

**MODEL 4810/4840
USER'S MANUAL
GEK-88954**

CODE COMPLIANCE

The printers described in this manual conform to the published codes and rules shown below:

- Underwriter's Laboratory Standard, 1950 without D3 Deviations
- Canadian Standards Association C22.2 No. 950-M1989
- IEC 950, VDE 0805/05.90, EN60950:1988 +A1:1990 +A2:1991
- Federal Communications Commission Rules, Part 15, Subpart J, Class A
- VDE 0871/0877 Class B
- CISPR-22, Class B
- ANSI X3.4-1977 (Code Set)
- ANSI X3.41-1974 (Code Extension)
- ANSI X3.64-1979 (Additional Controls)
- EIA/TIA-232-E/CCITT V.24
- ISO Standard 6429
- ISO Standard 2022

7/93

FCC COMPLIANCE STATEMENT

This equipment generates, uses, and can generate radio frequency energy if not installed and used properly, i.e. in strict accordance with the instructions, may cause interference to radio or television reception. This equipment complies with the requirements in part 15 of FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and television reception requiring the user to take whatever steps are necessary to correct the interference.

STATEMENT OF COMPLIANCE

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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SICHERHEITS – ANLEITUNG

Modelle GENICOM 4810 und 4840

Das Gerät entspricht der Schutzklasse I und muß immer an eine 3–adrige, geerdete Steckdose angeschlossen werden. Der Netzanschluß befindet sich an der Druckerrückwand. Stellen Sie sicher, daß die Netzspannung mit den Angaben auf dem Typenschild übereinstimmt.

Einschalten des Druckers:

- Alle Abdeckungen müssen geschlossen sein
- Keine Gegenstände auf dem Drucker ablegen oder gegen das Gerät lehnen
- Setzen Sie den Netzschalter, der sich an der Druckerrückseite befindet, auf 1. Die "Power–Anzeige" leuchtet auf und zeigt damit an, daß der Drucker eingeschaltet ist.

Abschalten:

- Um den Drucker abzuschalten, setzen Sie den Netzschalter auf 0.

ACHTUNG

Arbeiten und Reparaturen am geöffneten Gerät dürfen nur vom autorisierten GENICOM – Kundendienst vorgenommen werden.

Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß der/die/das

4810 und 4840

(Gerät, Typ. Bezeichnung)

In Übereinstimmung mit Bestimmungen der

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funkentstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

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6231 Sulzbach/Ts. Tel. 06196/7032–0**

Name des Herstellers/Importeurs

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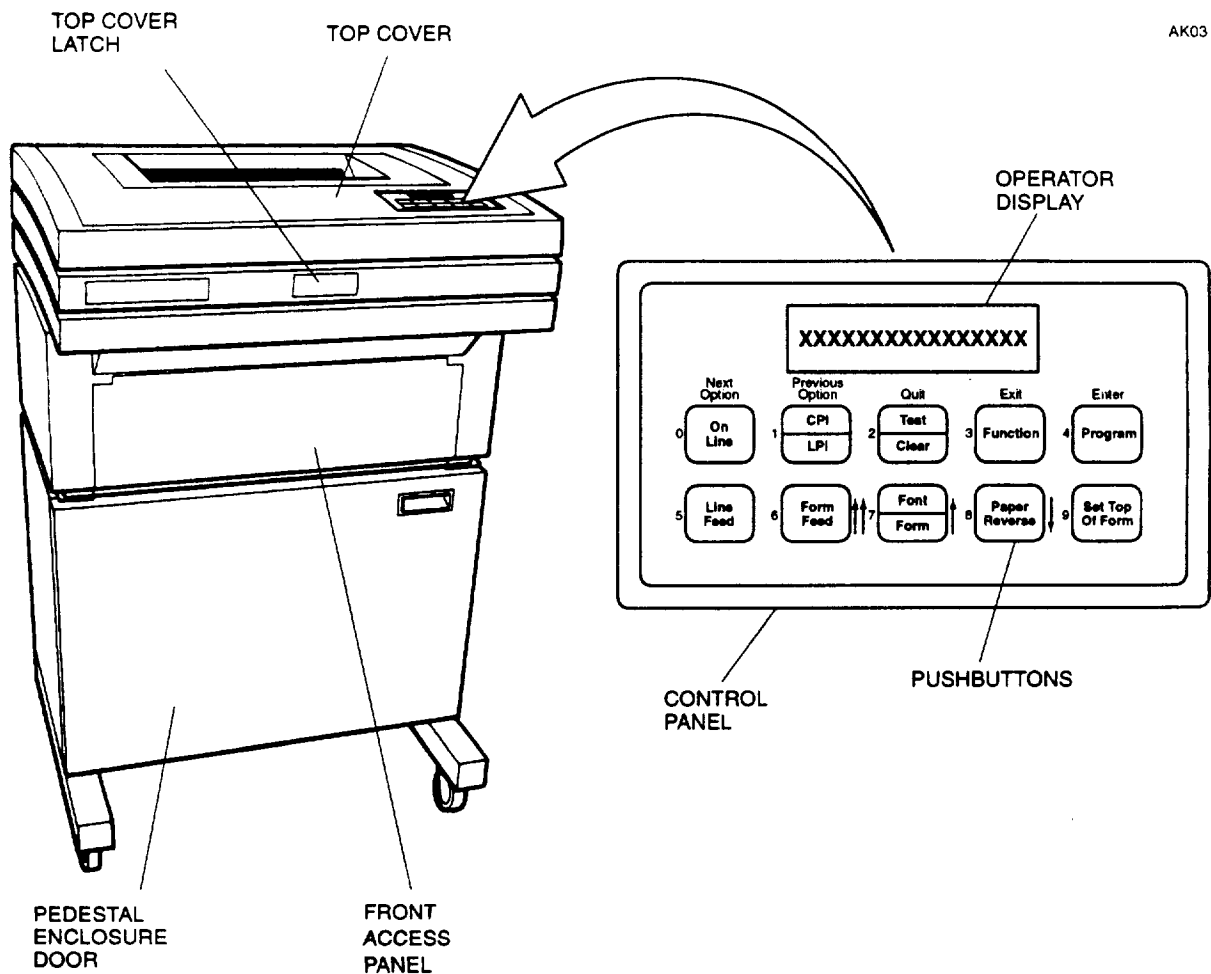
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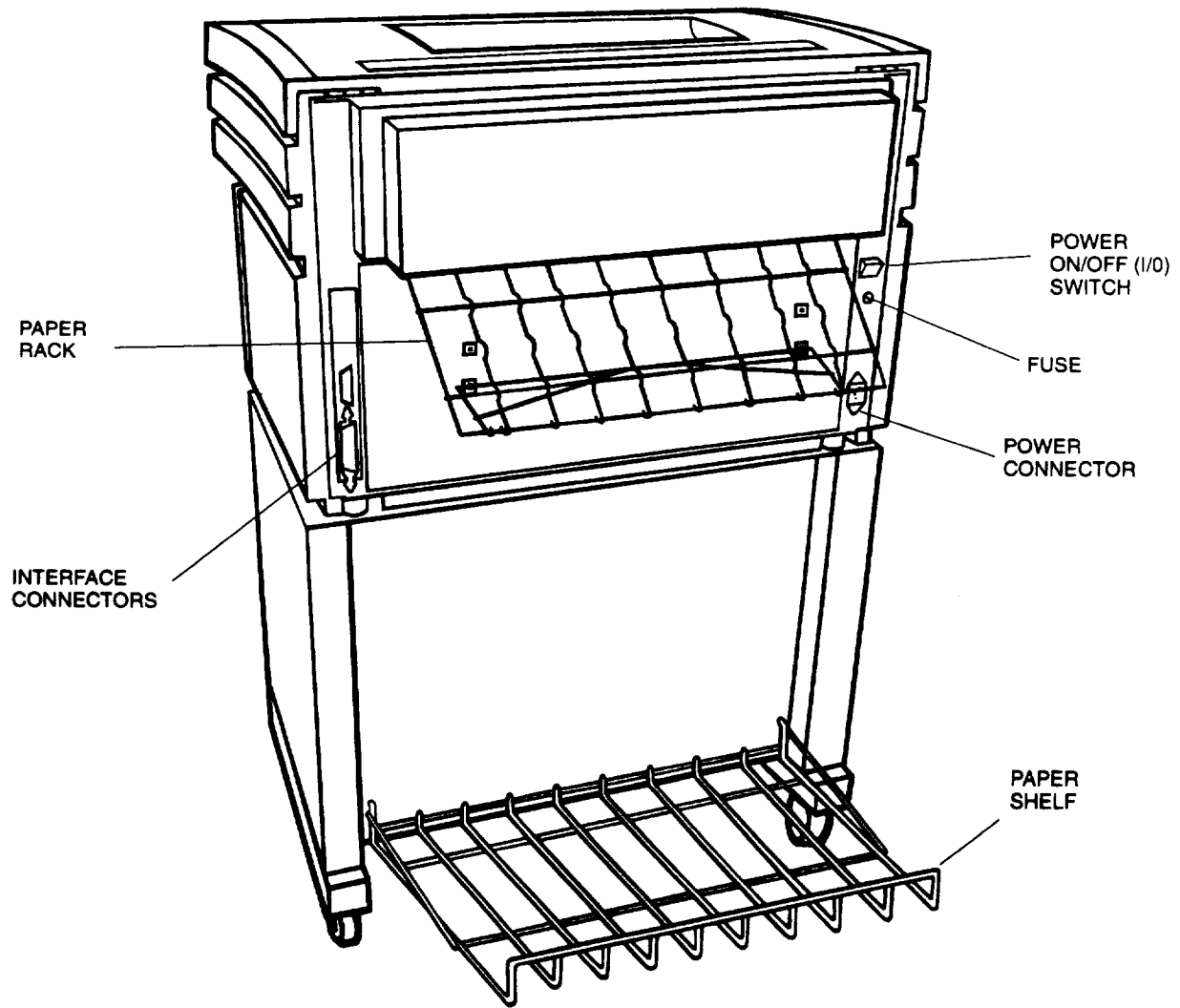
Chapter 1. Getting the Printer Up and Running

Introduction

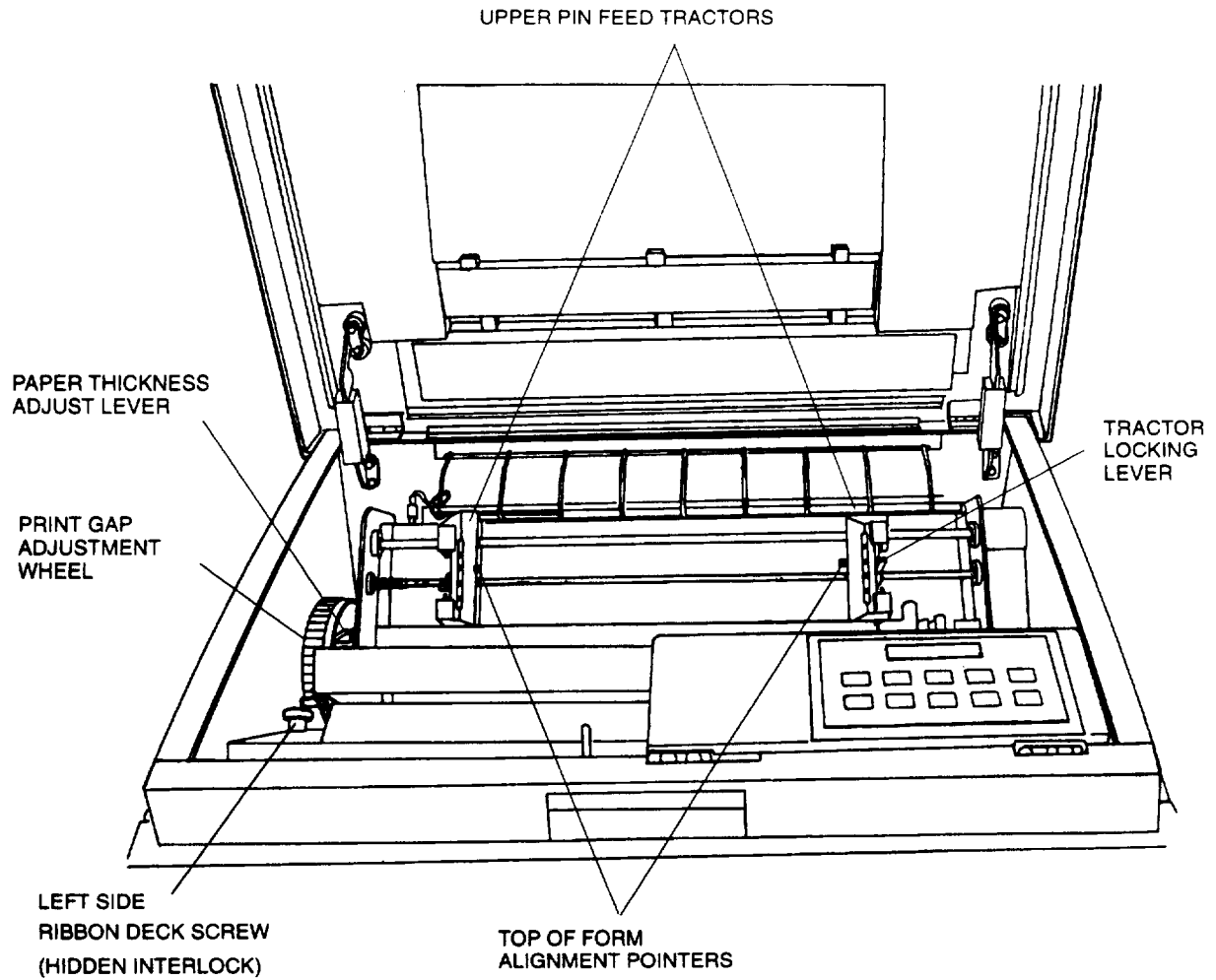
This chapter begins with illustrations to show what your printer and its various parts look like. Spend some time familiarizing yourself with the terminology so that you'll better understand the instructions that follow.



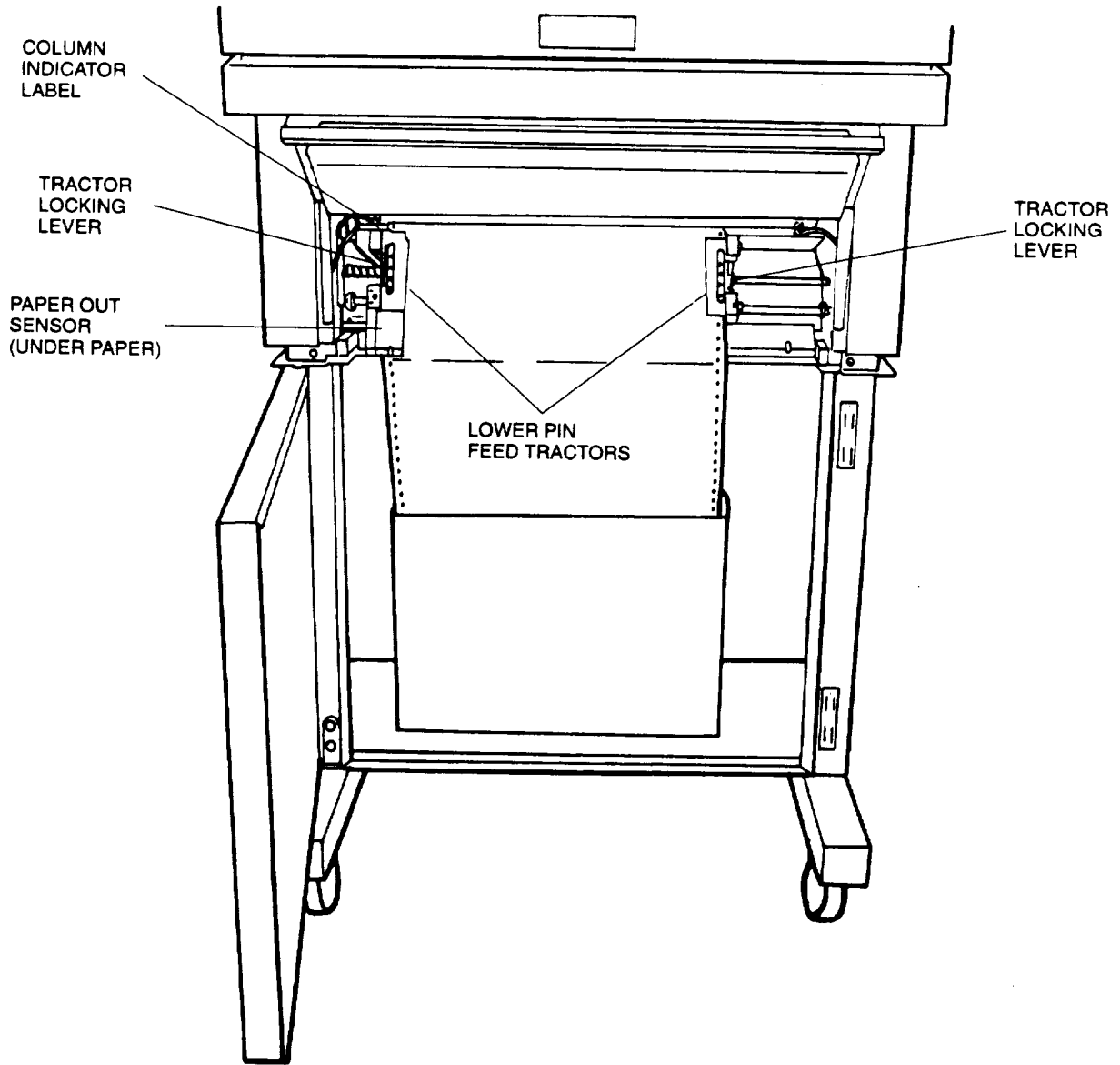
Front View of Printer
Figure 1-1



Rear View of Printer
Figure 1-2



Upper Operator Controls
Figure 1-3



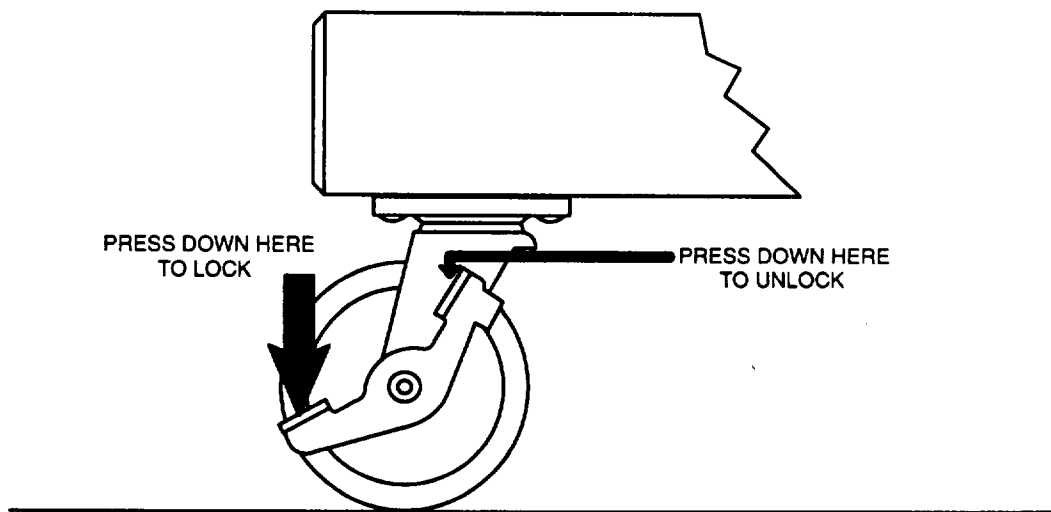
Lower Operator Controls
Figure 1-4

Preparing the Printer for Operation

Printer unpacking is complete when all accessories have been removed from the packaging and pedestal.

Move the printer to a suitable operating location. See Appendix C for considerations on the space and conditions required for normal operation.

The two front casters have locks to stabilize the printer once it has been moved to its location. Press one brake tab to lock the wheel of the caster and press the other tab to unlock. See Figure 1-5.



Right Front Pedestal Caster Shown in Locked Position
Figure 1-5

Important: For the initial setup of your printer, carefully follow the instructions of this chapter in the order they are presented.

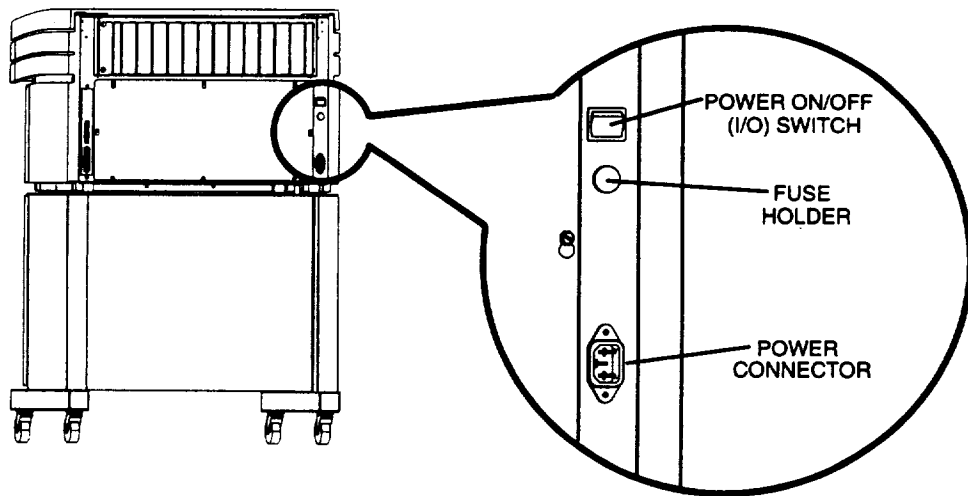
Connecting the Power Cable

This printer is equipped with an auto-switching power supply and can be connected to either a 115VAC or 230VAC source without damage or manually changing a switch setting.

The allowable voltage variation is $\pm 15\%$ and the allowable frequency is 48 to 65 Hz.

A power cable is packed with your printer. Plug the female end of the cable into the recessed connector at the rear of the printer. See Figure 1-6. Plug the other end into a compatible, properly grounded AC outlet.

Avoid using AC circuits serving other equipment which may cause chronic low voltage, noise interference, or power fluctuations.



Power Cable Connection
Figure 1-6

Connecting the Interface Cable

Both a 25-pin RS-232C serial and a 36-pin CENTRONICS parallel interface connector are standard on this printer. Both connectors are located on the data connector plate on the rear of the printer. See Figure 1-7.

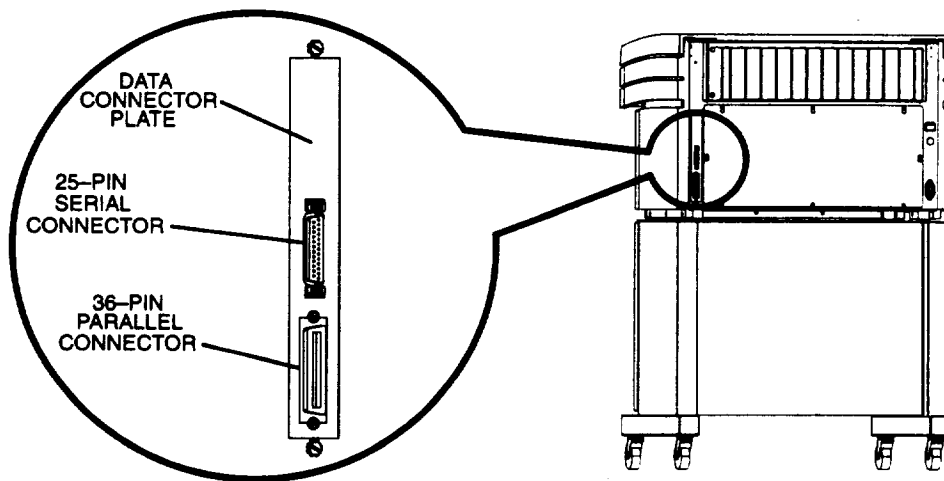
Chapter 4 contains useful information for setting up the interface to match your host. Any necessary changes in the setup are made by changing strap options through the control panel. Appendix F lists the interface strapping options.

The circuitry for Dataproducts short line parallel interface is resident in the printer. A different data connector plate with the proper connector is normally required to use the short line interface and is available as an option.

Options available:

- Dataproducts short line (data connector plate, connector, and internal cable and connector)
- Dataproducts long line (circuit board, internal cable, and connector)

Both options are available with either a 50-pin Winchester or 50-pin D-type connector. See Appendix D for a complete list of options.



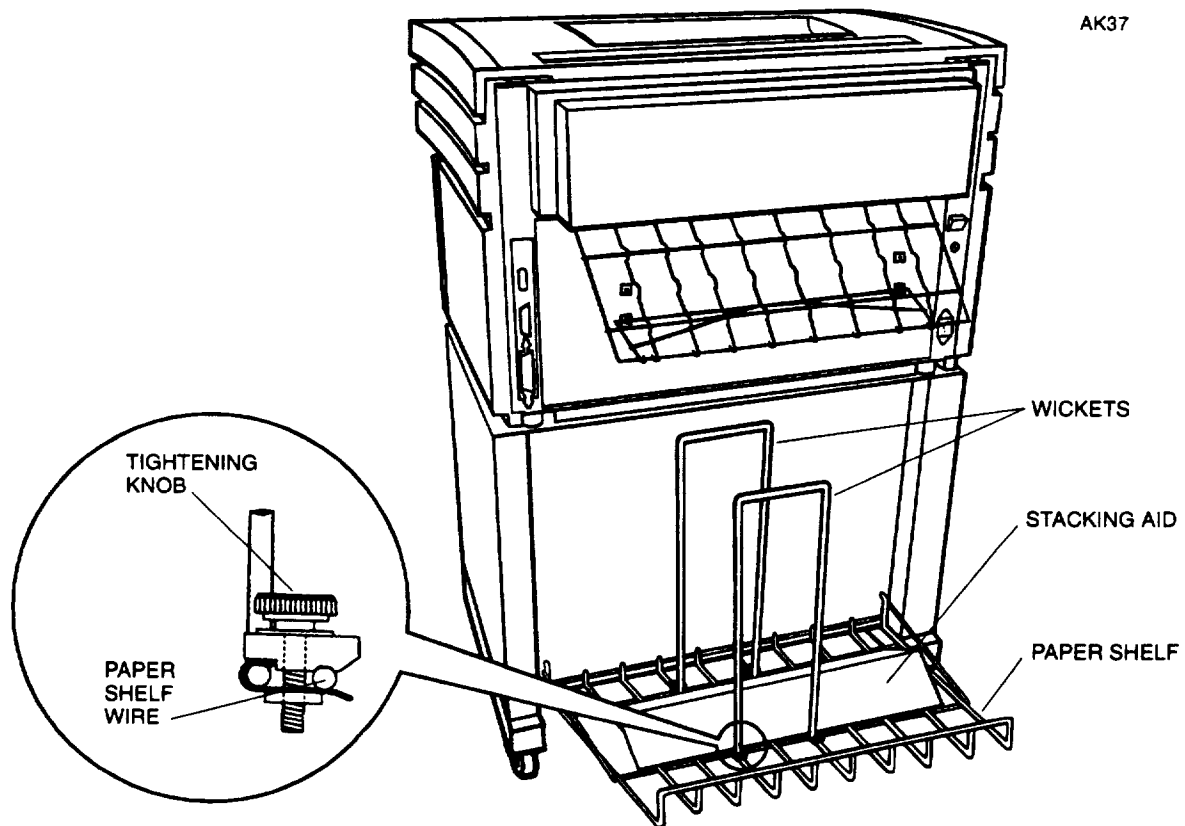
Interface Cable Connector
Figure 1-7

Installing the Paper Handling System

The paper handling system for this printer consist of a two-piece paper guide and a paper shelf with wickets and a stacking aid. See Figure 1-8.

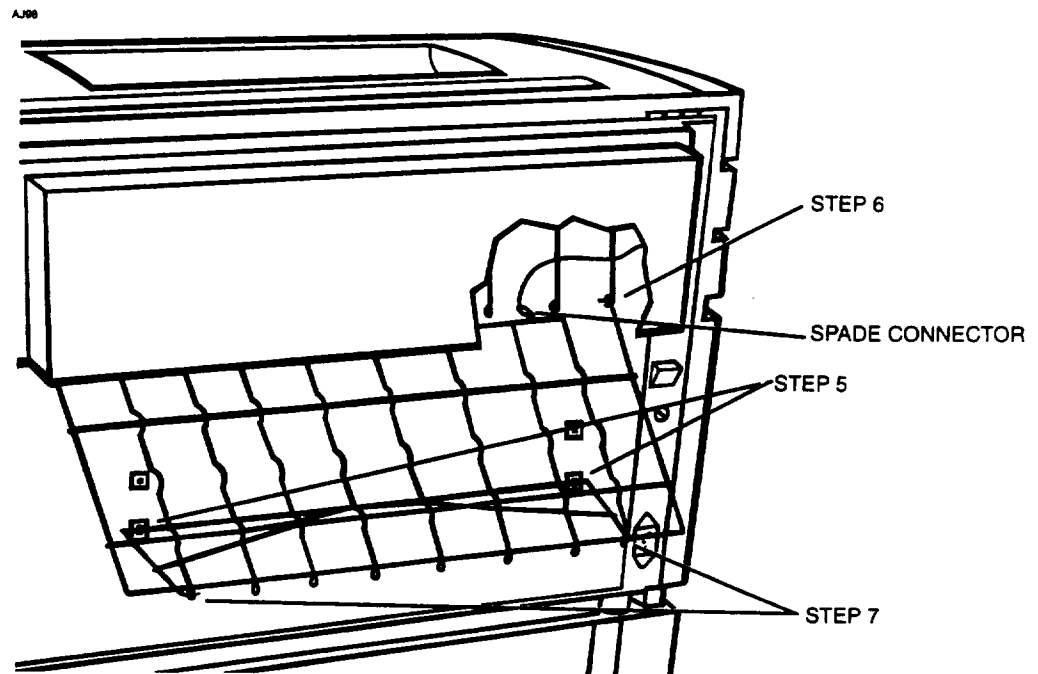
The paper shelf hangs on the back of the printer near the floor. The paper guide hooks onto the two end wire loops protruding from the rear paper exit and snaps into the clips on the back of the printer.

1. Hang the paper shelf on the back of the printer in the holes provided as shown in Figure 1-8.
2. Install the wickets on the shelf so the tightening knobs are facing away from the area the paper will occupy.
3. Slide the wickets along the shelf so the distance between the wickets accommodates the length of your fanfold paper.
4. Lay the V-shaped paper stacking aid on the shelf between the wickets. This stacking aid should be used when stacks of 1000 or more forms are anticipated. See Figure 1-8.



Paper Handling System
Figure 1-8

5. Snap the paper guide support (smaller of the two pieces) into the lower set of clips on the back of the printer. See Figure 1-9. The lower clips are used for forms that are 11-inches or larger between perforations. The upper clips are used for shorter forms.
6. Hook the guide (larger of the two pieces) into the two wire loops protruding from the rear paper exit. Make sure the spade connectors for the static ground wires are facing the printer. See Figure 1-9.
7. Connect the hooks of the lower piece into the end loops of the upper piece. See Figure 1-9.
8. Connect the two static ground wires from the printer to the paper guide assembly (one on each side). See Figure 1-9.



Paper Handling System
Figure 1-9

Loading Paper

Your printer is designed to use edge-punched (spocket- or pin-fed) fanfold paper. For a further description of the types of paper that can be used in your printer, see Appendix B.

CAUTION

Use full-width 14 7/8-inch (377.8cm) paper until you are familiar with the printer's setup and operation.

Printing without paper or using paper too narrow for the job will cause the print wires to hit the striker bar.

Never attempt to move the paper manually by turning the tractor shafts. This will upset the belt timing and may damage the tractors.

To load paper in your printer, complete the following steps:

1. Push the top cover latch in and raise the cover to the open position.
2. Turn the print gap adjustment wheel to the LOAD position by pushing the top of the wheel towards the rear of the printer until it stops. See Figure 1-10.
3. Push the paper thickness adjustment lever down to position 1. See Figure 1-10.
4. Open the top left and right tractor doors. See Figure 1-10

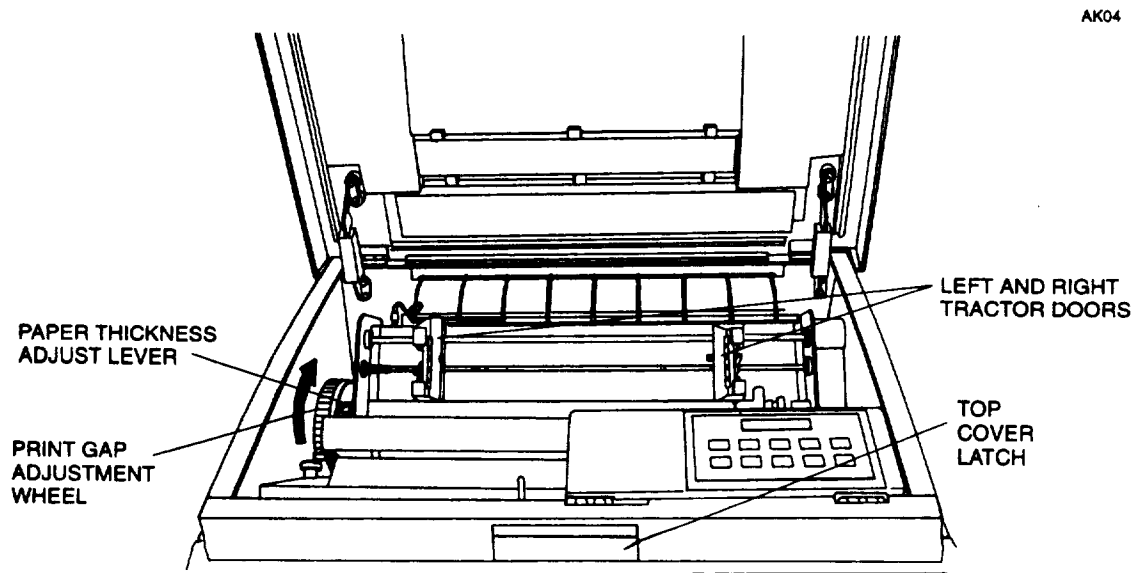


Figure 1- 10

5. Open the pedestal enclosure door and place the paper supply in the enclosure. **NOTE:** Either cut the top off the box of paper or tape the flaps down to prevent snagging the paper as it leaves the box.
6. Grasp the bottom edge of the front access panel of the printer and lift it to the open position. A magnetic latch will hold the panel open. See Figure 1-11.
7. Open the lower left and right tractor doors. See Figure 1-11.

