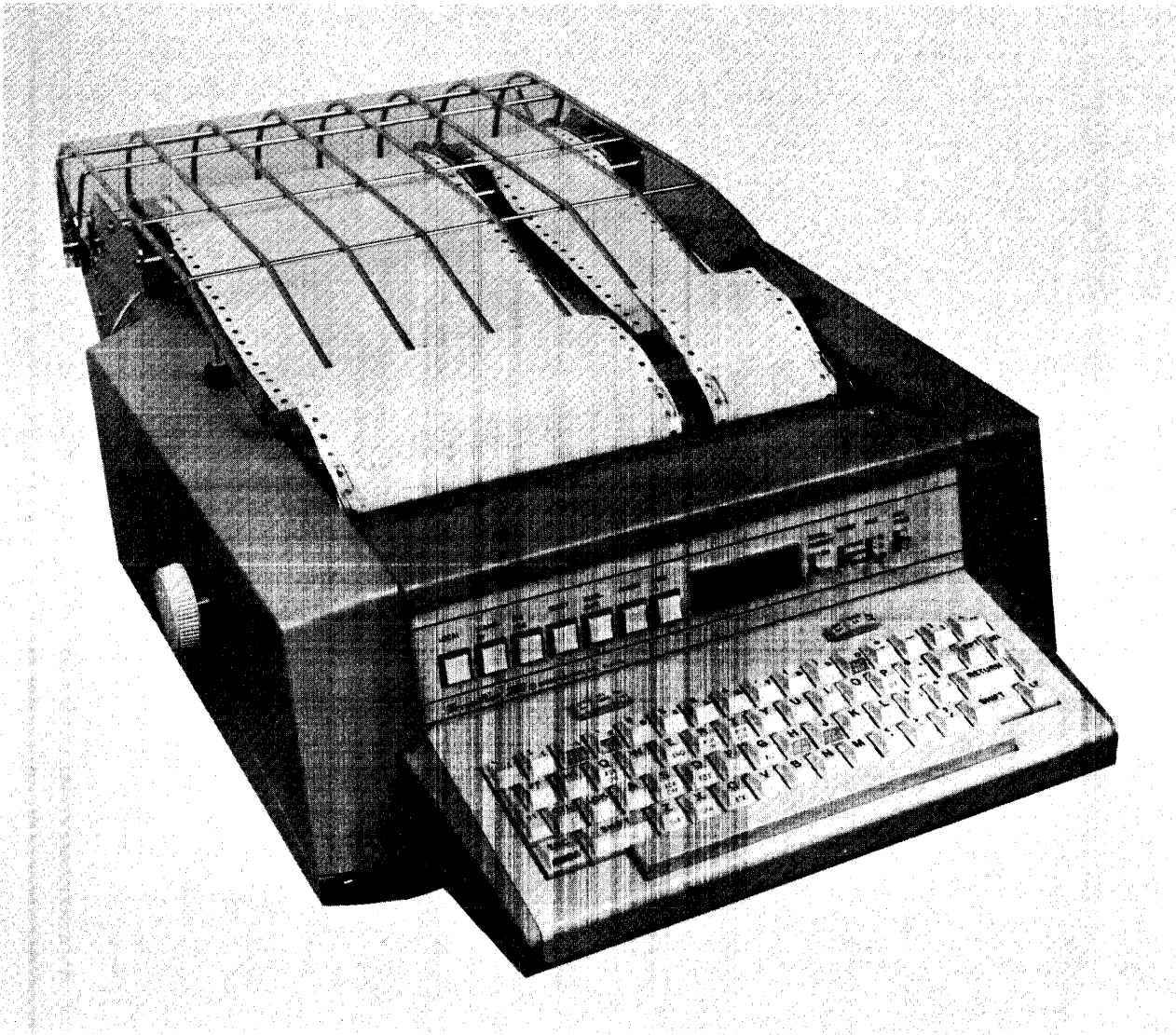
OVT-3001

Figure 3-7. Programmable Disc On Disc Punch (11" Form)



OVT-3000

Figure 3-8. Programmed Disc Mounting



OSP-4013

Figure 3-9. Split Platen Printer

SECTION 4

OPTIONS AND ACCESSORIES

This section gives a brief description of the more common Printer options. Some of the descriptions are technical in nature, and are written primarily for the application specialist. Consult your local specialist if you should have questions on these options.

ANSWERBACK

When the HERE IS pushbutton is pressed or the control code ENQ is received, an answerback message, up to 20 characters, is printed and transmitted. The message can be changed by your local serviceman.

AUTOMATIC ANSWERBACK

Similar to the answerback option described above except when the Printer is called, the Printer will automatically print (if the motor is on) and transmit its answerback message.

AUTOMATIC CARRIAGE RETURN

Any character which causes the column count to advance beyond the last print position will be converted to a carriage return code and cause the print position to automatically return to column one. The character causing this carriage return will be lost.

AUTOMATIC MOTOR CONTROL

It allows use of the interface circuit CB (Clear to Send) to control the motor. When CB comes on, the motor turns on; and when CB turns off, the motor turns off.

HIGH SPEED TRANSMISSION (300 PRINTER)

One of the rate selections is 120. This option allows the Printer to transmit information on tape at the rate of 120 characters per second (1200 baud). All printing is inhibited during this operation and the Printer goes to the "Standby" status.

HORIZONTAL TABULATION

This option is described in Section 3, Operation.

LINE CONTROL

The following functions take place with this option:

1. Line Control - Printer recognizes control codes to make a line change (change the state of the data set lead CA). The following control codes cause this function:

ACK

NAK

ETX (by making a jumper change, ETX will not cause a line change).

EOT (optional, by making a jumper change. EOT may be used also to make a line change).

2. Wait before transmit:

- Control "READY" lamp by DLE?

- ENQ exchange.

3. Mandatory Disconnect - Forced Disconnect when Printer recognizes DLE-EOT.

4. Printer recognizes NAK as equivalent to "Break" or "Interrupt".

5. Terminal Status - Printer responds to ENQ with ACK or NAK to show the Printer status. If the answerback option is included, ACK or NAK will be the last character after the answerback message.

PARITY ERROR DETECTION

The parity error detection feature examines each locally generated or received character to determine whether or not there is EVEN parity. In FULL DUPLEX, received data only is checked for parity errors.

If a character is detected with incorrect parity (ODD), there are two possible sets of action depending on the position of a jumper strap:

Jumper Position #1

Sounds Alarm - momentary
 Lights interrupt light until manually reset
 Transmits "Break"
 Turns Motor "Off" (see note)
 Goes to "Standby"
 Stops Reader

Jumper Position #2

Sounds Alarm - momentary
 Prints Diamond (see note)
 Lights interrupt light until manually reset
 Does not transmit "Break"
 Does not turn Motor "Off"
 Does not go to "Standby"
 Does not stop Reader

On units equipped with the "Transparency" option, a jumper change on the parity error detection board allows the parity checking to be operative or inhibited when the Printer is in the Transparent mode.

NOTE

In the case where the motor is turned off, it is possible to lose the last few characters because there is no time delay to allow for clearing out the memory.

