

Performax

User's Manual

Part Number 103263

Rev. F

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

WARNING

CHANGES OR MODIFICATIONS TO THIS UNIT NOT EXPRESSLY APPROVED BY THE PARTY RESPONSIBLE FOR COMPLIANCE COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE

When connecting the printer to a host computer system, always use shielded interface cables. The use of non-shielded interface cables is a violation of the FCC emissions limits for a Class A computing device. Do not leave unterminated interface cables connected to the printer.

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 class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Einhaltung mit betreffenden Bestimmungen kommt darauf an, dass geschirmte Ausführungen gebraucht werden. Für die Beschaffung richtiger Ausführungen ist der Betreiber verantwortlich.

DIESES GERAET WURDE SOWOHL EINZELN ALS AUCH IN EINER ANLAGE, DIE DEN NORMALEN ANWENDUNGSFALL NACHBILDET, AUF DIE EINHALTUNG DER FUNK-ENTSTOERBESTIMMUNGEN GEPRUEFT. ES IS JEDOCH MOEGlich, DASS DIE FUNK-ENTSTOERBESTIMMUNGEN UNTER UNGUENSTIGEN UMSTAENDEN BEI ANDEREN GERAETEKOMBINATIONEN NICHT EINGEHALTEN WERDEN. DER BETREIBER IST FÜR DIE EINHALTUNG DER FUNK-ENTSTOERUNGSBESTIMMUNGEN SEINER GESAMTEN ANLAGE VERANTWORTLICH, IN DER DIESES GERAET BETRIEBEN WIRD.

BESCHEINIGUNG DES HERSTELLERS/IMPORTEURS GS MARKED UNITS ONLY

Hiermit wird bescheinigt, dass der/die/das

Performax Model A600
(Gerat, Typ, Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

Vfg 1046/1984
(Amtsbkattverfugung)

funk--entstort ist.

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

Datasouth Computer Corporation
Name des Herstellers/Importeurs

WARNING

Any alteration or modification to this equipment may cause non-compliance to:

WARNUNG

Jegliche Umstellung oder Abänderung dieses Gerätes kann Zuwiderhandlung gegen:

ADVERTENCIA

Cualquier alteración o modificación a este equipo podría causar el incumplimiento con:

ATTENTION

Le changement ou la modification quelconque a cet équipement peut causer nonconformite avec:

UL Safety Standard 1950
IEC Safety Standard 950
CSA Safety Standard C22.2 No. 220
FCC Title 47, Part 15 regulations for Class A Computing Devices
VDE EMI regulations Vfg 1046, Class B (GS marked units only)
EN5022 Class A Limits
Canadian Radio Interference Regulations
CRC c.1374, Class A, Canada

zur Folge haben.

CAUTION

The printer must have the correct line fuse installed for the selected input voltage.

VORSICHT

Eine entsprechende Sicherung muß für die gewählte Voltzahl installiert werden.

PRECAUCION

El impresor tiene que tener instalado el fusible debido para el voltaje de entrada.

AVIS

L'imprimante doit avoir installé juste ligne de fusible pour le voltage d'entrée choisi.

WARNING

The operator must disconnect the printer from the A.C. power supply before performing any corrective action procedure that requires reaching into the printer.

WARNUNG

Der Drucker muß von der Stromversorgung abgekuppelt werden, ehe irgend welche Berichtigungs-Maßnahmen durchgeführt werden, die es notwendig machen, in das Innere des Druckers zu langen.

ADVENTERCIA

El usuario tiene que desconectar el impresor de la corriente alterna AC antes de hacer cualquier procedimiento de corección que requiera meter la mano dentro del impresor.

ATTENTION

Il faut que l'usager débranche l'imprimante de la source de puissance AC avant de réaliser quelque procédure rectificatif que oblige mettre la main dans l'imprimante.

WARNING

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

WARNUNG

Umstellung oder Abänderungen diese Gerätes dürfen nur mit ausdrücklicher Einwilligung der für die Zulassung verantwortlichen Partei geschehen und Verstöße dagegen könnten zur Folge haben, daß die Betriebserlaubnis für diese Ausrüstung widerrufen wird.

ADVERTENCIA

Los cambios o modificaciones a esta unidad no aprobados explícitamente por la parte responsable del cumplimiento podrían invalidar la autoridad del usuario para hacer funcionar el equipo.

ATTENTION

Les changements et modifications faits à cet unité et pas explicitement approuvés par la partie responsable de la conformité peuvent annuler l'autorité de l'usager à opérer l'équipement.

WARNING

Connect 115v (230v) units to 115V (230V) outlets only!