NOTE: If you're loading single-part paper, then fold paper over at a perforation so that the first two forms are double-thick. Later, when you power the printer up, feed these doubled forms out of the printer before you adjust the print gap.

8. Hand feed the paper, bypassing the lower tractor pins, up through the printer to the top tractors. After the printer is in operation, the semiautomatic paper loading feature described on page 1-13 may be used.

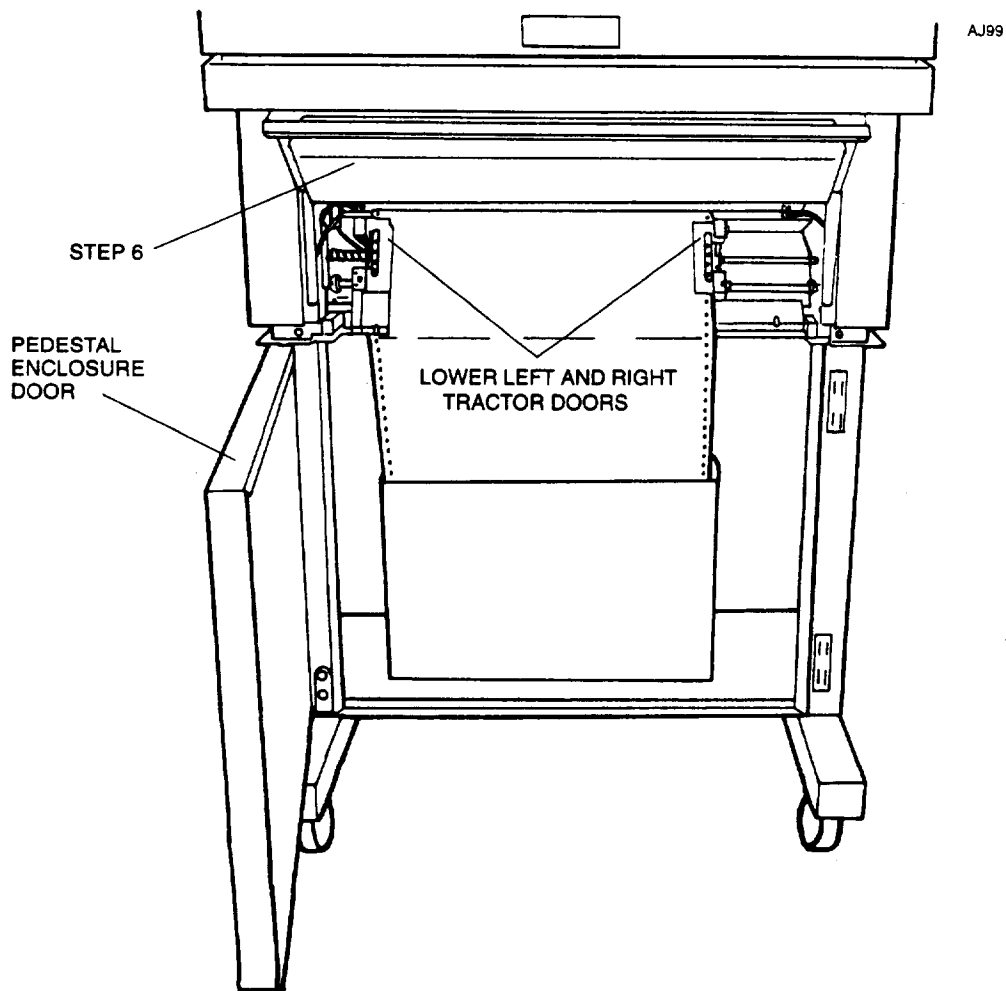


Figure 1-11

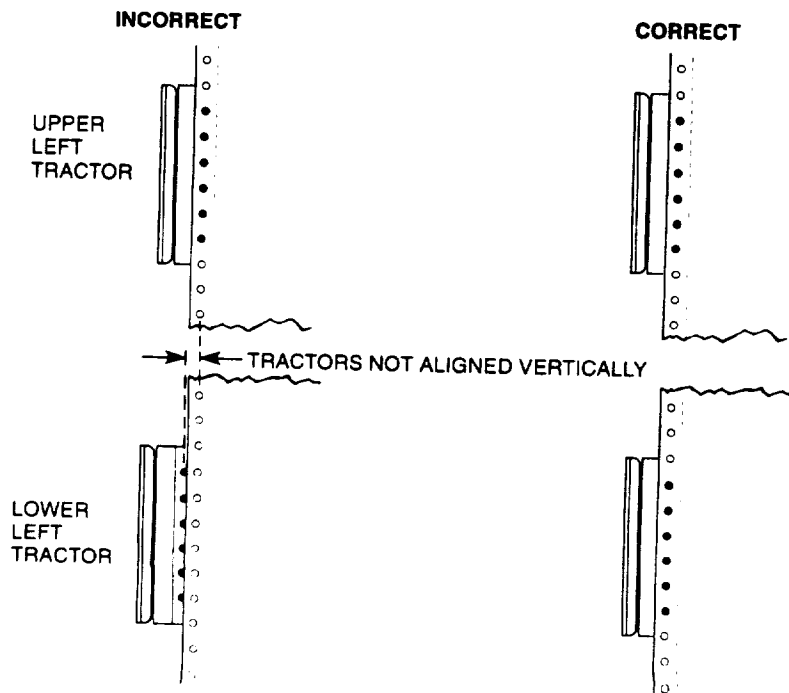
NOTE: For now, load the paper so that it will print on the **second** form (rather than first form) because a default strap setting pulls the paper into the printer about 4 inches (see pages 2-6 and 2-7). Later, vertical positioning and top of form (TOF) alignment will be completed after the printer is in operation.

9. Place the paper onto the pins of the upper left tractor and close the tractor door.
10. If necessary, release the locking lever on the right-hand tractor by flipping it down, and slide the tractor sideways to match the paper width.
11. Place the paper on the pins of the upper right tractor, making sure that the paper is straight horizontally, and close the tractor door.

If you have not done so already, release the locking lever on the right tractor by flipping the lever down. Slide the tractor *slightly* to the right to make the paper taut. Excessive tension will tear the pinholes and cause the paper to become misaligned. Lock the tractor in place by pressing up on the locking lever.

12. While applying a *slight* downward tension, lay the paper onto the lower tractors and close the tractor doors. If needed, unlock and adjust the lower tractors for correct alignment with the upper tractors and for correct paper tension.

IMPORTANT: The upper and lower tractors must be in line vertically after all adjustments are finished. See Figure 1-12.



AD35A

Aligning Upper and Lower Tractors
Figure 1-12

13. Close the front access panel and the pedestal enclosure door.

NOTE: *After the paper has been loaded, the print gap, paper tension, paper path, and top of form position must be set. These settings are discussed later in this chapter after the installation of the ribbon cartridge.*

Semiautomatic Paper Loading

Once the printer's tractors have been set up for the specific paper being used and power has been applied, the semiautomatic paper loading feature may be used.

After the paper is loaded in the lower tractors, pressing the FORM FEED pushbutton causes the paper to move up at a slower rate (10 inches per second) to the top tractors.

NOTE: *Some extremely thin forms, stiff cardstock, forms with raised labels, or envelopes with cutouts may not work with this feature. If you experience problems, load the paper manually.*

With the print gap adjustment wheel in the LOAD position, the paper thickness lever at position 1, and the upper tractor doors open, complete the following steps:

1. Load the paper into the lower tractors.
2. Press the FORM FEED pushbutton to move the paper up through the printer to the upper tractors.
3. Load the paper onto the upper tractors and close the tractor doors. Unlock and adjust the upper tractors as needed.

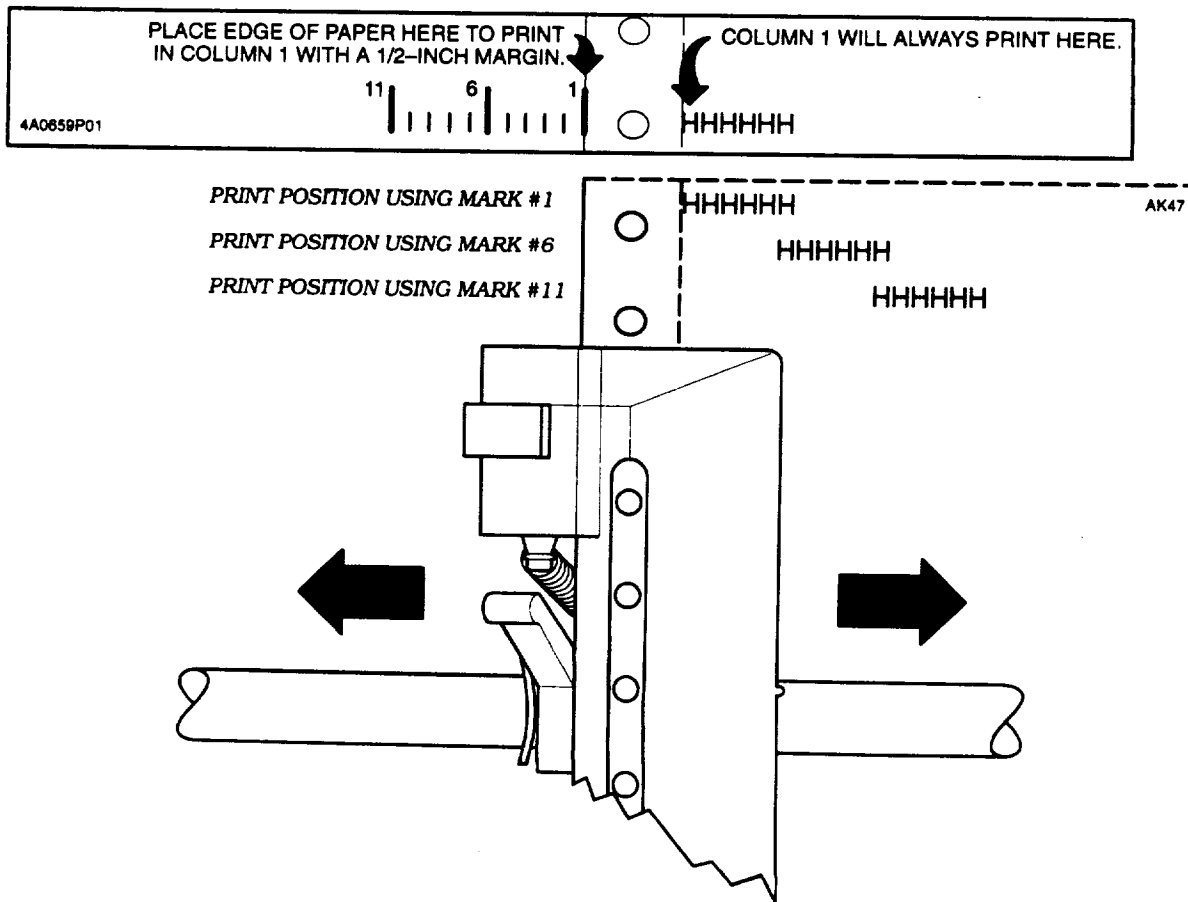
Horizontal Positioning of the Paper

The column indicator label is located directly above the lower left tractor. See Figure 1-13. Use this label as a guide to position the paper horizontally within the printer. Unlock and slide the tractors sideways to align the paper as needed. This positions the paper for the first physical print column.

A left margin is set electronically through either the control panel pushbuttons or a command sent by the host.

The marks on the label are set up for paper with a 1/2-inch margin or perforation strip and for printing at 10 cpi. When using paper with a different edge width or when printing at a different cpi value, use the H's printed on the label as a guide.

Aligning the edge of the paper with the first mark, as shown below, will cause the first column to print immediately after the perforation strip. (See the H's on the first line and the label.) Aligning the edge of the paper with the mark labeled 6 will cause the first column to print 1 inch from the edge. This position is column 6 on the paper after the perforation strip.



Column Indicator Label and Lower Left Tractor
Figure 1-13

About the Ribbon Deck

The ribbon deck contains the drive mechanism for the ribbon cartridge. The locking lever is used to open (**LOAD** position) and close (**RUN** position) the ribbon drive gears.

The ribbon fabric in the cartridge is placed between the drive gears of the deck as the cartridge is lowered onto the deck. When the locking lever is moved to the **RUN** position, the drive gears move together to grip the fabric.

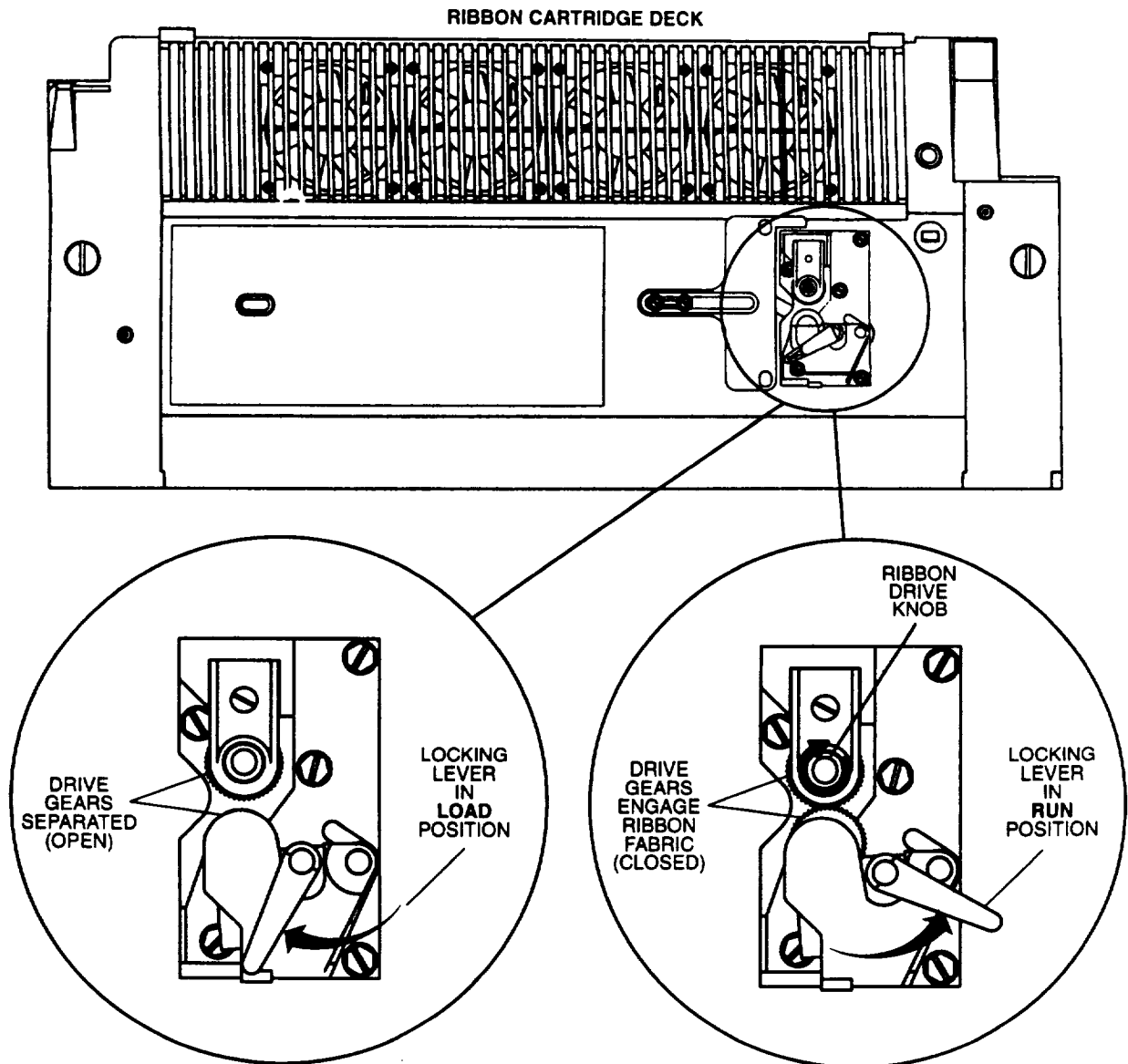


Figure 1-14

After the ribbon cartridge is in place and the locking lever has been turned to the **RUN** position, the ribbon drive knob is turned clockwise to manually advance the ribbon fabric.

About the Ribbon Cartridge

The top side of the ribbon cartridge has a window for viewing the ribbon fabric, the yellow SPOOL knob for taking up slack in the ribbon, and an orange SLIDE LEVER used to position internal parts. A removable shipping tab is located in the window on new cartridges. The bottom side has an opening for the ribbon deck drive gears and locking lever. When the ribbon is installed, the locking lever and ribbon drive knob will pass through the openings in the top side of the cartridge. Some ribbon cartridges have a reinker for longer life. The reinker lever should be rotated clockwise after the ribbon installation.

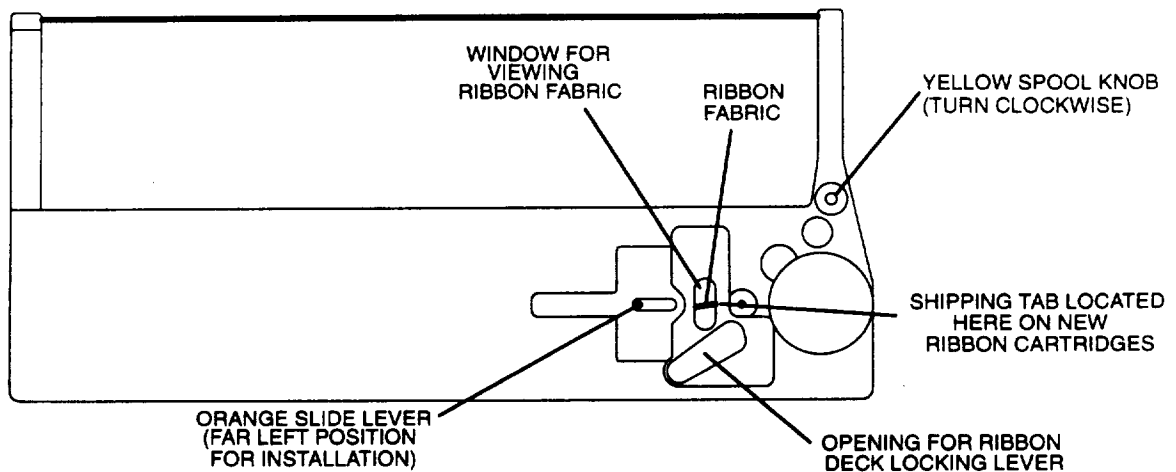
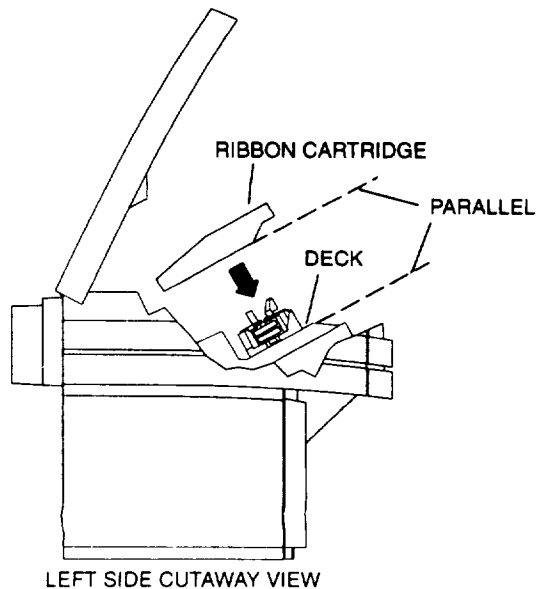


Figure 1-15

About the Installation



IMPORTANT

During installation, hold the ribbon cartridge so the bottom of the cartridge and the top of the deck are parallel to each other. See Figure 1-16.

Figure 1-16

Installing a New Ribbon

On the printer:

1. Place the printer offline and raise the top access door.
2. Turn the print gap adjustment wheel to the LOAD position.
3. Turn the ribbon locking lever to the LOAD position (clockwise).

On the ribbon cartridge:

4. Make sure the orange SLIDE LEVER on the ribbon cartridge is in the full left position.
5. Turn the yellow SPOOL knob clockwise to take out any slack in the ribbon fabric between the cartridge arms.

Installation:

6. Hold the ribbon cartridge over the ribbon deck at an angle that matches the tilt of the ribbon deck as described below:
As you face the front of the printer, hold the ribbon cartridge so the body of the cartridge is parallel to the floor. Rotate your hands down so that the angle of the cartridge (front to back) matches the tilt of the ribbon deck.
7. Lower the ribbon cartridge onto the ribbon deck so that the drive gears on the deck enter the opening on the bottom of the cartridge.
8. After the cartridge is in place, grasp the shipping tab on the ribbon cartridge and pull it up and towards the left to remove it from the cartridge.
9. Look into the window of the ribbon cartridge and make sure the ribbon fabric is not twisted, or folded, between the ribbon deck drive gears. If necessary, turn the yellow SPOOL knob to straighten the fabric.
10. Turn the ribbon locking lever to the RUN position (counterclockwise).
11. Turn the ribbon drive knob clockwise to unwind any ribbon fabric that has been wound onto the spool. The yellow SPOOL knob will stop turning when all fabric has been unwound.
12. If your ribbon cartridge has a reinker, turn the reinker lever to the ON position (clockwise). If necessary, see Figure 1-15.

NOTE: *After the ribbon cartridge has been installed, the print gap, paper tension, paper path, and top of form position must be set. These settings are discussed later in this chapter.*

Changing or Reinstalling a Ribbon

On the printer:

1. Place the printer offline and raise the top access door.
2. Turn the print gap adjustment wheel to the LOAD position.
3. Make sure the ribbon locking lever is in the LOAD position (clockwise).

On the ribbon cartridge:

4. Make sure the orange SLIDE LEVER on the ribbon cartridge is in the full left position.
5. Turn the yellow SPOOL knob clockwise to take out any slack in the ribbon material between the cartridge arms, and then *hold* the yellow SPOOL knob to prevent the ribbon from loosening.
6. Look into the window of the ribbon cartridge and make sure that the short length of visible ribbon fabric is relatively straight and taut. See Figure 1-17. If necessary, slowly turn the yellow SPOOL knob clockwise to straighten the ribbon, and then *hold* the yellow SPOOL knob to prevent the ribbon from loosening.

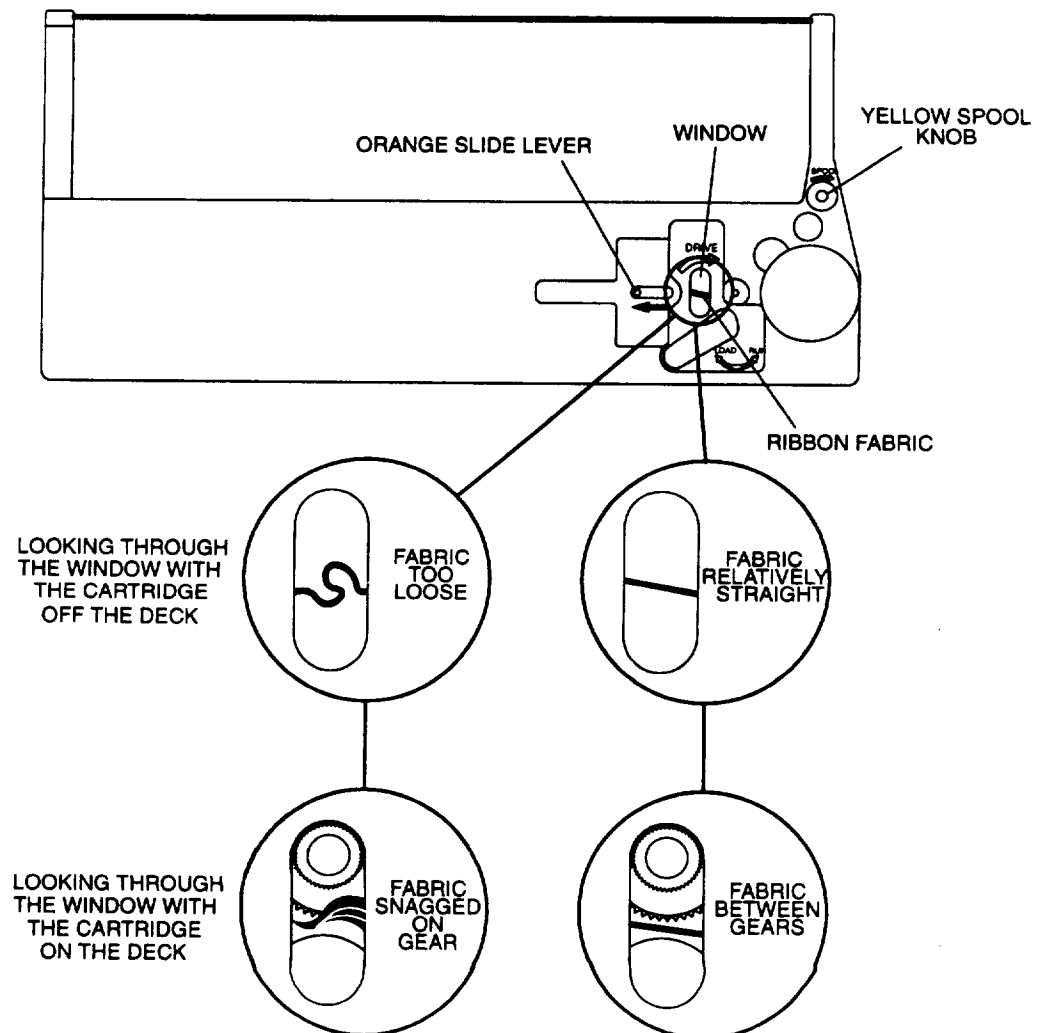


Figure 1-17

Changing or Reinstalling a Ribbon (continued)

Installation:

7. Hold the ribbon cartridge over the ribbon deck at an angle that matches the tilt of the ribbon deck. If necessary, see Figure 1-16.
8. Lower the ribbon cartridge onto the ribbon deck so that the drive gears on the deck enter the opening on the bottom of the cartridge.
9. Look into the window of the ribbon cartridge and make sure the ribbon fabric is not twisted, or folded, between the ribbon deck drive gears. If necessary, turn the yellow SPOOL knob to straighten the fabric. See Figure 1-17.
10. Turn the ribbon locking lever to the RUN position (counterclockwise).
11. Turn the ribbon drive knob clockwise to unwind any ribbon fabric that has been wound onto the spool. The yellow SPOOL knob will stop turning when all fabric has been unwound.
12. Turn the print gap adjustment wheel to the desired setting.
13. If your ribbon cartridge has a reinker, turn the reinker lever to the ON position (clockwise). If necessary, see Figure 1-15.

Removing a Ribbon

1. Place the printer offline and raise the top access door.
2. Turn the print gap adjustment wheel to the LOAD position.
3. Turn the ribbon locking lever to the LOAD position (clockwise).
4. Lift the ribbon off the ribbon deck.

Print Gap Adjustment Wheel

The print gap adjustment wheel is used to adjust the distance between the bank of print head actuators and the striker bar.

Setting the gap too tight will cause smudging on the paper and can obstruct the movement of the shuttle mechanism. Overloading or stalling the shuttle will cause the printer to stop and **Fault:Shuttle** will be displayed on the control panel.

Setting the gap too loose may cause unacceptable print quality and excessive noise.

Reading the Scale

The print gap adjustment wheel has two scales to aid in setting the proper gap.

Using the White Scale

The white scale with the black markings is used to set the gap by the number of parts in the paper being used. Set the wheel to **1** for single-part paper, **2** for two-part paper, etc.

This is a relative setting. A change in the paper weight or the thickness of the carbon paper (if used) in multipart forms may require further adjustment. Cardstock and carriers with stick-on labels require a larger print gap.

Using the Black Scale

The black scale with the white markings is used when direct measurements in thousandths of an inch are made. Its main use was during the factory setup of the printer.

After the ideal gap setting has been found for a particular type of form, note the wheel setting using the black scale. A four-part form with a heavy first sheet may run best with the wheel set at **26** or **27** on the black scale instead of somewhere in the **4** range on the white scale. The smaller increments (one click of the wheel per number) provide a more accurate setting to go back to after reloading paper or changing the ribbon.

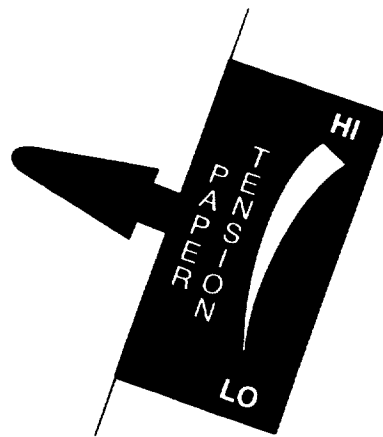
The most accurate, but somewhat more complicated, way to set the gap is to load the paper and ribbon, and then use a .004-inch feeler gauge or shim between the ribbon smudge shield and the paper. Slide the gauge from one side of the form to the other and adjust the gap so the gauge is snug at the tightest point.

Paper Thickness Adjustment

The paper tension adjustment lever is located next to the print gap adjustment wheel. It is used to maintain the proper tension on the paper during printing.

Place the five-position lever to LO (the bottom position) when loading paper, setting top of form, and printing single-part paper. This position applies the least tension to the paper and should be used as the first trial position for all forms.

For multipart forms and single-part paper that is heavier than 20 pounds, higher paper tension lever settings may be required. Six-part forms are normally run at the second or third position.



AJ94

Paper Thickness Adjustment Lever
Figure 1-18

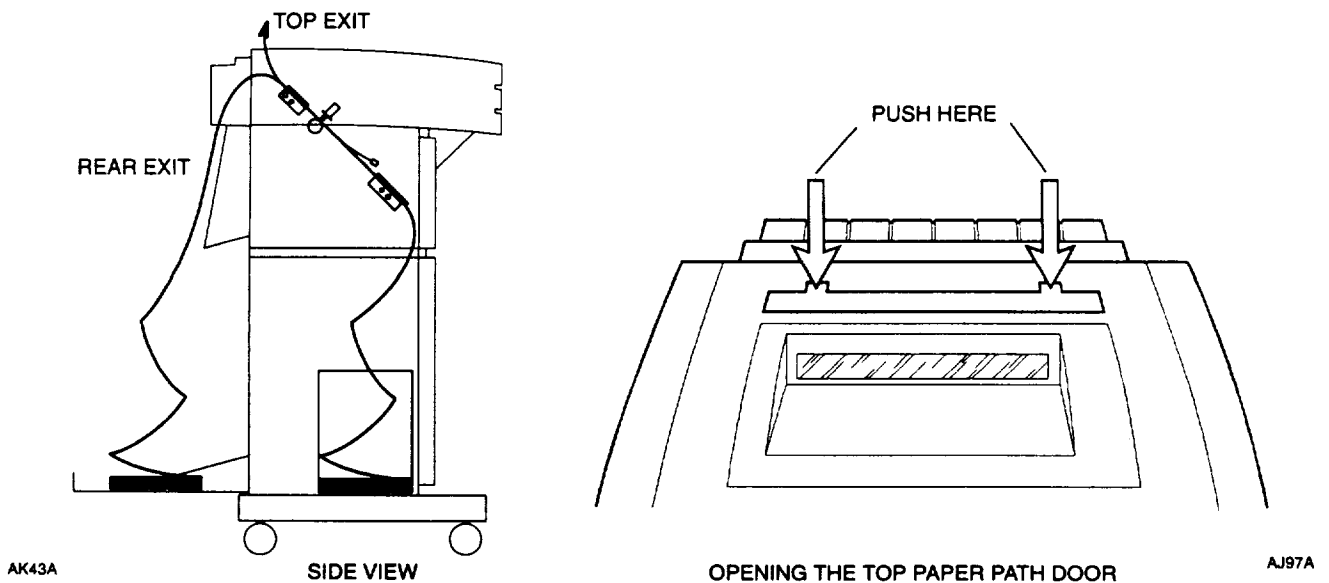
Selecting the Paper Path

This printer has a top exit paper path and a rear exit paper path.

The top path is used when forms or peel-off labels are printed and removed from the printer individually.

The rear path is used when high volumes or unattended print jobs are printed.

When the top exit is closed, the paper will automatically seek the rear exit. To switch to the top exit, push down on the ears of the top exit door as shown below.



Top and Rear Paper Paths
Figure 1-19

IMPORTANT

1. Choose the paper path *before* allowing the paper to go past the upper tractors.
2. The top cover *must* be closed for the paper to use either path.

Power-On Sequence

With the ribbon cartridge and paper installed and the power cable connected, the printer is ready for power to be applied. The power switch is located on the rear panel. See Figure 1-6 on page 1-6.

The following describes the power-on sequence and shows the expected display:

- Printer starts diagnostics and **Self Test** shows on the display. The shuttle and ribbon motors will run for a brief period.
- The printer then loads the processing software and **Loading...Wait** is displayed.
- Printer completes the sequence in approximately 15 seconds.
- When the power-on sequence and self-test are completed, **Local** or **Online** is displayed.

With printer option strap A24 IN, the printer always powers up online. Strap A24 OUT causes the printer to always power up offline. See Chapter 2 and Appendix F for strap settings.

Interlock Switch

This printer has an interlock switch circuit to meet safety and international requirements.

The interlock switch circuit disables the power supply voltages when the ribbon deck is lifted. See Figure 1-3 on page 1-3. This eliminates any potential shock hazard or inadvertent printer start-up while moving parts in the print area are accessible. The ribbon deck must be in place and the screws must be tightened securely for printer operation.

Important: *Removing the ribbon deck with the power applied will energize the interlock circuit. If this happens, the deck must be replaced, power must be turned off, and you must wait 5 minutes before attempting to reapply power.*

Initializing the Printer

Initializing resets the printer electronics and sets the printer parameters to a set of known conditions. Parameters include margins, tabs, forms control, cpi, lpi, etc. The set of known conditions can be either the factory default settings or previously defined settings that were stored in memory. See Chapter 2 for information on storing customer-defined settings.

When to Initialize

Initialize the printer when:

- You want the printer set to the factory default settings.
- You want the printer set to your previously stored settings.
- New integrated circuit chips (firmware upgrade or options) are installed.
- The electronics lock up, causing the printer to ignore control panel inputs.
- Repair actions involving the circuitry have been made.

Which Method to Use

There are two methods used to initialize the printer. One method uses the initialization switch located on the back of the control panel to set the printer to the factory default settings. The second method uses the control panel pushbuttons to initialize the printer to either the factory settings or to customer-defined settings that were previously stored.

Method 1 – Using the Initialization Switch

Use of the initialization switch will erase any customer-defined settings (in use or previously stored) and restore the printer to the factory set parameters. All special modes (bar codes, partial line up/down, etc.) will be cancelled. This method is particularly useful if the printer should ever lock up and the keypad does not respond to inputs.