If a non-printable character (space, delete, or control code) is detected to have a parity error, the diamond will not be printed and the printer will not advance to the next print position.

RED/BLACK RIBBON OPTION

This option allows two-color printing. When an ESC 3 code is recognized, the ribbon will lift to the red inked portion of the ribbon. Recognition of an ESC 4 will lower the ribbon to the normal black inked portion of the ribbon. Unlike the standard ribbon configuration, the ribbon does not lower to a position below the print line. Red/Black Ribbon option is not available on Split Platen Printers.

SPLIT PLATEN

This option is described in Section 3, Operation.

TRANSPARENCY SWITCH

This option includes the addition of the TRANSPARENCY switch on the Printer's control panel. It is used in conjunction with the optional Paper Tape Reader and Punch or Magnetic Tape Cassette Accessory to enable reading and punching or recording of other than ASCII coded data. When the switch is in the ON position, the Printer can transmit or receive data for the tape devices, but is "transparent" to all codes so there is no printing or control code action. Remote control of the punch or reader is not possible but a received "Break" will stop a transmitting reader.

VERTICAL TABULATION AND FORM FEED (VTFF)

This option is described in Section 3, Operation.

MAGNETIC TAPE CASSETTE ACCESSORY (TCA)

This option is a compact desk-top unit which adds the capability of data storage and retrieval on magnetic tape cassettes. Read and write speeds may be chosen from 10, 15, 20, 30, or 120 characters per second controlled by the Printer. For operating instructions, refer to the Operator's Manual accompanying your TCA.

PAPER TAPE ACCESSORY

A paper punch and reader are available with a desk or pedestal. For operating instructions, refer to the Operator's Manual accompanying your Paper Punch and Reader.

NOTE

For timing characteristics and "fill" character information in regard to using the Tape Cassette Accessory (TCA) or Paper Tape Accessory with your Printer, refer to Section 6 of this manual (pages 6-12 through 6-16).

SECTION 5

TAKING CARE OF YOUR TermiNet PRINTER

THINGS TO REMEMBER

- a. Leave the Printer energized in the "Standby" condition if it is used daily.
- b. Turn the power off and place the dust cover over the Printer if it is used infrequently. (Do not place cover on Printer when Printer is turned "ON".)
- c. Make certain that the paper is consistent (especially in the case of multiple copies), properly stacked, and properly aligned at all times in order to prevent paper jams. Paper jams can bend the print fingers. Operators should have the service representative show them how to straighten bent print fingers.
- d. Understand the correct procedure for installing ribbons, and use only specified ribbon. Incorrect ribbon installation can cause damage to the Printer.
- e. Before going "On Line", make certain all switches are set properly.
- f. The CTL (Control) key must be held down while pressing a control code key.

- g. Keep the Printer clean; and keep foreign objects off the Printer, especially liquids (coffee cups, soft drinks, etc.).

CLEANING THE PRINTER



DISCONNECT POWER CORD FROM THE PRINTER BEFORE PERFORMING ANY CLEANING OPERATION.

- a. Clean the exterior of the Printer with a damp cloth or sponge. A domestic cleaning agent can be used to remove stubborn dirt.
- b. Clean type fingers by using a type cleaning brush backed by a sponge or soft cloth. See Figure 5-1.

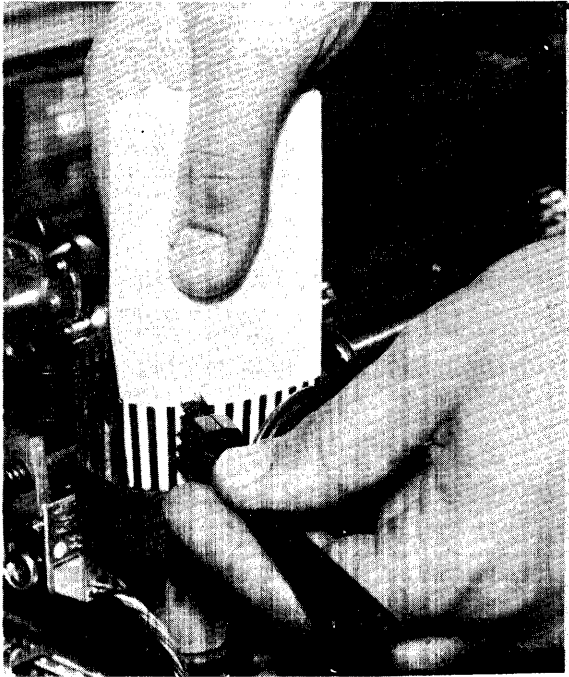
REPLACING PUSHBUTTON LAMPS

To replace a pushbutton lamp (Type #7327), follow the procedures shown by Figures 5-2 through 5-6. Spare lamps and a lamp puller are supplied with every new Printer.

AVOIDING UNNECESSARY SERVICE CALLS

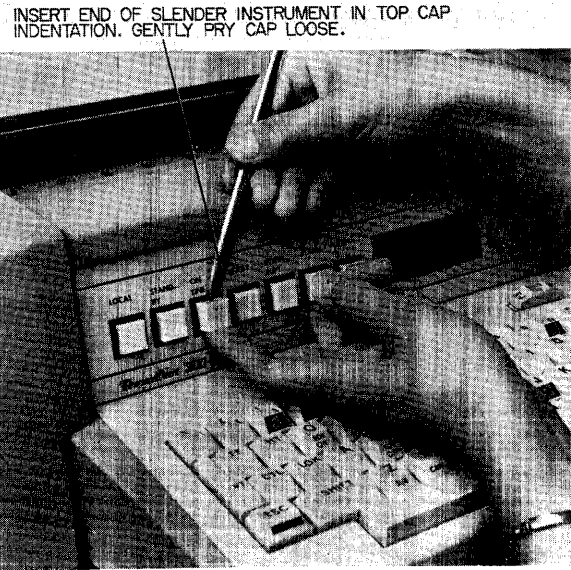
If you have a problem, use the following chart before calling for service. You may avoid an unnecessary interruption of your operation and an unnecessary service call.

<u>PROBLEM</u>	<u>CAUSE AND/OR CORRECTIVE ACTION</u>
Printer does not turn on. (no lights)	<ul style="list-style-type: none"> - Power cord is not plugged in or loose. - Printer power switch at rear of Printer is off. - Knee switch not on (desk ASR). If knee switch does not turn Printer on, make certain the Printer power switch (at rear of Printer) is on.
ALARM indicator lights.	<ul style="list-style-type: none"> - Paper shield up (Terminet 300 Printers only). - Paper out condition (Internal or External switches). - Punch paper out when paper punch accessory is being used. - TCA at end of tape when in WRITE mode ONLY when TCA accessory is being used.
INTERRUPT indicator lights.	<ul style="list-style-type: none"> - Push INTERRUPT pushbutton to unlock keyboard. - If condition persists, check RATE switch.
No printing from keyboard (Beep tone present) (No Beep tone)	<ul style="list-style-type: none"> - INHIBIT switch in the PRINT position. - TRANSPARENCY switch in ON position. - Press INTERRUPT pushbutton.
Printing is light.	<ul style="list-style-type: none"> - Replace ribbon.
Indicator lamp does not light.	<ul style="list-style-type: none"> - Replace lamp.
Uneven line spaces.	<ul style="list-style-type: none"> - Check paper release lever position (friction feed Printers).