WARNUNG

115V (230V) Geräte nur an 115V (230V) Steckdosen anschließen!

ADVERTENCIA

Conectar unidades de 115V (230V) a tomas solamente de 115V (230V)!

ATTENTION

Brancher les unités 115V (230V) avec seulement les prises 115V (230V)!

WARNING

The printhead gets hot during use. Wait until the printhead is cool before handling the printhead.

WARNUNG

Die Druckköpfe erhitzen sich, während das Gerät in Betrieb ist. Die Druckköpfe müssen erst ausgekühlt sein, bevor sie angefaßt werden dürfen.

ADVERTENCIA

La cabeza impresora se calienta el uso. Esperar hasta que la cabeza impresora se enfrie antes de manipularla.

ATTENTION

La tête d'impression se chauffe pendant l'usage. Attendre que la tête d'impression soit froide avant de la toucher.

WARNING

Connecting this equipment to an underground power receptacle can result in the risk of electrical shock.

WARNUNG

Der Anschluß dieses Gerät an einen ungeerdeten Kraftstrom-Behälter kann einen elektrischen Schock verursachen.

ADVERTENCIA

El conectar este equipo a una toma de corriente no conectada a tierra puede resultar en el riesgo de un corrientazo.

ATTENTION

Branchant cet équipement à une prise pas connecté à terre peut résulter en risque de choc électrique.

WARNING

Make certain the printer is disconnected from the A.C. power supply before reaching into the printer to perform any cleaning or maintenance task.

WARNUNG

Der Drucker muß vom Stromnetz abgekuppelt sein, ehe irgend welche Wartungs-oder Reinigungsarbeiten vorgenommen werden können.

ADVERTENCIA

Asegurar que el impresor se desconecte de la corriente alterna AC antes de meter la mano dentro del impresor para cualquier labor de limpieza o mantenimiento.

ATTENTION

Assurer que l'imprimante n'est pas brancher à la source de puissance AC avant de mettre la main dans l'imprimante pour nettoyage ou entretien.

SILICON SOFTWARE

1989 Ready Systems Corp. All rights reserved. Unpublished-rights reserved under the copyright laws of the United States.

RESTRICTED RIGHTS LEGEND

Use, duplication or disclosure by the Government is subject to restrictions as set forth in subparagraph (c)(1)(i) of the Rights in Technical Data & Computer Software clause at DFARS 252.227-7013.

READY SYSTEMS, 470 POTRERO AVENUE, SUNNYVALE, CA 94086

Table Of Contents

Title

Page

Overview

Printer Overview	1
Quick Start Up Procedure	2

Chapter 1: Installation And Start Up

Unpacking The Printer	1-1
Selecting A Site For The Printer	1-2
Printer Parts	1-4
Shipping Material Removal	1-6
Shipping Thumbscrews	1-6
Shipping Carriage Clip	1-7
Installing The Power Cord	1-8
Installing The Ribbon Cartridge	1-9
Loading Forms	1-13
Printer Self Test	1-14
Interfacing	1-15
RS-232 And RS-422 Serial Interface Configuration	1-15

Chapter 2: Forms Handling

Recommended Types, Sizes And Weights	2-1
Continuous Forms	2-1
Single Part Cut Sheets	2-1
Multi-part Cut Sheets	2-1
C-Size Drawing Paper	2-2
Paper Paths	2-3
Forms	2-4
Bottom Feed Path	2-4
Front Feed Path	2-8
Top-Of-Form Adjustment	2-10
Tear Off Adjustment	2-11
Form Thickness Adjustment	2-12
Changing From Continuous Forms To Cut Sheets	2-14
Changing From Cut Sheets To Continuous Forms	2-14
Paper Out When Using Continuous Forms	2-15
Paper Out When Using Cut Sheets	2-15

Chapter 3: Keypad Operation

Arrangement Of Keys And Indicators	3-1
Description Of Indicators	3-2
Primary Key Functions	3-3

LCD Display	3-6
-------------------	-----

Chapter 4: Features and Profiles

Features	4-1
Profiles	4-1
Secondary Key Functions	4-2
LCD Display	4-4
Profile Feature Listing	4-4
Changing Features In A Profile	4-5
User Programmable Features	4-8
Group 1 Forms Control	4-8
Group 2 Personality	4-12
Group 3 Printer Control	4-14
Group 4 Serial Control	4-17
Group 5 Parallel Control	4-19
Group 6 Profile Control	4-20
Group 7 Diagnostics	4-21