Method 2 – Using the Keypad to Initialize

Using the control panel pushbuttons to initialize the printer allows resetting to previously stored customer-defined parameters or to the factory default parameters. Initializing to the factory setting using the keypad does not erase a customer-defined setup that was previously stored.

Printer Initialization





Initialization Switch

Reset the printer with the initialization switch using the following procedure. The initialization switch is located in the hole located on the back of the control panel.

1. Turn the printer off.
2. Slide the initialization switch to the UP position.
3. Turn the printer on. The printer will perform a self-test and initialize.
4. When the display shows **St:Initialize**, slide the initialization switch back to its original position (down).

Control Panel Initialization – Local 3 – 0 – 0 – 4 – 4


With the printer in **Local**, initialize the printer with the control panel using the following procedure:

1. Press 3  to enter the Function Mode.
2. Press 0  until **FCT:Setup** is displayed.
3. Press 4  to enter the setup mode.
4. Press 4  to initialize to factory default setup.

To restore the customer-defined settings using **Setup:Recall**, press **3 – 0 – 0 – 4 – 0 – 4**.

If the printer was operating before initialization, it may need to be reconfigured for the specific task at hand.

Test Pattern Printing

With the printer in Local, press and hold 2 .

Stop the printing by releasing the pushbutton.

The printer will print a rolling test pattern of all printable ASCII characters. The pattern is printed in the font style, line length (determined by the margins), characters per inch, and lines per inch settings that are currently in effect (selected locally or remotely).

Using the Test Pattern as a Tool

Use the test pattern as a guide to determine whether or not the print gap adjust knob is set correctly. If thicker paper (more copies) is being used, turn the print gap adjust knob clockwise to increase the gap. If thinner paper (fewer copies) is being used or the printing is too light, turn the knob counterclockwise to decrease the gap. Generally, the print gap should be set to the lowest setting that does not cause smudging.

If printing becomes lighter gradually over a period of time, the ribbon may need replacing.

```
tuvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@ABCDE
uvwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@BCDEF
vwxyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@BCDEFG
xyz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@BCDEFGH
yz{|}~ !"#$%&'()*+,-./0123456789:;<=>?@BCDEFGHI
z{|}~ !"#$%&'()*+,-./0123456789:;<=>?@BCDEFGHIJK
{|}~ !"#$%&'()*+,-./0123456789:;<=>?@BCDEFGHIJKL
|}~ !"#$%&'()*+,-./0123456789:;<=>?@BCDEFGHIJKLM
}~ !"#$%&'()*+,-./0123456789:;<=>?@BCDEFGHIJKLMN
~ !"#$%&'()*+,-./0123456789:;<=>?@BCDEFGHIJKLMNO
 !"#$%&'()*+,-./0123456789:;<=>?@BCDEFGHIJKLMNOP
!"#$%&'()*+,-./0123456789:;<=>?@BCDEFGHIJKLMNOQP
#$%&'()*+,-./0123456789:;<=>?@BCDEFGHIJKLMNOPQR
%&'()*+,-./0123456789:;<=>?@BCDEFGHIJKLMNOPQRS
&'()*+,-./0123456789:;<=>?@BCDEFGHIJKLMNOPQRST
%'()*+,-./0123456789:;<=>?@BCDEFGHIJKLMNOPQRSTU
&'()*+,-./0123456789:;<=>?@BCDEFGHIJKLMNOPQRSTUV
```

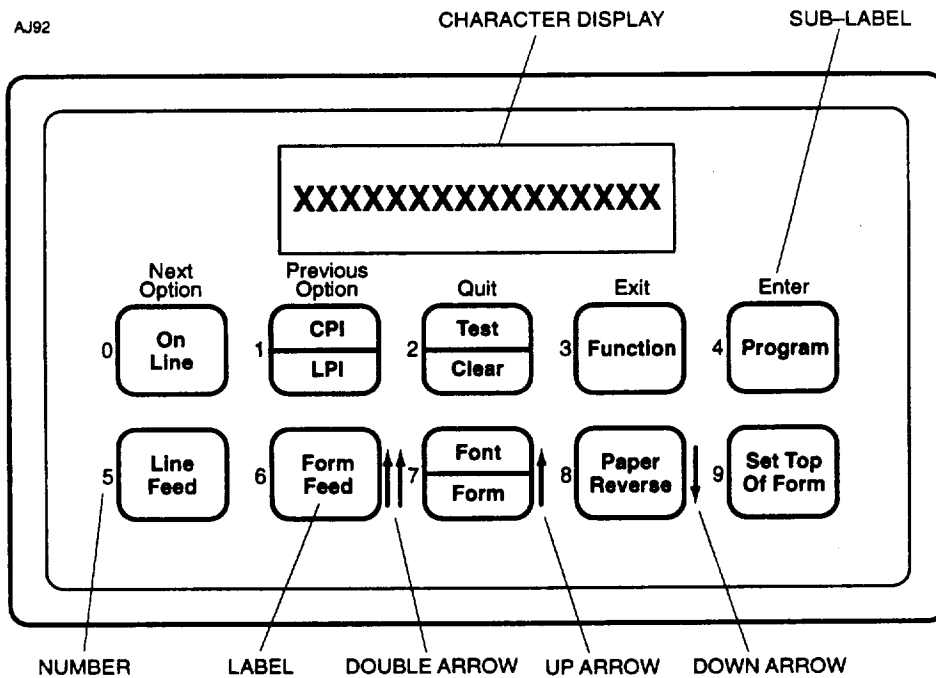
Test Pattern Sample

Chapter 2. Operating the Printer

Description of the Control Panel

The control panel is mounted in the top of the printer and is accessible with the top cover either open or closed. It has ten pushbuttons that have labels, numbers, and, in some cases, sub-labels or arrows. The sixteen-character display and the beeper allow the printer to communicate with you.

With the top cover open, the control panel will move around slightly to the touch. This is normal. The floating mount allows the panel to align itself when the top cover is closed. The mount is also hinged so that you can tilt it forward to use the initialization switch and to remove the ribbon deck for service.



Operator Control Panel
Figure 2-1

Description of the Control Panel (continued)

Beeper

The control panel beeper sounds momentarily when:

- a pushbutton is pressed.
- a BEL control code is received.
- a PAPER LOW condition exists.
- an EVFU loading error occurs.
- a hard fault occurs.

Display

The sixteen-character display tells you:

- the printer's status - Online, Local, Self-test, etc.
- what mode the printer is in - Function or Program.
- which menu or menu option is presently on display to assist in making selections.
- when a fault condition exists.

Pushbuttons

The pushbuttons are sealed membrane-type switches used to make menu selections, clear faults, and position the paper. An explanation of the pushbuttons' functions is given in the following section on "Operation of the Control Panel."

Initialization Switch

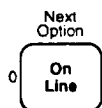
The recessed initialization switch located on the back of the control panel is used to clear and reset the electronic circuitry of the printer. A small screwdriver or pencil can be used to reach the switch when needed. An explanation of when, why, and how to initialize the printer is in Chapter 1.

Operation of the Control Panel

The *primary* use of each pushbutton is printed on the button itself. But when the PROGRAM (4) or FUNCTION (3) keys are pressed, the pushbuttons perform according to their printed *sub-label*.

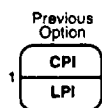
Numbers - The number printed to the side of each pushbutton can be used to remember a pushbutton sequence for a frequently used operation. Example: When offline, pressing **3 - 1 - 4** will print out the printer's configuration status sheet.

Basic Pushbutton Use



ONLINE - Causes the printer to switch from online to local and local to online.

The sub-label for this pushbutton is **NEXT OPTION**, which allows you to move forward through the menu selections when in the Program or Function Mode. It can be momentarily pressed to view the next option or pressed and held to scroll.

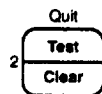


CPI/LPI - Characters per inch/lines per inch - Used to select and display cpi and lpi settings. Press the pushbutton once to display the currently selected **CPI**. Press it twice within one second to display the currently selected **LPI**.

When this pushbutton is pressed and held while **CPI:** is showing, the display will scroll through the available cpi settings starting with the cpi value currently set. When the pushbutton is released, the cpi value showing on the display is selected as the current setting. Available cpi settings are 10, 12, 13.3, 15, and 16.7. If a display shows **LS** on the right, a nonstandard cpi value has been set by the host.

Similarly, when the pushbutton is held while **LPI:** is showing, the various lpi settings are shown starting with the current value. Release the pushbutton when the lpi value you want to select is showing on the display. Available lpi settings are 3, 4, 6, and 8. If a display shows **LS** on the right, a nonstandard lpi value has been set by the host.


The sub-label for this pushbutton is **PREVIOUS OPTION**, which allows you to move backwards through the menu selections when in the Program or Function Mode. It can be momentarily pressed to view the next option or pressed and held to scroll.





TEST/CLEAR - When pressed momentarily, fault displays are cleared. When pressed and held (after faults have been cleared), a rolling test pattern is printed in the currently selected font style, cpi, lpi, and line length. When the pushbutton is released, the test pattern stops after the print buffer is empty and the printer performs a self-test.


The sub-label for this pushbutton is **QUIT**, which allows the printer to return to **Local** from the Program or Function Mode.

Basic Pushbutton Use (continued)

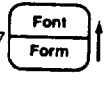
 **FUNCTION** - When pressed while offline, the printer enters the first level of the Function Mode and changes the pushbuttons from their *primary or labeled* use to their *sub-labeled* use. The sub-label for this pushbutton is EXIT and allows you to leave the current menu and go back one level. Information on using the Function Mode starts on page 2-8.

 **PROGRAM** - When pressed while offline, the printer enters the first level of the Program Mode and changes the pushbuttons from their *labeled* use to their *sub-labeled* use. The sub-label for this pushbutton is ENTER, which allows a menu option or operation to be chosen. Information on using the Program Mode starts on page 2-8.

 **LINE FEED** - Advances the paper one line based on the current lines per inch setting each time it is pressed. Holding the pushbutton down causes consecutive line feeds at a rate of 10 per second until released. It can be used online with printer control strap A26 IN. (Strap settings are discussed on page 2-55 and Appendix F.)

 **FORM FEED** - Advances paper to the next top of form setting, once for each time the pushbutton is pressed. It can be used online with printer control strap A26 IN. It also controls the paper tear-off function online with control strap B20 IN. See "Paper Tear-off Feature" on page 2-28.

When using the control panel to alter the form length, top or bottom margin size, or horizontal and vertical tab positions, this pushbutton will increase the number on the display by 10 each time it is pressed. Also see "Using the Arrows" on page 2-7.

 **FONT/FORM** - Used to select and display the font style and form number. Press the pushbutton once to display **Font:** followed by the currently selected font style. Press it twice within one second to display **Form:** followed by the currently selected form number.

When this pushbutton is pressed and held while the font style is showing, the display will scroll through the available font styles starting with the currently selected font. When the pushbutton is released, the font showing on the display is selected. (The font styles available are dependent on which emulation is being used and are shown on the next page.)

Similarly, when this pushbutton is pressed and held while the form number is showing, the display will scroll through the form numbers starting with the currently selected form. When the pushbutton is released, the form number showing on the display is selected. The available forms that can be selected are 0 through 9 and **Deviation**. See page 2-14 for information on how to use the Forms Entry/Storage Feature. The arrow is discussed on page 2-7.

Basic Pushbutton Use (continued)

FONT/FORM (continued)

Printer option straps B22 and B23 must be OUT to use this pushbutton for selecting a font or form.

When the Micro Adjust feature (option strap B22) or the Auto View feature (option strap B23) are enabled, pressing this pushbutton advances the paper 1/72 inch. Holding the button down causes consecutive paper moves at a rate of 50 per second. Also, see "Using the Arrows" on page 2-7.

The available font styles for all emulations except IBM Proprinter and Epson FX286 are:

DISPLAY	FONT STYLE
Data Proces	Gothic Data Processing
High Speed	High Speed Draft
Gothic NLQ	Gothic Near Letter Quality
Courier NLQ	Courier Near Letter Quality
Correspond	Correspondence
Graphics	Character Graphics
OCR-A	Optical Character Recognition - set A
OCR-B	Optical Character Recognition - set B
Italic NLQ	Italic Near Letter Quality

The available font styles for the IBM Proprinter emulation are:

DISPLAY	FONT STYLE
DP	Did Gothic Data Processing
Fastfnt	Did Gothic Data Processing
NLQ	Did Gothic Near Letter Quality
NLQ II	Did Courier Near Letter Quality
Alt NLQ	Res Courier Italic Near Letter Quality
Alt II	Res Courier Italic Near Letter Quality
DP	Res Gothic Data Processing
Fastfnt	Res Gothic Data Processing
NLQ	Res Gothic Near Letter Quality
NLQ II	Res Courier Near Letter Quality

The available font styles for the Epson FX286 emulation are:

DISPLAY	FONT STYLE
Draft	Gothic Data Processing
Sans Serif	Gothic Near Letter Quality
Roman	Courier Near Letter Quality
Italic	Italic Near Letter Quality

Basic Pushbutton Use (continued)

8 Paper Reverse PAPER REVERSE - Moves the paper backwards 1/72 inch each time the button is pressed. Holding the button down causes consecutive 1/72-inch backward steps at a rate of 50 per second until the button is released. Moving paper with this pushbutton will affect the top of form position. See the discussion on the arrows on page 2-7.

9 Set Top Of Form SET TOP OF FORM - Tells the printer where the top of form (TOF) position (perforation) is located on the paper. The paper perforation must first be positioned at the pointer on each of the upper tractor doors. Position the paper using the LINE FEED and PAPER REVERSE pushbuttons.

Setting Top of Form

Note: To ensure proper printing integrity, do **not** print within 1/8 inch of perforations.

- Using the LINE FEED and PAPER REVERSE pushbuttons, align the forms perforation with the pointers on the upper tractor covers. See Figure 2-2.
- Close the top cover. *The cover must be closed for the paper to enter the paper path of the printer.*
- Press the SET TOP OF FORM pushbutton.

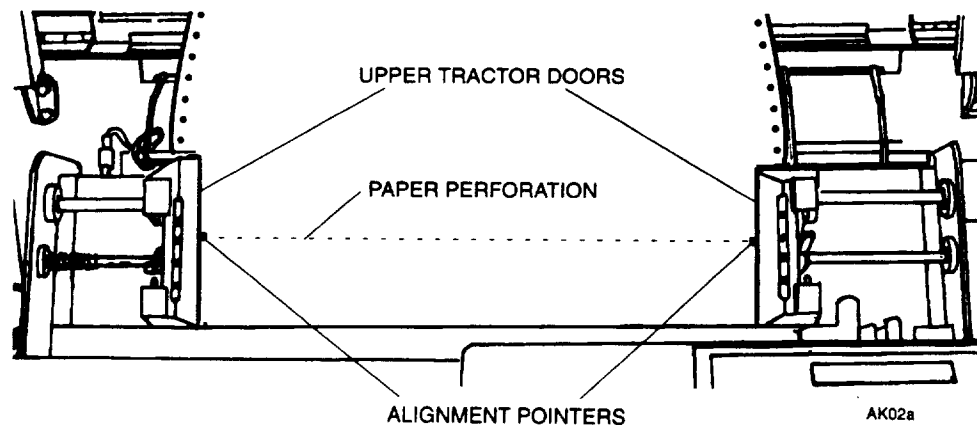


Figure 2-2

After the perforation is positioned at the notches and the SET TOP OF FORM pushbutton is pressed, the printer will move the paper so that the paper is correctly positioned at the print wires for printing.

Printer option strap B9 controls which direction the paper travels during the set TOF operation. See Appendix F for strap listing.

When strap B9 is OUT, the paper will move forward a pre-determined distance to align the first printable form. This distance is calculated by the printer using the value set for the length of the form. The factory default form length is set for 11-inch forms.

Basic Pushbutton Use (continued)

SET TOP OF FORM (continued)

When strap B9 is IN, the paper will move backwards approximately 4 inches and does not rely on the length of form value. This feature eliminates the need for the operator to manually set the length of form value, since it can be supplied by the host.

If the B9 IN feature is used, make sure that there is sufficient paper loaded above the upper tractor units so that the paper does not back out of the tractors when setting TOF.

Using the Arrows

Online: the arrows beside the PAPER REVERSE and FONT/FORM pushbuttons indicate the direction of unregistered paper moves made each time the button is pressed. Unregistered paper moves are **not** recorded by the printer and do not change any of the form settings (margins, length, etc.). The unregistered moves are similar to manually turning a platen knob on a typewriter while someone is typing.

Each time the pushbutton is pressed, the **paper** will move in the direction of the arrow 1/72 of an inch. Holding an arrow pushbutton down causes consecutive paper moves at a rate of 50 per second.

Pressing the down arrow pushbutton moves the paper down (printing will move up on the form) and pressing the up arrow pushbutton moves the paper up (printing is positioned farther down on the form).

When printing text characters, the space added or subtracted using these pushbuttons affects the spacing between lines of text. Using these pushbuttons while printing dot graphics may cause gaps or horizontal dark streaks.

Note: The top of form setting will be adjusted by the number of times the buttons are pressed. Since the moves are not recorded, the printer doesn't "know" that the paper has been adjusted and will position the paper where it "thinks" the TOF should be. This new position will differ from your original setting (See SET TOF pushbutton).

Offline: Normally, the pushbuttons with arrows operate by their labels as explained earlier. But, when using a menu selection in the Program Mode that has a counter (tabs, margins, etc.), the pushbuttons are used to change the number in the counter. The single up arrow increases the count by 1 each time it is pressed and the single down arrow decreases the count by 1. The single arrow pushbuttons can be pressed and held to scroll through the numbers. The double up arrow pushbutton increases the count by 10 each time it is pressed.

Function and Program Modes

Pressing the FUNCTION or PROGRAM pushbutton while offline causes the printer to enter that mode.

Function Mode

The Function Mode is used to gain information about the printer, align and define forms, back paper out of the printer, and perform maintenance and troubleshooting. The foldout diagram on the next page shows the menu structure and the displays you can expect. An explanation of the displays and their usage starts on page 2-11.

Program Mode

The Program Mode uses an extensive menu of options to set up and control the printer's operation.

The foldout diagram on page 2-10 shows the menu structure and the displays you can expect. An explanation of the displays and their usage starts on page 2-32.

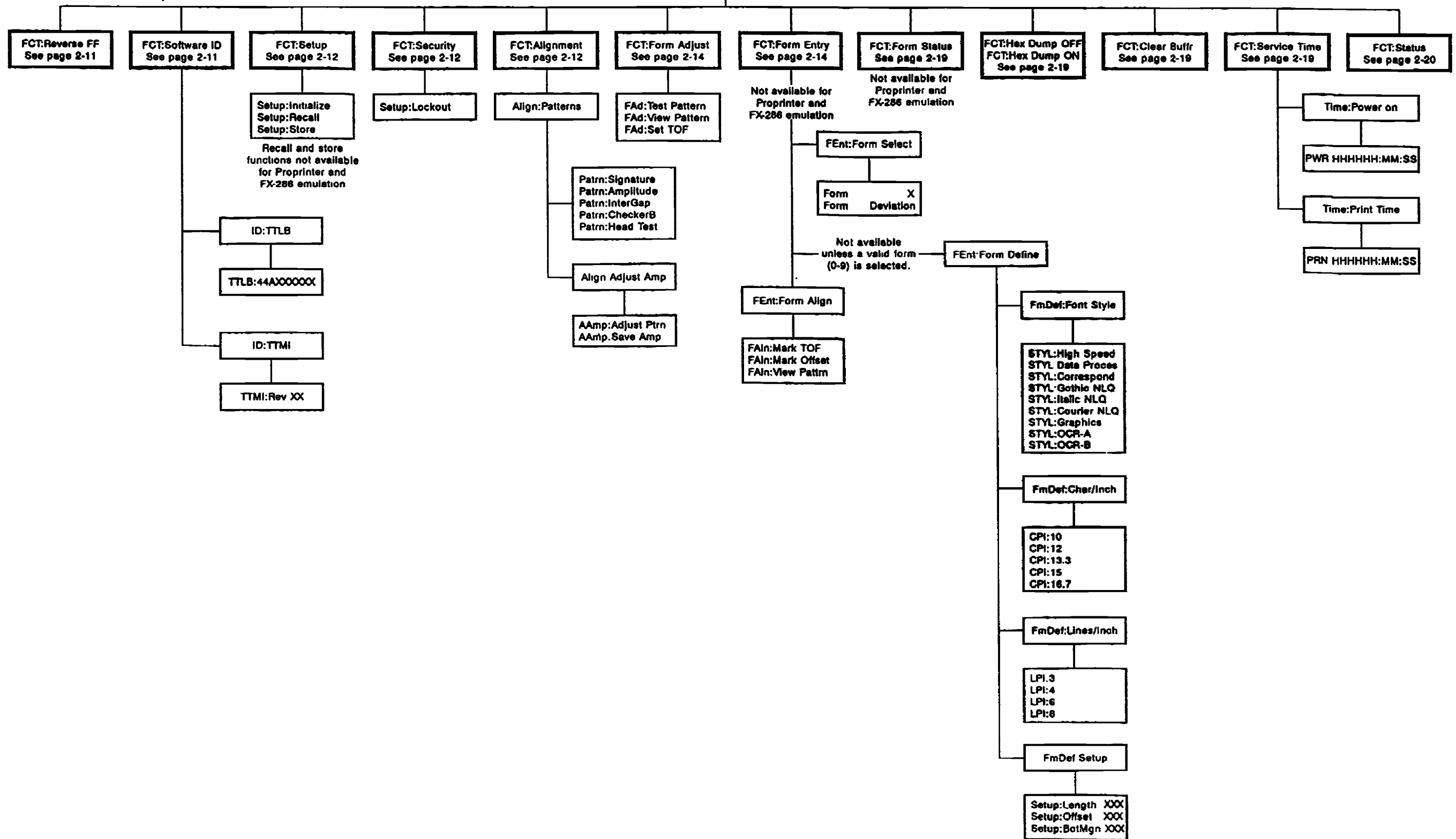
While in the Function or Program Mode:

- Pressing the NEXT OPTION (0) or PREVIOUS OPTION (1) pushbuttons causes the display to change to the next menu or option.
- Pressing the ENTER (4) pushbutton causes the printer to enter a sub-menu or perform the operation showing on the display.
- Pressing the EXIT (3) pushbutton causes the display to return one step up the menu tree or to **Local** if already at the top level.
- Pressing the QUIT (2) pushbutton causes the display to leave the Function or Program Mode and return to **Local**.


While in Local, press
(See page 2-11)

3 Function

FUNCTION MODE



Using the Function Mode

While in **Local**, Press  to enter the Function Mode.

Starting on this page, the displays shown on the far left side are first-level menu choices. Press the ENTER pushbutton to cause the printer to perform that operation or to enter into a second-level menu. Second-level and subsequent sub-menus are shown indented under their parent menus. The horizontal lines are used to show the beginning and end of a first-level parent menu and all of its sub-menu options.

Press the NEXT OPTION (0) or PREVIOUS OPTION (1) pushbutton to change the display to the next menu item.

Press QUIT (2) to return to the parent menu or to **Local** when in a first-level menu.

Press EXIT (3) to leave the Function Mode and return to **Local**.

FCT:Reverse FF Pressing the ENTER (4) pushbutton causes a reverse form feed to occur. Use this feature to position the first form at the upper tractors after moving paper out of the printer to tear off printed forms. This feature can also be used to back paper out of the printer after the print job is finished and the printed forms have been torn off.

Important: If the paper is inadvertently backed out of the upper tractors, the paper will have to be reloaded.

FCT:Software ID Software identification - Used to show the part or version number of the installed software.

ID:TTLB - Table Top Logic Board identification.

TTLB:44AXXXXXX - Part number of currently installed firmware.

ID:TTMI - Table Top Machine Interface Board identification.

TTMI:Rev XX - Revision number of circuit board.

Using the Function Mode (continued)

FCT:Setup Used to initialize the printer, store the current printer configuration, and recall the stored configuration.

The **Store** and **Recall** options are not available when using the Proprinter or FX286 emulations.

Setup:Initialize Resets all parameters to the factory default configuration. Also see Chapter 1.

Setup:Recall Recall is used to configure the printer to the parameters that were stored using **Setup:Store**. Use this option to restore your parameter selections after initialization.

Setup:Store Storing saves all the parameters you have changed into non-volatile RAM. Examples: Interface setup straps, option straps, font style, cpi, lpi, etc. These changes can be quickly restored after performing a **Setup:Initialize** by using **Setup:Recall** or the ANSI ESC c command.

FCT:Security This function allows you to lock out the control panel keyboard for security purposes.

Press the ENTER (4) pushbutton to enter the sub-menu shown below.

Security:Lockout To activate the lockout, press and hold the ENTER (4) pushbutton for 5 seconds. A beep will confirm the lockout, and **Local** will be displayed.

During lockout, the only pushbuttons that are still active are ON LINE (0), TEST/CLEAR (2), LINE FEED (5), and FORM FEED (6). (The TEST/CLEAR pushbutton will not initiate rolling ASCII self-test during lockout.)

To unlock the keyboard, press the FUNCTION (3) pushbutton once and then the PROGRAM (4) pushbutton twice. A beep will tell you that the keyboard is unlocked.

Note: If a fault occurs during lockout, the keyboard is automatically unlocked and the fault is displayed.

FCT:Alignment This menu is used to check the performance of the print heads and to examine electrical alignments by service technicians.

Align:Patterns Once a test pattern has been selected, press the ENTER (4) pushbutton to start the test pattern. Press the ENTER (4) pushbutton again to stop the printing. The printer signature page and the head test pattern continue printing until finished.

Patrn:Signature - Printer signature page.

Patrn:Amplitude - Amplitude test pattern.

Using the Function Mode (continued)

FCT:Alignment (continued)

Patrn:InterGap - Print module intergap test pattern.

Patrn:CheckerB - Checkerboard test pattern.

Patrn:Head Test - Print head verification test.

The signature, amplitude, and checkerboard patterns are used by service technicians to check adjustments and repairs, and to evaluate the overall print quality ability of the printer. The print module intergap pattern and head test are designed for use by those that choose to check, move, or replace print heads themselves.

InterGap

The intermodule gap pattern is used after print heads are replaced or moved. The pattern shows whether or not the print heads are spaced properly in relation to each other. Chapter 3 gives more information on the use of this pattern and has sample printouts.

Head Test

The print head verification test reveals weak or malfunctioning print head actuators.

Pressing the ENTER (4) pushbutton with **Patrn:Head Test** showing starts the test. The printer switches to low print intensity, prints 10 inches of checkerboard pattern, stops printing, and then switches back to the original print intensity setting.

The printout will show vertical streaks if any actuators are weak or malfunctioning. Chapter 3 gives more information on this test and has a sample of the printout.

Align:Adjust Amp This menu is used by service technicians to adjust the shuttle motor swing amplitude.

AAmp:Adjust Ptrn - Prints a pattern during adjustment.

AAmp:Save Amp - Used to save the new adjustment.

Using the Function Mode (continued)

FCT:Form Adjust This menu is used to help align the paper to the print line of the printer. Use the line feed, up arrow, and down arrow pushbuttons to align the paper. Use the **FAd:View Pattern** option to check positioning. Repeat as necessary. The printer will advance paper to the next form if a sixth attempt is made to print HHHHHH.

Note: Make sure there is sufficient paper above the top tractors since the paper will be pulled down approximately 4-inches to print regardless of the setting of option strap B9.

FAd:Test Pattern Pressing the ENTER (4) pushbutton starts the printing of a rolling ASCII text test pattern. Press the ENTER (4) pushbutton again to stop the printing.

FAd:View Pattern Pressing the ENTER (4) pushbutton pulls the paper down to the print wires, prints HHHHHH on the first printable line, and moves the paper back for viewing. If included in the form description, the Hs will print at the top margin or at the special offset from top of form.

FAd:Set TOF After adjustments are completed, use this option to set top of form.

FCT:Form Entry This menu and its sub-menus are used to define and store up to ten customized form descriptions. Font style, cpi, lpi, form length, bottom margin, and special offset from top of form can be defined for each form and be stored in nonvolatile memory.

These menus and options are not available when using the Proprinter or FX286 emulations.

The following steps are used to redefine a stored form description and to store the description for future use.

1. With the display showing **FCT:Form Entry**, press the ENTER (4) pushbutton and use the **FEnt:Form Select** menu to select a form.

FEnt:Form Select Form Entry - Form Select. The forms shown below are factory set. Pick one of these forms that you would like to modify.

2. Press the ENTER (4) pushbutton to enter the sub-menu shown below. Press the NEXT OPTION (0) pushbutton until the form number you want shows in the display. Press the ENTER (4) pushbutton to select the form - **Form Selected** will be displayed momentarily.

Using the Function Mode (continued)

FCT:Form Entry (continued)

	Display	Offset from TOF	Form Length	Bottom Margin	Font Style	CPI	LPI
Form	0	0"	3"	0"	Draft	10	6
Form	1	0"	3.5"	0"	Draft	10	6
Form	2	0"	4"	0"	Draft	10	6
Form	3	0"	6"	0"	Draft	10	6
Form	4	0"	7"	0"	Draft	10	6
Form	5	0"	8"	0"	Draft	10	6
Form	6	0"	8.5"	0"	Draft	10	6
Form	7	0"	11"	0"	Draft	10	6
Form	8	0"	12"	0"	Draft	10	6
Form	9	.1"	8.5"	.2"	Draft	13.3	8

Form Deviation This display means that the the current setup does not match any of the stored forms. A top margin may have been set or a parameter has been changed through the control panel or sent by the host. The current setup will be lost if any stored form is selected. If you do not wish to disturb these settings, press the **QUIT (2)** pushbutton to leave the Function Mode.

3. After the form is selected, press the **EXIT (3)** pushbutton to return to the parent menu, and then press the **NEXT OPTION (0)** pushbutton. **FEnt:Form Define** will be displayed.

FEnt:Form Define This menu is used to select the font style, cpi, lpi, form length, bottom margin, and special offset from top of form. *A valid form (Form 0-9) must be selected to use this part of the menu.*

4. Press the **ENTER (4)** pushbutton to gain access to the sub-menus.

NOTE: Any of the sub-menus under **FEnt:Form Define** may be skipped by pressing the **NEXT OPTION (0)** pushbutton. **EXAMPLE:** If you know that the font style in this stored form is correct, skip steps 5 through 7, press the **NEXT OPTION (0)** pushbutton, and continue with step 8.

FmDef:Font Style Form Define - Font Style. This menu is used to select one of the 9 font style options shown below.

5. Press the **ENTER (4)** pushbutton to enter the sub-menu shown below.

Styl:High Speed
Styl:Data Proces
Styl:Correspond
Styl:Gothic NLQ
Styl:Italic NLQ
Styl:Courier NLQ

Using the Function Mode (continued)

FCT:Form Entry (continued)

Styl:Graphics
Styl:OCR-A
Styl:OCR-B

6. Press the NEXT OPTION (0) pushbutton until the desired font style is displayed, and then press the ENTER (4) pushbutton to select that font.
7. Press the EXIT (3) pushbutton to return to the parent menu and press the NEXT OPTION (0) pushbutton.

FmDef:Char/Inch Form Define - Characters Per Inch. This menu allows the selection of one of the five options for cpi shown below. (Not all cpi options are available for each font style.)

8. Press the ENTER (4) pushbutton to enter the sub-menu shown below.

CPI:10
CPI:12
CPI:13.3
CPI:15
CPI:16.7

9. Press the NEXT OPTION (0) pushbutton until the desired cpi setting is displayed, and then press the ENTER (4) pushbutton to select that setting.
10. Press the EXIT (3) pushbutton to return to the parent menu, and press the NEXT OPTION (0) pushbutton.

FmDef:Lines/Inch Form Define - Lines Per Inch. This menu is used to select one of the four options for lpi shown below.

11. Press the ENTER (4) pushbutton to enter the **FmDef:Lines/Inch** sub-menu.

LPI:3
LPI:4
LPI:6
LPI:8

12. Press the NEXT OPTION (0) pushbutton until the desired lpi setting is displayed, and then press the ENTER (4) pushbutton to select that setting.
13. Press the EXIT (3) pushbutton to return to the parent menu, and then press the NEXT OPTION (0) pushbutton.

Using the Function Mode (continued)

FCT:Form Entry (continued)

FmDef:Setup Form Define - Setup. This menu is used to set the form length, bottom margin, and special offset from top of form using line counters. Minimum form length is .33 of an inch (8.4mm, 240 decipoints). Maximum form length is 22 inches (559mm, 15,840 decipoints).

14. Press the ENTER (4) pushbutton to enter the sub-menu shown below.

Setup:Length XXX
Setup:Offset XXX
Setup:BotMgn XXX

15. Use the up (7) and down (8) arrow pushbuttons to increase or decrease the line counters. The double up arrow (6) pushbutton will increase the count by 10 each time it is pressed.

After each counter is set to the desired number, press the ENTER (4) pushbutton to store that value.

Press the NEXT OPTION (0) pushbutton to change from one counter to another.

16. After all three counter values are set and stored, press the EXIT (3) pushbutton twice to return to the first-level parent menu, and then press the NEXT OPTION (0) pushbutton.

FEnt:Form Align Form Entry - Form Alignment. This menu is used only when setting a special offset from top of form (TOF). See page 2-23 for an explanation of the special offset from top of form.

The **Mark TOF** function gives the processor a reference point for the beginning of the offset and the **Mark Offset** shows the end of the offset. The **View Patrn** function will print HHHHHH as a visual aid. It is similar to the **FCT:Form Adjust** menu options discussed earlier.

Note: A valid form (0-9, not deviation) must be selected before using this function.

17. Press the ENTER (4) pushbutton to enter the sub-menu shown below.

FAIn:Mark TOF Form Alignment:Mark Top of Form.
FAIn:Mark Offset Form Alignment:Mark Special Offset from Top of Form.
FAIn:View Patrn Form Alignment:View HHHHHH Pattern.

18. Use the LINE FEED, up arrow, and down arrow pushbuttons to roughly align the paper perforation with the pointers on the upper tractors. This will act as the top of form setting.

Using the Function Mode (continued)

FCT:Form Entry (continued)

19. Press the NEXT OPTION (0) pushbutton until the display shows **FAIn:View Pattrn**.

Note: Make sure there is sufficient paper above the top tractors since the paper will be pulled down approximately 4 inches to print.

20. Press the ENTER (4) pushbutton. The printer will pull the paper down to the print wires, print **HHHHHH** on the first printable line, and move the paper back up for viewing.

Make any needed adjustments to the paper's position (step 18) and repeat step 20 as needed. An attempt to use the view pattern function a sixth consecutive time will cause a form feed.