PTM-3011

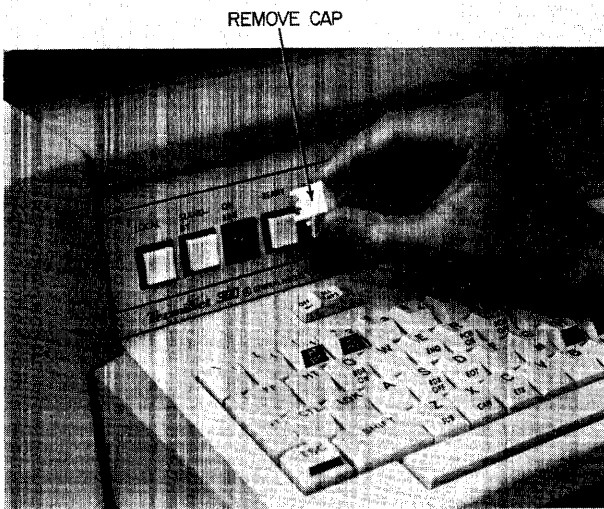
Figure 5-1. Cleaning Type Fingers



INSERT END OF SLENDER INSTRUMENT IN TOP CAP INDENTATION. GENTLY PRY CAP LOOSE.

PKM-3008

Figure 5-2. Loosening Cap



REMOVE CAP

PKM-3009

Figure 5-3. Removing Cap

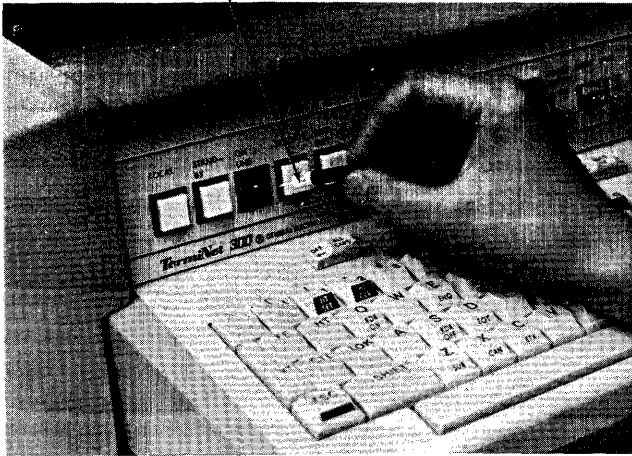


PUSH LAMP PULLER ON GLASS PORTION OF LAMP. PULL LAMP OUT OF SOCKET.

PKM-3010

Figure 5-4. Using Lamp Puller

REMOVE LAMP FROM SOCKET



PKM-3011

Figure 5-5. Removing Lamp

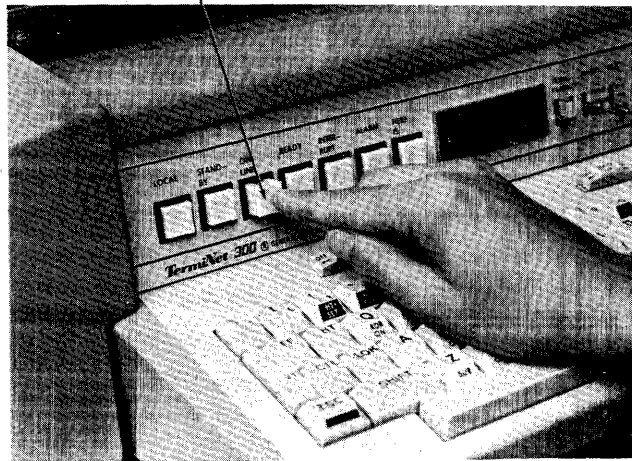
INSERT NEW LAMP



PKM-3012

Figure 5-6. Installing Lamp

REPLACE CAP KEEPING INDENTATIONS
ON TOP AND BOTTOM



PKM-3013

Figure 5-7. Replacing Cap

SECTION 6

TermiNet PRINTER OPERATING CHARACTERISTICS

The purpose of this section is to provide application specialists with detailed characteristics of the TermiNet Printers to assist in implementing communications between TermiNet Printers and other printers and computer systems. Because this section is technical in nature, the information may be too complex for the experience of some operators.

NOTE

For detailed information on referenced jumpers in this section, refer to Service Manuals GEH-2185 for the TermiNet 300 Printer and GEK-36105 for the TermiNet 1200 Printer.

DATA TRANSMISSION AND RECEPTION

The TermiNet Printer is an asynchronous transmitting or receiving device. All transmitting or receiving between the standard TermiNet Printer and any other device is carried on in serial form.

INTERFACE

The electrical interface between a standard TermiNet Printer and a communications network is in accordance with RS-232C. The TermiNet Printer can be interfaced in various ways if the interface specifications are met. The following describes the standard and optional interface circuits.

INTERFACE CONNECTIONS (RS-232)

PIN NO.	CIRCUIT	DESCRIPTION	COMMENTS
1	AA	Protective Ground	Tied to machine frame and enclosure.
2	BA*	Transmitted Data	
3	BB	Received Data	
4	CA*	Request to Send	<p>When on, turns on transmitter carrier of data set arranged for line control half duplex operation. When off, holds half duplex data sets in RECEIVE.</p> <p>Turned on by:</p> <ul style="list-style-type: none"> (a) On Line button (b) Line Control character received even if in Standby** (c) DLE? received** <p>Turned off by:</p> <ul style="list-style-type: none"> (a) Low voltage (b) EOT recognized (may be strapped to have no effect)

*Printer to Data Set.

**When Line Control Option is included.

Continued

INTERFACE CONNECTIONS (Continued)

PIN NO.	CIRCUIT	DESCRIPTION	COMMENTS
4 Cont.			(c) Standby or Local pushbuttons (d) Line Control characters sent**
5	CB	Clear to Send	Lights READY light when on unless: (a) Paper out (b) If INTERRUPT light is on (c) DLE? (wait before transmit) has been received without ACK following**
7	AB	Signal Ground	
8	CF	Received Line Signal Detector	
11	SCA	Secondary Transmitted Data	
12	SCF	Secondary Received Line Signal Detector	
20	CD*	Data Terminal Ready	Signals data set that Printer is capable of receiving a call. (a) Turned off in LOCAL to prevent auto answer by data set. This will initiate disconnect in data set. (b) Turned off for 67 ms to initiate forced disconnect by data set upon recognition of DLE EOT**. (c) Held off by paper out signal beginning as soon as CB goes off. Not affected by paper out if CB is on. (d) Off when power is off. (e) Turned on by STANDBY or ON LINE pushbuttons except in items c and d above.
22	CE	Ring Indicator	Used by Automatic Answerback Option.

*Printer to Data Set.