Chapter 5: Troubleshooting And Maintenance

Scheduled Maintenance	5-1
Error Messages	5-3
Paper Out Condition	5-3
Non-Volatile Memory Error	5-3
Paper Jam	5-4
Carriage Jam	5-6
Parity Error	5-8
Ribbon Life End	5-10
Cover Open	5-10
Access Open	5-11
Keypad Lockout	5-11
Printer Diagnostics	5-11
Print Profile	5-11
Firmware Test	5-12
PrintheadTest	5-13
Run Mode Test	5-14
Run Self-Test	5-15
Display Mode	5-16
Troubleshooting	5-16
Troubleshooting Table	5-18

Appendices

Appendix A: Printer Specifications

Printer Characteristics	A-1
Emulations	A-2
Font Specifications	A-3
Paper Feed Specifications	A-3
Forms Mode Change	A-4
Communications Interface	A-4
Operator Panel Functional Description	A-5
Ribbon Cartridge/Drive	A-5
Physical	A-5
Electrical	A-5
Environmental	A-5
Shock And Vibration	A-6
Compliances	A-6

Appendix B: Interface Specifications

Parallel Interface	B-1
Parallel Interface Enable/Disable	B-6
RS-2: 232C Serial Interface	B-7
Serial Interface Enable/Disable	B-9

Appendix C: Default Tables

Appendix D: System Administration Features

Features Available In The Hidden System Control Group	D-2
Key Functions Which May Be Locked Or Delayed	D-5

Appendix E: Ribbon Life Monitor Feature

Ribbon Monitor Operation	E-1
Check Ribbon	E-1
Replace Ribbon	E-2

Appendix F: ASCII Conversion Chart

Overview

Printer Overview

This dot matrix impact printer provides high-speed performance, a rugged, round-the-clock duty cycle, and flexibility to handle a variety of printing applications.

Feature Highlights:

- A straight paper path
- 18 wire ballistic printhead
- Demand document printing
- Auto-tear off feature
- Paper parking and reloading of fan fold forms at the touch of a key
- Four individual, user-defined print profiles to speed printer setup when changing forms
- Epson FX, DEC LA120, IBM Graphics printer, IBM Proprinter XL, DS-180, and DPCL emulations
- Optional Cut Sheet paper path
- Ribbon Life Monitor feature that tracks usage rate of ribbon

Quick Start Up Procedure

The following is an abbreviated installation and start up procedure for users who are familiar with printer products. If you are not experienced with printers, please refer to Chapter 1.

1. Place the printer on a printer stand.

2. Remove shipping thumb screws (see figure on page 1-6).
3. Remove clip securing carriage belt (see figure on page 1-7).
4. Use the printhead adjustment lever on the top right hand side of the printer to move printhead away from the platen.
5. Install ribbon cartridge.
6. Install power cord.

WARNING

CONNECT 115V UNITS TO 115V OUTLETS ONLY!!

7. Turn printer on.
8. Position left tractor. Align pins with first mark (see page 2-5). Position paper guides, one next to each tractor and one in the middle of the form.
9. Place paper in tractors. For paper less than 8.5 inches wide see Forms Setup Procedure, page 2-5.

CAUTION

**IMPROPER MARGIN SETTINGS CAN LEAD TO PRINthead DAMAGE!!
DO NOT PRINT OVER TRACTOR HOLES OR OFF PAPER EDGE.**

10. Press the **Load** key. Move forms adjustment lever all the way forward (to the rear of the printer), then back two detents for single part paper. For multi-part forms see page 2-13.
11. Press the **Setup** key.
12. Press the Feature key once to select Self-Test.
13. Press the Enter key.

This will start the printer self test. The test may be stopped by pressing the On/Off Line key, or the Enter key.

Chapter 1: Installation and Start Up

Unpacking the Printer

Remove all items from the shipping carton:

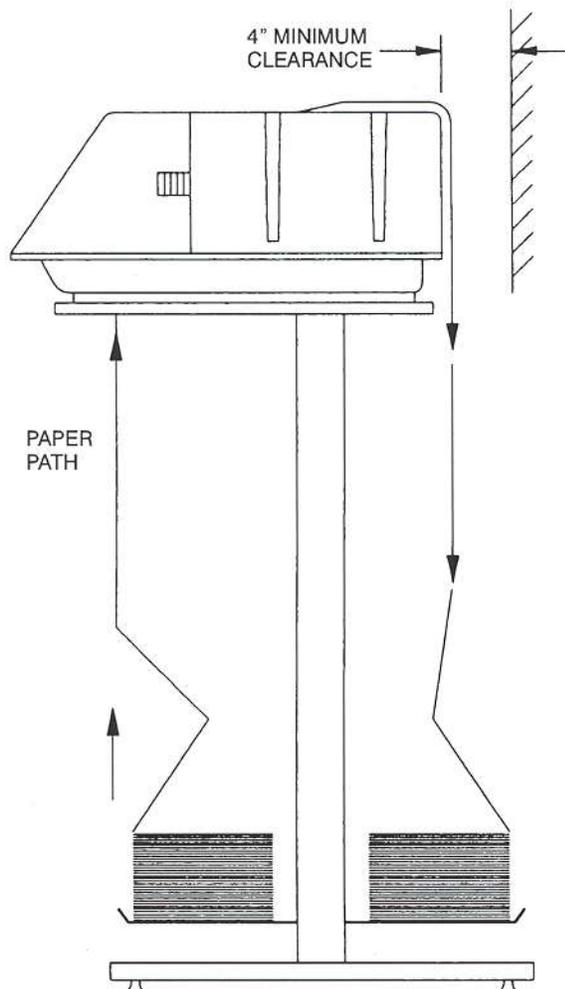
- Dot Matrix Printer
- Ribbon Cartridge

- Power Cord
- Accessory Kit:
 - User's Manual
 - Programmer's Manual
 - Three-Ring Binder
 - Warranty card

If any items are missing, please contact your distributor. Save the shipping carton and all packing materials. These items will be needed in the event the printer is to be shipped.

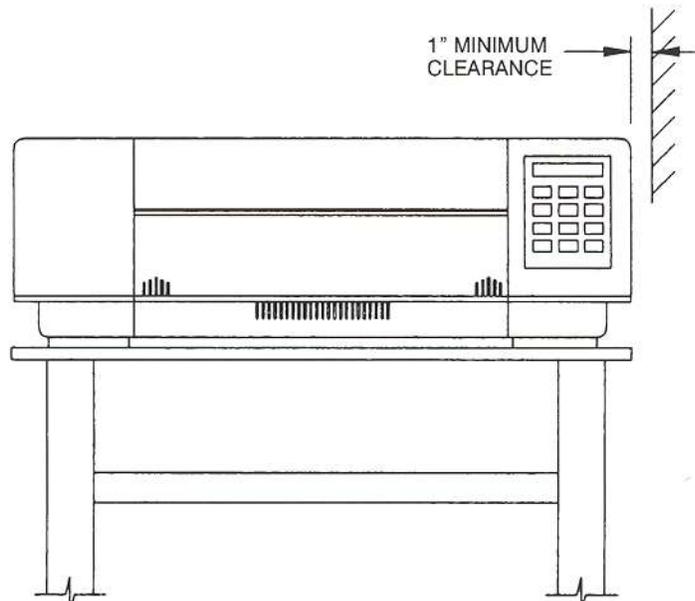
CAUTION

**SHIPPING THE PRINTER IN ANY CONTAINER OTHER THAN
ITS ORIGINAL PACKAGING MAY RESULT IN SHIPPING
DAMAGE AND MAY VOID THE WARRANTY.**



The printer weighs approximately 47 pounds and must be located on a sturdy printer stand.

Sufficient ventilation must be provided. Leave a minimum of 4 inches of space at the back of the printer and a minimum of 1 inch of space on either side.

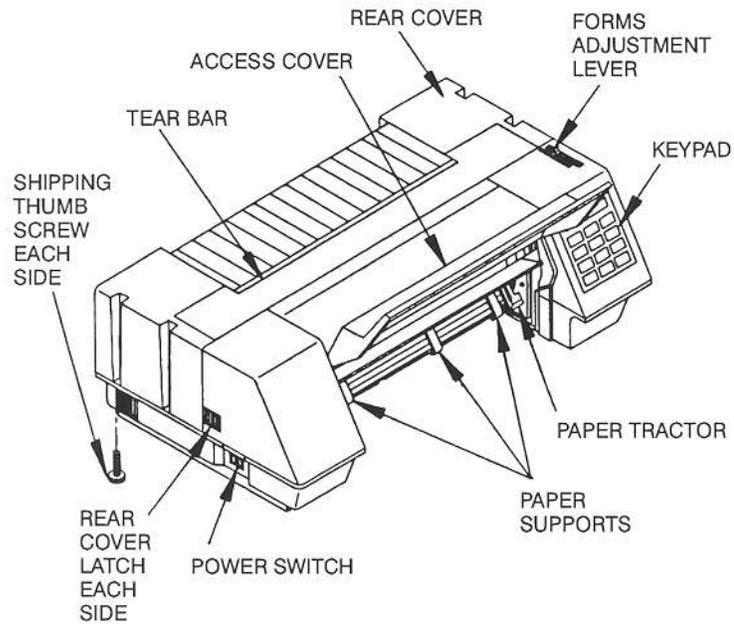


Locate the printer near a grounded power receptacle. Do not use an extension cord to connect the printer. Do not plug any other equipment into the same receptacle.