21. After the paper is positioned properly, press the NEXT OPTION (0) pushbutton until **FAIn:Mark TOF** appears in the display.

22. Press the ENTER (4) pushbutton to mark the top of form setting. **TOF Marking** will be displayed momentarily.

23. Press the PREVIOUS OPTION (1) pushbutton until the display shows **FAIn:View Pattrn** again.

24. Use the LINE FEED (5) pushbutton to advance the paper the distance needed for the offset. The distance in inches is determined by the lpi setting. Advancing six lines at 6 lpi would equal a 1-inch offset.

25. Press the ENTER (4) pushbutton. The printer will pull the paper down to the print wires, print **HHHHHH** on the first printable line, and move the paper back up for viewing.

Make any needed adjustments to the paper's position with the LINE FEED and up and down arrow pushbuttons, and repeat step 25 as needed.

26. After the offset distance has been set, press the NEXT OPTION (0) pushbutton until **FAIn:Mark Offset** appears in the display.

27. Press the ENTER (4) pushbutton to mark the offset position. **Offset Marking** will be displayed momentarily.

28. Press the QUIT (2) pushbutton to return to **Local**.

Important: Use the **FCT:Setup** menu option **Setup:Store** to save this form in nonvolatile memory. This allows you to quickly restore this setting using **Setup:Recall** after an initialization.

Using the Function Mode (continued)

FCT:Form Status Pressing the ENTER (4) pushbutton causes the form status listing to print. The listing provides the font style, cpi, lpi, length, offset, and bottom margin of each stored form.

The first form in the list is the current setup, or active form. If it matches a stored form, the number of that form appears after the heading FORM CONTROL:. If the active form does not match one of the stored forms, FORM DEVIATION appears.

Press the QUIT (2) pushbutton to return to **Local**.

FCT:Hex Dump OFF Pressing the ENTER (4) pushbutton causes the display to alternate between these two displays.

FCT:Hex Dump ON

When **FCT:Hex Dump OFF** is shown, the printer operates in the normal mode. When the display is changed to **FCT:Hex Dump ON**, data sent to the printer is dumped in hexadecimal format. See Appendix A of the Programmer's Manual.

When the desired display is showing, press the QUIT (2) pushbutton to return to **Local**, switch to **Online**, and send data to the printer.

FCT:Clear Buffr Pressing the ENTER (4) pushbutton clears all buffers of data (including interface buffers). Any data already processed and sent to the image memory cannot be cleared. (This may be as much as 1/2 inch on a line.) **Buffer Clearing** will be displayed. The display may be momentary or as long as 2 seconds depending on how much data was buffered.

Press the QUIT (2) pushbutton to return to **Local**.

FCT:Service Time This menu shows total elapsed time that the printer has had power applied and the total time the shuttle motor has run.

Press the ENTER (4) pushbutton for the sub-menu below.

Time:Power On Total time power has been applied to the printer. Press the ENTER (4) pushbutton to display time (see below).

PWR HHHHHH:MM:SS

Time:Print Time Total time power has been applied to the shuttle motor. Press the ENTER (4) pushbutton to display time (see below).

PRN HHHHHH:MM:SS

Reset Used by service technicians.

Using the Function Mode (continued)

FCT:Status

Pressing the ENTER (4) pushbutton when this display is showing causes the printer configuration status sheet to print. This sheet contains all the information about the current printer configuration. Use this sheet as a reference for how the printer is configured for a particular print job.

If service or technical assistance is needed for a problem, have the status sheet available to provide any needed information.

A reduced sample of the printout is shown on the next page.

THE PRESENT CONFIGURATION IS: TTM1 - Version 51
TITLE - 44A514550
TITLE Checksum: 5E5F

Font:
Selected Style - 44A514635 Data Proces
Installed Fonts -
Part Number Style FNT Register SGR Parameter
44A51460000 Data Proces 0100 10
44A51460000 Data Proces 0100 11
44A51460000 Graphics 0900 12
44A51460000 Gothic NLO 0100 13
44A51460000 Courier NLO 0200 14
44A51460000 High Speed 0800 15
44A51460000 OCR-A 0400 16
44A51460000 OCR-B 0500 17
44A51460000 Italic NLO 0300 18
44A51460000 Correspond 1010 19

CPI - 10
Country - USA CP 437
Mode - Normal
Horizontal Expansion - X1
Vertical Expansion - X1
Vertical Expansion Mode - Default
Superscript/Subscript - Off
Upper Case Foldover - Off
Tall High Speed - On

Line Spacing:

LPI - 8

Forms Control:

Form - 7
Form Length - inches 11.0 decipoints 7920
Top Offset - 0.0 0
Top Margin - 0.0 0
Bottom Margin - 0.0 0

Forms Eject:

Eject Move - Normal FF

Retract Move - None

Interface Control:

Interface Type - Parallel

Interface Straps A:

0 1 2 3 4
1234567890123456789012345678901234567890
0001000100000000000000000000000000000000

Hardware Control Straps:

0 1 2 3 4
123456789012345678901234567890123456789012345678
0011000100111111000000001110011011111000000000000

Margin Settings:

decipoints

Left Margin - 0

Right Margin - 9504

Horizontal Tabs:

None

Vertical Format Control:

Active - Vertical Tabs

Emulation VFU -

Default

Vertical Tabs -

None

Print Engine Options:

Vertical Slew Rate - Normal

Print Direction - Bidirectional

Engine Off Delay (seconds) - 2

Printer Control Straps:

Printer Straps A:

0 1 2 3 4
1234567890123456789012345678901234567890
0010000001011100001100000110001100000001

Printer Straps B:

0 1 2 3 4
1234567890123456789012345678901234567890
0000000010000001100000000000000000000000

Printer Straps C:

0 1 2 3 4
1234567890123456789012345678901234567890
0000000010000000000000100000000000000000

Printer Straps D:

0 1 2 3 4
123456789012345678901234567890123456789012345678
10101101000

Emulation:

ANSI

Options:

Barcodes POSTNET Oversize Download-Fonts

Power On Time (HH:MM:SS) - 000007:02:32

Print Time (HH:MM:SS) - 000000:23:18

Key definitions for program mode are:

Program - printer setup menu.

Function - control, status, stored form setup menu.

Quit - exit completely from program or function mode.

Exit - exit to previous menu or function level.

Next Option - advance to next menu or function item.

Previous Option - back up to previous menu or function item.

Enter - select new menu or displayed value.

Status Printout Sample

Setting up a Form

Several methods can be used to set up a form. Form description requirements and personal preference will determine which method you use. Setting up the physical boundaries of a form consists of setting the length of the form, a top margin (if used), a bottom margin, and the special offset from TOF (if used). An explanation of the special offset from top of form starts on page 2-24.

Although the entire length of the form is available for printing, some combination of a top and bottom margin or a bottom margin and offset is recommended to avoid printing on the paper perforation and possibly snagging print wires.

Active Form

An active form is the form description that presently resides in the printer's processor. When printing starts, the active form is used to format the page.

The active form can be a description that was entered through the control panel, sent from the host, or one of the stored forms that was selected. It is the first form described on the form status printout and also appears on the printer's status printout.

Methods

An active form can be set up using the following methods:

- Program Mode - use the **PRG:Form Control** menu to set the active form length, top margin, and bottom margin.
- Function Mode - use the **FEnt:Form Select** menu to select a stored form description. (Factory-set form descriptions are on page 2-14.)
- Function Mode - use the **FCT:Form Entry** menu to change a stored form and set the form length, bottom margin, and special offset from top of form.
- ANSI Emulation - use the ESC[p1;p2;p3r escape sequence to set the active form length, top margin, and bottom margin.

Form Length

Form length is set using the currently set lpi value. If the form length is set to 66 lines while the lpi is set at 6, the length will be 11 inches. After the form length has been set up, an lpi change will not change the form length.

The minimum form length is .33 inch (8.4mm, 240 decipoints), and the maximum length is 22 inches (559mm, 15,840 decipoints).

Setting up a Form (continued)

Top Margin

The top margin is set using the currently set lpi value. If the top margin is set to 6 lines while the lpi is set to 6, printing will start on line 7. Lines 1 - 6 (1 inch) will be skipped. After the form has been set up, an lpi change will not alter the length of the margin.

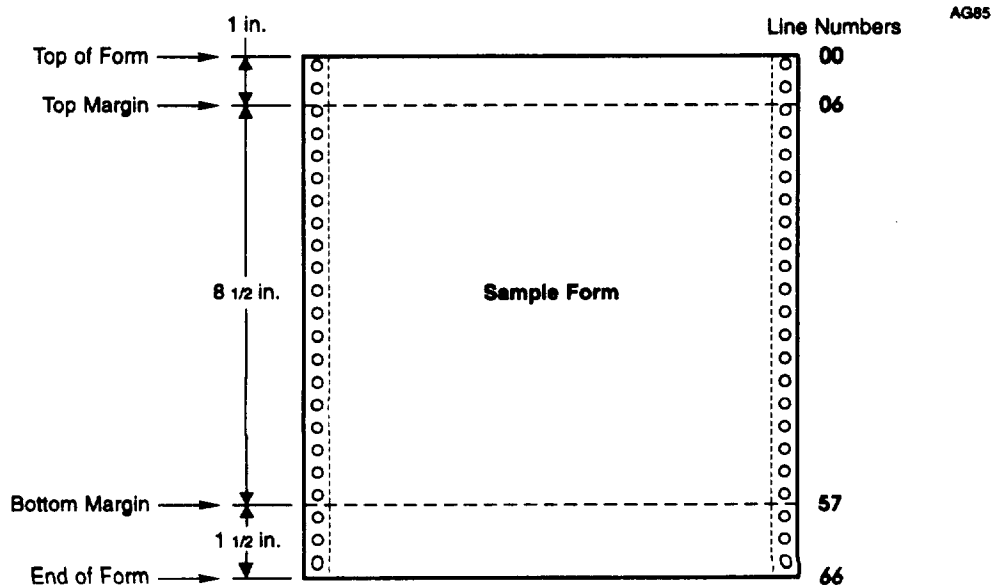
Bottom Margin

The bottom margin is set using the currently set lpi value. If the bottom margin is set to 57 lines while the lpi is set to 6, the last printable line will be line 57. Lines 58 - 66 (1.5 inch) on an 11-inch form will be skipped. After the form has been set up, an lpi change will not alter the length of the margin.

Special Offset from TOF

The special offset is set using the currently set lpi value. If the offset distance is set to 6 lines while the lpi is set to 6, printing will start on line 7. Lines 1 - 6 (1 inch) will be skipped. The offset occurs once each time the top of form position is set using the pushbutton on the control panel. After the form has been set up, an lpi change will not alter the length of the offset distance.

The special offset from top of form should not be confused with a top margin. They are distinctly different and serve separate functions. See the explanation on the next page.



Special Offset from TOF

Explanation of the Special Offset from TOF

The special offset from TOF feature is used mainly with preprinted forms. Certain application programs immediately start printing data on the first form with no consideration for where the form is positioned. In the past, the person loading paper was responsible for positioning the form so that the first printed line fell in the correct place on the form (perforation 2.5 inches above the notches in the upper tractors for the green forms, 1 inch above the notches for paychecks, etc.).

Using the special offset from the top of form allows you to load *all* forms and paper with the perforation at the notches.

Since the host program knows the distance between perforations, it will print the first form and then move the paper to the same position on the next form. This will continue through the box of forms to be printed.

The offset is used to position the string of forms to the first print line on the first form. The host, knowing the length of the form, is then responsible for advancing the paper to the next form's first print line.

Example: To print standard data listings, the operator selects an 11-inch form (Form 7) at 6 lpi, with no top or bottom margins. The date, which is the first printed data on each page, is supposed to land 1 inch from the top of the form (perforation). TOF has been set with the perforation at the notches of the upper tractors.

When the application program starts, the date is printed on the first line of the form, not 1 inch from the perforation. The program prints the first page and advances the forms to the second page. The second page is also printed with the date at the perforation.

This cannot be compensated for with a top margin, since a margin affects every form. A top margin would effectively add to the space that the host uses to go from form to form.

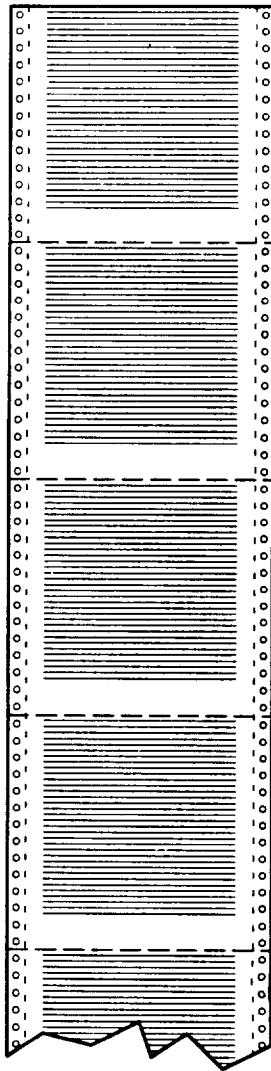
In the following illustrations, the application program knows to print 54 lines of data (9 inches at 6 lpi) and then advance the paper 12 lines (2 inches at 6 lpi) before printing the next form. This will continue until the print job is finished.

Paper in both examples was loaded with the perforation at the notches of the upper tractors.

Special Offset from TOF (continued)

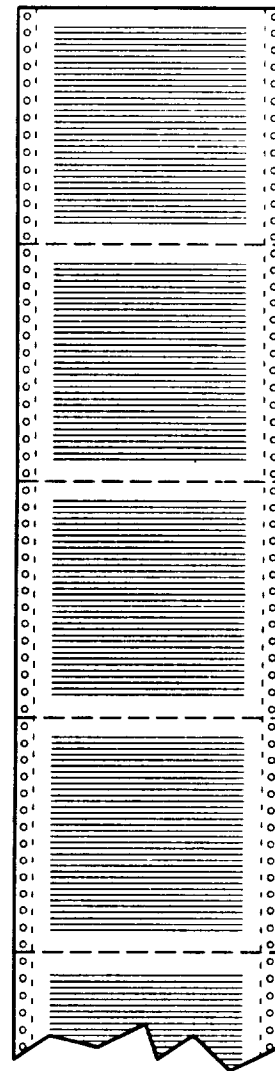
Without the offset (Example A), the data printed starts at the first printable line of the form. The paper should have been loaded with the perforation 1 inch above the notches for the desired results.

Example B shows the effect of the special offset on the print job. The offset (1 inch) was stored in a form description and paper was loaded with the perforation at the notches.



WITHOUT OFFSET

Example A



WITH SPECIAL OFFSET
FROM TOP OF FORM

Example B

AD101L

Low Paper Printing

Low paper printing allows you to replenish the forms supply without losing data or forms registration.

This printer will print to the end of the current form or to the end of the last form (end of paper) after sensing a low paper condition.

Several option straps are used to control this operation and are discussed on the next page.

Fault:Low Paper

When the paper supply runs down to 12.5 inches (32cm) remaining, the paper out sensor is activated. The printer will finish the remainder of the current form and stop. The display will show **Fault:Low Paper** and the beeper will sound.

At this point, depending on form length, one or more unused forms may remain below the print wires. You can either replenish the paper supply now, or press the TEST/CLEAR pushbutton to continue.

Important: If your print job has been using reverse paper moves (backing paper up while using bar codes, oversize, or vertical moves), stop at this point and replenish the paper supply. Once the paper runs out of the lower tractors, poor print quality and jams could occur.

Pressing the TEST/CLEAR pushbutton causes the printer to enter the low paper printing mode. The remaining forms are printed at a slower rate and the display shows **Online:Low Print**.

A form length of 12.5 inches or longer causes the printer to bypass the low paper fault. The printer will finish the last form and immediately go to a paper out condition.

Replenishing Paper Supply

1. With the printer in **Local**, press the FORM FEED pushbutton to eject the remaining forms out of the upper tractors.
2. Load a fresh supply of paper/forms and return the print gap adjustment wheel to the proper setting. If necessary, see "Loading Paper" in Chapter 1.

Note: If printer control strap B9 is OUT, the beginning edge of the first form can be positioned at the pointers, since paper will move forward when the SET TOP OF FORM pushbutton is pressed. If strap B9 is IN, place the perforation at the notches with one full form above the upper tractors to prevent the paper from being pulled out of the upper tractors.

3. If needed, use the LINE FEED and down arrow pushbuttons to make final adjustments to the perforation's position.
4. Press SET TOP OF FORM and place the printer **Online**.
5. Press the TEST/CLEAR pushbutton to clear the fault displays.

Low Paper Printing (continued)

Straps

The following straps are used to determine how the printer will react to a paper low condition and when the condition is reported to the host.

Parallel Interface Strap:

- A5 OUT causes the printer to signal a fault to the host when a paper out condition exists.

Printer Option Straps:

- B16 IN causes the printer to signal a fault (paper out) to the host as soon as low paper is sensed.
- B17 IN causes the printer to switch to **Local** and signal the host (deselect) when paper low is sensed. B16 must be IN.
- B18 IN causes the printer to continue to print to the end of the last form when paper low is sensed.
- B39 OUT will disable any reverse paper moves during low paper printing.

The following chart shows how the printer's condition and strap settings interrelate.

Printer Condition	Parallel Interface Strap	Printer Option Straps			Control Panel Display	Parallel Interface Lead Status		
	A5	B16	B17	B18		PE	Fault	Select
Low Paper Condition has been Sensed	*	OUT	*	OUT	Fault:Low Paper	Low	Low	High
	OUT	IN	OUT	OUT	Fault:Low Paper	High	High	High
	IN	IN	OUT	OUT	Fault:Low Paper	High	Low	High
	OUT	IN	IN	OUT	Fault:Low Paper	High	High	Low
	IN	IN	IN	OUT	Fault:Low Paper	High	Low	Low
Low Paper Printing started by pressing TEST/CLEAR	*	*	*	OUT	Online:Low Print	Low	Low	High
Automatic Low Paper Print Mode On	*	*	*	IN	Online:Low Print	Low	Low	High
Paper Out Condition	OUT	*	*	*	Fault:Paper Out	High	High	Low
	IN	*	*	*	Fault:Paper Out	High	Low	Low

* Either IN or OUT

Paper Tear-Off Feature

Pressing the FORM FEED pushbutton while the printer is online starts the paper tear-off feature cycle.

This feature slews paper forward out of the printer far enough to tear off the last printed form at its perforation. **Tearoff** will show in the display. After a 15-second delay, the beeper will sound a warning. The paper then retracts back into the printer and is positioned at the print wires ready to print.

Pressing the FORM FEED pushbutton a second time during this cycle will cancel the 15-second delay and immediately retract the paper.

Printer option strap A26 IN allows use of the FORM FEED pushbutton while online, and option strap B20 IN enables the tear-off feature. Both straps must be IN for the feature to work. (See Appendix F for information on changing strap settings.) The FORM FEED pushbutton still functions normally when offline.

This feature will not work during a fault condition such as **Fault:Cover Open** or **Fault:Striker Bar**.

Paper Path

The distance the forms are ejected and retracted depends on which paper path (top exit or rear exit) is being used. The program mode's **PRG:Forms Eject** menu (page 2-58) is used to set the proper tear-off distances for each paper path.

Number of Forms Ejected

This feature works by performing a series of forward form feeds to eject the paper and a shorter series of reverse form feeds to reposition the paper. It is designed to prevent the paper from being backed out of the upper tractors. Since paper is needed in the tractors above the print wires, that form(s) can not be printed. (See Special Forms below.)

The charts on pages 2-29 and 2-30 show the number of forward form feeds (or forms ejected), the number of forms retracted (reverse form feeds), and the approximate amount of paper retracted for a given form length. Option strap B21 must be OUT.

Special Forms

When using special forms like labels on a carrier, printer option strap B21 IN allows full retraction of the forms. If the carrier is not torn off, it can be fully retracted so the first form can be used.

Paper Tear-off Feature (continued)

**Rear Paper Exit Tear-Off
Calculated Ejection and Retraction Chart
(Option Strap B21 OUT)**

FORM LENGTH (INCHES)	NUMBER OF FORMS EJECTED	NUMBER OF FORMS RETRACTED	INCHES RETRACTED
0.5	34	22	11
1.0	17	11	11
1.5	12	8	12
2.0	9	6	12
2.5	7	4	10
3.0	6	4	12
3.5	5	3	10.5
4.0	5	3	12
4.5	4	2	9
5.0	4	2	10
5.5	4	2	11
6.0	3	2	12
6.5	3	2	13
7.0	3	2	14
7.5	3	2	15
8.0	3	2	16
8.5	2	1	8.5
9.0	2	1	9
9.5	2	1	9.5
10.0	2	1	10
10.5	2	1	10.5
11.0	2	1	11.0
11.5	2	1	11.5
12.0	2	1	12
12.5	2	1	12.5
13.0	2	1	13
13.5	2	1	13.5
14.0	2	1	14
14.5	2	1	14.5
15.0	2	1	15
15.5	2	1	15.5
16.0	2	1	16
16.5	2	1	16.5
17.0	1	0	11.0
17.5	1	0	0
18.0	1	0	0
18.5	1	0	0
19.0	1	0	0
19.5	1	0	0
20.0	1	0	0
20.5	1	0	0
21.0	1	0	0
21.5	1	0	0
22.0	1	0	0

Paper Tear-off Feature (continued)

**Top Paper Exit Tear-Off
Calculated Ejection and Retraction Chart
(Option Strap B21 OUT)**

FORM LENGTH (INCHES)	NUMBER OF FORMS EJECTED	INCHES EJECTED	INCHES RETRACTED	FORMS NOT USED
0.5	16	8	5	6
1.0	8	8	5	3
1.5	5	8	5	2
2.0	4	8	4	2
2.5	3	8	3	2
3.0	2	8	5	1
3.5	2	8	4.5	1
4.0	2	8	4	1
4.5	1	8	3.5	1
5.0	1	8	3	1
5.5	1	8	2.5	1
6.0	1	8	2	1
6.5	1	8	1.5	1
7.0	1	8	1	1
7.5	1	8	.5	1
8.0	1	8	0	1
8.5	1	8.5	-.5	1
9.0	1	9	-1	1
9.5	1	9.5	-1.5	1
10.0	1	10	-2	1
10.5	1	10.5	-2.5	1
11.0	1	11	-3	1
11.5	1	11.5	-3.5	1
12.0	1	12	-4	1
12.5	1	12.5	-4.5	1
13.0	1	13	-5	1
13.5	1	13.5	-5.5	1
14.0	1	14	-6	1
14.5	1	14.5	-6.5	1
15.0	1	15	-7	1
15.5	1	15.5	-7.5	1
16.0	1	16	-8	1
16.5	1	16.5	-8.5	1
17.0	1	17	-9	1
17.5	1	17.5	-9.5	1
18.0	1	18	-10	1
18.5	1	18.5	-10.5	1
19.0	1	19	-11	1
19.5	1	19.5	-11.5	1
20.0	1	20	-12	1
20.5	1	20.5	-12.5	1
21.0	1	21	-13	1
21.5	1	21.5	-13.5	1
22.0	1	22	-14	1

Negative retraction numbers are forward paper moves.

Local Auto View Feature

The local auto view feature is used to view the last line printed through the glass in the top cover. Printer option strap B23 must be IN to enable this feature. See Appendix F for information about changing strap settings.

Viewing

When the printer is switched from **Online** to **Local** at the control panel, the paper will move up until the last printed line is at the pointers of the upper tractors.


Retracting

When the printer is switched back to **Online**, the paper will move down until it is positioned at the print wires ready for printing.

The paper will also be retracted if either the Program or Function Modes are entered and when the TEST/CLEAR pushbutton is pressed and held.

When this feature is enabled, the paper may or may not move immediately when the SET TOP OF FORM pushbutton is pressed. Depending on the printer's condition (active or idle), it may not retract the paper until the ONLINE pushbutton is pressed.

Using the Program Mode

While in **Local**, Press  to enter the Program Mode.

Starting with this page, the displays shown on the far left side are first-level menu choices. Press the ENTER pushbutton to cause the printer to perform that operation or to enter into a second-level menu. Second-level and subsequent sub-menus are shown indented under their parent menus.

Press the NEXT OPTION (0) or PREVIOUS OPTION (1) pushbutton to change the display to the next menu item.

Press QUIT (2) to return to the parent menu or to **Local** when in a first-level menu.

Press EXIT (3) to leave the Program Mode and return to **Local**.

NOTE: The first menu discussed in this section is for selecting the emulation. The emulation *must be selected first to enable the proper menu displays to appear*. Press the NEXT OPTION (0) pushbutton until **PRG:Emulation** appears in the display.

PRG:Emulation This menu is used to select the emulation. This printer can emulate (become functionally similar to) ANSI Standard X3.64-1979, Printronix P-Series, IBM Proprinter, Dataproducts, and Epson FX-286 type protocols. From this point on, these protocols will be referred to as ANSI, P Series, Proprinter, Dataproducts, and FX-286 emulations.

Which emulation to use will depend on what control codes and escape sequences will be sent by the host. See *Programmer's Manual, GEK-89025*, for information on each emulation.

Press the ENTER (4) pushbutton to enter the following sub-menu:

Emul:ANSI
Emul:FX286
Emul:Proprinter
Emul:Printronix
Emul:Dataproduct

Press the NEXT OPTION (0) pushbutton until the desired emulation appears in the display, and then press the ENTER (4) pushbutton.

When the emulation is selected, the printer will perform a self-test and the display will show **Self Test** followed by **Loading.....Wait**. All printer parameters will be set to the default state as if an ESC c had been received from the host.

Using the Program Mode (continued)

PRG:Font This menu and its sub-menus are used to select the font style, cpi, international character set, enhancements, print options, and expansion.

As shown in the foldout on page 2-10, the emulation selected will determine which displays will appear.

Font:Styl This menu is used to select the font style.

Press the ENTER (4) pushbutton to enter the following sub-menu:

Used with all emulations except Proprinter and FX-286.

Styl:High Speed	abcABC123
Styl:Data Proces	abcABC123
Styl:Correspond	abcABC123
Styl:Gothic NLQ	abcABC123
Styl:Italic NLQ	abcABC123
Styl:Courier NLQ	abcABC123
Styl:Graphics	βπL
Styl:OCR-A	abcABC123
Styl:OCR-B	abcABC123

Used with the IBM Proprinter emulation only.

Styl:DP	Res	abcABC123
Styl:Fastfnt	Res	abcABC123
Styl:NLQ	Res	abcABC123
Styl:NLQ II	Res	abcABC123
Styl:DP	Did	abcABC123
Styl:Fastfnt	Did	abcABC123
Styl:NLQ	Did	abcABC123
Styl:NLQ II	Did	abcABC123
Styl:Alt NLQ	Res	abcABC123
Styl:Alt II	Res	abcABC123

Used with the FX286 emulation only.

Styl:Draft	abcABC123
Styl:Sans Serif	abcABC123
Styl:Roman	abcABC123
Styl:Italic	abcABC123

Press the NEXT OPTION (0) pushbutton until the desired font style appears in the display, and then press the ENTER (4) pushbutton.

Using the Program Mode (continued)

Font:Char/Inch This menu is used to select the characters per inch (cpi). If a display shows **LS** on the right, a nonstandard cpi value has been set by the host.

Press the ENTER (4) pushbutton to enter the following sub-menu:

Used with all emulations except Proprinter and FX-286. The chart shows which cpi values can be used with each font style.

CPI:10 abcABC123
CPI:12 abcABC123
CPI:13.3 abcABC123
CPI:15 abcABC123
CPI:16.7 abcABC123

CPI:XX.X LS

FONT STYLE	CPI Value				
	10	12	13.3	15	16.7
High Speed	X				
Data Processing	X	X	X	X	X
Correspondence	X	X	X	X	
Gothic NLQ	X	X	X	X	
Italic NLQ	X				
Courier NLQ	X	X	X	X	
Graphics	X	X	X	X	X
OCR-A	X				
OCR-B	X				

Used with the Proprinter and FX-286 emulations only.

CPI:10
CPI:12

Press the NEXT OPTION (0) pushbutton until the desired cpi value appears in the display, and then press the ENTER (4) pushbutton.

Font:Country This menu and its sub-menus are used to select the international character set (country).

This printer has 50 standard international character sets.

When using the Proprinter emulation, international character sets must be selected using escape sequences from the host.

See *Programmer's Manual, GEK-89025*, for more information on international character sets and print samples.

Using the Program Mode (continued)

Font:Country Press the ENTER (4) pushbutton to enter the
(continued) following sub-menu:

Used with all emulations except Proprinter and FX-286.

Coun:USA ISO
Coun:GERMANY ISO
Coun:FRNCH A ISO
Coun:FRENCH B
Coun:CANADIAN
Coun:DUTCH
Coun:ITALIAN
Coun:UK
Coun:SPANISH
Coun:DAN/NOR A
Coun:DAN/NOR B
Coun:DAN/NOR C
Coun:DAN/NOR D
Coun:SWED/FIN A
Coun:SWED/FIN B
Coun:SWED/FIN C
Coun:SWED/FIN D
Coun:SWISS
Coun:ITALIAN ISO
Coun:SPANISH ISO
Coun:UK A
Coun:SLO/CROAT
Coun:TURKISH
Coun:GREEK
Coun:USA CP 437
Coun:MULTI CP850
Coun:CODE PG 852
Coun:CODE PG 853
Coun:CODE PG 855
Coun:CODE PG 860
Coun:CODE PG 863
Coun:CODE PG 864
Coun:CODE PG 865
Coun:CODE PG 866
Coun:CODE PG 867
Coun:ISO 8859-1
Coun:ISO 8859-2
Coun:ISO 8859-3
Coun:ISO 8859-4
Coun:ISO 8859-5
Coun:ISO 8859-6
Coun:ISO 8859-7
Coun:ISO 8859-8
Coun:ISO 8859-9
Coun:GREEK CP437
Coun:DEC MULTI
Coun:ROMAN8
Coun:MAZOWIA CP
Coun:TURKISH CP
Coun:GREEK CP851

Using the Program Mode (continued)

Font:Country (continued) Used with the FX-286 emulation.

Coun:USA
Coun:FRENCH
Coun:GERMAN
Coun:UK
Coun:DANISH I
Coun:SWEDISH
Coun:ITALIAN
Coun:SPANISH
Coun:JAPANESE
Coun:NORWEGIAN
Coun:DANISH II
Coun:SPANISH II
Coun:LATIN AMER
Coun:NETHERLANDS
Coun:ANGLO-UNI
Coun:SPANISH AM
Coun:PORTUGUESE
Coun:AFRICAN
Coun:SWISS
Coun:TURKISH
Coun:GREECE
Coun:YUGOSLAVIAN

Press the NEXT OPTION (0) pushbutton until the desired set appears in the display, and then press the ENTER (4) pushbutton.

Font:Speci Mode Font - Special Mode. This menu is used to select font enhancements. Press the ENTER (4) pushbutton to enter the following sub-menu.

Multiple modes can be set. As each mode is selected, the display will momentarily read On (Example: **Underline On**).

Used with all emulations except Proprinter and FX-286.

Mode:Normal	abcABC123
Mode:Bold	abcABC123
Mode:Underline	<u>abcABC123</u>
Mode:Proportionl	abcABC123
Mode:Double wide	a b c A B C 1 2 3

Selecting **Mode:Normal** turns off all special modes.

Mode:Double Wide is a 2X horizontal expansion of the currently selected font and cpl.

Using the Program Mode (continued)

Font:Spec Mode Used with the Proprinter emulation only.
(continued)

As each mode is selected, the display will momentarily show **Mode Set**.

Mode:Fastfont	abcABC123
Mode:Italic Font	abcABC123
Mode:Emphasized	abcABC123
Mode:Double High	abcABC123
Mode:Double Wide	abcABC123
Mode:Reset	
Mode:Save	

Special mode Fastfont is printed at 12 cpi. Double High and Double Wide are 2X expansions.

Selecting Mode:Reset disables all currently active special modes. Mode:Save must be used after the reset to clear special modes stored in nonvolatile memory.

Selecting Mode:Save *after* setting the special modes saves these selections to nonvolatile memory. The saved selections can be recalled by sending the Set Initial Condition command ESC[K n1 n2 init id p1 p2 from the host (see programmer's manual).

Used with the FX-286 emulation only.

As each mode is selected, the display will momentarily show **Mode Set**.

Mode:Underline	<u>abcABC123</u>
Mode:Emphasized	abcABC123
Mode:Double High	abcABC123
Mode:Double Wide	abcABC123
Mode:Dbl Strike	abcABC123
Mode:Condensed	abcABC123
Mode:Reset	

Special mode emphasized is a shadow effect by double-striking a dot with a slight offset of 1/120 inch for draft and 1/240 inch for NLQ. Double high and double wide are 2X expansions. Condensed mode prints 10 cpi at 17.1 cpi and 12 cpi at 20 cpi. Reset clears all special modes.

Press the NEXT OPTION (0) pushbutton until the desired special mode appears in the display, and then press the ENTER (4) pushbutton.

Using the Program Mode (continued)

Font:Prt Options Font - Print Options

This menu, its sub-menu, and options are used to control the printing position of expanded characters, the type of superscript/subscript printing, and character case conversions.

Press the ENTER (4) pushbutton, and then:

- Press the ENTER (4) pushbutton to enter the POpt:VertExp Opt sub-menu *or*
- Press the NEXT OPTION (0) pushbutton until the POpt:SScript ON/OFF or the POpt:FoldOver ON/OFF option appears in the display.

After the desired sub-menu or option appears in the display, proceed as follows:

POpt:VertExp Opt Print Option/Vertical Expansion Options

This sub-menu is used to control how the the expanded characters will appear. Although all expanded characters are printed from the top down, the positioning on the page will make them appear to "grow" up or "sag" down when compared to normally printed characters on the same line. See the examples below.

The characters in the examples below were printed at 1X, 2X, 3X, 4X, and 5X vertical expansion with 2X horizontal expansion.

Press the ENTER (4) pushbutton to enter the sub-menu shown below.

VExOpt:Baseline VExOpt:Baseline AAAAAA

VExOpt:Default VExOpt:Default AAAAAA

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

Using the Program Mode (continued)

Font:Prt Options (continued)

POpt:SScript ON or OFF Print Options - Super/Subscript

This option is used with all emulations except Proprinter and FX-286.

Print Options - Super/Subscript ON/OFF. With SScript OFF, the printer will process the ANSI partial line up (PLU) and partial line down (PLD) commands by moving the text up or down 3/72 inch. With SScript ON, PLU and PLD cause the text to be compressed and stay within the printed line boundaries.

The printout samples below show the effect these options will have while printing superscript and subscript characters.