**When Line Control Option is included.

SPEED

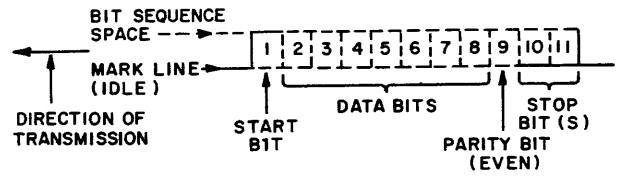
Data transmission speed is variable on the Printer, depending on the position of the selector switch on the control panel. The TermiNet 300 Printer transmits, receives, and prints at a standard 10, 15, or 30 characters per second. An optional speed of 20 cps is available for one of the standard speeds. It can be optionally configured to transmit and receive (but not print) at 120 characters per second.

The TermiNet 1200 Printer transmits, receives, and prints at a standard 10, 30, or 120 characters per second. It can be optionally configured to operate at speeds of 15, 20, or 60 characters per second as a substitute for one of the standard speeds.

The corresponding transmission rates for these various character rates are 110 (109.95), 150, 200, 300, 600, and 1200 baud.

CHARACTER COMPOSITION

Each character is composed of one start bit, seven data bits, a parity bit, and one stop bit (at a 110 baud rate, two stop bits are used). See Figure 6-1.



MSC-4012

Figure 6-1. Typical Character Bit Pattern

ASCII CODE

The TermiNet Printers use the American Standard Code for Information Interchange (ASCII) as shown in Figure 6-2. For ease of reference, a rearrangement of this chart to octal form is shown in Figure 6-3. Each of the 128 ASCII codes can be transmitted by pressing one or a combination of two keys on the Printer.

ASCII code chart

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

MSC-3002

Figure 6-2. ASCII Code Chart

1ST AND 2ND OCTAL DIGITS	3RD OCTAL DIGIT							
	0	1	2	3	4	5	6	7
00	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL
01	BS	HT	LF	VT	FF	CR	SO	SI
02	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB
03	CAN	EM	SUB	ESC	FS	GS	RS	US
04	SP	!	"	#	\$	%	&	'
05	()	*	+	,	-	.	/
06	0	1	2	3	4	5	6	7
07	8	9	:	;	<	=	>	?
10	@	A	B	C	D	E	F	G
11	H	I	J	K	L	M	N	O
12	P	Q	R	S	T	U	V	W
13	X	Y	Z	[\]	^	_
14	\	a	b	c	d	e	f	g
15	h	i	j	k	l	m	n	o
16	p	q	r	s	t	u	v	w
17	x	y	z	{	|	}	~	DEL

MSC-4013

Figure 6-3. Octal Form of ASCII Code Chart

Terminet CHARACTER CODES

The following tabulation shows the ASCII codes in numeric order, the corresponding ASCII character, and the Terminet keys pressed to generate the codes.

N(10)	N(8)	N(2)	CHARACTER	Terminet KEY(S)	N(10)	N(8)	N(2)	CHARACTER	Terminet KEY(S)
0	000	0000000	NUL	CTL \ (Grave accent)	64	100	1000000	@	Shift (Grave accent)
1	001	0000001	SOH	CTL A	65	101	1000001	A	Shift A
2	002	0000010	STX	CTL B	66	102	1000010	B	Shift B
3	003	0000011	ETX	CTL C	67	103	1000011	C	Shift C
4	004	0000100	EOT	CTL D	68	104	1000100	D	Shift D
5	005	0000101	ENQ	CTL E	69	105	1000101	E	Shift E
6	006	0000110	ACK	CTL F	70	106	1000110	F	Shift F
7	007	0000111	BEL	CTL G	71	107	1000111	G	Shift G
8	010	0001000	BS	BS	72	110	1001000	H	Shift H
9	011	0001001	HT	HT	73	111	1001001	I	Shift I
10	012	0001010	LF	LF	74	112	1001010	J	Shift J
11	013	0001011	VT	VT	75	113	1001011	K	Shift K
12	014	0001100	FF	FF	76	114	1001100	L	Shift L
13	015	0001101	CR	RETURN	77	115	1001101	M	Shift M
14	016	0001110	SO	CTL N	78	116	1001110	N	Shift N
15	017	0001111	SI	CTL O	79	117	1001111	O	Shift O
16	020	0010000	DLE	CTL P	80	120	1010000	P	Shift P
17	021	0010001	DC1	CTL Q (RDR ON)	81	121	1010001	Q	Shift Q
18	022	0010010	DC2	CTL R (PCH ON)	82	122	1010010	R	Shift R
19	023	0010011	DC3	CTL S (RDR OFF)	83	123	1010011	S	Shift S
20	024	0010100	DC4	CTL T (PCH OFF)	84	124	1010100	T	Shift T
21	025	0010101	NAK	CTL U	85	125	1010101	U	Shift U
22	026	0010110	SYN	CTL V	86	126	1010110	V	Shift V
23	027	0010111	ETB	CTL W	87	127	1010111	W	Shift W
24	030	0011000	CAN	CTL X	88	130	1011000	X	Shift X
25	031	0011001	EM	CTL Y	89	131	1011001	Y	Shift Y
26	032	0011010	SUB	CTL Z	90	132	1011010	Z	Shift Z
27	033	0011011	ESC	ESC &CTL { (Opening brace)	91	133	1011011	[	Shift { (Opening brace)
28	034	0011100	FS	CTL | (Vertical line)	92	134	1011100	|	Shift | (Vertical line) |
29	035	0011101	GS	CTL } (Closing brace)	93	135	1011101	]	Shift } (Closing brace)
30	036	0011110	RS	CTL ~ (Tilde)	94	136	1011110	~ (Circumflex)	Shift ~ (Tilde)
31	037	0011111	US	CTL _ (underline)	95	137	1011111	_ (Underline)	- (Underline)
32	040	0100000	SP	(Space bar)	96	140	1100000	\ (Grave accent)	\ (Grave accent)
33	041	0100001	!	Shift 1	97	141	1100001	a	A
34	042	0100010	" (Quotation mark)	Shift 2	98	142	1100010	b	B
35	043	0100011	#	Shift 3	99	143	1100011	c	C
36	044	0100100	\$	Shift 4	100	144	1100100	d	D
37	045	0100101	%	Shift 5	101	145	1100101	e	E
38	046	0100110	&	Shift 6	102	146	1100110	f	F
39	047	0100111	' (Apostrophe)	Shift 7	103	147	1100111	g	G
40	050	0101000	(	Shift 8	104	150	1101000	h	H
41	051	0101001	)	Shift 9	105	151	1101001	i	I
42	052	0101010	*	Shift :	106	152	1101010	j	J
43	053	0101011	+	Shift ;	107	153	1101011	k	K
44	054	0101100	, (Comma)	,	108	154	1101100	l	L
45	055	0101101	-	-	109	155	1101101	m	M
46	056	0101110	.	.	110	156	1101110	n	N
47	057	0101111	/	/	111	157	1101111	o	O
48	060	0110000	0	0	112	160	1110000	p	P
49	061	0110001	1	1	113	161	1110001	q	Q
50	062	0110010	2	2	114	162	1110010	r	R
51	063	0110011	3	3	115	163	1110011	s	S
52	064	0110100	4	4	116	164	1110100	t	T
53	065	0110101	5	5	117	165	1110101	u	U
54	066	0110110	6	6	118	166	1110110	v	V
55	067	0110111	7	7	119	167	1110111	w	W
56	070	0111000	8	8	120	170	1111000	x	X
57	071	0111001	9	9	121	171	1111001	y	Y
58	072	0111010	:	:	122	172	1111010	z	Z
59	073	0111011	;	;	123	173	1111011	{ (Opening brace)	{ (Opening brace)
60	074	0111100	<	Shift ,	124	174	1111100	| (Vertical Line)	| (Vertical line)
61	075	0111101	=	Shift -	125	175	1111101	} (Closing brace)	} (Closing brace)
62	076	0111110	>	Shift .	126	176	1111110	~ (Tilde)	~ (Tilde)
63	077	0111111	?	Shift /	127	177	1111111	DEL	DEL