POpt:SScript OFF

SuperScriptNormal SubScriptNormal with SScript OFF

POpt:SScript ON

~~SuperScript~~Normal ~~SubScript~~Normal with SScript ON

When a **POpt:SScript** display is showing, pressing the ENTER (4) pushbutton will cause the display to alternate back and forth between **ON** and **OFF**. When the desired option is showing in the display, press the EXIT (3) pushbutton to return to the Font:Prt Options menu, or press the QUIT (2) pushbutton to return to **Local**.

POpt:FoldOvr ON or OFF Print Options - Fold Over

This option is used with all emulations except Proprinter and FX-286.

Print Options - Fold Over ON/OFF. This feature converts lowercase characters to uppercase with no descenders for higher speed printing. With POpt:FoldOvr ON, characters a - z (61H - 7AH) are converted to A - Z (41H - 5AH). It only affects the High Speed and Data Processing fonts. This option overrides the setting of printer option strap A31 (no descenders in draft).

When a **POpt:FoldOvr** display is showing, pressing the ENTER (4) pushbutton will cause the display to alternate back and forth between **ON** and **OFF**. When the desired option is showing in the display, press the EXIT (3) pushbutton to return to the Font:Prt Options menu, or press the QUIT (2) pushbutton to return to **Local**.

Using the Program Mode (continued)

Font:Prt Options (continued)

POpt:Tall HS ON or OFF Print Options - Tall High-Speed Font

The high-speed font uses five-dot-high characters with a sixth-dot for descenders. The normal vertical height of the characters based on printing at 8 lpi. The tall high-speed font has the same 5- or 6-dot characters but is based on 6 lpi printing. When exiting this menu, the option showing on the control panel display will take effect.

POpt:Tall HS OFF

```
ABCDEFGHIJKLMN O PQRSTU VWXYZ[\]^_`abcdefghijklmnopqr  
BCDEFGHIJKLMN O PQRSTU VWXYZ[\]^_`abcdefghijklmnopqrs  
CDEFGHIJKLMN O PQRSTU VWXYZ[\]^_`abcdefghijklmnopqrst  
DEFGHIJKLMN O PQRSTU VWXYZ[\]^_`abcdefghijklmnopqrstu
```

POpt:Tall HS ON

```
ABCDEFGHIJKLMN O PQRSTU VWXYZ[\]^_`abcdefghijklmnopqr  
BCDEFGHIJKLMN O PQRSTU VWXYZ[\]^_`abcdefghijklmnopqrs  
CDEFGHIJKLMN O PQRSTU VWXYZ[\]^_`abcdefghijklmnopqrst  
DEFGHIJKLMN O PQRSTU VWXYZ[\]^_`abcdefghijklmnopqrstu
```

Font:Horiz Expand Font - Horizontal Expansion

This option is not used with the Proprinter and FX286 emulations.

This menu and its sub-menu are used to expand the currently selected font style horizontally from 1 to 8 times normal width. Do not confuse expanded character printing with the oversize character font; they are distinctly different. Oversize uses its own font style. Press the ENTER (4) pushbutton to enter the following sub-menu:

```
Horiz Exp:X1  
Horiz Exp:X2 X1 X2 X3 X4  
Horiz Exp:X3  
Horiz Exp:X4  
Horiz Exp:X5 X5 X6 X7 X8  
Horiz Exp:X6  
Horiz Exp:X7  
Horiz Exp:X8
```

The first option displayed is the printer's current setting.

Press the NEXT OPTION (0) pushbutton until the desired horizontal expansion appears in the display, and then press the ENTER (4) pushbutton.

Using the Program Mode (continued)

Font:Vert Expnd Font - Vertical Expansion

This option is not used with the Proprietary and FX-286 emulations.

This menu and its sub-menu are used to expand the currently selected font style vertically from 1 to 8 times normal height. Do not confuse expanded character printing with the oversize character font; they are distinctly different. Oversize uses its own font style.

Press the ENTER (4) pushbutton to enter the following sub-menu:

```
Vert Exp:X1    x1 x2 x3 x4 x5 x6 x7 x8
Vert Exp:X2
Vert Exp:X3
Vert Exp:X4
Vert Exp:X5
Vert Exp:X6
Vert Exp:X7
Vert Exp:X8
```

The first option displayed is the printer's current setting.

Press the NEXT OPTION (0) pushbutton until the desired vertical expansion appears in the display, and then press the ENTER (4) pushbutton.

PRG:LPI Program - LPI

This menu is used to select the lines per inch (lpi). If a display shows **LS** on the right, a nonstandard lpi value has been sent by the host.

Press the ENTER (4) pushbutton to enter the following sub-menu.

```
LPI:3
LPI:4
LPI:6
LPI:8
LPI:XX.X    LS
```

Press the NEXT OPTION (0) pushbutton until the desired lpi value appears in the display, and then press the ENTER (4) pushbutton.

Using the Program Mode (continued)

PRG:Form Control Program - Form Control

This menu and its sub-menu are used to set vertical form boundaries. A form can be set up using this option, the Function Mode, or by escape sequences sent from the host.

Also, see the discussion on setting up a form on page 2-22 and the illustration on page 2-23.

Press the ENTER (4) pushbutton to enter the Form Control Setup menu.

FormCtl:Setup Form Control - Setup

The menu is used to set the form length, top margin, and bottom margin. Minimum form length is .33 of an inch (8.4mm, 240 decipoints). Maximum form length is 22 inches (559mm, 15,840 decipoints).

Press the ENTER (4) pushbutton to enter the sub-menu shown below.

Setup:Length XXX
Setup:TopMgn XXX
Setup:BotMgn XXX

Each of these displays represents a line counter to measure distance. The counter uses the current lpi setting to calculate the length of the form and margins. A count of 6 equals 1 inch at 6 lpi.

Use the up arrow (7) and down arrow (8) pushbuttons to increase or decrease the line counters (XXX). The double up arrow (2) pushbutton will increase the count by 10 each time it is pressed.

After each counter is set to the desired number, press the ENTER (4) pushbutton to store that value.

Press the NEXT OPTION (0) pushbutton to change from one counter to another.

After all three counter values are set and stored, press the EXIT (3) pushbutton to return to the parent menu.

Using the Program Mode (continued)

PRG:Interface Op Program - Interface Options

This menu and its sub-menus are used to set up the printer's interface straps and the serial interface parameters.

See Chapter 4 for a description of the interfaces and important information on host-to-printer protocols. Appendix F describes the purpose of each interface strap. A copy of the printer's status printout can be helpful when using the charts in Appendix F to help decide which straps need to be changed.

Press the ENTER (4) pushbutton to enter the IFOp:Type menu.

IFOp:Type Interface Options - Type

This menu is used to select either the parallel, serial, or multisource interface. *The interface type must be selected first before the correct menus will appear in the control panel display.*

Press the ENTER (4) pushbutton to enter the sub-menu shown below.

Type:Serial	Use serial interface.
Type:Parallel	Use parallel interface.
Type:MultiSource	Use both serial and parallel interfaces.

Press the NEXT OPTION (0) pushbutton until the desired interface type appears in the display, and then press the ENTER (4) pushbutton.

When the interface type is selected, the printer will perform a self-test and the display will show **Self Test** followed by **Loading.....Wait**.

Reenter the IFOp:Type menu by pressing **4 - 0 - 0 - 0 - 0 - 4** after the self-test has been completed.

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display.

IFOp:SourceDelay	Displayed for multisource only.
IFOp:ParallelSet	Displayed for parallel and multisource only.
IFOp:Serial Set	Displayed for serial and multisource only.

Multisource Interface - See Chapter 4 for information on setting the source delay.

Parallel Interface - Go to page 2-44 for option selections.

Serial Interface - Go to page 2-46 for option selections.

Using the Program Mode (continued)

PARALLEL INTERFACE

This section covers the parallel interface strap menus. If using the serial interface only, skip to page 2-46. See Appendix F for strap explanations.

IFOp:ParallelSet Interface Options - Parallel Set

This menu is used to select the parallel interface software strap menu or the hardware (HW) interface strap menu. The software straps are designated Set A and the hardware straps Set H.

Press the ENTER (4) pushbutton to enter the sub-menu shown below.

ParOp:Straps **ParOp:HWstraps**

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

ParStrp:Set A Parallel Strap - Set A

This menu is used to set the individual parallel interface software straps.

Press the ENTER (4) pushbutton to enter the strap sub-menu shown below.

```
IStrp:Set A1    IN
IStrp:Set A2    OUT
"
"
"
IStrp:Set A40   IN
```

Press the NEXT OPTION (0) or PREVIOUS OPTION (1) pushbutton to scroll through the 40 available straps until the desired strap number appears in the display.

Press the ENTER (4) pushbutton to switch alternately between **IN** and **OUT**.

After all straps have been set, press the EXIT (3) pushbutton to return to the ParOp:Straps menu, press NEXT OPTION (0) to advance to the ParOp:HWstraps menu, or press QUIT (2) to return to **Local**.

Important: After all settings have been made, use the Function Mode **Setup:Store** option (page 2-12) to store the changes in non-volatile memory. (This applies to all emulations except Proprietary and FX-286.)

Using the Program Mode (continued)

PARALLEL INTERFACE (continued)

ParOp:HWstraps Parallel Options - Hardware Straps

This menu is used to either set the straps to the factory default settings or to enter a sub-menu to set individual straps.

Press the ENTER (4) pushbutton to enter the sub-menu shown below.

HWstraps:Default
HWstraps:Set H

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display.

- When the ENTER (4) pushbutton is pressed with **HWstraps:Default** showing in the display, the straps are set to the factory default state. The state of these settings is dependent on whether a CENTRONICS or Dataproducts parallel interface is being used. The chart in Appendix F shows the default settings.
- When the ENTER (4) pushbutton is pressed with **HWstraps:Set H** showing in the display, the following sub-menu is displayed.

```
HWstrap:H1      IN
HWstrap:H2      OUT
"
"
"
HWstrap:H48     IN
```

Press the NEXT OPTION (0) or PREVIOUS OPTION (1) pushbutton to scroll through the 48 available straps until the desired strap number appears in the display.

Press the ENTER (4) pushbutton to switch alternately between **IN** and **OUT**.

After all straps have been set, press the EXIT (3) pushbutton to return to the ParOp:HWstraps menu, or press QUIT (2) to return to **Local**.

Important: After all settings have been made, use the Function Mode **Setup:Store** option (page 2-12) to store the changes in non-volatile memory. (This applies to all emulations except Proprietary and FX-286.)

Using the Program Mode (continued)

SERIAL INTERFACE

This section covers the serial interface strap and protocol menus. See Chapter 4 and Appendix F for detailed information about the serial interface. If using the parallel interface, see page 2-44.

IFOp:Serial Set Interface Options - Serial Set

This menu is used to change strap and parameter settings for the serial interface. The sub-menus can be skipped through by pressing the NEXT OPTION (0) pushbutton. When the desired sub-menu is displayed, press the ENTER (4) pushbutton.

Press the ENTER (4) pushbutton to enter the following sub-menu:

SerOp:Protocol Serial Options - Protocol

Press the ENTER (4) pushbutton to enter the following sub-menu:

Protocol:DC1/DC3
Protocol:ETX/ACK
Protocol:CD
Protocol:CA
Protocol:SCA
Protocol:None

Press the NEXT OPTION (0) pushbutton until the desired protocol appears in the display, and then press the ENTER (4) pushbutton.

Press the EXIT (3) pushbutton to return to the SerOp:Protocol menu, and then press the NEXT OPTION (0) pushbutton to advance to the next menu.

SerOp:Word Size Serial Options - Word Size

Press the ENTER (4) pushbutton to enter the following sub-menu:

Word:8 Bits	8 data bits, no parity
Word:8+Parity	8 data bits, 1 parity bit, parity check enabled
Word:8+Par,NoChk	8 data bits, 1 parity bit, parity check disabled
Word:7 Bits	7 data bits, no parity
Word:7+Parity	7 data bits, 1 parity bit, parity check enabled
Word:7+Par,NoChk	7 data bits, 1 parity bit, parity check disabled

Press the NEXT OPTION (0) pushbutton until the desired word size and parity combination appears in the display, and then press the ENTER (4) pushbutton.

Press the EXIT (3) pushbutton to return to the SerOp:Word Size menu, and then press the NEXT OPTION (0) pushbutton to advance to the next menu.

Using the Program Mode (continued)

SERIAL INTERFACE (continued)

SerOP:Stop Bits Serial Options - Stop Bits

This menu is used to select the number of stop bits for each data word.

Press the ENTER (4) pushbutton to enter the following sub-menu:

StopBits:1
StopBits:2

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

Press the EXIT (3) pushbutton to return to the SerOp:Stop Bits menu, and then press the NEXT OPTION (0) pushbutton to advance to the next menu.

SerOp:Straps Serial Option - Straps

This menu is used to select the serial interface strap Set A and Set B sub-menus.

Press the ENTER (4) pushbutton. Press the NEXT OPTION (0) pushbutton until the desired strap set appears in the display, and then press the ENTER (4) pushbutton.

SerStrp:Set A Serial Straps - Set A

This sub-menu is used to change the state of individual straps in Set A.

Press the ENTER (4) pushbutton to enter the following sub-menu:

IStrap:A1 IN
IStrap:A2 OUT
"
"
"
IStrap:A40 IN

Press the NEXT OPTION (0) or PREVIOUS OPTION (1) pushbutton to scroll through the 40 available straps until the desired strap number appears in the display.

Press the ENTER (4) pushbutton to switch alternately between **IN** and **OUT**.

After all straps have been set, press the EXIT (3) pushbutton to return to the SerOp:Set menu, press NEXT OPTION (0) to change to the other SerStrp:Set menu, or press QUIT (2) to return to **Local**.

Using the Program Mode (continued)

SERIAL INTERFACE (continued)

SerStrp:Set B Serial Straps - Set B

This sub-menu is used to change the state of individual straps in Set B.

Press the ENTER (4) pushbutton to enter the following sub-menu:

```
IStrap:B1    IN
IStrap:B2    OUT
"
"
"
IStrap:B40   IN
```

Press the NEXT OPTION (0) or PREVIOUS OPTION (1) pushbutton to scroll through the 40 available straps until the desired strap number appears in the display.

Press the ENTER (4) pushbutton to switch alternately between **IN** and **OUT**.

After all straps have been set, press the EXIT (3) pushbutton twice to return to the SerOp:Straps menu, press NEXT OPTION (0) to advance to the SerOp:Speed menu, or press QUIT (2) to return to **Local**.

SerOp:Speed Serial Options - Speed (Baud Rate)

This menu is used to change the baud rate of the serial interface.

Press the ENTER (4) pushbutton to enter the following sub-menu:

```
Speed:300 Baud
Speed:600 Baud
Speed:1200 Baud
Speed:2400 Baud
Speed:4800 Baud
Speed:9600 Baud
Speed:19200 Baud
Speed:38400 Baud
```

Press the NEXT OPTION (0) pushbutton until the desired baud rate appears in the display, and then press the ENTER (4) pushbutton.

Press the EXIT (3) pushbutton to return to the SerOp:Speed menu, and then press the NEXT OPTION (0) pushbutton to advance to the next menu.

Using the Program Mode (continued)

SERIAL INTERFACE (continued)

SerOp:Parity Serial Options - Parity Type

This menu is used to select the parity type for the serial interface. The available parity options are determined by the word size (page 2-46) and the serial strap setting definitions in Appendix F.

Parity:None will be the only selection if no parity bit is selected in the **SerOp:Word Size** menu.

Press the ENTER (4) pushbutton to enter the following sub-menu:

Parity:Even
Parity:Odd
Parity:Space
Parity:Mark

Press the NEXT OPTION (0) pushbutton until the desired parity type appears in the display, and then press the ENTER (4) pushbutton.

Press the EXIT (3) pushbutton to return to the SerOp:Parity menu, and then press the NEXT OPTION (0) pushbutton to advance to the next menu.

SerOp:Busy Trip Serial Options - Busy Trip

This menu is used to select the trip point of the serial buffer. The trip point is the threshold of the number of characters in the serial buffer before BUSY is signaled to the host. Information on the buffer characteristics is in Chapter 4.

Press the ENTER (4) pushbutton to display the trip point counter.

Busy Trip XXXX

Use the up arrow (7) and down arrow (8) pushbuttons to increase or decrease the counter in increments of 50. The FORM FEED (2) pushbutton will increase the count by 500 each time it is pressed.

When the desired trip point is reached, press the ENTER (4) pushbutton to store that value.

Press the EXIT (3) pushbutton to return to the SerOp:Busy Trip menu, or press the QUIT (2) pushbutton to return to **Local**.

Using the Program Mode (continued)

PRG:Margin Set Program - Margin Set

This menu is used to clear and set the left and right margins.

The **SetLft** and **SetRght** displays represent column counters to measure distance. The counters use the current cpi setting to calculate the distance for the margins. The number shown in the counter display is a printable column.

Column 1 (left margin default) will contain the first printed character. If a 1-inch left margin is needed at 10 cpi, set the counter to 11 so the first 10 columns are skipped.

Column 132 (right margin default at 10 cpi) will contain the last printed character. If a 1-inch right margin is needed at 10 cpi, set the counter to 122 so the last 10 columns (123-132) are skipped.

A cpi change after the left margin will not affect the distance.

Press the **ENTER** (4) pushbutton to enter the following sub-menu:

```
Mgn:Clr Margins    Margin - Clear Both Margins
Mgm:SetLft    XXX    Margin - Set Left
Mgn:SetRght    XXX    Margin - Set Right
```

Press the **NEXT OPTION** (0) pushbutton until the desired option appears in the display, and then press the **ENTER** (4) pushbutton.

Use the up arrow (7) and down arrow (8) pushbuttons to increase or decrease the counter. The double up arrow (6) pushbutton will increase the count by 10 each time it is pressed.

When the desired column count is reached, press the **EXECUTE/SELECT** (4) pushbutton to store that value.

Press the **EXIT** (3) pushbutton to return to the **PRG:Margin Set** menu, or press the **QUIT** (2) pushbutton to return to **Local**.

Using the Program Mode (continued)

PRG:Horiz Tabs Program - Horizontal Tabs

This menu is used to set and clear horizontal tabs.

The column number used to set a tab is a printable column.

Press the ENTER (4) pushbutton to enter the following sub-menu:

```
Htb:Clear All
Htb:NextTab  XXX
Htb:PrevTab  XXX
Htb:Set Tab  XXX
Htb:Clr Tab  XXX
```

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display.

The following explains what each option will do when the ENTER (4) pushbutton is pressed:

- Htb:Clear All - will clear all horizontal tabs.
- Htb:NextTab - will advance to the next tab and display the column count for that tab each time the pushbutton is pressed.
- Htb:PrevTab - will go back to the previous tab and display the column count for that tab each time the pushbutton is pressed.
- Htb:Set Tab - will set a horizontal tab at the column number shown in the display. See below.
- Htb:Clr Tab - will clear the tab at the column count shown in the display. See below.

Use the up arrow (7) and down arrow (8) pushbuttons to increase or decrease the column counters when using the Set Tab and Clr Tab options. The double up arrow (6) pushbutton will increase the count by 10 each time it is pressed.

After the Set Tab or Clr Tab column counter is set to the desired column, press the ENTER (4) pushbutton.

Using the Program Mode (continued)

PRG:Vert Format Program - Vertical Format Control

This menu and its sub-menus are used to determine which system of vertical paper moves the printer will use.

Press the ENTER (4) pushbutton to enter the following sub-menu:

VtForm:Type Vertical Format - Type

This menu is used to select either an emulation-dependent vertical format unit (VFU) or a vertical tab table for vertical moves.

The VFU option is for all emulations except Proprinter and FX286.

Press the ENTER (4) pushbutton to enter the following sub-menu:

VtType:Vert Tabs **VtType:Emul VFU**

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

See *Programmer's Manual, GEK-89025*, for operation of the electronic VFU (EVFU).

When VtType:Vert Tabs is selected, the following sub-menu will show in the display:

VtForm:Vert Tab

Press the ENTER (4) pushbutton to enter the following sub-menu:

Vtb:Clear All
Vtb:NextTab XXX
Vtb:PrevTab XXX
Vtb:Set Tab XXX
Vtb:Clr Tab XXX

The following explains what each option will do when the ENTER (4) pushbutton is pressed:

- Vtb:Clear All - will clear all vertical tabs.
- Vtb:NextTab - will advance to the next tab and display the line count for that tab each time the pushbutton is pressed.

Using the Program Mode (continued)

PRG:Vert Format (continued)

- Vtb:PrevTab - will go back to the previous tab and display the line count for that tab each time the pushbutton is pressed.
- Vtb:Set Tab - will set a vertical tab at the line number shown in the display. See below.
- Vtb:Clr Tab - will clear the tab at the line count shown in the display. See below.

Use the up arrow (7) and down arrow (8) pushbuttons to increase or decrease the line counters when using the Set Tab and Clr Tab options. The double up arrow (6) pushbutton will increase the count by 10 each time it is pressed.

After the Set Tab or Clr Tab column counter is set to the desired column, press the ENTER (4) pushbutton.

PRG:Engine Opts Program - Print Engine Options

This menu and its sub-menus are used to control the shuttle motor, paper slew rate, and print wire actuator tiers.

Press the ENTER (4) pushbutton to enter the following sub-menu:

EOpt:Slew Rate Engine Options - Slew Rate

This menu is used to set the speed at which paper can be moved through the printer during printing operations (form feeds, vertical moves, etc.). The reduced slew speed can be useful if you are experiencing trouble with heavy stock or stiff multipart forms. Using the reduced slew speed can slow throughput considerably.

Press the ENTER (4) pushbutton to enter the following sub-menu:

Slw:Normal 20 inches per second slew rate.
Slw:Reduced 10 inches per second slew rate.

Press the NEXT OPTION (0) pushbutton until the desired slew rate appears in the display, and then press the ENTER (4) pushbutton.

Using the Program Mode (continued)

PRG:Engine Opts (continued)

EOpt:Direction Engine Options - Shuttle Print Direction

This menu is used to control the firing of the print wires in relationship to the swing of the shuttle. Bidirectional mode allows printing during both the left and right shuttle swing (normal operation).

Printing only during the left or right swing of the shuttle is used for troubleshooting and alignment purposes. A slight increase in the quality of printing may be realized using a single-swing option due to the characteristics of the timing.

Press the ENTER (4) pushbutton to enter the following sub-menu:

Dir:Bidirectionl
Dir:Right
Dir:Left

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

EOpt:Eng Off Dly Engine Options - Shuttle Motor Off Delay

This menu is used to set the power-off delay for the shuttle motor.

This delay is the time between the moment when no print data is detected and the moment when the shuttle motor is shut off. A short delay time is preferred. If the host is sending data slower than the printer can print, a longer delay may prevent the time lost when the shuttle is turned off and cycled back on again.

Long delay times may cause form smudging if the paper gap is set too tight.

Press the ENTER (4) pushbutton to enter the following sub-menu:

Delay:2 seconds
Delay:5 seconds
Delay:10 seconds
Delay:20 seconds

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

Using the Program Mode (continued)

PRG:Engine Opts (continued)

EOpt:Print Iten Engine Options - Print intensity

This menu is used to set the print intensity (striking power) of the print head actuators.

Low intensity is used mainly for testing the print actuators (see Chapter 3). The low intensity setting may give acceptable print quality on single-part forms.

Medium intensity is for normal use and is the default setting of this printer. It gives excellent print quality while extending the life of the print actuators and the ribbon fabric.

High intensity is used when heavy multipart forms show a need for more print impact on the last copy.

Press the ENTER (4) pushbutton to enter the following sub-menu:

Iten:Low
Iten:Medium
Iten:High

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

PRG:Printer Opts Program - Printer Options

This menu and its sub-menus are used to select strap options. Set A is for all emulations except Proprinter and FX-286. Set C is for Proprinter and FX-286 emulations only.

PStraps:Set A Printer Option Straps - Set A

This menu is used to set the individual printer option straps. See Appendix F for the definitions of the straps and how they affect the printer. These options appear in the display only when emulations other than Proprinter or FX-286 have been selected.

Press the ENTER (4) pushbutton to enter the following sub-menu:

PStrap:A1 IN
PStrap:A2 OUT
"
"
"
PStrap:A40 IN

Using the Program Mode (continued)

PRG:Printer Opts (continued)

Press the NEXT OPTION (0) or PREVIOUS OPTION (1) pushbutton to scroll through the 40 available straps until the desired strap number appears in the display.

Press the ENTER (4) pushbutton to switch alternately between **IN** and **OUT**.

After all straps have been set, press the EXIT (3) pushbutton to return to the PStrap:Set A menu, press NEXT OPTION (0) to advance to the PStrap:Set B menu, or press QUIT (2) to return to **Local**.

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

PStraps:Set B Printer Option Straps - Set B

and

PStraps:Set C Printer Option Straps - Set C

These menus are also used to set individual printer option straps and are selected and changed the same as Set A.

Press the ENTER (4) pushbutton to enter the desired strap menu, press the NEXT OPTION (0) or PREVIOUS OPTION (1) pushbutton to scroll through the straps until the desired strap number appears in the display, and press the ENTER (4) pushbutton to switch alternately between **IN** and **OUT**.

After all straps have been set, press the EXIT (3) pushbutton to return to the PStrap:Set A menu, press NEXT OPTION (0) to advance to the PStrap:Set B menu, or press QUIT (2) to return to **Local**.

Using the Program Mode (continued)

PRG:SmartGraphic

NOTE: This display and menu will not be available unless the SmartGraphics controller option has been installed.

This menu is used to select either the Code V or IGP graphics emulations.

Press the ENTER (4) pushbutton to enter the sub-menu shown below.

SGL:None	None - pass through mode.
SGL:Code V Emul	QMS Code V Emulation.
SGL:IGP Emul	Printronic IGP Emulation.

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

Selecting **SGL:None** will cause the SmartGraphics controller to enter the permanent pass-through mode. All graphics emulation commands will be ignored by the controller and all received data will be passed directly to the printer.

Using the Program Mode (continued)

PRG:Forms Eject

This menu is used to select the paper tear-off feature and to set the paper eject and retract distances to the paper path in use. Also see the explanation starting on page 2-28, "Paper Tear-Off Feature", for paper movement distances.

Press the ENTER (4) pushbutton to enter the sub-menu shown below.

FmEjt:Normal FF
FmEjt:Rear Exit
FmEjt:Top Exit
FmEjt:RetractMov

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

When **FmEjt:RetractMov** is displayed, press the ENTER (4) pushbutton for this sub-menu:

RetMov:Next TOF Retract paper to next usable TOF.
RetMov:FullRetrn Fully retract paper.

Next TOF retracts the paper to the next usable top of form (perforation) without pulling the forms out of the upper tractors.

Full Return is used on forms that are mounted on a carrier (labels). The forms will be ejected so the last printed label can be peeled off the carrier, and then the forms are retracted fully into the printer so the next label on the carrier can be printed.

Press the NEXT OPTION (0) pushbutton until the desired option appears in the display, and then press the ENTER (4) pushbutton.

Selections through the control panel using this menu affect printer option straps B20, B21, and B26. The chart below shows how this menu and the straps are linked. See Appendix F for strap explanations.

Forms Eject Option Menu Display	Printer Option Strap			Status Sheet Indication	
	B20	B21	B36	Eject Move	Retract Move
FmEjt:Normal FF	OUT	x	x	Normal FF	None
FmEjt:Rear Exit	IN	x	OUT	Rear Exit	See Below
FmEjt:Top Exit	IN	x	IN	Top Exit	See Below
RetMov:Next TOF	x	OUT	x	See Above	Next TOF
RetMov:FullRetrn	x	IN	x	See Above	Full Return

Chapter 3. Operator Care and Maintenance

Introduction

These shuttle matrix printers are designed so that preventive maintenance is **not** required. There are **no** lubrication requirements; therefore, operator maintenance is minimal.

Operator Cleaning Procedures

The following services are performed when the ribbon is replaced or when otherwise required:

1. Turn the power switch off and disconnect the power cable from the AC source.

WARNING

Use extreme care while cleaning around the smudge shield area. The shield is constructed of thin metal and the edges are sharp. Avoid bending or wrinkling the shield.

2. Turn the print gap adjust wheel to the LOAD position, turn the ribbon deck locking lever to the LOAD position, remove the ribbon cartridge, and wipe away any accumulation of dust from the smudge shield and striker bar area.
3. With a soft brush and vacuum, remove any paper dust that has accumulated inside the printer. Most dust tends to accumulate in the striker bar area and the paper supply compartment.
4. Reinstall or replace (if print legibility is not acceptable) the ribbon cartridge.
5. Clean the outside surfaces of the printer with a clean cloth and water. Do not use cleaning solutions. Always dry the outside cabinet surfaces with a clean dry cloth.
6. Reconnect the power cable and apply power to the printer for operation.

Operator Troubleshooting

Many of the operating faults that can occur are operator-correctable. They are often related to an incorrect setup, wrong adjustment, or the need to replenish consumables.

Initializing the Printer - Newly installed parts or options, power fluctuations, static buildup, or errant electrical signals may cause the printer electronics to lock up. Initializing the printer will clear this problem as long as no damage has been done.

Use the initialization procedure on Page 1-19 when:

- Inputs to the control panel are ignored or misinterpreted.
- The printer performs unexplained actions or ignores commands.
- The printer misinterprets valid commands from the host.

The remainder of this chapter is divided into the following sections and contains information to help guide you through possible problems.

TABLE 3-1 - Soft Fault Displays, lists messages that may appear that do not stop the printer.

TABLE 3-2 - Hard Fault Displays, lists messages that may appear when printing has stopped unexpectedly. It also lists the probable cause and the action needed to clear the fault.

TABLE 3-3 - Electrical Problems, guides you when the display, pushbuttons, or an incorrect data printout is the problem.

TABLE 3-4 - Mechanical Problems, addresses problems with paper feeding, print quality, and incorrect adjustments.

TABLE 3-5 - Diagnostic Fault Codes, shows and explains the faults that may be detected during self-test diagnostics.

Print Head Actuator Replacement - Step-by-step replacement instructions and information that may keep you online if a replacement module is not immediately available.

Operator Troubleshooting (continued)

Soft Faults

When a soft fault occurs, printing continues (or can be started) and immediate operator intervention may not be required. Some change in the data being sent to the printer may be required. If a wire driver or print head actuator fails (see the first two displays in Table 3-1), printing may continue without damage to the printer (see the section on module replacement).

Press the TEST/CLEAR pushbutton to clear the display.

Either **Online** or **Local** will be displayed in front of the following fault messages:

TABLE 3-1
Soft Fault Displays

DISPLAY	MEANING
:WD n	A defective wire driver has been found (See Note 1).
:WDAct n	A defective wire driver or print head actuator has been found (See Note 1).
:SVTMRreset	Service time was set to zero or the timer has failed.
:DLF ram	Download Font RAM failure.
:Suspend	Printing is temporarily suspended because of a short-duration, low power supply voltage or the ribbon weld passing the sensor.
:Low Print	Low paper print mode.
:VFU TOF	Missing TOF in the VFU load sequence.
:VFU PI	PI lead: The menu option for PI lead selection is set incorrectly.
:VFU Inval	There is an invalid character(s) in the VFU load sequence.
:VFU Long	The VFU table length has been exceeded.
:VFU Short	The VFU load sequence defines a form which is less than the minimum form length or less than the top or bottom margins.

Operator Troubleshooting (continued)

TABLE 3-1 (continued)
Soft Fault Displays

DISPLAY	MEANING
:FntCksm X	The font pair specified by X has failed the checksum test (See Note 2).
:DLF Pstn	The download font contains an invalid character position.
:DLF Cksum	The download font has a load checksum error.
:DLF Numbr	The download font has an invalid font number.
:DLF Dnsty	The download font contains an invalid font density/width.
:DLF DotSp	The download font contains an adjacent dot error.
:DLF Term	The download font has an invalid terminator.
:DLF Memry	There is insufficient memory for the download font.
SGL FAILED ST	The SmartGraphics controller failed self-test.

Note 1: When a defective wire driver or actuator is found, **n** will indicate the position (1 - 66 for 800-lpm or 1 - 33 for 400-lpm).

Note 2: **X** - font EPROM set **1-4** or download RAM **5**. If all installed fonts fail the checksum test, the **Fault:No Font** message will be displayed.

Miscellaneous Non-Fault Messages

The following displays indicate printer status:

When the display is preceded by a :, either **Online** or **Local** will be displayed in front of the following fault messages:

DISPLAY	MEANING
:Ready	The serial interface CB lead is true.
: VFU	A valid VFU has been downloaded.
Local:Remote	Printer deselected by host via received DC3.
Tearoff	Paper is in position for tear off at rear exit.
TopTearoff	Paper is in position for tear off at top exit.

Operator Troubleshooting (continued)

Hard Faults

When a hard fault occurs, printing will stop and operator intervention is required. Correct the condition causing the fault and press the TEST/CLEAR pushbutton to restore printer operation.

TABLE 3-2
Hard Fault Displays

DISPLAY	MEANING
Fault:Low Paper	A low paper condition exists. Press TEST/CLEAR to proceed to low paper printing. See "Low Paper Printing" on page 2-26 of Chapter 2.
Fault:Paper Out	Paper supply is depleted. Load paper and set top of form. Paper out sensor is reset when paper is inserted in the lower tractors and TEST/CLEAR is pressed.
Fault:Paper Jam	No paper movement has been sensed by the paper motion sensor. 1 - Turn the print gap adjust wheel to the LOAD position and physically clear the paper jam. 2 - Reload paper and readjust right side tractors, paper tension and gap. 3 - Press TEST/CLEAR to clear display.
Fault:Ribbon	Ribbon cartridge is missing, installed incorrectly, or damaged.
Fault:Ribbon Jam	Ribbon has stopped moving. Remove cartridge, inspect, and try to reinstall.

Operator Troubleshooting (continued)

TABLE 3-2 (continued)
Hard Fault Displays

Fault:Strikr Bar	Print gap adjust wheel turned to the OPEN position. Adjust for proper paper gap.
Fault:Shuttle	Shuttle drive motor is stalled or overloaded. Check for interference caused by a paper jam or paper gap adjusted too tight.
Fault:Low Power	Power supply has sensed low line voltage or is temporarily overloaded by continuous high density printing.
Fault:ImageLogic	No image logic dot request processed for 5 seconds. Try to clear fault by cycling power and initializing. Call for service.
Fault:NV Cksum	Nonvolatile RAM checksum failure.
Fault:No Font	No printable font found in printer. Try to clear fault by cycling power and initializing. If fault does not clear, call for service.
Fault:XXX HD FAN	A print head fan in the ribbon deck has failed. XXX - LFT for Left, LCT for Left Center, RCT for Right Center, and RT for Right fan. Call for service.
Fault:REAR FAN	The rear fan for the logic circuit boards has failed. Call for service.

Operator Troubleshooting (continued)

Electrical Problems

Use Table 3-3 when problems are experienced with the display, pushbuttons, or data printouts.

TABLE 3-3
Electrical Problems

PROBLEM	POSSIBLE CAUSE/CURE
No indication on the display panel when power is turned on.	<ul style="list-style-type: none">■ Make sure that the power cable is plugged into the printer and wall outlet.■ Check for power at the wall outlet using a known good appliance.■ Check thumbscrews and press "X" on ribbon deck.■ Check the printer for blown fuse.
Some pushbuttons are inoperative.	<ul style="list-style-type: none">■ Normal if printer is online.■ Offline: Printer may be locked up. Try to print a status as future reference for strap settings and then initialize the printer.
Printer does not respond correctly to pushbutton commands.	<ul style="list-style-type: none">■ Invalid configuration may be causing printer to lock up. Turn power off and then back on. If problem persists, initialize the printer.
Incorrect or no printout.	<ul style="list-style-type: none">■ Check interface cable connections.■ Selected speed (baud rate) may not be compatible with host. Reset serial interface data rate.■ Parity selected may not be compatible with host. Reset serial interface parity type.■ Interface strap settings may not be compatible with host. Recheck settings and compare to host protocol settings.

Operator Troubleshooting (continued)

Mechanical Problems

Use Table 3-4 when problems are experienced with paper feeding and print quality.

TABLE 3-4
Mechanical Problems

PROBLEM	POSSIBLE CAUSE/CURE
Paper does not feed properly.	<ul style="list-style-type: none">■ Paper supply in lower enclosure not aligned properly.■ Paper snagging on box. Cut top of box off.■ Paper not loaded properly. Reload paper and check all four tractors for proper adjustment.
Paper tearing, paper "walking" out of tractors, elongation of paper pin holes.	<ul style="list-style-type: none">■ Excessive tension on paper. Readjust paper thickness adjust lever, readjust print gap adjust wheel, check right side upper and lower tractors for correct lateral paper tension.
Paper jammed.	<ul style="list-style-type: none">■ Paper jams are most often caused by incorrect paper tension (see above) or misaligned tractors or paper. <ol style="list-style-type: none">1. Turn the Print gap adjust wheel to the LOAD position and physically clear paper jam.2. Reload paper, readjust right side tractors, paper tension, and gap.3. Press TEST/CLEAR to print buffered data and to clear display.

(continued)

Operator Troubleshooting (continued)

TABLE 3-4 (continued)
Mechanical Problems

PROBLEM	PROBABLE CAUSE/CURE
Light printing	<ul style="list-style-type: none">■ Ribbon worn. Install a new ribbon.■ Paper gap too large. Turn print gap adjust wheel for a smaller gap.
Ribbon droops on one side during printing or outer columns of print missing.	<ul style="list-style-type: none">■ Ribbon cartridge improperly installed. Check installation by repeating installation procedure.■ Print heads too close to paper. Adjust paper gap setting for thicker paper.
Weak or absent printing in some columns, light or missing dots in adjacent columns, poor print quality in a narrow zone of the print area. :WD XX, :WDAct XX, or :DriverCkt may be displayed.	<ul style="list-style-type: none">■ Check for loose cable connection on print head actuators.■ Defective print module. Replace or move the suspect module to a different zone. If the problem remains and is localized in the same zone, cable or driver circuitry may be defective. Call for service. <p>O. K. to continue using printer if light or missing dots can be tolerated temporarily.</p>

Operator Troubleshooting (continued)

Self-test Error Messages

Self-test diagnostics are run:

- During the power-on sequence.
- After initialization by either the control panel keypad or the initialization switch.
- After printing.
- When requested from the host by the ESC Q sequence.

The following table shows the display message, fault, and error message. (The error message is only used when requested by ESC Q - See note.) The fault column indicates which circuit board is defective.

NOTE: The error message is used only in ANSI emulation with serial interface. When an ESC Q is received, the printer performs a self-test and sends the appropriate error message to the host if a fault is found. DCS = ESC P and ST = ESC \.

TABLE 3-5
Diagnostic Fault Codes

DISPLAY	FAULT	ERROR MESSAGE
Self Test	Self-test in progress.	N/A
St:Initialize	Control panel switch in ISU position.	N/A
St:TTLB checksum	TTLB board ROM checksum failure.	DCS IROM ST
St:TTLB dram	TTLB board dynamic RAM failure.	DCS IDRAM ST
St:TTLB sram	TTLB board static RAM failure.	DCS IWRAM ST
St:TTLB dma X	TTLB board DMA controller X failed.	DCS IDMAx ST
St:TTLB timer X	TTLB board timer X failed.	DCS ITx ST
St:TTLB interrupt	TTLB board interrupt controller failure.	DCS IINT ST

Operator Troubleshooting (continued)

TABLE 3-5 (continued)
Diagnostic Fault Codes

DISPLAY	FAULT	ERROR MESSAGE
St:TTLB nvrnm	TTLB nonvolatile RAM failure.	DCS INVR ST
St:TTLB swing rd	TTLB swing reduction logic failure.	DCS IHDW ST
St:TTLB nv cksum	TTLB nonvolatile RAM checksum bad.	DCS SBAT ST
St:Parallel Fail	TTLB parallel interface failure.	DCS PID ST
St:Serial Failed	TTLB serial interface failure.	DCS HSD ST
St:TTMI error	Invalid response from TTMI board.	DCS SDMAx ST
St:TTMI noresp	No response from TTMI board.	DCS HID ST
St:Shuttle Error	Shuttle cannot stabilize.	N/A
St:TTMI checksum	TTMI board ROM checksum failure.	DCS HIROM ST
St:No Interface	No interface found.	N/A
Online:WD xx or Online:WDAct xx	Defective wire driver or actuator.	DCS ACT ST
Loading.....Wait	Self-test completed with no errors found, printer software is loading.	DCS OK ST

NOTE: Printer option strap B40 must be IN to perform the complete parallel and serial interface self-test.

User Replaceable Parts

This printer has been designed so that the parts that most likely wear out after extended use are replaceable by the operator.

These parts include:

- Print heads.
- Ribbon smudge shield.
- Tractor assemblies.
- Ribbon drive mechanism.

The replacement of these parts requires only a few minutes and no special tools. Replacement instructions are provided with each replacement kit ordered from your authorized service agent or distributor.

Print Head Replacement

The 33 print heads in this printer are identical. If a replacement print head is temporarily unavailable, rearrange the heads so that the defective one is located in an area that is least likely to be used. Relocating the defective head to the far right end of the shuttle would still allow a full 12.8-inch line (128 characters at 10 cpi) to be printed starting at the left.

Print heads for the 400-lpm printers have one actuator. See Figure 3-1. Print heads for the 800-lpm printer have two actuators. The handle is used to lift the print head from the printer. During installation, press down and to the right on the barrels of the print head to position it properly.

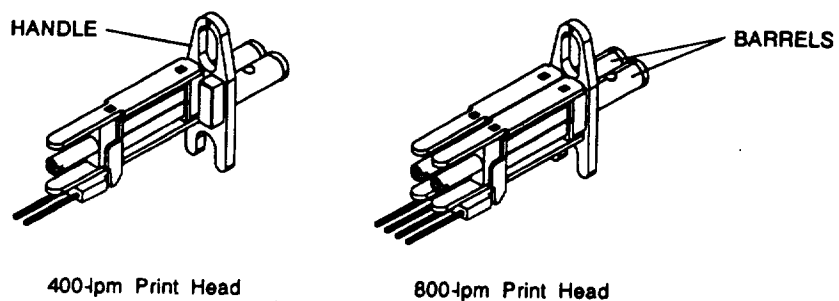


Figure 3-1

The section starting on the next page covers the testing and replacement of the print heads.

See Appendix D for information on ordering print head replacement kits.

NOTE: Do not operate the printer with a print head removed. All 33 heads must be in place with their connectors secured to maintain shuttle balance.

Print Head Replacement (continued)

Print Head Test

NOTE: Recommended paper for print head tests:
20-lb, single-part, white (such as Moore's #1410C)

If a print head actuator fails, run the print head test to check for weak actuators that may also need to be replaced.

With the printer in **Local**, press:

- 3 - (Function Mode)
- 0 or 1 - (Next Option or Previous Option) until **FCT:Alignment** is displayed.
- 4 - (Enter) to enter the alignment menu.
- 4 - (Enter) to enter the patterns menu.
- 0 - (Next Option) until **Patrn:Head Test** is displayed.
- 4 - (Enter) to start the test.

The printer will switch to low intensity and print a checkerboard pattern. A white stripe in the printout identifies the location of a failed print actuator. A weak or marginal actuator will have missing or light dots in the printout.

Leave the printout in the printer to help identify the correct print head to be removed.

Removal

To remove and replace a print head, complete the following steps:

1. Turn the printer power off and disconnect the power cable from the AC source.
2. Open the top access door and set the print gap adjustment wheel to the **LOAD** position.
3. Remove the ribbon cartridge.
4. Tilt the control panel up and towards the front of the printer.
5. Unscrew the two captive thumbscrews and remove the ribbon deck.

NOTE: If the printer has been printing for an extended time, allow it to cool for five minutes.

6. Remove the Allen wrench from the foam padding. See Figure 3-2.

Print Head Replacement (continued)

7. Unscrew the two screws securing the print head cable cover for the print head to be removed. See Figure 3-2. Unscrew the screws until their ends are flush with the end of the cover.

NOTE: On 400-lpm printers, the cable covers are attached in pairs. Three screws must be loosened to remove the covers.

When removing print heads 6, 17, and 28 on a 800-lpm printer, two cable covers must be removed. Remove covers 1 and 2 for print head 6, covers 3 and 4 for print head 17, and covers 5 and 6 for print head 28.

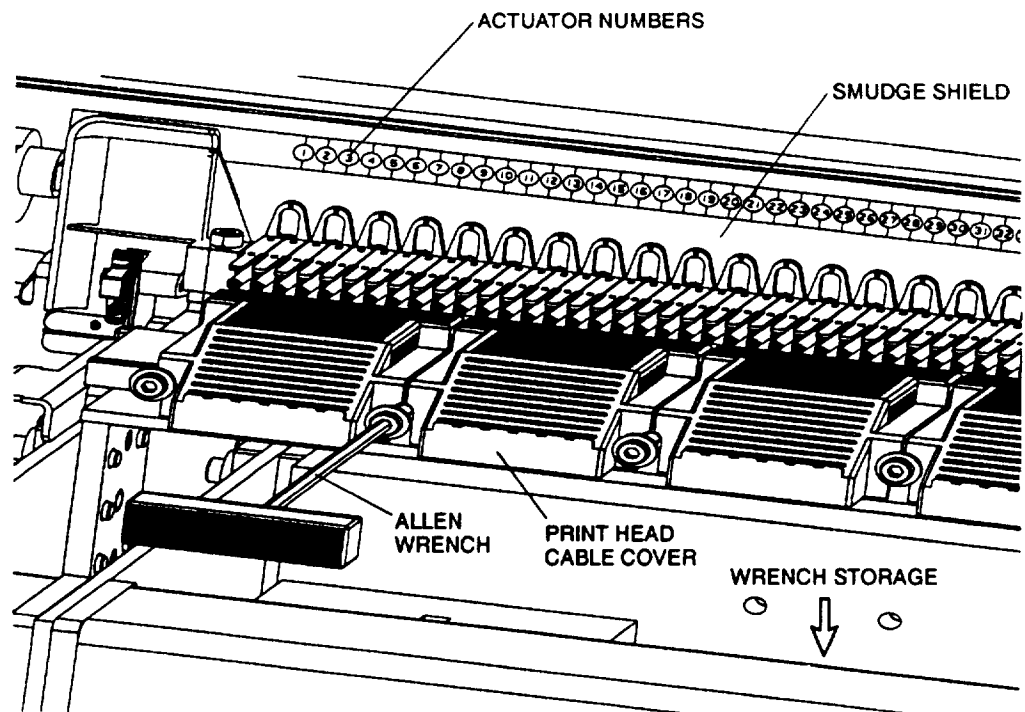


Figure 3-2

8. Remove the cable cover by pulling back on it while wiggling it from side to side. After it is disconnected, lift up on the back of the cover to clear the screws.

Print Head Replacement (continued)

9. Each print head number is shown in a large circle on the label underneath the print heads. See Figure 3-3. Lay the Allen wrench down between the dotted lines over the number of the head to be removed. The print head screw underneath the head is difficult to see; however, you can feel it with the wrench. See Figure 3-3.
10. Loosen the screw 1/2 turn.
11. Grasp the print head by the handle and lift it out of the printer. See Figure 3-3.

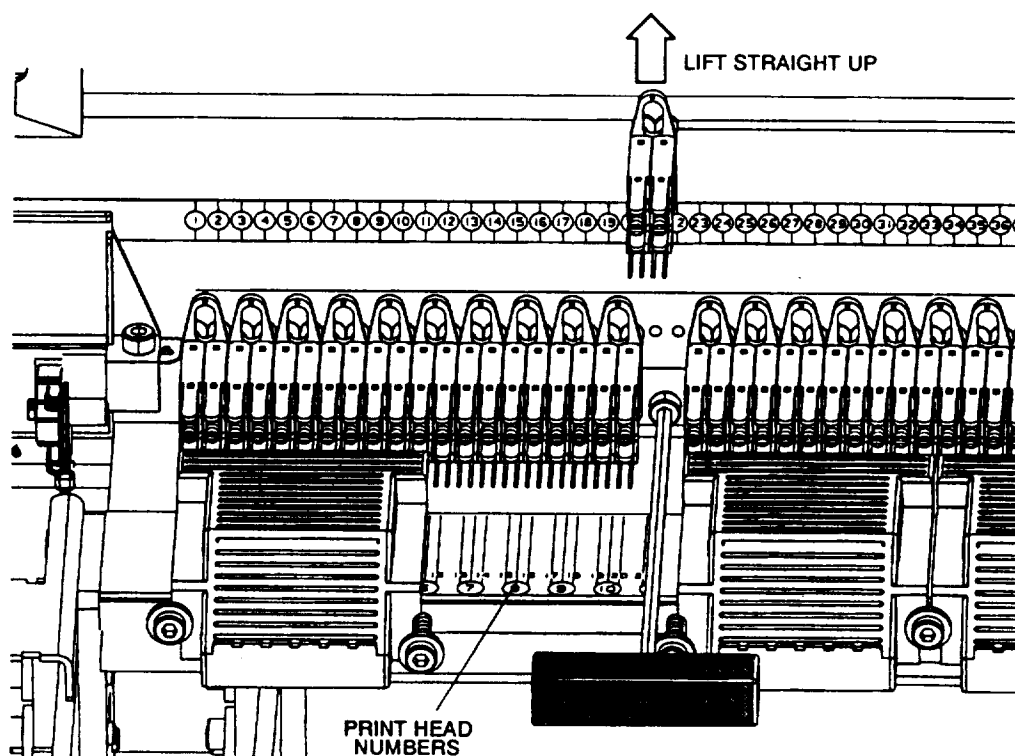


Figure 3-3

Print Head Replacement (continued)

12. Place the new print head over the print head screw. Press down and to the right on the barrels of the print head and tighten the screw. See Figure 3-4.

NOTE: If there is not enough or too much clearance for the new print head, loosen the print head screws on all of the heads to the left of the one you are replacing. When the new print head is in place, tighten all print head screws starting with the new one and working towards the left side of the printer. Keep all the print heads snug against the head on the right.

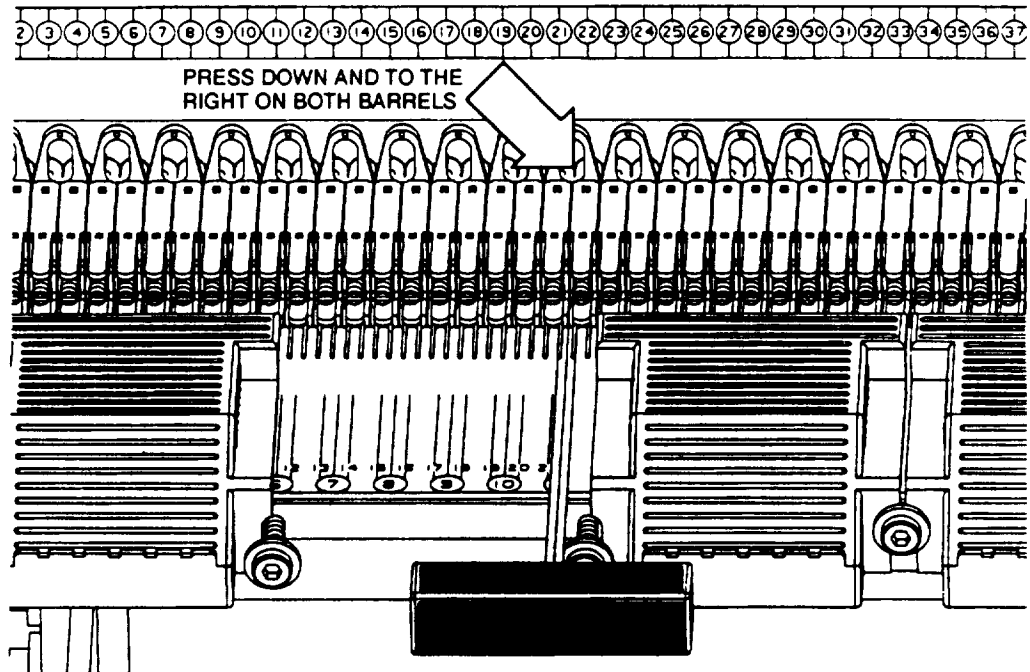


Figure 3-4

13. Push the cable cover/connector over the connecting pins on the print heads. Wiggle the cover from side to side while pushing the connector onto the pins. When in place, press down on the end of the cover while tightening the cover screws.
14. Install the ribbon deck and a ribbon cartridge. Make sure the thumbscrews are tight on the ribbon deck.

Note: Press firmly on the "X" on the ribbon deck (as instructed on the label) to ensure proper connection. A poor connection will leave the printer in an interlock power off condition (no power, no displays, etc.).

To recover from this condition, press firmly on the "X". There will be a delay of several (at least 2) minutes before power restoration.

15. Apply power and run the printer head test again to verify correct operation.

Chapter 4. Printer Interface

Introduction

These printers are configured with both CENTRONICS parallel and RS-232C serial interfaces. The 36-pin parallel and 25-pin serial interface connectors are located at the rear of the printer cabinet. See Figure 4-1.

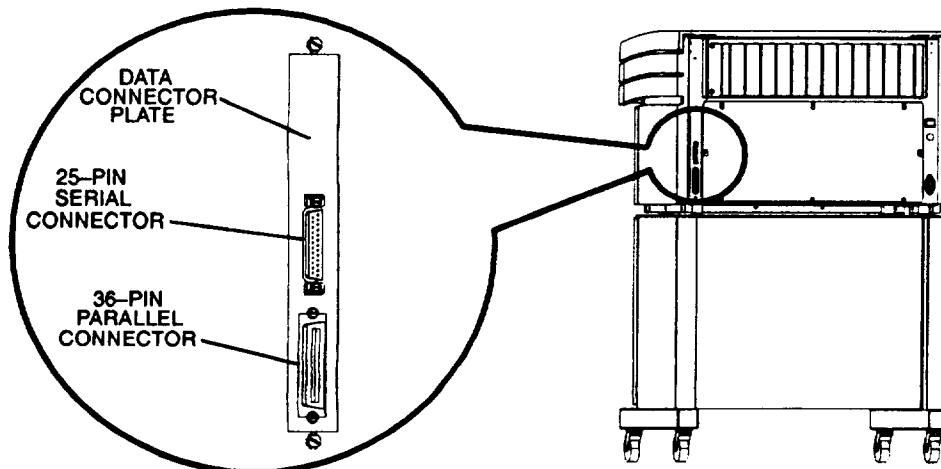
Both interfaces can be monitored for data by selecting the multisource option from the control panel.

The circuitry for Dataproducts short line parallel interface is resident in the printer. A different data connector plate with the proper connector is normally required to use the short line interface and is available as an option.

Options available:

- Dataproducts short line (data connector plate with connector and internal cable).
- Dataproducts long line (circuit board, data connector plate with connector and internal cable).

Both options are available with either a 50-pin Winchester or 50-pin D-type connector. See Appendix D for a complete list of options.



Interface Connectors
Figure 4-1

Parallel Interface

Interface Signal Path

This printer uses a high-speed parallel interface to accept data transfers at rates up to 300,000 characters per second.

The interface board contains the circuitry needed for CENTRONICS parallel and Dataproducts short line parallel interfaces. The Dataproducts interface requires an optional internal cable with the proper connector.

The optional Dataproducts long line parallel interface requires an additional circuit board as well as the internal cable with the proper external connector. This long line interface is used for installations where the printer may be located up to 500 feet (152 meters) from the host.

All parallel interfaces accept seven- or eight-bit data transfers.

Input Buffer Size

Two 4090-byte buffers are provided to store data when using the parallel interface. When one buffer is full, incoming data is switched to the second buffer. When using the multisource interface option, buffer size is reduced to 2045-byte. This allows both the parallel and serial interfaces to have two 2045-byte storage areas.

CENTRONICS Interface Operation

The data source can clear the input buffer through the PRIME lead before initiating a data transfer. Selection of the printer for receiving data will cause the SELECT line to go high, identifying the printer to the data source as being available to print received data.

Data is applied to the printer on eight parallel lines on specific pins at the interface reserved for this purpose. Each eight bits placed on the parallel input data bus is strobed into a latch by the STB pulse. Thereafter, the printer moves the data into a buffer for subsequent printing by means of a direct memory access routine.

The printer accepts the data and control signals from the data source. Printer status is furnished to the host through the data cable via the interface logic board.

Parallel Interface (continued)

Parallel Interface Control Options

Parallel interface control is divided into two categories: software control and hardware configuration.

Software Control

Parallel interface straps are used to set the programming functions within the printer for a particular application. The straps are set using the keypad pushbuttons. The parallel interface must be selected before the straps will appear in the display menu.

See Appendix F for a complete listing of the available straps and the instructions for changing the settings.

Hardware Configuration

The application specific integrated circuit (ASIC) technology used in this printer allows the hardware portion of the interface to be configured using the keypad pushbuttons.

The display menu choices allow setting all straps simultaneously to the factory default settings or changing the setting of each strap individually.

Appendix F contains a listing of all hardware straps, the SMPI jumper number that they replaced, and the recommended (default) settings for use with CENTRONICS or Dataproducts parallel interfaces.

CENTRONICS/Dataproducts Settings

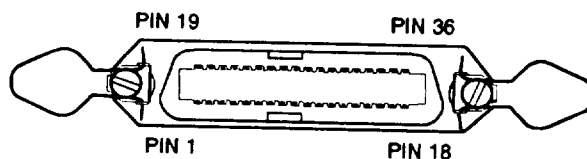
When either the CENTRONICS or Dataproducts interface is selected, the hardware straps automatically default to the settings recommended for that interface. (See the default settings in the Appendix F listing.)

Individual strap changes should be saved to nonvolatile memory by pressing **3 - 0 - 0 - 4 - 1 - 4** while the display is showing **Local:**.

Saving the settings allows you to recall the settings (3 - 0 - 0 - 4 - 0 - 4) after an interruption in power or after a keypad printer initialization (3 - 0 - 0 - 4 - 4).

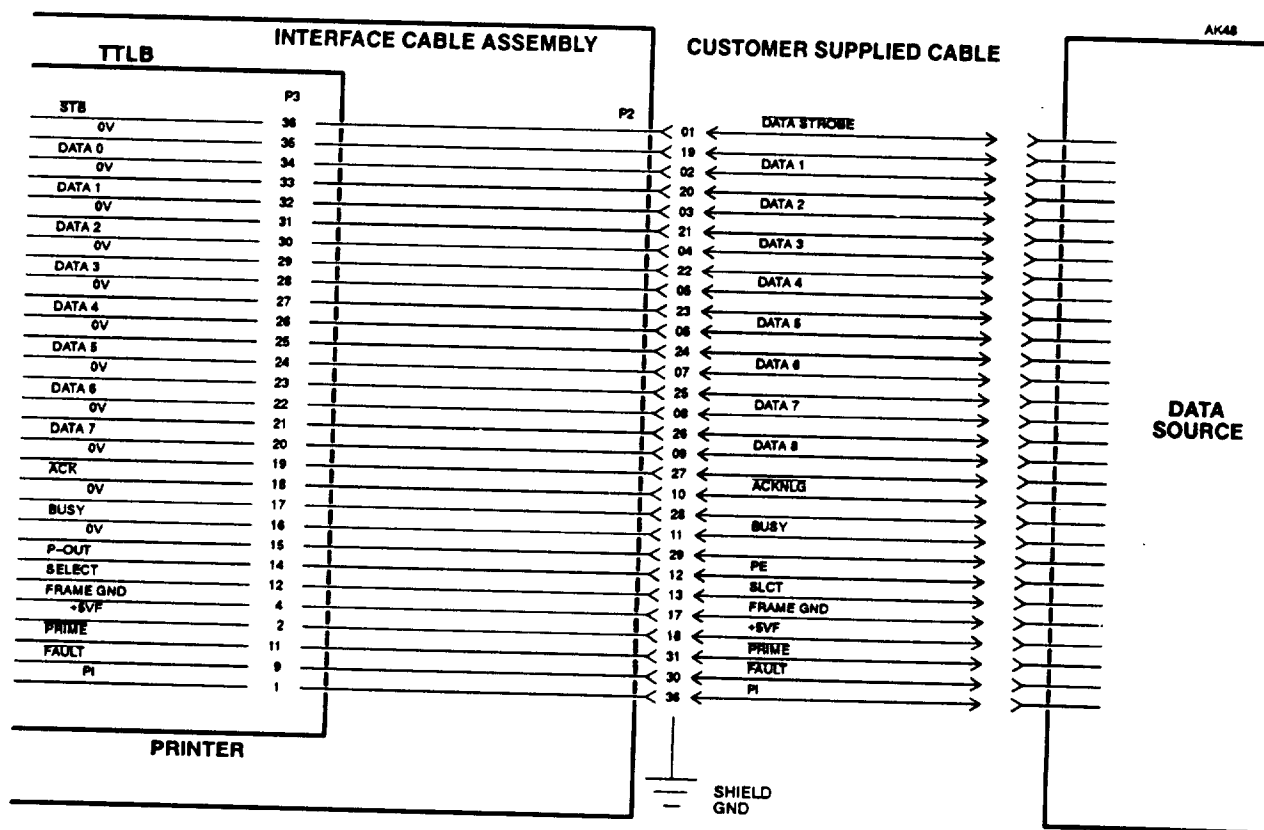
Parallel Interface (continued)

Parallel Interface Pin Assignments



**Parallel Interface 36-pin Panel Mount Receptacle
Figure 4-2**

The parallel interface data cable requires a 36-pin male connector.
(Amphenol Part No. 57-30360 or equivalent)



**CENTRONICS Parallel Interface Cable Pin Assignments
Figure 4-3**

Parallel Interface (continued)

CENTRONICS Interface Signal Definition

STB - Input from the data source. The strobe pulse must be a minimum of 0.5 μ s in duration. The strobe pulse is used to clock the data from the data source into the interface board data latches. The strobe pulse may be inverted by hardware strap H29.

DATA0 - DATA7 - Data bits 0 through 7 are input from the data source. A high level represents a binary ONE and a low level represents a binary ZERO. All data received is identified by decoders as printable or nonprintable, with an inherent decoder delay.

Control codes that affect printer operation are decoded and stored. Hardware straps permit selection of desired control codes for printer functions.

Data setup time is not necessary. The strobe pulse can be generated by the data source concurrent with placing the data on the bus.

The printer can receive 7-bit data where the eighth bit will cause the character to be printed in the alternate font. The alternate font is determined by the settings of control straps A17 - A20.

ACK - The acknowledge pulse is generated by the printer to indicate to the data source that a character has been received. The ACK is generated 2.5 μ s after the trailing edge of the strobe is received. The ACK pulse is 2.5 μ s in duration. Hardware straps permit changing the pulse width or disabling ACK.

BUSY - BUSY is generated by the printer when data cannot be received. The BUSY signal may be inverted by hardware strap H26. Several printer conditions (fault, paper out, etc.) are strap-selectable to cause a BUSY condition.

PAPER OUT - The PAPER OUT state is a low level under normal conditions. When a PAPER OUT condition occurs, the TTLB board generates a level change at the output to tell the data source that the printer can no longer receive data for printing. Hardware strap H31 permits inversion of this signal.

SELECT - The SELECT state is high when the printer is in the SELECT mode. When DESELECT occurs, the TTLB board generates a level change at the output to tell the data source that the printer is in a DESELECT state. Hardware strap H30 permits inversion of this signal.

Parallel Interface (continued)

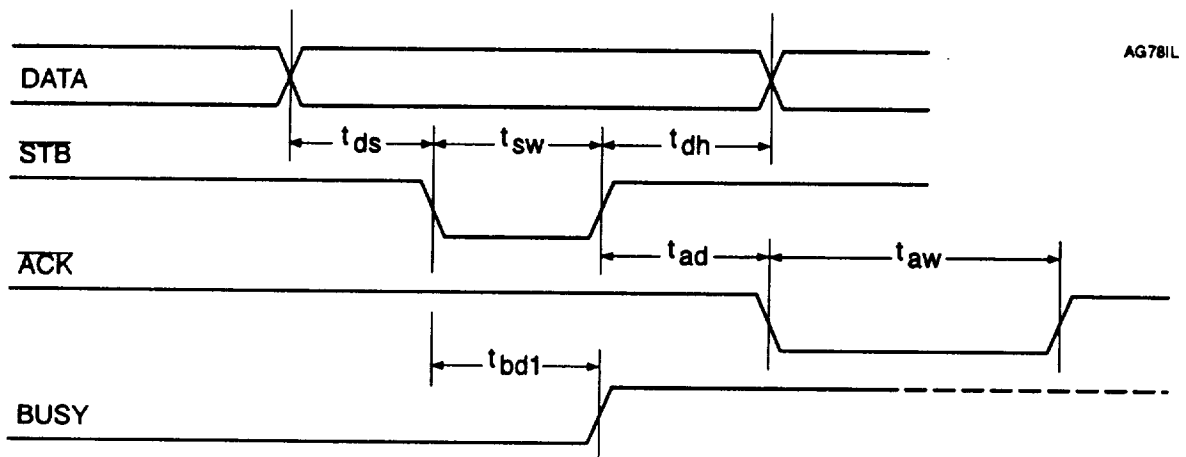
PRIME - This signal is input from the data source. The input buffer is cleared in anticipation of receiving new data for printing.

FAULT - The FAULT signal is high under normal operating conditions. The occurrence of a printer fault, paper out, or deselect generates a fault which lowers the FAULT signal. Hardware strap H32 permits inversion of this signal.

+5 VDC - This voltage is intended to tell the data source that the printer is connected to the host, it is turned on, and the logic voltage is present in the printer.

PI - The source-generated PAPER INSTRUCTION lead is used to inform the printer that the information on the data lines is to be treated as a paper move command or page format data.

CENTRONICS Interface Signal Timing



KEY

- t_{ds} - Minimum data setup = 0 sec.
- t_{dh} - Minimum data hold time = 0 sec.
- t_{sw} - Minimum STB width = 500 ns.
- t_{ad} - Maximum ACK delay from STB trailing edge = 3.0 μ s
- t_{bd1} - Maximum delay of BUSY after STB leading edge = 1.2 μ s
- t_{aw} - Typical attack width = 2.4 μ s

Figure 4-4

Serial Interface

Serial Interface Operation

Select the serial interface using the control panel keypad – **Local:**

4-0-0-0-0-4-4, 0 until **Type:Serial** shows, then **4**. See Chapter 2.

The serial interface accepts data at selectable rates from 300 to 38.4K bits per second. Data can be received in 7- or 8-bit form with a variety of start/stop and parity combinations.

When printing the high-speed font at 10 cpi and 133 characters a line (counting an LF), the 800-lpm printer requires a sustained serial rate of 1774 characters per second. Using 10-bit serial characters requires a baud rate of at least 19,200 for maximum throughput.

Important: The printer is provided with a number of interface strap options (Appendix F) that can be used to supply feedback to the data source regarding the printer's status. The way the printer reflects BUSY/READY status is dependent on what the source expects to see. You must configure the printer's interface firmware to match the method used by the source.

The printer can be strapped to generate a DC3 code (sometimes referred to as XOFF) to reflect "BUSY" and a DC1 (XON) code to reflect "READY" conditions. The use of DC1 and DC3 requires a full duplex communication channel, since these codes are transmitted simultaneously with the receipt of data.

The BUSY condition can also be reflected by the on/off condition of the CA or CD leads in the interface.

Using the ETX/ACK protocol requires that a block of text from the host be terminated by an ETX control code. When the printer sees the ETX, it sends an ACK to the host, signaling receipt of the block. The maximum block size is the input buffer minus one.

One of two modes of ETX/ACK operation can be selected using serial interface straps A25 and A26.

With A25 IN, an immediate ACK is sent for each received ETX until the buffer is at least 75% full. At 75% full, the buffers switch and the data is processed.

With A26 IN, each buffer holds only one block of data, and the ACK response won't be sent until one buffer has transferred the data for processing.

Strap A26 overrides A25 if both straps are IN.

Signals and signal levels conform to EIA RS-232C/CCITT V.24 standards.

Serial Interface (continued)

Serial Buffer Characteristics

The printer uses two 4090-byte buffers to temporarily store data during the time intervals when the printer is occupied with nonprinting tasks (such as paper movement) or when the data flow temporarily exceeds the print rate. The printer processes the data in one buffer while receiving data in the other buffer.

When one buffer is full (reaches a preset threshold), the interface signals a BUSY condition to the host and a switch is made to the other buffer if it is empty. A READY condition is sent when an empty buffer has been switched and is prepared to receive data.

The threshold may be set adjusted in 50-byte increments from 200 to 3750 bytes through the control panel using the **SerOp:Busy Trip** menu.

The buffers are reduced to 2045 bytes if the multisource interface has been selected and the threshold adjusted from 200 bytes to 1525 bytes.

Buffer Overrun

If the host continues to send data after the printer reports BUSY, the buffer will eventually be filled. At this point, any additional data sent from the host will be discarded. When the buffer is later printed, a warning (*BUFFER OVERRUN*) will be printed after the printed data.

Accepting Data While Offline

Serial interface straps B7 and B8 allow the buffer to accept data while offline. This feature is designed to accept and store the data to prevent loss while signaling the host to stop sending data until the printer is ready. Strap A5 must be IN since the printer uses XON/XOFF (DC1/DC3) to signal the host.