TIMING CHARACTERISTICS AND FILL CHARACTERS

Because certain non-printing operations (for example, Line Feed) require a finite amount of time, data being printed must be delayed so that it will not be lost when the non-printing operations occur. Also, an operation must be delayed, such as motor off, so that characters in memory can be printed. These time delays can be provided by using "fill" characters. In general, a "fill" character can be defined as any character in the ASCII code that does not cause an equipment action but takes time to process. The Time Delay and "Fill" Character Tables list those operations that require a time delay, the associated time, and the number of "fill" characters required if used.

In the following text of this section, a description is given on how the Printers are used with the TermiNet Cassette Accessory and Paper Punch and Reader regarding fill characters. Many of the necessary delays are provided automatically and some delays can be obtained by methods other than using the number of "Fill" characters specified in the table.

NOTE

The following text shows various examples of how fill characters are used. In these examples, the following symbols will be used:

B - Backspace
 C - Carriage Return
 F - Form Feed
 L - Line Feed
 V - Vertical Tabulation
 # - Fill Character

TermiNet 300 PRINTER

The following chart summarizes the time interval and "fill" character requirements for the TermiNet 300 Printer. The following text gives examples of how "fill" characters are used.

NORMAL SINGLE LINE FEED

The time delay required from the last character on a line until the first character on the next line is 300 milliseconds. This time includes the CR, LF characters and the time to decode the first character on the new line. Since at 300 baud each character time is 33.3 milliseconds, $300/33.3$ equals nine character times for the required 300 millisecond delay. To produce this delay, use six fill characters in addition to the CR, LF codes and the first character on the new line.

Example One: (300 Baud)

Line 1: The TermiNet 300 Data CommunicationCL#####
 Line 2: Printer Operates at 30 CharactersCL#####
 Line 3: Per Second

CONSECUTIVE LINE FEEDS

If there are to be consecutive line feeds after a line of printing, a time delay of 350 milliseconds is required for the initial double line feed and 67 for each additional line feed. The 350 millisecond delay may be provided by eight fill characters ($350/33.3$ equals eleven characters less CR, LF, LF) and the subsequent 67 millisecond delay requires 2 fill characters ($67/33.3$ equals two characters).

TIME DELAY AND "FILL" CHARACTER CHART
FOR THE TermiNet 300 PRINTER

PRINTER OPERATION	INTERVAL BETWEEN	APPROXIMATE INTERVAL IN MILLISECONDS	NON-PRINTING FILL CHARACTERS			PLACEMENT OF FILL CHARACTERS
			30 cps	15 cps	10 cps	
Normal Single Linefeed*	Last char. on old line and first char. on new line.	300	6	2	0	After line feed code.
Repeated line feeds	(a) Last char. on old line and second LF code.	350	8	3	1	After first line feed code.
	(b) Subsequent LF codes.	67	2	1	0	After the second and subsequent line feed codes.
Backspace**	Printing and then reprinting in same position.	230	6	3	2	After the backspace code.
Startup***	Commanding motor on and printing.	430	12	6	4	After "Motor On" code.
Shutdown****	Last data char.	300	9	4	3	Between last data character and "Motor Off" code.
Vertical Tab	VT or FF command and 1st character.	$9 + \frac{.75}{\text{line}}$ $4 + \frac{.38}{\text{line}}$ $3 + \frac{.25}{\text{line}}$			$300 + (27 \times \text{No. of Lines}) = \text{Required Time Delay in Milliseconds}$	
		(1)				
Red and Black Printing	Before ESC Code	300	9	5	3	Before and after changing ribbon colors
	After ESC Code	50	2	1	1	

*If there is no CR, one "fill" character should be added to that shown.

**If BACKSPACE code is used more than once, it may take the place of "fill" characters; e.g., at 30 cps, to type and underscore "AND", send A N D BS BS BS fill fill fill - - - . The delay is required to insure hammers have recovered from the previous actuation.

***The TermiNet 300 Printer will go from a motor off state to a printing or "ON LINE" state in response to the two code sequence ESC h or H, or also in the case of automatic motor on from the Data Set. The delay is required to allow the motor to come up to speed.

****The TermiNet 300 Printer will go from a printing "ON LINE" state to a motor off state in response to the two code sequence ESC j or J, by the EOT code (when jumpered), or also in the case of automatic motor off from the Data Set. The delay that precedes the motor off command is required to allow time to print any characters that are in memory waiting for the proper registration of the hammers and belt.

(1) Example:

At 30 cps with one line of VT:

$$[300 \text{ MS} + (27 \text{ MS} \times 1)] = 327 \text{ MS of required time delay}$$

$$30 \text{ char/sec} = 33.3 \text{ MS/char}$$

$$\text{Fills required} = 327 \text{ MS} \div 33.3 \text{ MS/char.}$$

$$= 9.85 \text{ CHARACTERS of Fill's}$$

$$\approx 10 \text{ FILL's (always round off to next higher number).}$$

Example Two: (300 Baud)

For one printing line followed by two non-printing blank lines:

THE TERMINET 300CL#####L##LPRINTER

The above would produce:

Line 1: THE TERMINET 300

Line 2:

Line 3:

Line 4: PRINTER

BACKSPACE

The time delay required between printing and reprinting in this same position is 230 milliseconds. The delay is to insure that the print hammer has recovered from the previous actuation. The delay can be produced by using any six characters at 300 baud between the first and second printing in the same position. Backspace Codes, BS, may take the place of an equal number of fill characters.

Example Three: (300 Baud)

Type and underline the word AND:

Line 1: ANDBBB#_ _ _

will produce AND

STARTUP

A delay of 430 milliseconds is required for the Printer to go from a non-printing or STANDBY state to a printing or ON LINE state under code control. The delay allows print belt synchronization. This time delay can be produced by using twelve fill characters at 300 baud between the Motor On code, ESC H or h, and the start of data transmission.

Example Four: (300 Baud)

Line 1: ESC H #####The TermiNet 300 Printer

SHUTDOWN

A delay of 300 milliseconds is required for the Printer to go from a printing state to a motor off non-printing state in response to the code sequence, ESC J or j; by the EOT code (when jumpered) or in the case of automatic motor off from the data set. This delay allows time for characters in memory to be printed when the proper registration of the hammers and print belt occur. Use nine fill characters between the last character and the Motor Off code sequence.

Example Five:

Line 1: The TermiNet 300 Printer#####ESC J

VERTICAL TABULATION AND FORM FEED

The amount of time delay required between a VT or FF command and the first character to be printed is dependent on the number of lines that are tabulated. The following formula will determine the time delay in milliseconds and number of fill characters for that delay.

- a) $300 + (27 \times \text{No. of Tabulated or Form Feed Lines}) = \text{Delay (msec)}$
- b) $\frac{\text{Delay in msec.}}{1000} \times \text{Characters per Second} = \text{No. of fill characters}$

Example Six: (300 Baud)

To vertical tabulate four lines after first printing one line of data:

- a) $300 + (27 \times 4) = 408 \text{ msec.}$
 - b) $\frac{408 \text{ msec}}{1000} \times 30 = 12.2 \text{ fill characters}$
- 13 Fill Characters Required
- The TermiNet 300CV#####Printer

The above would produce:

- Line 1: The TermiNet 300
- Line 2:
- Line 3:
- Line 4:
- Line 5: Printer

RED/BLACK (TWO COLOR) PRINTING

Time delays or fill characters are required before and after changing colors to allow all characters in the first color to be printed and allow the ribbon lift mechanism to stabilize. The time delays are 300 msec before the ESC code and 50 msec immediately after the code.

Example Seven (300 Baud) Changing Colors In Midline:

Red#####ESC4##BlackCL

Example Eight (300 Baud) Changing Colors When Changing Lines:

- Line 1: BlackCL#####
- Line 2: ESC3##Red

TERMINET 1200 PRINTER

The following chart summarizes the time interval and "fill" character requirements for the TermiNet 1200 Printer. The following text gives examples of how "fill" characters are used.

TIME DELAY AND "FILL" CHARACTER CHART FOR THE TermiNet 1200 PRINTER

Function	Definition of Time Interval	Time Interval In Msec	Number of Characters To Equal Time Interval			
			120 cps	30 cps	15 cps	10 cps
Following a Printable Line Ending in Line Feed	Length of New Line including carriage return and/or platen moving code	300	36	9	5	3
Following a Non-Printable Line Ending in Line Feed	Length of New Line including carriage return and/or platen moving code	75	9	3	2	1
Following a Printable Line Ending in Vertical Tab or Form Feed	Length of New Line including carriage return and/or platen moving code	300 plus 27 per line*	36 plus 3 per line	9 plus .75 per line**	5 plus .38 per line**	3 plus .25 per line**
Following a Non-Printable Line Ending in Vertical Tab or Form Feed	Length of New Line including carriage return and/or platen moving code	50 plus 27 per line*	6 plus 3 per line	2 plus .75 per line**	1 plus .38 per line**	1 plus .25 per line**
Backspace	After BS code and including the next printable character	230	28	7	4	3
Red and Black Printing	Before ESC code	300	36	9	5	3
	After ESC code	50	6	2	1	1
Start-Up	After Motor-On Command and including the first printable character	430	52	13	7	5
Shutdown	After last printable character and before the Motor-Off Command	300	36	9	5	3

*A maximum of 36 printable characters may be included during this time interval.

**One character minimum - always round off to next higher number.

NOTE

Although the following data format is different from the format specified for TermiNet 300 Printers, all data formatted for TermiNet 300 Printers will be accurately printed by TermiNet 1200 Printers when operated at, or below, the baud rate for which the data was formatted. However, the efficiency of printing on the TermiNet 1200 Printer may be improved by reformatting the data to take advantage of the greater memory of the TermiNet 1200.

FOLLOWING A PRINTABLE LINE ENDING IN LF

A new line must be at least 300 milliseconds long, including the platen moving code at the end, if it follows a line which has one or more printable characters and ends in LF. This time allows the last printable character on the previous line to be printed and the line feed to be executed before the next platen moving code is received.

This rule is satisfied during normal text where LF is the only platen moving code if each line including the LF code is a minimum of 36 characters long at 1200 baud, 9 characters long at 300 baud, 5 characters long at 150 baud, or 3 characters long at 110 baud.

Example One: (1200 Baud)

Spacing: 1234567890123456789012345678901234567890
 Line 1: This line requires fills #####CL (Can be at end of line)
 Line 2: ##### This line requires fills CL (Can be at start of line)
 Line 3: This line ##### requires fills CL (Can be at center of line)
 Line 4: No Fill Characters required this line CL

FOLLOWING A NON-PRINTABLE LINE ENDING IN LF

A new line must be at least 75 milliseconds long including the platen moving code at the end if it follows a line which has no printable characters and ends in LF.

Example Two: (1200 Baud)

Spacing: 1234567890123456789012345678901234567890
 Line 1: No Fill Characters required this line CL
 Line 2: #####L (Non-Printing line ending in LF)
 Line 3: Mi n Li ne L (Minimum line is 75 msec long or 9 characters)

CONSECUTIVE LINE FEEDS

A line feed immediately following a line feed at the end of a line which has one or more printable characters must follow the rule given above for "Following a Printable Line Ending in LF". Thus fill characters must be added before the new line feed to make that line 300 milliseconds long. Refer to Example two, Lines 1 and 2.

A line feed immediately following a line feed at the end of a line which has no printable characters must follow the rule given above for "Following a Non-Printable Line Ending in LF". Thus fill characters must be added before the new line feed to make that line 75 milliseconds long.

Example Three: (1200 Baud)

Spacing: 1234567890123456789012345678901234567890
 Line 1: #####L (Non-printing line ending in LF)
 Line 2: #####L (75 msec or 9 fills)
 Line 3: #####L (75 msec or 9 fills)

FOLLOWING A PRINTABLE LINE ENDING IN VT OR FF

Of interest here is the time interval of 300 milliseconds plus 27 milliseconds per line of form movement immediately following a VT or FF code at the end of a line including at least one printable character. A platen moving code (LF, VT, or FF) during this time interval must be the last character in the time interval. The time interval may include no more than 36 printable characters. (This restriction is 36 printable characters at all baud rates.) The remainder of the time may be taken up by time delay or fill characters.

Example Four: (1200 Baud)

Line 1: 1234567890123456789012345678901234567890CV (no fills required)
 (Vertical Tab 3 lines, 300 msec plus 3 x 27 msec = 381 msec)

Need 381 ms of fill time while platen is moving = 46 character times

46 Character Fill Time: 36 Printing Characters max#####

Line 2: 36 Characters from Fill time plus rest of line CL

FOLLOWING A NON-PRINTABLE LINE ENDING IN VT OR FF

The rule here is the same as that for "Following a Printable Line Ending in VT or FF" except the time interval of interest is 50 milliseconds plus 27 milliseconds per line of form movement.

Example Five: (1200 Baud)

Line 1: 1234567890123456789012345678901234567890CF (No fills required)
 (Form Feed 3 lines, 300 msec plus 3 x 27 msec = 381 msec)
 381 ms = 46Character times

Line 2: #####
 (Vertical Tab 10 lines, 50 msec plus 10 x 27 msec = 320 msec)

39 Character fill time: 320 ms = 39 Character times

36 Printing Characters max.###

Line 3: 36 Characters in fill time plus rest of lineCL

BACKSPACE

A 230 millisecond time interval must occur between printing and reprinting in the same position. Thus a 230 millisecond time delay or the appropriate number of non-printable characters must be placed immediately after the first BS code. Some of these non-printable characters may be additional BS codes and the last character in the time interval may be printable.