Strap B7 allows the buffer to react to data offline the same way it reacts online. Data is accepted until the trip point is reached (520 characters from full) when XOFF is transmitted to the host. Data will continue to be received until the buffer is full. Subsequent data will be lost.

Strap B8 IN causes XOFF to be sent for every 20 characters received until the buffer is full. If lead control has been selected, BUSY will only be sent once after the first 20 characters.

Strap B8 IN overrides strap B7.

Serial Interface (continued)

Serial Interface Data Stream

Most serial interface applications can be matched by using various combinations of stop bit(s), parity, and 7- or 8-bit data. Appendix F and Chapter 2 have information on changing strap settings.

Interface strap A30 selects 1 or 2 stop bits, B2 selects parity, and B6 selects 7- or 8-bit data.

The following chart illustrates the possible combinations.

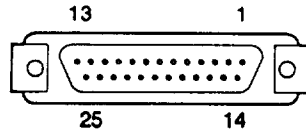
INTERFACE STRAP			DATA STREAM	TOTAL BITS
A30	B2	B6		
0	0	0	START + 7 DATA + PARITY + 1 STOP BIT	10
1	0	0	START + 7 DATA + PARITY + 2 STOP BITS	11
0	1	0	START + 7 DATA + 1 STOP BIT	9
1	1	0	START + 7 DATA + 2 STOP BITS	10
0	0	1	START + 8 DATA + PARITY + 1 STOP BIT	11
1	0	1	START + 8 DATA + PARITY + 2 STOP BITS	12
0	1	1	START + 8 DATA + 1 STOP BIT	10
1	1	1	START + 8 DATA + 2 STOP BITS	11

NOTE: Interface strap B1 OUT causes the 8th bit to be interpreted as a PI lead. * DATA becomes 7 DATA + PI.

Serial Interface (continued)

Serial Interface Pin Assignments

AG791L

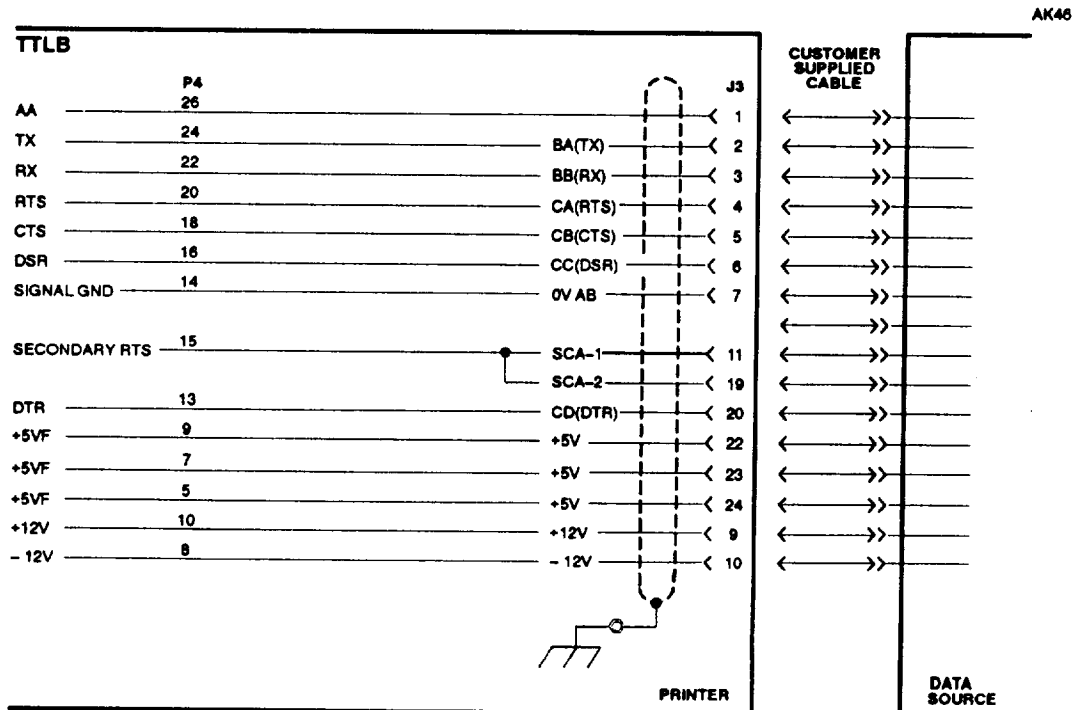


Serial Interface 25-pin Panel Mount Receptacle

Figure 4-4

The serial interface data set cable requires the following or equivalent parts to connect to the female panel mounted connector.

- Cannon 25-pin plug DBM-25P
- Cannon shell BD115339-22
- Cannon screw lock (2) D20419-21



Serial Interface Cable Pin Assignments

Figure 4-5

Serial Interface (continued)

Serial Interface Signal Definition

PIN	SIGNAL	DIRECTION	DESCRIPTION
1	AA	—	Chassis Ground
2	BA (TX)	From Printer	Printer transmits coded BUSY/READY status as DC1/DC3 (XON/OFF) or as a 200msec. BREAK.
3	BB (RX)	To Printer	This is the primary input line that carries the data from the source to the printer. Data is accepted while online and for 1 second after going offline to allow for line delays during satellite communications.
4	CA (RTS)	From Printer	Request To Send - Normally high. Can be used to reflect BUSY/READY (A8), FAULT (A16), and SELECT (A24) status. A32 is used to reverse the level.
5	CB (CTS)	To Printer	Clear To Send - Used to indicate to the printer that transmission to the host is not inhibited. Printer can transmit if using CD1/DC3 or BREAK protocol. CB must be positive or open (not tied to CA or CD) for DC1/DC3 protocol.
6	CC (DSR)	To Printer	Data Set Ready - Printer transmitting is inhibited unless signal is high. See strap B4 in Appendix F. Printer can still receive data.
7	OV	—	Printer Signal Ground

Serial Interface (continued)

Serial Interface Signal Definition (continued)

PIN	SIGNAL	DIRECTION	DESCRIPTION
11	SCA-1	From Printer	Secondary Request To Sent - Permits printer status to be reflected in the same manner as CA. See straps A4, A12, A20, and A27 in Appendix F.
19	SCA-2	From Printer	Same as pin 11.
20	CD (DTR)	From Printer	Data Terminal Ready - Permits printer status to be reflected in the same manner as CA. See straps A7, A15, A23, and A28 in Appendix F.

Serial Interface Control Jumpers

The jumpers defined below are used to provide control of the hardware interface. They are located on the logic board (TTLB). The following shows the standard configuration.

STANDARD	JUMPER	DESCRIPTION
IN	J5	Transmit always enabled regardless of the state of the CB lead.
OUT	J6	Host CB lead function determined by J7 and J8.
IN	J7	CB lead pulled high but is still controlled by the host.
OUT	J8	CB lead is controlled only by the host.

Appendix A. Unpacking Instructions

These instructions are provided as a reference for those who:

- are unpacking multiple printers.
- have this manual but don't have the printer yet.
- wish to save the unpacking instructions as a guide to repacking the printer if the need arises.

Unpacking

1. Cut the shipping straps. See Figure A-1.
2. Lift the top off the shipping package. See Figure A-1.

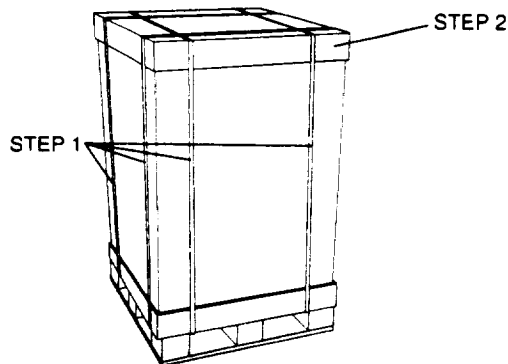


Figure A-1

3. Remove any items stored in the tray inside the shipping package. See Figure A-2.
4. Remove the tray. See Figure A-2
5. Remove the two pieces of ethafoam packing material from the top of the printer. See figure A-2.
6. Lift out the front wall of the shipping package sleeve. See Figure A-2.

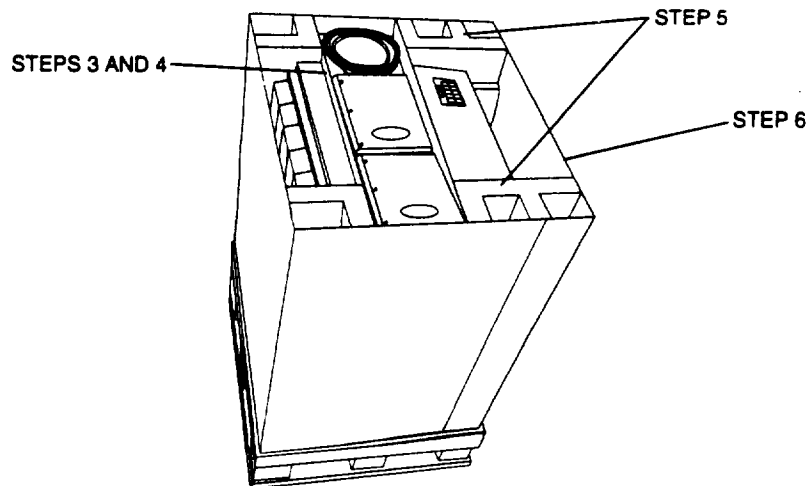


Figure A-2

7. Remove the packing material and box containing the paper handling system from in front of the printer. See Figure A-3
8. Remove the remaining portion of the shipping package sleeve. See Figure A-3

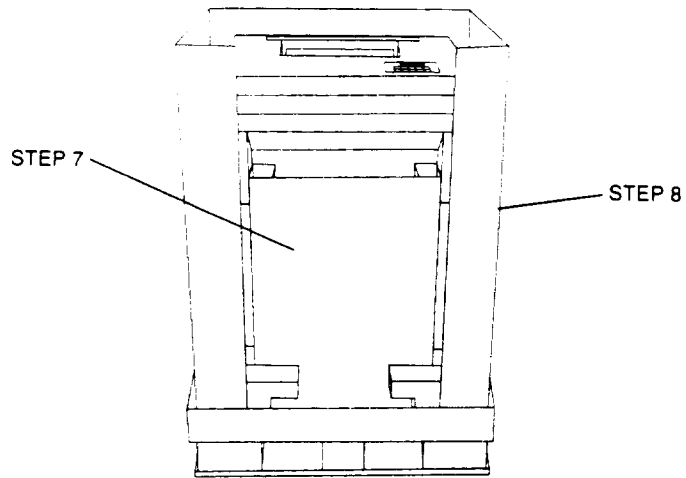


Figure A-3

9. Remove the ribbon cartridge box and the packing material from the rear of the printer. See Figure A-4.

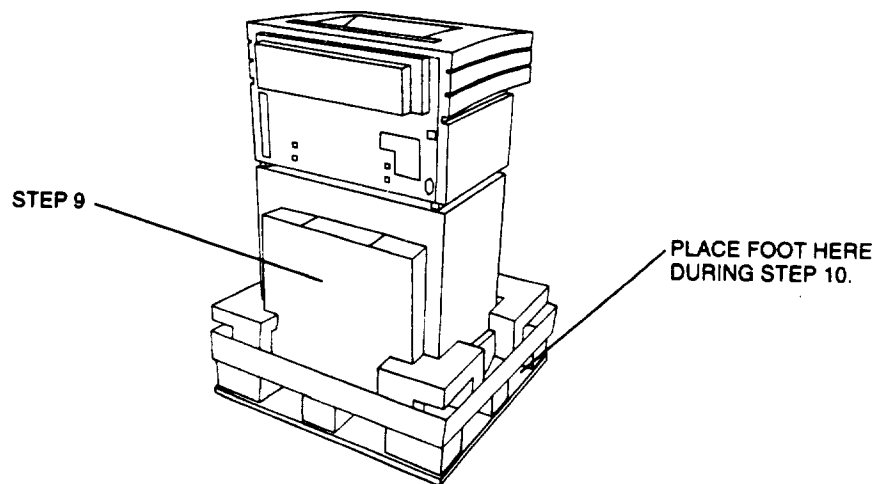


Figure A-4

CAUTION

The printer is top heavy. Use two people for the next four steps.

10. Using two people, carefully slide the printer, *in the shipping package base*, off of the pallet. This is easiest done with one person on one side of the printer and the other person on the other side. Place your foot on the pallet to prevent it from moving, and slide the printer forward off of the pallet.
11. Cut the four corners of the shipping package base so that the sides will lay flat. See Figure A-5.

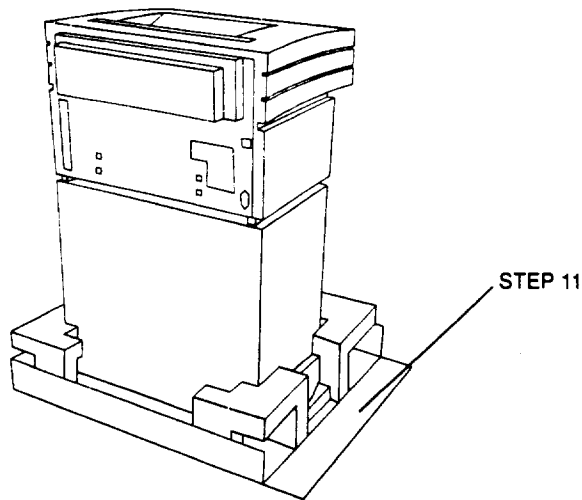


Figure A-5

12. Tilt the printer up slightly on one side and kick the ethafoam block out from under the printer. Carefully lower the printer.
13. Tilt the printer up on the other side and remove the other ethafoam block.
14. Remove the plastic bag from the printer.
15. Roll the printer off of the base of the shipping package.

Appendix B. Paper Specifications

The printer is designed to use edge-punched (sprocket-fed) fanfold paper. See diagram below. Multipart forms should be free of staples or stitching and preferably held together with glue or self-crimping techniques. They need to be of uniform thickness from side-to-side. In the case of special forms and gummed labels, it is best to consult your forms supplier for help in selecting the best forms construction and to try a sample to ensure satisfactory operation. The chart on the next page lists forms that should provide satisfactory performance.

Paper widths from 3 inches (76.2mm) to 16.54 inches (420.1mm) and form lengths from 0.33 inch (8.4mm) to 22 inches (559mm) can be accommodated. Fanfolds between 6 and 12 inches (15.2 and 30.5cm) apart are recommended.

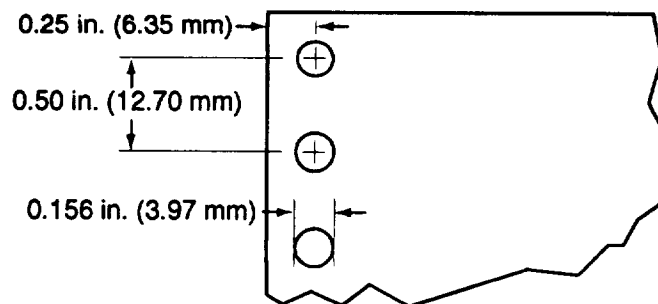
NOTE: High humidity may cause unsatisfactory paper feeding and handling. Low humidity may cause static buildup. Make sure you test how well the forms feed under various ambient conditions. Some recycled papers have a higher content of dust and debris, which may require more frequent cleaning of the printer.

The most satisfactory performance from the printer can be achieved with paper of the recommended weights as shown below.

Recommended Paper Weights

Number of Parts	Recommended Paper Weight	Weight of Carbon Insert Sheet
1	15 lb. (56 g/m ²)	
2, 3, or 4	13.5 lb. (50 g/m ²)	5 lb. (19 g/m ²)
5 or 6	12 lb. (45 g/m ²)	5 lb. (19 g/m ²)

Recommended maximum weight for single-ply paper is 24 lb.(90 g/m²). Maximum forms thickness should not exceed 0.025 inches. Cardstock up to 100 lb.(163 g/m²) can be handled.



**Sprocket Hole Details
Figure B-1**

Paper Specifications (continued)

Company	Catalog Number	Description	
Avery	4162	Clear Label, One-wide 3 1/2" X 15/16"	
Moore	J21147	24-lb. White Wove Envelope with Keen Edge	
	J13706	24-lb. White Wove Envelope	
	J21105	24-lb. Ivory Laid Textured Envelope	
	8530SG	One-wide Tab Card, Computer Punch Card	
	1530SG	Two-wide Tab Card, Computer Punch Card	
	1412T, 1412TC	Single-part 11" X 14 7/8" 15-lb.	
	1412T, 1412RH	Two-part 11" X 14 7/8" 15-lb.	
	1412T, 1412TQ, 1412RH	Three-part 11" X 14 7/8" 15-lb.	
	1412T, 1412TE	Four-part 11" X 14 7/8" 15-lb.	
	1412T	Five-part 11" X 14 7/8" 15-lb.	
	1412T, 1412TQ, 1412NP	Six-part 11" X 14 7/8" 15-lb.	
	TC7	110-lb. Time Cards	
	21022	20-lb. Laid Textured	
	13557	Six-part Universal Mailer	
	13060	Seven-part Universal Mailer	
	13086	Two-wide 3" X 5" Card 100-lb. White Tag Stock	
	29264	Mini-printer Label 3 1/2" X 15/16"	
	1410Q	Two-part 14 7/8" X 11"	
	1410CKP	One-part 14 7/8" X 11"	
	8510	One-part 8 1/2" X 11"	
	8512TQ	Three-part 8 1/2" X 11"	
	8512TQ	Six-part 8 1/2" X 11"	
	13078	3" X 5", 100-lb. White Tag Stock	
	9510J	Four-part 9 1/2" X 11"	
	9510CK, 9510J, 9510CJ	One-part 9 1/2" X 11"	
	1182T	One-part 11 3/4" X 8 1/2"	
	1280J, 1280CK	One-part 12" X 8 1/2"	
	1482TA, 1488TH	One-part 14 7/8" X 8 1/2"	
	NNSY 4430/26	Four-part 9 1/2" X 11"	
	P1-9511-15-00	One-part 9 1/2" X 11" 15-lb.	
	P1-9511-20-00	One-part 9 1/2" X 11" 20-lb.	
	13805	One-part 20-lb.	
	28084	Label, One-wide 3 1/2" X 15/16"	
	28118	Label, Two-wide 3 1/2" X 15/16"	
	28142	Label, Three-wide 3 1/2" X 15/16"	
	28183	Label, Four-wide 3 1/2" X 15/16"	
	NCR	2-10-L6	6-part Quick Mailer
		6240174082	8-1/2" X 11" Carbonless 5-part
		211093	Single-part 11" X 14-7/8" 15-lb.

Appendix C. Considerations for Operation

- Voltage: 115 or 230 VAC automatic sensing
- Input Voltage Variation: $\pm 15\%$ of assigned line voltage
(97-132VAC / 194-264VAC)
- Frequency: 48 to 65 Hz
- Power Consumption: 400 watts printing rolling ASCII draft font
- Dissipated Power: Maximum printing 1370 BTU/hour
- Weight: Unpacked 135 pounds (297 kg)
Shipping 150 pounds (330 kg)
- Overall size: Width 26.5 inches (67.3cm)
Height 42 inches (106.7cm)
Depth 25 inches (63.5cm)
Depth with paper handling system 35 inches (88.9cm)

An additional 20 inches (50.8cm) of clearance is required in front of the printer to open the pedestal door.

- Temperature: Operating +39 to +104 degrees Fahrenheit
(+4 to +40 degrees Centigrade)
Storage -40 to +158 degrees Fahrenheit
(-40 to +70 degrees Centigrade)
- Humidity: Operating 10 to 90% relative humidity noncondensing
Storage 5 to 95% relative humidity noncondensing

Appendix D. Parts, Accessories, Expendables, and Options

The items listed below are available from your authorized GENICOM distributor, service agent, or from GENICOM headquarters at the following address:

GENICOM Corporation
 Parts Sales
 1 Genicom Drive
 Waynesboro, Virginia 22980-1999

1-800-535-4364
 FAX: (703) 949-1392

When ordering, specify description, part or catalog number, and quantity desired.

Description	Part or Catalog Number
Ribbon Cartridge	4A0040B01
Ribbon Cartridge - Long Life with Reinker	4A0040B02
Print Head (400-lpm Printer)	4D0491G01
Print Head (800-lpm Printer)	4D0088G01
Print Head 5-Pack (400-lpm Printer)	4D0681G01
Print Head 5-Pack (800-lpm Printer)	4D0682G01
SmartGraphics Controller Kit	4A0646G01
Twinax/Coax Interface Kit	4A0043G01
50-pin D-Type Connector Kit	4A0044G01
50-pin Winchester Connector Kit	4A0683G01
Dataproducts Long Lines Interface with D-Type 50-pin Connector.	4A0045G01
Dataproducts Long Lines Interface with Winchester 50-pin Connector.	4A0684G01
Upper Tractor Kit	4D0679G01
Lower Tractor Kit	4D0680G01
Ribbon Smudge Shield	4D0685G01
Service Manual	GEK-88955

Appendix E. Print Samples

High Speed Font at 10 CPI

0123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdef
123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefg
23456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefgh
3456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghi
456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghij
56789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghijk
6789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghijkl
789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghijklm

Gothic Draft - Data Processing Font at 10 CPI

0123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdef
123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefg
23456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefgh
3456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghi
456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghij
56789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghijk
6789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghijkl
789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghijklm

Gothic Near Letter Quality (NLQ) at 10 CPI

0123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdef
123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefg
23456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefgh
3456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghi
456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghij
56789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghijk
6789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghijkl
789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`'abcdefghijklm

Character Graphics Font

αβγπΣσρ
χβΓπΣσρτ
χβΓπΣσρτξ
χβΓπΣσρτξθ
χβΓπΣσρτξθΩ
χβΓπΣσρτξθΩδ
χβΓπΣσρτξθΩδω

Print Samples (continued)

Correspondence at 10 CPI - Better quality than Draft - Better speed than NLQ.

0123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdef
123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefg
23456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefgh
3456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghi
456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghij
56789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijk
6789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijkl
789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklm

OCR-A

0123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdef
123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefg
23456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefgh
3456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghi
456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghij
56789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijk
6789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijkl
789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklm

OCR-B

0123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdef
123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefg
23456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefgh
3456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghi
456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghij
56789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijk
6789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijkl
789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklm

Courier NLQ at 10 CPI

0123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdef
123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefg
23456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefgh
3456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghi
456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghij
56789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijk
6789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijkl
789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklm

Italic NLQ at 10 CPI

0123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdef
123456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefg
23456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefgh
3456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghi
456789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghij
56789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijk
6789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijkl
789: ; <=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_`abcdefghijklm

Appendix F. Description of Strapping Options

This appendix explains the firmware strap settings, which are changed using the control panel pushbuttons.

- Save any strap setting changes using the **Setup:Store** feature to prevent losing them when power is removed or when the printer is initialized.
- Straps that change a default condition may not be recognized until a self-test is performed. Cycle the printer power or press the TEST/CLEAR pushbutton.

Parallel Interface Software Straps

With the parallel interface selected and the printer offline, select the parallel interface straps by pressing:

- 4 - (Program Mode)
- 0 - (Next Option) until **PRG:Interface Op** is displayed
- 4 - (Enter)
- 0 - (Next Option) until **IFOp:ParallelSet** is displayed
- 4 - 4 - 4 (Enter) until **IStrap:A1 OUT** is displayed

Use the NEXT OPTION or PREVIOUS OPTION pushbuttons until the desired strap is displayed and use the ENTER pushbutton to change the strap's setting.

Strap definitions for parallel interface are different from those for serial interface.

Strap Number	Meaning if IN	Meaning if OUT
A1 - A3	Reserved for future use.	
A4	No Prime on Select (Online).	Prime on Select.
A5**	No Fault on Paper Out or Deselect.	Fault on Paper Out or Deselect.
A6	Enable TOF/BOF leads.*	Disable TOF/BOF leads.*
A7	Include PI lead in parity.*	Do not include PI lead in parity.*
A8	Pass 8-bit data - Option Strap A32 determines 8th bit usage.	Bit 8 equals 0.
A9	Include bit 8 in parity.*	Do not include bit 8 in parity.*
A10	Character with parity error replaced by space.*	Character with parity error unchanged.*
A11	Enable parity checking.*	Disable parity checking.*
A12	Paper moving lead reflects paper out status.*	Paper moving lead does not reflect paper out status (lead is unused).*

*Dataproducts Interface Only

**To completely disable the BUSY lead, A5, H19, H20, H21, and H22 must be IN

A13-A40 Reserved for future use.

Parallel Interface Hardware Straps

The ASIC (application specific integrated circuit) technology used in this printer allows the hardware portion of the interface to be configured using the control panel pushbuttons.

In the following chart, the column labeled SMPI is a cross-reference to other shuttle matrix printers using non-ASIC interface boards.

C - Factory default setting for CENTRONICS interface. Automatically selected when the parallel interface and any emulation except Dataproducts is selected.

D - Factory default setting for Dataproducts interface. Automatically selected when the Dataproducts emulation is selected.

Selecting the HWstraps:Default option in the menu will set all 48 straps to the default settings depending on which emulation is in effect. Straps can also be changed individually.

Changing Hardware Strap Settings

With the parallel interface selected and the printer offline, select the parallel interface hardware straps by pressing:

- 4 - (Program Mode)
- 0 - (Next Option) until **PRG:Interface Op** is displayed
- 4 - (Enter)
- 0 - (Next Option) until **IFOp:ParallelSet** is displayed
- 4 - (Enter) to select **ParOp:Straps**
- 0 - (Next Option) until **ParOp:HWstraps** is displayed
- 4 - (Enter) to select

Press 4 - (Enter) for the default settings or press

- 0 - (Next Option) until **HWstraps:Set H** is displayed
- 4 - (Enter) to select **HWstrap:H1 OUT**

Use the NEXT OPTION or PREVIOUS OPTION pushbuttons until the desired strap is displayed, and use the ENTER pushbutton to change the strap's setting.

Parallel Interface Hardware Straps (continued)

Parallel Interface Hardware (HW) Strap Table

HWstrap	Default	State	SMPI	Function
H1	C,D	IN OUT	J16 J15	Interface lead PRIME high causes printer buffer clear. Interface lead PRIME low causes printer buffer clear.
H2	C,D	IN OUT	J13 J14	Enable the interrupt on all control codes. Interrupt disabled on all control codes except LF, VT, FF, CR, DC1, and DC3. Note straps H11 - H16.
H3	C,D	IN OUT	J12 J11	DEL decoded does not cause an interrupt. DEL decoded causes an interrupt.
H4	C,D	IN OUT	J10 J9	DEL decoded does not cause printer PRIME. DEL decoded causes printer PRIME.
H5	C,D	IN OUT	J8 J7	PERR reset by $\overline{IOW8}$ (EOL, CR, LF, VT, FF) or \overline{PRMSET} . PERR reset by the leading edge of the next data strobe or by $\overline{IOW8}$ or by \overline{PRMSET} .
H6	Reserved for future use.			
H7	C,D	IN OUT	J4 J3	Underline character treated as CR. Underline character printed.
H8	C,D	IN OUT	J2 J1	Latched interface lead PI causes an interrupt. Latched interface lead PI does not cause an interrupt.
H9	C,D	IN OUT	J36 J35	Interface lead ACK does not reflect ONLINE/LOCAL status. Interface strap A5 must also be IN. Interface lead ACK reflects ONLINE/LOCAL status.
H10	C,D	IN OUT	J34 J33	Selectable character conversion to space enabled. See H41 - H48. Selectable character conversion to space disabled.
H11	C,D	IN OUT	J32 J31	CR not decoded. CR decoded to generate an interrupt.
H12	C,D	IN OUT	J30 J29	FF not decoded. FF decoded to generate an interrupt.
H13	C,D	IN OUT	J28 J27	LF not decoded. LF decoded to generate an interrupt.
H14	C,D	IN OUT	J26 J25	VT not decoded. VT decoded to generate an interrupt.
H15	C,D	IN OUT	J24 J23	DC3 not decoded. DC3 decoded to generate an interrupt.
H16	C,D	IN OUT	J22 J21	DC1 not decoded. DC1 decoded to generate an interrupt.
H17	D C	IN OUT	J52 J51	Interface lead BUSY does not reflect ACK. Interface lead BUSY reflects ACK.
H18	C,D	IN OUT	J50 J49	Interface lead BUSY/DEMAND toggles with each character. Interface lead BUSY/DEMAND doesn't toggle with each character.
H19**	C,D	IN OUT	J48 J47	Does not allow software to control the BUSY lead. Allows software to control the BUSY lead.
H20**	C,D	IN OUT	J46 J45	Interface lead BUSY does not reflect (ONLINE/LOCAL) FAULT/ PAPER OUT status. Interface lead BUSY reflects (ONLINE/LOCAL) FAULT/PAPER OUT status.
H21**	D C	IN OUT	J44 J43	Interface lead BUSY does not reflect (FAULT) ONLINE/LOCAL/ PAPER OUT status. Interface lead BUSY reflects (FAULT) ONLINE/LOCAL/PAPER OUT status.

Parallel Interface Hardware Straps (continued)

HWstrap	Default	State	SMPI	Function		
H22**	D	IN	J42	Interface lead BUSY does not reflect (PAPER OUT) ONLINE/LOCAL/FAULT status.		
	C	OUT	J41	Interface lead BUSY reflects (PAPER OUT) ONLINE/LOCAL/FAULT status.		
H23	C,D	IN	J40	Interface lead ACK does not reflect PAPER OUT.		
		OUT	J39	Interface lead ACK reflects PAPER OUT.		
H24	C,D	IN	J38	Interface lead ACK does not reflect FAULT.		
		OUT	J37	Interface lead ACK reflects FAULT.		
H25	C,D	IN	J71	Interface leads DATA 0-7, VFURDY, PAPMVG, PARERR, TOF, BOF, and PARBIT are active high.		
		OUT	J72	Interface leads DATA 0-7, PAPMVG, PARERR, TOF, BOF, and PARBIT are active low. VFURDY active only when DP VFU loaded.		
H26	C D	IN	J68	Interface lead BUSY is active high.		
		OUT	J67	Interface lead BUSY is active low.		
H27	C,D	IN	J66	Interface lead PI active high.		
		OUT	J65	Interface lead PI active low.		
H28	D C	IN	J64	Interface lead PI enabled.		
		OUT	J63	Interface lead PI disabled.		
H29	D C	IN	J59	Interface lead STB is active high.		
		OUT	J60	Interface lead STB is active low.		
H30	C,D	IN	J58	Interface lead SELECT is active high.		
		OUT	J57	Interface lead SELECT is active low.		
H31	C,D	IN	J55	Interface lead PAPER OUT is active high.		
		OUT	J56	Interface lead PAPER OUT is active low.		
H32	C,D	IN	J54	Interface lead FAULT is active high.		
		OUT	J53	Interface lead FAULT is active low.		
H33	C D	IN	N/A	Disable demand delay.		
		OUT	N/A	Enable demand delay.		
H34 - H35	Used together to set ACK delay from strobe.		H34 OUT OUT IN IN	H35 OUT IN OUT IN	Delay None (D) 1 μsec. 2 μsec. 3 μsec. (C)	
H36 - H37	Used together to set ACK pulse width.		H36 OUT OUT IN IN	H37 OUT IN OUT IN	Pulse Width None (D) 1 μsec. 2 μsec. 3 μsec. (C)	NOTE: The pulse width will be 1 μsec. if H34 and H35 are out while using CENTRONICS interface.
H38	C,D	IN	J76	Interface lead IDENT1 low.		
		OUT	J75	Interface lead IDENT1 high.		
H39	C,D	IN	J78	Interface lead IDENT0 low.		
		OUT	J77	Interface lead IDENT0 high.		
H40	C,D	IN	J80	Interface lead PAPMVG reflects VFURDY.		
		OUT	J79	Interface lead PAPMVG reflects PAPMVG.		
H41 - H48	Used with strap H10 to select space character substitution. H41 corresponds to bit 1 of the character code. (See ASCII Chart.) All are OUT as the factory default. Example: Setting H41 - H44 (for bits 1 - 4) and H46 (bit 6) IN would cause a space to be printed when a slash (/) character is received. A8 must be IN if H41 is set.					

**To completely disable the BUSY lead, A5, H19, H20, H21, and H22 must be IN

Serial Interface Straps

Changing Serial Interface Strap Settings

With the serial interface selected and the printer offline, select the serial interface straps by pressing:

- 4 - (Program Mode)
- 0 - (Next Option) until **PRG:Interface Op** is displayed
- 4 - (Enter)
- 0 - (Next Option) until **IFOp:Serial Set** is displayed
- 4 - (Enter)
- 0 - (Next Option) until **SerOp:Straps** is displayed
- 4 - (Enter)
- For Set A - Press 4 - (Enter) to display **IStrap:A1 OUT**
- For Set B - Press 0 - (Next Option) to display **SerStrp:Set B**, and then press 4 to select

Use the NEXT OPTION or PREVIOUS OPTION pushbuttons until the desired strap is displayed, and use the ENTER pushbutton to change the strap's setting.

READY/BUSY CONTROL STRAPS

Strap Number	Meaning if IN	Meaning if OUT
A1 - A3	Reserved for future use.	
A4	Ready/Busy via SCA.	SCA does not reflect Ready/Busy.
A5	Ready/Busy via DC1/DC3.	DC1/DC3 does not reflect Ready/Busy.
A6	Reserved for future use.	
A7	Ready/Busy via CD.	CD does not reflect Ready/Busy.
A8	Ready/Busy via CA.	CA does not reflect Ready/Busy.

FAULT CONTROL STRAPS

Strap Number	Meaning if IN	Meaning if OUT
A9 - A11	Reserved for future use.	
A12	FAULT via SCA.	SCA does not reflect FAULT.
A13	FAULT via DC1/DC3.	DC1/DC3 does not reflect FAULT.
A14	Reserved for future use.	
A15	FAULT via CD.	CD does not reflect FAULT.
A16	FAULT via CA.	CA does not reflect FAULT.

Serial Interface Straps (continued)

SELECT STATE CONTROL

Strap Number	Meaning if IN	Meaning if OUT
A17 - A19	Reserved for future use.	
A20	SELECT state via SCA.	SCA does not reflect SELECT.
A21	SELECT state via DC1/DC3.	DC1/DC3 does not reflect SELECT.
A22	Reserved for future use.	
A23	SELECT state via CD.	CD does not reflect SELECT.
A24	SELECT state via CA.	CA does not reflect SELECT.
A25	ETX/ACK protocol enabled with immediate ACK.	ETX/ACK protocol disabled (depending on strap A26).
A26	ETX/ACK protocol enabled with ACK on buffer pass. Overrides strap A25.	ETX/ACK protocol disabled (depending on strap A25).
A27	SCA active low.	SCA active high.
A28	CD active low.	CD active high.
A29	Disable parity check.	Enable parity check.
A30	2 stop bits.	1 stop bit.
A31	Inhibit transmitting to host.	Do not inhibit transmitting.
A32	CA active low.	CA active high.