RED AND BLACK PRINTING

A 300 millisecond delay (36 fill characters) is required before changing from one color to another color. Immediately after changing color a 50 millisecond delay is needed (6 fill characters). These delays allow the Printer to complete printing in the initial color and allow the ink ribbon motion to stabilize after the change.

Example Six: (1200 Baud)

To print "Terminet" in black followed by "Printer" in red:

Line 1: Terminet#####ESC 3#####Printer

The ribbon will remain raised to print in red.

START-UP

A 430 millisecond time interval must occur between a Motor-On command and printable characters to allow the print belt to come up to speed. The Motor-On command may be by code (ESC h or ESC H) or by Automatic Motor Control from the data set. Place the 430 millisecond time delay or the appropriate number of fill characters immediately after the Motor-On command.

SHUTDOWN

To insure that all characters are printed, a 300 millisecond time interval must occur between the last printable character and the Motor-Off command. The Motor-Off command may be by code (ESC j or ESC J), by the EOT code (when jumpered), or by Automatic Motor Control from the data set. Place the 300 millisecond time delay or the appropriate number of fill characters immediately before the Motor-Off command.

USING YOUR LOCAL TermiNet PAPER TAPE ACCESSORY, PRINTING LOCALLY
OR TRANSMITTING TO A REMOTE PRINTER

AUTOMATIC DELAYS

When reading a paper tape with your local Reader, the Reader automatically pauses (supplies a delay) for the following operations, when properly strapped on the R&P PCB:

- Linefeed
- Backspace
- Carriage Return
- Escape Function
- Shutdown as a result of codes ESC j or ESC J

NOTE

The automatic delay supplied for Carriage Return is not needed if using only TermiNet Printers. However, the delay is needed if you are transmitting information to a Terminal that has a mechanical Carriage Return or some other Carriage Return method that takes an appreciable amount of time.

INSERTING DELAYS WHEN MAKING A PAPER TAPE FOR THE TermiNet PAPER TAPE READER

When making a paper tape to be read by your local Reader, follow the procedures for the Printer operations listed below to obtain the necessary delays. This assumes strap on R&P board is installed, otherwise you will have to add delays, as required by the Terminal you are printing on.

NOTE

The procedures following call for codes ESC ~ to obtain delays. However, any Escape and character combination that does not adversely affect your system can be used. ESC ~ is most often used and is recommended. The delay time is generated because each Escape and character combination that is read will cause the Reader to stop for approximately 300 milliseconds. This method of using an Escape and Character Combination (e.g., ESC ~) to generate time delays is only applicable when using the TermiNet Paper Tape Reader.

Consecutive Linefeeds - Follow the first LF with ESC ~, then enter as many consecutive LF's as required.

NOTE

X represents printable character.

Example: X X X X LF ESC ~ LF LF LF LF LF LF X X X X

Start-Up as a Result of ESC H - Follow the start-up code (ESC h or ESC H) with ESC ~ ESC ~

Example: ESC H ESC ~ ESC ~ X X X

Shutdown as a Result of Control Code EOT - Precede EOT with ESC ~.

Example: X X X ESC ~ EOT

Single Vertical Tab or Form Feed - Precede the VT or FF with ESC ~ and follow the VT or FF with one ESC ~ for every 12 lines or less of form movement.

Example: Vertical Tab, 5 lines - X X X LF CR ESC ~ VT ESC ~ X X X

Example: Form Feed, 28 lines - X X X LF CR ESC ~ FF ESC ~ ESC ~ ESC ~ X X X

Consecutive Vertical Tabs or Form Feeds - Precede the first VT or FF with ESC ~ and follow the first VT or FF with one ESC ~ for every 12 lines or less of form movement; then follow with "blocks of codes" for the consecutive VT or FF movements. Each of these consecutive "blocks of codes" should consist of a VT or FF followed by one ESC ~ for every 12 lines or less of form movement.

Example: Vertical Tab, 10 lines, Vertical Tab, 8 lines, Vertical Tab 25 lines.

X X X LF CR	ESC ~ VT ESC ~	VT ESC ~	VT ESC ~ ESC ~ ESC ~	X X X
	VT #1 - 10 lines	VT #2 - 8 lines	VT #3 - 25 lines	

USING THE TermiNet 300 PRINTER WITH THE TermiNet CASSETTE ACCESSORY (TCA), A1 AND A2 MODELS

NECESSARY DELAYS FOR THE PRINTER

When transmitting to a TermiNet 300 Printer, the TCA provides the necessary delays for all Printer operations at 300 baud or lower except Vertical Tab and Form Feed (delays for VT and FF are provided for local printing). To determine the number of fill characters needed for VT and FF, use the following formulas:

NOTE

When using a formula, round out answer to next highest whole number.

$$10 \text{ characters per second} - \frac{300 + (27 \times \text{No. of Lines})}{100} = \text{Number of Fill Characters}$$

$$15 \text{ characters per second} - \frac{300 + (27 \times \text{No. of Lines})}{67} = \text{Number of Fill Characters}$$

$$30 \text{ characters per second} - \frac{300 + (27 \times \text{No. of Lines})}{33} = \text{Number of Fill Characters}$$

If you are sending information to a Terminal with a mechanical Carriage Return or some other carriage return method that takes an appreciable amount of time, you may need fill characters to supply a delay as specified by the manufacturer of the Terminal to which you are transmitting.

NOTE

In most cases, a 300 millisecond delay should be sufficient for Carriage Return. For an approximate 300 millisecond delay, use nine (9) "fill" characters at 30 cps, five (5) "fill" characters at 15 cps, and three (3) "fill" characters at 10 cps.

WRITING AT 120 CPS

When writing at 120 cps (recording on tape from keyboard cannot be done at 120 cps, only at 10 or 30 cps), there must be a "fill" character at the beginning of data to be written. This allows the TCA to come up to speed before

the valid data is written; otherwise, the first character of valid data would be lost. The "fill" character is not recorded. The "beginning" of data includes any time when 16 milliseconds have elapsed since data was received.

If it is anticipated that a tape being made will be used to make a second tape in another TCA (at 120 cps), a "fill" character should be written at the beginning of data. If a third tape is made from the second tape, two (2) fill characters should be written on the first tape.

For example, Tape 1 is written from the keyboard at 30 cps (or less) with two (2) "fill" characters.

- Tape 1 is used to write Tape 2 (in another TCA) at 120 cps. Since one (1) "fill" character is lost, Tape 2 has one (1) "fill" character.
- Tape 2 is used to write Tape 3 (in another TCA) at 120 cps. The "fill" character is lost and Tape 3 has no "fill" character.
- If Tape 3 was used to make a fourth tape, the first character of data would be lost.

From the preceding example, you can conclude that the anticipated number of times the data is rewritten in the manner described will dictate the number of "fill" characters that should be written on the first tape.