Strap Number	Meaning if IN	Meaning if OUT
B1	8-bit data; No PI lead function. See Note 1.	7-bit data; Bit 8 = PI lead.
B2	Parity bit not present.	Parity bit present.
B3	Reserved for future use.	
B4	CC false inhibits transmitting.	CC does not inhibit transmitting.
B5	Underline character = CR.	Underline character = Underline character.
B6	8-bit character.	7-bit character.
B7	Accept data offline - send XOFF when buffer almost full - see B8.	Do not accept data while offline.
B8	Accept data offline - send XOFF every 10th character - overrides B7.	Do not accept data while offline.

Straps A33-A40 and B9-B40 are reserved for special applications.

Note 1 - Serial interface strap B1 and printer control strap A32 determine 8th bit usage.

Hardware jumpers on the TTLB board serve the following functions.

J5 IN (J6 OUT) - Transmit always enabled regardless of CB lead state.

J6 IN (J5 OUT) - Host CB lead function determined by J3 and J4.

J7 IN (J8 OUT) - CB lead pulled true but is still controlled by host.

J8 IN (J7 OUT) - CB lead is controlled only by host.

Printer Control Straps

There are three sets of printer option straps: Set A, B, and C.

Set C is only available when the Proprinter or FX-286 emulation is selected. Set A is only available when using an emulation other than Proprinter or FX-286. Only the applicable sets are displayed for the emulation in effect.

Select the emulation first to make the appropriate strap sets available.

Changing Printer Option Strap Settings

With the printer offline, select the option straps by pressing:

- 4 - (Program Mode)
- 0 or 1 - (Next or Previous Option) until **PRG:Printer Opts** is displayed
- 4 - (Enter) The display shows **PStrap:** followed by either **Set A** or **Set B** depending on which emulation is selected

Pressing 4 - (Enter) selects the set showing on the display

Pressing 0 - (Next Option) and then 4 - (Enter) selects the next set

Use the **NEXT OPTION** or **PREVIOUS OPTION** pushbuttons until the desired strap number is displayed, and use the **ENTER** pushbutton to change the strap's setting.

Options A1 through A8 apply to Printronix emulation only.

Strap Number	Meaning if IN	Meaning if OUT
A1	Coded select/deselect active.	Coded select/deselect ignored.
A2	Reserved for future use.	
A3	CR causes overprint.	CR invokes edit mode.
A4	Restrict LPI to 8.	Allow all LPI selections.
A5	Enable VFU load.	Disable VFU load.
A6	Requires PI lead for VFU load.	Allow VFU load without PI lead.
A7	Reserved for future use.	
A8	Reserved for future use.	

Printer Control Straps (continued)

Options A9 - A16 apply to the ANSI and Dataproducts emulations only.

Strap Number	Meaning if IN	Meaning if OUT
A9	SI/SO will select/deselect bar codes and oversize.	SI/SO is ignored.
A10	Paper position is set to top of bar code after printing.	Paper position is left at end of bar code after printing.
A11	Disable ESC c (reset) sequence.	Enable ESC c sequence.
A12	Enable staggered bar codes.	Enable low density bar codes.
A13	Position Unit Mode (PUM) set - Absolute decipoint mode.	PUM reset - row/column mode.
A14	Paper position reset to top of oversize after printing.	Paper position left at end of oversize after printing.
A15	LF after dot graphics puts paper on next LPI grid.	LF after dot graphics moves one LPI increment.
A16	3000 Compatibility Mode.	ANSI Mode.

Options A17 - A40 apply to all emulations except Proprinter and FX-286.

Strap Number	Meaning if IN	Meaning if OUT
A17-A20	4-bit binary value selecting alternate font. See chart on following page.	
A21	CPI reset on font change.	CPI preserved after font change.
A22	Truncate PI slews at top of form.	No truncation of PI slews.
* A23	No descenders in NLQ.	Descenders used in NLQ.
A24	Power-up interface online.	Power-up interface in local.
A25	Slashed zero character.	Normal zero character.
A26	Enable LF and FF pushbuttons online.	Disable LF and FF pushbuttons online.
A27	Wraparound at right margin.	Truncate at right margin.
A28	CR converted to LF control code.	CR works as CR.
A29	Ignore received CR control code.	Observe received CR.
A30	Ignore HT if table empty.	HT is space if table empty.
* A31	No descenders in draft.	Descenders used.
A32	8th bit selects 256 character font.	8th bit selects alternate font.
A33	4410/40 Compatibility Mode.	4810/4840 Native Mode.
A34	Make 12 CPI font from 10 CPI.	Make 12 CPI font from 13.3 CPI.
A35	Make 15 CPI font from 16.7 CPI.	Make 15 CPI font from 13.3 CPI.
A36	LNM reset by default, LF = LF. See Note 1.	LNM set by default, LF = CR, LF. See Note 1.
A37	No CR on vertical position command.	CR for vertical position command except LF.
A38	GENC1C reset by default, C1 control codes ignored. See Notes 1&2.	GENC1C set by default, C1 control codes recognized. See Notes 1&2.
A39	GENCS2 reset by default - codes 20H-7EH and A0H-FFH are printable. See Notes 1&2.	GENSC2 set by default - codes 15H, 20H-7EH, and 80H-FFH are printable. See Notes 1&2.
A40	Reduced POSTNET bar code quiet zone and 24 bars per inch. Use 12 cpi for calculating spacing.	Normal POSTNET bar code quiet zone and 20 bars per inch. Use 10 cpi for calculating spacing.

* Applies to the following characters only: Q ; , _

Printer Control Straps (continued)

Notes for A36, A38, and A39:

Note 1: A change in the default state of LNM, GENC1C, and/or GENCS2 will not be effective until followed by an RIS, GENTST, self-test, or a power-up sequence.

Note 2: GENCS2 overrides GENC1C.

4-BIT BINARY VALUE FOR SELECTING ALTERNATE FONT

Strap Option				Font Table Entry	SGR Parameter	Default Font
A17	A18	A19	A20			
OUT	OUT	OUT	OUT	0	10	Gothic Draft
OUT	OUT	OUT	IN	1	11	Gothic Draft
OUT	OUT	IN	OUT	2	12	Character Graphics
OUT	OUT	IN	IN	3	13	Gothic NLQ
OUT	IN	OUT	OUT	4	14	Courier NLQ
OUT	IN	OUT	IN	5	15	High Speed
OUT	IN	IN	OUT	6	16	OCR-A
OUT	IN	IN	IN	7	17	OCR-B
IN	OUT	OUT	OUT	8	18	Italics NLQ
IN	OUT	OUT	IN	9	19	Correspondence

See Appendix E for an explanation of character mapping.

Options B1 through B8 apply to the Dataproducts VFU only.

Strap Number	Meaning if IN	Meaning if OUT
B1	Extended line counter mode: PI slew range = 0 through 63.	Normal line counter mode: PI slew range = 1 through 15.
B2	Default is 8 LPI.	Default is 6 LPI.
B3	Control codes disabled (ASCII codes 00H-1FH).	Control codes enabled.
B4	Form control codes disabled (ASCII codes 10H-13H; LF, VT, FF, CR)	Form control codes enabled.
B5-B8	Reserved for future use.	

Printer Control Straps (continued)

Options B9- B40 apply to all emulations.

Strap Number	Meaning if IN	Meaning if OUT
B9	Set top of form uses reverse paper motion.	Set top of form uses forward paper motion.
B10-B15	Reserved for future use.	
B16	Paper low is paper out. See B17&B18.	Paper low is not a fault.
B17	Deselect on paper low if B16 is IN.	Do not deselect on paper low.
B18	Automatic Low Paper Printing to the end of the last sheet. Overrides straps B16&B17.	Stop printing at paper low.
B19	Stored form programming disabled.	Stored form programming enabled.
B20	Paper tear-off feature enabled if strap A26 is IN.	Paper tear-off feature disabled.
B21	Paper tear-off feature does full paper retraction.	Paper tear-off feature does calculated paper retraction.
B22	Enable micro adjustment of paper with the double arrow key.	Disable micro adjustment function.
B23	Automatic View feature enabled.	Automatic View feature disabled.
B24-B35	Reserved for future use.	
B36	Paper tear-off distance set for top exit.	Paper tear-off distance set for rear exit.
B37	Paper jam does not report Fault	Paper jam reports Fault
B38	Ribbon jam detector does not report ribbon fault.	Ribbon jam detector reports ribbon fault.
B39	Reverse paper motion is permitted during low paper printing.	Reverse paper motion is not permitted during low paper printing.
B40	Perform complete parallel and serial interface self-test diagnostics. B40 switches to OUT when test is completed successfully.	Test only for installation of parallel and serial interface.

Options C1 through C16 apply to the Proprinter emulation only.

Strap Number	Meaning if IN	Meaning if OUT
C1	Slashed zero enabled.	Slashed zero disabled.
C2	Line length equals 8 inches.	Line length equals 13.2 inches.
C3	Condensed printing at 12 CPI yields 12 CPI.	Condensed printing at 12 CPI yields 20 CPI.
C4	Code page - Multilingual at initialization.	Code page - USA at initialization.
C5	Character set 2 selected.	Character set 1 selected.
C6	Default form length is 12 inches.	Default form length is 11 inches.
C7	Carriage return - CR plus LF.	Carriage return - CR without LF.
C8	Carriage return for LF, VT, and ESC J.	No carriage return for LF, VT, and ESC J.
C9	NLQ II and alternate NLQ II can use Multilingual Code Page 850.	NLQ II and alternate NLQ II can only use USA Code Page 437.
C10-C16	Reserved for future use.	

Printer Control Straps (continued)

Options C17 through C40 apply to the FX286 emulation only.

Strap Number	Meaning if IN	Meaning if OUT
C17	Condensed printing enabled.	Condensed printing disabled.
C18	Slashed zero enabled.	Slashed zero disabled.
C19	Codes 128-255 are character graphics.	Codes 128-255 are Italic characters.
C20	Default print quality is NLQ.	Default print quality is Data Processing.
C21	Default form length is 12 inches.	Default form length is 11 inches.
C22	Enable 1 inch perforation skip.	No perforation skip.
C23	Carriage return = CR plus LF.	Carriage return = CR without LF.
* C24	No descenders in draft or NLQ.	Descenders used in draft and NLQ.
C25-C29	5-bit binary value selecting the default international character set. See the chart on the following page.	
C30-C40	Reserved for future use.	

* Applies to the following characters only: Q ; , _

5-BIT BINARY VALUE FOR SELECTING FX286 INTERNATIONAL CHARACTER SETS

C25	C26	C27	C28	C29	Character Set
OUT	OUT	OUT	OUT	OUT	USA
OUT	OUT	OUT	OUT	IN	French
OUT	OUT	OUT	IN	OUT	German
OUT	OUT	OUT	IN	IN	United Kingdom
OUT	OUT	IN	OUT	OUT	Danish I
OUT	OUT	IN	OUT	IN	Swedish
OUT	OUT	IN	IN	OUT	Italian
OUT	OUT	IN	IN	IN	Spanish
OUT	IN	OUT	OUT	OUT	Japan
OUT	IN	OUT	OUT	IN	Norway
OUT	IN	OUT	IN	OUT	Danish II
OUT	IN	OUT	IN	IN	Spanish II
OUT	IN	IN	OUT	OUT	Latin America
OUT	IN	IN	OUT	IN	Netherlands
OUT	IN	IN	IN	OUT	Anglo-Universal
OUT	IN	IN	IN	IN	Spanish American
IN	OUT	OUT	OUT	OUT	Portugal
IN	OUT	OUT	OUT	IN	Africa
IN	OUT	OUT	IN	OUT	Switzerland
IN	OUT	OUT	IN	IN	Turkey
IN	OUT	IN	OUT	OUT	Greece
IN	OUT	IN	OUT	IN	Yugoslavia

NOTE: All other combinations are ignored.

Glossary

The following listing of words, with their definitions, are common data communications terms relating to computer printers as well as other computer devices.

Printer Related Terms

ANSI: American National Standards Institute. The national clearinghouse and coordinating agency for voluntary standards in the United States. ANSI establishes standards in such areas as data transmission codes, interface protocols, storage media, and high level languages. One standard, ANSI X3. 64, defines control sequences for two-dimensional character imaging devices. This standard is the native control language of the GENICOM 3xxx and 4000 printer families; thus, the term ANSI can refer to the set of control and escape sequences that is analogous to, and distinct from, the IBM and Epson emulations.

ASCII: American Standard Code for Information Interchange. ANSI X3. 64. A widely used, constant-length code for transferring alphanumeric characters, symbols, and device control codes among digital systems.

Asynchronous: With reference to serial communication protocols, asynchronous implies that: 1) data is transferred one character at a time, rather than in blocks; 2) there is no chain of synchronizing pulses transmitted with a block of data; 3) communication depends on clocks in the sending and receiving equipment running at the same frequency, plus or minus a small defined percentage of error. The RS-232 and RS-422 interfaces are examples of popular asynchronous communications protocols.

BASIC: Beginner's All-purpose Symbolic Instruction Code. A popular general purpose programming language. Since the language is widely understood and available as standard on many personal computers, programming examples in GENICOM user's manuals are often written in BASIC.

Baud: A unit of signaling speed associated with serial data transmission that defines the number of signal elements transmitted per second. Ten signal elements are typically required to transmit an ASCII character via the most common serial interface; thus, a rate of 1200 baud will generally be understood to mean 120 characters per second.

Bidirectional Printing: A term associated with daisy wheel and dot matrix printers, meaning that printing occurs on both the left-to-right and right-to-left traverse of the carriage. Bidirectional printing increases printing throughput, but places greater demands on the mechanical integrity of the printer to achieve horizontal registration equivalent to unidirectional printing.

Binary: Relating to a base 2 numbering system. Logic functions are implemented in binary in electrical circuitry for many reasons. Principal among these is that there is much less potential for error in deciding whether a voltage or current level corresponds to a 1 or a 0 than there is in deciding whether the level corresponds to say, an 8 or a 9. In other words, if you are looking at a light bulb, you can decide whether the light bulb is on or off with considerably less potential for error than you can decide how bright the light bulb is. The term binary is sometimes used to distinguish a method of encoding data for storage and transmission in which each byte of data represents a numeric value as opposed to, for instance, an ASCII character. Graphics information might typically be encoded in binary format, while text information might be encoded in ASCII format.

Bit: The smallest element of data. A bit will represent a value of either 1 or 0.

Bitmap: This is typically a two-dimensional array of bits such that each bit represents a dot to be displayed or printed. Ultimately, every image to be displayed or printed by a raster device must be translated into a bitmap, but significant differences exist both in the point in the process in which this translation occurs and in the methods by which it is achieved.

Bold printing: Printing in which the stroke widths of the characters are increased relative to the stroke widths of the same characters in the parent font. In the case of the typesetter or laser printer, bold printing is usually achieved by font substitution. In the case of the dot matrix printer, bolding is usually done by overprinting the character with a slight offset in horizontal position on a subsequent pass of the carriage. In the case of the daisy wheel printer, bold printing is usually effected by overprinting the character without moving the carriage. The precise meaning and method of bold printing is apt to vary from one product to the next, however, even within the same printing technology.

Buffer: A storage area for data. Since data can often be transmitted faster than it can be printed, a print data buffer can free both the sending system and the transmission lines from waiting on the printer.

Busy: A signal sent from the printer to the data source indicating that the printer is temporarily unable to receive more data. In the case of the Centronics interface, busy refers to a dedicated hardware signal. In the case of the RS-232 serial interface, a busy condition can be indicated by the status of one or more hardware signals, or by a control character, or both.

Byte: A unit of data comprising eight bits.

CENTRONICS Interface: A unidirectional parallel printer interface protocol originated by the Centronics Data Computer Corporation, which has subsequently been widely adopted by manufacturers of printers, plotters, and other peripherals.

Characters per second (cps): A speed rating that refers to the highest number of characters that a printer can print in a second. In the printer technologies where the term is applicable, the value will depend on factors such as character pitch and print quality selection. The average value (throughput) will always be less than the cps value.

Character Set: This can refer to the set of all letters, numbers, and symbols that the printer can print. More frequently, it refers to the mapping of a set of characters to the ASCII table. Using a character set appropriate for the United States, for instance, a printer might print the circumflex symbol in response to the ASCII code 5E hex. Using a character set appropriate to Sweden, the printer might print the umlaut symbol in response to the same code. The maximum number of symbols that can be selected by the expanded ASCII code (8 bits per character) is 255. Typically, a printer will have available more than 255 symbols, which could include characters from foreign alphabets, graphics characters, and math symbols. In order to select from a range of characters greater than 255, the printer will have provisions to select among character sets. These character sets may or may not be implemented across all available fonts.

Chip: A common term for an integrated circuit. A chip can contain circuitry comprising anything from four gates to the most powerful microprocessor.

Closed Loop: A system comprising a controlling element, a driven element, and a feedback (or error) signal from the driven element to the controlling element. The error signal indicates to the controlling element the magnitude and direction of correction necessary to achieve the desired output from the system. An example of a closed loop system is a man driving his car into his garage. The controlling element is the man and the driven element is the car. The error signal is the visual (or, in the unhappy case, audible) information that the man is processing to yield the current position and velocity of the car relative to the garage. If the system is operating correctly, then the desired output will be achieved; that is, the car will be stopped at the appropriate spot in the garage.

Coax: When used to describe a printer interface, this refers to a synchronous bidirectional serial protocol used with IBM 3270 display systems. Data connections are via RG62AU coaxial cable.

Collating: In printing, collating means accumulating printed sheets in a given order. In computing, collating means merging sets of relating data in a given order.

Configuration: The unique arrangement of components that makes up a distinct system, or the set of option selections that determines the behavior of a system.

Control Codes: The first 32 locations in the ASCII table. These are traditionally used to transmit information other than printable symbols to the printer. The control code 0A hex, for instance, is almost universally interpreted as a line feed. The response of a printer to other control codes will depend on the emulation. Printable symbols are mapped to some of the control code locations in some character sets.

CPI: Characters per inch. Horizontal spacing of characters on a line; also referred to as pitch.

CPS: See characters per second.

CRT: Cathode Ray Tube. The display device common to television sets, computer monitors, and oscilloscopes.

Cut Sheet: Single sheet of paper.

Cut Sheet Feeder: Device used to automatically insert single sheets of paper.

Data: Information. With reference to printers, this usually means information to be printed that is digitally encoded.

Database: A collection of related data, coded to indicate relationships.

Data Connector: Multi-pin connector that connects the printer to the data source.

Data Source: A computer, modem, buffer, or any device used to send data to the printer.

Data Transfer: Moving information from one place to another.

dBa: Decibel. Unit of sound pressure. A noise level of 55 dBa is considered "office quiet".

Default: The condition that will be in effect if no action has been taken to change it. The parameter that will be supplied by the operating system when a software command is issued without a parameter.

Dot Matrix: This term is properly used to refer to a set of printer technologies which includes impact dot matrix, ink jet, and thermal transfer, wherein a character or symbol is printed using an array of dots. In current usage, "dot matrix printer" usually implies impact dot matrix technology.

Download: This is computer jargon, and as such, defies a solid definition. An approximate translation would be the transfer of a block of data from a larger device or system to an area of memory in a smaller device or system. A downloaded font is a set of character bitmaps or outlines sent from a data source to a printer. The term "downline load" is an even more unfortunate jargon phrase that means approximately the same thing.

DP: Data processing. This can refer to a print quality option that features the highest speed and relatively low print quality.

DPI: Dots per inch. Unit of resolution applicable to raster devices, including printers and CRTs. Devices can have different horizontal and vertical resolutions. Higher resolutions are associated with better looking images.

Draft Mode: A print quality selection option associated with lower resolution and higher speed than NLQ, so named because you might select this option to print your first draft of a document. In some GENICOM products, draft mode is an intermediate quality between DP and NLQ.

Dual Interface: Many GENICOM printer models have both parallel and serial interfaces resident in the same printer.

Dual Mode: The capability of a printer to print in two modes; i. e. , draft and letter quality. A phrase used primarily in advertising copy to ornament a very ordinary capability.

Dump: Computer jargon that implies a batch transfer of data to a printer. A screen dump means printing whatever is on the monitor.

ECMA: European Computer Manufacturing Association.

Emulation: A set of functions and associated control and escape sequences identified with a particular make and model of printer. A GENICOM printer equipped with a Diablo emulation will behave like a Diablo printer in terms of response to control codes and escape sequences, although the throughput of the GENICOM printer may exceed the throughput of the emulated Diablo printer by a factor of ten or more. The popular emulations, such as Diablo, Epson FX80, IBM-GP, etc. , have become de facto printer control language standards. There is a potential for variations among implementations of the same emulation, based partly on the evolution of the emulated product. Identifying and resolving these differences can be exquisitely tedious. The native printer control language of the GENICOM 3000 and 4000 series is ANSI X3. 64, which is not an emulation at all, but is sometimes erroneously referred to as such. Support of ANSI X3. 64 is prevalent in mainframes. The personal computer world has tended not to follow suit, even though the ANSI standard is, in many important respects, more logical than the alternatives.

EPROM: Erasable programmable read-only memory. Physically, this is a chip into which a program or other information is written for permanent storage. An EPROM can be erased and reprogrammed a finite number of times. A typical erasure of an EPROM involves placing the device under an ultraviolet lamp for twenty minutes.

Escape Sequence: Remote selection of printer functions and features is achieved using command strings which are preceded with the ESCAPE character (27 decimal, 1B hex). Escape sequences associated with similar functions will vary from one emulation to the next. For example, the escape sequence that selects the magenta band on the four-color process ribbon is ESCAPE m in IBM Color Graphics emulation. The escape sequence that does the same thing in ANSI is ESCAPE [35m.

Expanded Character: Character printed at twice the normal width.

Fanfold: Continuous paper folded like "z" so it lies in a stack. Fanfold paper usually has perforated holes on the sides that are engaged by corresponding pins in the printer's tractor mechanism.

Fault: A hardware signal assigned to a dedicated line on the parallel printer interface. The fault line is normally high (permissive) and goes low to indicate a fault in the operation of the printer. The conditions indicated by the fault signal will vary from one printer to the next, and are often strap selectable. Examples of conditions that might activate the fault signal are cover open, ribbon failure, and print gap open.

Firmware: Firmware is a program or other information recorded in a permanent storage device, such as ROM or PROM.

Font: Traditionally, a set of letters, numbers, and punctuation marks of a particular typestyle and size, such as 10-point Courier or 14-point Times Roman. The practical meaning of font will vary with the printer technology being discussed. In the case of the dot matrix printers, a font will consist of a set of bitmaps, one for each character or symbol in the font. These bitmaps define individual dots at a particular type size. The bitmaps can be adjusted algorithmically to adjust the type size within a narrow range. For instance, in the 3000 distributor model series, the 10-cpi Courier font is algorithmically reduced in size to generate the 12-cpi version of the font. In some of the laser emulations, such as HP, there will be a unique bitmap for each type size. In the case of ACE or PostScript printers, on the other hand, a font will consist of a set of outlines, which can be continuously scaled to yield an enormous range of sizes. This means that the answer to "How many fonts?" will often require some expansion.

Footprint: The dimensions of the area of the desk that is occupied by the printer, as set up for use.

Form Set Printing: Printing of multipart forms, either single sets of multipart forms or continuous pin feed forms, where the pinfeed edges may be separated cleanly from the form, leaving the multiple copies in an intact set.

Friction Feed: Use of friction rollers to move paper through the printer.

GP: Graphics printing. Refers to the IBM-GP emulation.

Hardware: As opposed to software, this refers to electrical and mechanical components, logic circuits, and so forth.

High Resolution: With respect to printers, this refers to the ability of the printer to control the placement of a relatively large number of dots in a given area.

Initialize Printer: In some of the GENICOM products, this refers to an action initiated by the operator to restore all of the printer settings to the settings as shipped. This is sometimes referred to as an Initial Setup (ISU) action. Printer settings affected by an ISU include the emulation and the interface type. An unsophisticated operator may be hard-pressed to recover from an inadvertent ISU. There are less radical evolutions which can properly be described as initializing the printer. When operating in parallel interface, there is a hardware signal named INIT, which is asserted, for example, at the occasion of booting a personal computer. The assertion of the INIT hardware signal will reset all attributes applicable to the particular emulation to a set of defaults which are emulation dependent and may also be strap selectable. In addition, there are software commands (escape sequences) in some emulations which will cause a similar result.

Interface: The set of physical connections and associated electrical specifications established to transfer data between two pieces of equipment, such as a computer and a printer. Two types of interfaces which are commonly used to connect printers to data sources are RS-232 (a serial interface) and Centronics (a unidirectional parallel interface). There are a myriad of interfaces for data exchange. Interfaces can be categorized into the three classes:

1) interfaces which are defined by a sanctioning body, such as IEEE-488, a bidirectional parallel protocol; 2) interfaces which originated as proprietary, but have been so widely adopted as to become de facto standards, such as Centronics; 3) interfaces which for reasons of governmental or company security are strictly proprietary. The word is used to mean either the specification or the actual hardware used to connect equipment, including the circuits that control communication.

ISO: International Standards Organization.

Jumper: A hardware device (shorting wire or physical switch) used to select among alternate signal paths. You might set a jumper on the 4000 product, for instance, to change the polarity of the BUSY signal.

Landscape: A textual or graphical presentation that is oriented horizontally on the longer dimension of a page.

LED: Light-emitting diode. LEDs have replaced incandescent bulbs used as indicators in many applications because they operate at lower voltages, generate less heat, and do not regularly burn out.

Letter Quality: Printing equivalent in appearance to the output of a high quality business typewriter. This assessment is subjective.

Line Terminator: A character designated to signify the end of a line. Traditionally, the line feed and form feed control codes are interpreted as line terminators, while other control codes, such as carriage return and vertical tab, can be designated line terminators by strap selection.

Lines Per Minute (lpm): the number of lines a printer prints each minute.

Local: As opposed to online, a printer is powered up and may print internal test patterns and menus, but will not receive data.

Logic Seeking: Sometimes logic-seeking head. The print head will be routed on the shortest path between characters to be printed. A simple example: Assume subsequent lines of text consisting of a character in column 40 and a character in column 41, with the remainder of the line consisting of spaces. Without logic seeking, the printer will print the characters in columns 40 and 41 and then send the carriage to column 1 (home) before printing the next line. With logic seeking, the carriage would return to column 40 before printing the next line. Logic seeking improves throughput and reduces wear on the printer.

LPI: Lines per inch: A measure of line spacing. When the line spacing is 6 LPI, the distance between the bottom of a line of print and the bottom of the next is 1/6 inch.

Margin Justification: The process in which spacing is used between words to achieve a straight printed border along the margin, usually referring to the right margin, since the left margin is already justified. This function might logically be performed by the host, but some printers, including some models of the Diablo, perform margin justification in the printer.

Mark: A term originating in the teletype era, this identifies a negative voltage signal in the RS-232 interface. Paradoxically, a negative voltage signal in that interface corresponds to a logic 1, while a positive signal corresponds to logic 0. You will hear the term used most often to apply to a parity protocol in which the parity bit is always set to logic 1 to satisfy hardware requirements.

Menu: As applied to printers, a method of enabling the operator to select among printing options by using control panel pushbuttons to select from a printed list.

Mode: An overused and potentially ambiguous term, "mode" is used on menus of some GENICOM products to contain a set of logically unrelated print attributes, such as doublewide and underline. If in doubt, do not use the word.

Modem: Data communications equipment (DCE) to convert binary data into analog signals suitable for transmission on telecommunication networks (modulate), and to convert received analog signals into binary data (demodulate).

MTBF: Mean time between failures. How long you should expect the product to run before it breaks. This is based on the mean of the times between failures of a controlled sample set, such as life- test units.

MTTR: Mean time to repair. How long a reasonably competent technician should be expected to work to fix the product. This figure is based on the same kind of experience as is MTBF.

NLQ: Near letter quality. A subjective assessment of print quality, NLQ implies that the characters are not fully formed, but look pretty good. A test that might be applied is: if a manuscript is printed in NLQ, then it should be acceptable to a college professor or editor.

NUL: The ASCII character 00. A byte of data in which all bits are set to zero. The term is used to distinguish between the ASCII character 00 and the ASCII character associated with the numeral "0", which is 30 hex. The NUL character is a component of diverse escape sequences in various emulations.

OCR: Optical Character Recognition. A set of font specifications, presently comprising OCR-A and OCR-B, to facilitate the identification of characters read by optical scanners. The standard was originated by ECMA, and later adopted by ANSI and ISO.

Offline: The condition when a printer or other device may be powered on and yet not able to receive data.

Online: A printer or other device is able to receive or exchange data.

Paper Path: Path that the paper follows through the printer.

Parallel Interface: An interface in which the eight bits that make up each byte of data are transmitted simultaneously over eight separate wires.

Parameter: A value or variable that is passed to a procedure or function. An independent variable. A quantity applied as a description of an aspect of a system. Any of a set of physical properties whose values determine the characteristics or behavior of something. A parameter of a silicon diode that is of concern when applying that device in a circuit is the peak inverse voltage rating. A parameter that influences the appearance of a printed page is line spacing.

Parity: A method of checking for errors in data transmission used in some serial interfaces. The data source adds a bit—called the parity bit—to each byte of data so that the total number of 1s is either always even (even parity) or always odd (odd parity).

Pin Feed Paper: Multisheet paper that has sprocket holes along both edges and is separated by perforations.

Platen: A bar, plate, or roller on the opposite side of the paper from the print mechanism, designed to absorb or reflect excess energy associated with impact printing.

Power Down: Power turn-off sequence.

Power Up: Power turn-on sequence.

Primary Ribbon: Color ribbon containing red, green, blue and black.

Print head: In an impact dot matrix printer, the assembly that contains rows of pins and associated magnetic actuators that put the dots on paper. In an ink jet printer, the analogous device that contains nozzles and valves or pumps. In a thermal transfer printer, the analogous device that contains heating elements.

Print Quality: A subjective assessment as to how good the printed characters and symbols look, or a specification which attempts to quantify how good the characters look. Measurable aspects of print quality include relative darkness of individual dots, differences in relative darkness from one dot to the next, consistency of dot placement, registration, and so forth.

Process Ribbon: Color ribbon containing yellow, magenta, cyan and black. A palette of colors can be achieved by overprinting colors on subsequent passes of the print head.

Program: As related to computers, a sequence of instructions.

PROM: Programmable read-only memory. Physically, this is a chip into which a program or other information is written for permanent storage. A PROM can be programmed only once after manufacture.

Proportional Printing: Printing in which the amount of white space on either side of a character is adjusted to reflect the width of the character itself. If proportional printing is enabled, then an exclamation point printed next to an exclamation point will occupy significantly less space than an uppercase M printed next to an uppercase M. If proportional printing is not enabled, then every character in the font will occupy the same width on the line.

Protocol: In electronic communications, a set of hardware and software conventions governing the formatting and treatment of data to be exchanged. There are myriads of protocols for data communication.

RAM: Random-access memory. An area of memory structured so that an individual byte can be accessed for read or write operations by referring to the address of that byte.

Remote Programming: Instructions sent from a data source to a printer to duplicate selections achievable by operating the control panel. You could select proportional printing, for example, by operating the control panel, or you could send an escape sequence from the data source to do the same thing.

Resolution: The number of locations at which dots can be placed in a given area to form either characters or graphics.

ROM: Read-only memory. Physically, this is a chip into which a program or other information is written for permanent storage. The term ROM is used in contrast to the terms PROM and EPROM, the implication being that ROM is programmed at manufacture. This meaning is made explicit by the term "masked ROM".

RS-232C: A common serial communications protocol, first applied to data communications carried out between modems connected by long lines, including, but by no means restricted to, telephone lines. The standard was eventually codified by the Electronic Industries Association (EIA). The frequency and extent of variations in the implementation of RS-232 among applications and vendors is notorious. Establishing communications between two devices, both of which purport to be "RS-232 compatible", is liable to require hours of trial and analysis.

Scroll: To move the displayed material on a CRT screen up or down.

Serial Transfer: Sending coded data over a single line.

Slew Rate: The maximum speed at which a printer can move paper.

Skewed: Loading pinfeed paper crooked.

Softkeys: Keys, which could include control panel keys on a printer, that have different functions depending on conditions.

Software: Software simply means a computer program or set of programs.

Space: Referring to the RS-232 interface, space means a positive voltage signal. Paradoxically, in this interface, a positive signal is a logic 0, while a negative voltage is a logic 1.

Submenu: A menu selected from another menu.

Subscript: Printing characters a half line below the line currently being printed.

Superscript: Printing characters a half line above the line currently being printed.

Synchronous: With reference to serial communications protocols, synchronous implies that: 1) data is transferred in blocks of characters rather than as individual characters; 2) a series of synchronizing pulses is transmitted with each block; 3) communication does not depend on frequency agreement between clocks in the transmitting and receiving equipment.

System Compatibility: The quality of a system such that elements of the system can exchange information and otherwise operate in harmony.

Terminal: The input/output device you use to communicate with a computer.

TOF: Top of form. This is a hardware or software input to a printer to indicate that the top of a sheet of paper is positioned where you want it to be with respect to the print head at the start of the form.

Tractor Feed: The use of pairs of discrete mechanisms (tractors) to move paper through the printer. A tractor will comprise a set of pins on a belt that engage corresponding holes in the paper, and a spring-loaded clip that holds the paper in engagement with the pins.

Throughput: A description of the speed of a printer that is more comprehensive than cps, lpm, or ppm. Throughput will depend on data transmission rates and print attributes such as cpi, lpi, and quality selection. Throughput will reflect characteristics of the printer that affect real-world performance, but may not affect cps, lpm, or ppm measurements. Examples of such characteristics include the buffer size, the efficiency of logic-seeking mechanisms and the power of the paper-handling functions. Throughput can never be quantified without reference to the specific document used for the test.

Twinax: A bidirectional synchronous serial protocol used exclusively with IBM system 3x/AS-400 workstation control units and certain IBM cluster controllers. Data connection is via twinaxial cable.

Unidirectional Printing: Left to right printing only, selected in instances where horizontal registration is critical.

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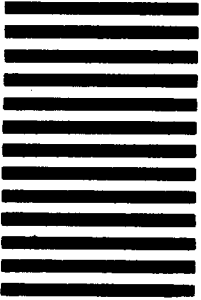
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