ON LINE INTER-BLOCK GAP (A2 MODEL ONLY)

A received "Recorder On" Code (DC2) will initiate an inter-block gap. The transmitting Printer must provide a minimum time delay of 300 milliseconds after the transmission of the DC2 code so that data is not sent while the receiving TCA is generating an inter-block gap. Insert the fill characters after the DC2. For an approximate 300 millisecond delay, use nine (9) "fill" characters at 30 cps, five (5) at 15 cps, and three (3) at 10 cps.

USING THE TermiNet 1200 PRINTER WITH THE TermiNet CASSETTE ACCESSORY (TCA), A3 MODEL

RECORDING

Incremental Rates

Recording on tape from the keyboard is straightforward at incremental rates (10 or 30 cps), but cannot be done at 120 cps. At incremental rates, characters are recorded as keyed in. Characters which may require delays in the Printer when read out (LF, BS, VT, FF, ESCH, ESCJ, DC3) are followed by a short space of blank tape to enable the tape unit to stop and start when reading at non-incremental rate (120 cps). This blank tape (about 3 character spaces) is written in approximately .024 second. This will not result in any noticeable delay to the operator. In addition to the blank tape generated, VT and FF must be followed by 2 fill characters.

When writing a tape at an incremental rate from an automatic data source, time must be allowed to write the required space on tape. There is always ample time for this at 10 cps. At 30 cps, time must be provided after delay characters. One fill is sufficient for all delay codes except VT and FF which must be followed by three fill characters.

NOTE

If the Printer motor is on, the Fill Character rules for the Printer must also be satisfied.

In addition to the delay characters listed in the above paragraph, a DC2 code must be followed by 300 msec. of delay time or the appropriate number of Fill characters to allow for the writing of Inter-Block Gap. Recording is not dependent on the state of the Data Set Interface leads.

Should an operator "get ahead" of the recording mechanism by typing while a space is being written, an alarm will be generated. This is very unlikely for keyboard data but could occur for an answerback sequence. This alarm will light the alarm lamp, turn off the motor, transmit a break, and sound the alarm. This action is for local data only. Received data cannot cause this alarm, facilitating the use of Fill Characters for timing. If adequate fill characters are not included, received data may be lost (not copied on tape).

In Transparency

Data received in Transparency is recorded exactly as received. Therefore, no automatic spaces are generated and each delay character must be followed by 3 Fill Characters (5 Fills after VT or FF). Delay time may not be substituted for these Fill Characters when recording incrementally.

Non-Incremental Rate

Magnetic Tape recording at 1200 baud is done differently with the TermiNet 1200 than the TermiNet 300. Unlike the TermiNet 300, operation with the TermiNet 1200 at 1200 baud is not character dependent. Whenever the terminal is in the 1200 baud rate position, and the A3 TCA in RECORD Mode, the TCA will move tape at the proper rate for 1200 baud recording, regardless of the condition of the data stream except during VT or FF motion. Data transmitted to the TermiNet 1200 should contain all fills required for printing, with the added condition that every LF code should be followed by 3 fills or 24 msec. of time. If the Printer is receiving the transmission in Transparency or Standby, then 3 Fills or 24 msec. of time should follow each delay character except VT or FF codes which must be followed by 5 Fills or 41 msec. Recording is not dependent on the state of the Data Set Interface signals.

READING (Incremental or Non-Incremental)

The A3 Model TCA does not delay after every LF code when reading. An internal timer will cause delays to guarantee the minimum time required for the TermiNet 1200 operation. LF, BS, VT, and FF characters will be separated by 300 msec. if they appear closer than this in the data stream. Timing for VT and FF will be as required for proper operation (closed Loop TCA to TermiNet). The TCA will always delay a full 300 msec. for MOTOR ON and MOTOR OFF (ESC H and ESC J). A strap is included to vary the timer. With the jumper out, the timer will run at 430 msec., long enough for all codes. With the jumper in, the timer will run 300 msec., which is adequate for all codes except MOTOR ON. Fill Characters (additional 16 Fills) must be recorded after the MOTOR ON, if the 300 msec. timing is used. If the Printer is in Transparency, no delays will occur.

When the Printer is on ON LINE or STANDBY, the Data set Interface Signal Clear to Send (CB) must be present to read tape. If a DC3 code or an Interrupt is received, the TCA will stop reading after the next character is read.

TIME DELAY AND FILL CHARACTER CHART

The chart on the following page summarizes the time delays and fill characters required when using the A3 TCA with the TermiNet 1200 Printer.

TIME DELAY AND FILL CHARACTER CHART
FOR USING THE TCA (A3 MODEL) WITH THE TermiNet 1200 PRINTER

CODE	MOTOR ON KEYBOARD DATA	MOTOR ON 10 CPS DATA	MOTOR ON 30 CPS DATA	MOTOR ON 120 CPS DATA	MOTOR OFF KEYBOARD DATA	MOTOR OFF 10 CPS DATA	MOTOR OFF 30 CPS DATA	MOTOR OFF 120 CPS DATA
LF	None	(Note 1) Printer Req.	(Note 6) Min. - 24 msec. Max. - Printer Req.	Min. 24 msec Max. Printer Req.	None	None	(Note 2) 24 msec.	24 msec.
VT or FF	(Note 3) 2 Fills	Min. - 2 fills Max. - Printer Req.	Min. - 24 msec. plus 2 fills. Max. - Printer Req.	Min. - 24 msec. plus 2 fills. Max. - Printer Req.	2 Fills	2 Fills	24 msec. plus 2 fills	24 msec. plus 2 fills
(Note 4) BS	None	Printer Req.	Min. - 24 msec. Max. - Printer Req.	Min. - 24 msec. Max. - Printer Req.	None	None	24 msec.	24 msec.
ESC H 2J Out on TRP/3	None	Printer Req.	Printer Req.	Printer Req.	None	None	24 msec.	24 msec.
ESC H 2J In on TRP/3	16 fills	16 fills	24 msec. plus 16 fills	Min. - 24 msec. plus 16 fills. Max. - Printer Req.	16 fills	16 fills	24 msec. plus 16 fills.	24 msec. plus 16 fills.
(Note 5) ESC J	None	None	24 msec.	24 msec.	None	None	24 msec.	24 msec.
Received DC2	N/A	(Note 6) 300 msec.	300 msec.	300 msec.	N/A	300 msec.	300 msec.	300 msec.
DC3	None	None	24 msec.	24 msec.	None	None	24 msec.	24 msec.

NOTES:

1. Printer Req. refers to the fill characters which are required by the Printer.
2. When delay time is referenced, either delay time or fill characters may be used. In Transparency, Fill Characters must be used.
3. When fill characters are referenced, fill characters must be used. Delay time may not be substituted.
4. A single backspace must be accomplished by BS, BS, Space to ensure the proper delay when the data is played back. The fill characters indicated are required after each of those BS codes.
5. The fill characters listed for ESC J are required by the TCA after the code. Fill characters are also required by the Printer before the code when the motor is on.
6. 24 msec at 30 cps = 1 "fill", at 120 cps = 3 "fills"; 300 msec at 10 cps = 3 "fills", at 30 cps = 9 "fills", at 120 cps = 36 "fills".

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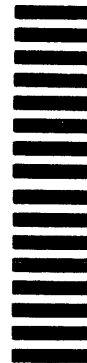
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