Avoid the following:

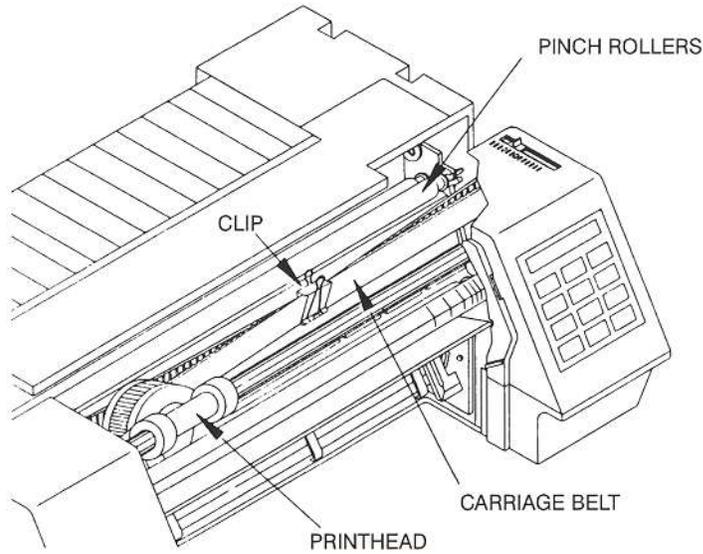
- Direct sunlight or excessively illuminated areas
- Direct placement in front of air conditioning or heating vents
- Extreme high or low temperatures
- Exposure to excessive dirt or dust
- Exposure to vibration or mechanical shock
- Excessive humidity or condensation

Use the following illustrations to locate all of the major printer parts.



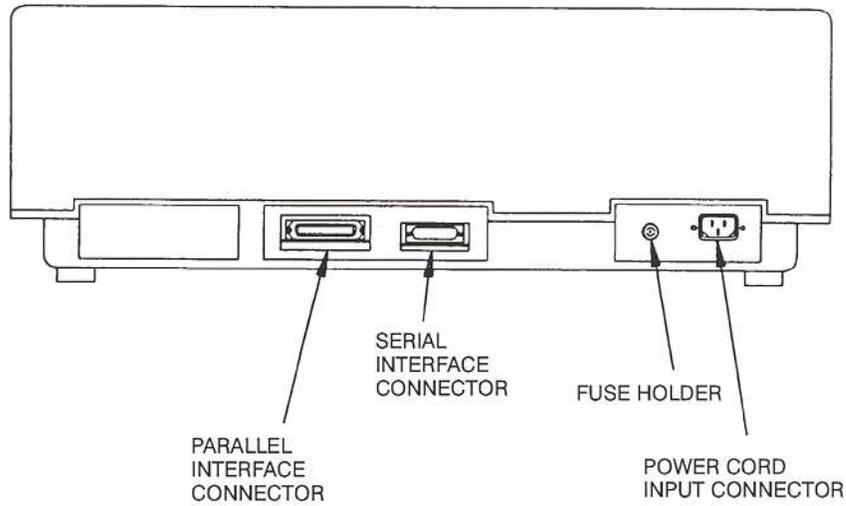
CAUTION

**REMOVE REAR COVER SHIPPING SCREWS (2)
BEFORE ATTEMPTING TO OPEN THE REAR COVER SET.**



CAUTION

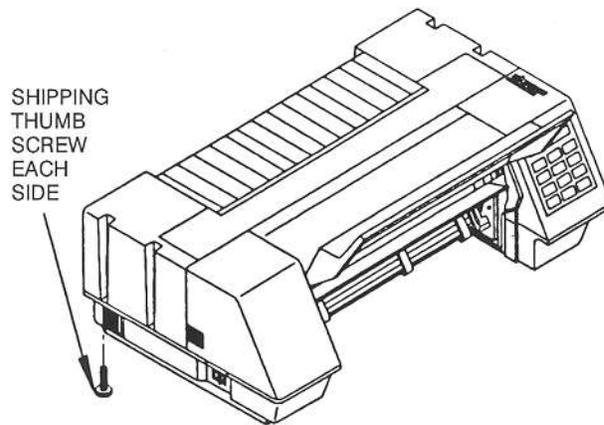
REMOVE CLIP SECURING CARRIAGE BELT BEFORE ATTEMPTING TO OPERATE THE PRINTER.



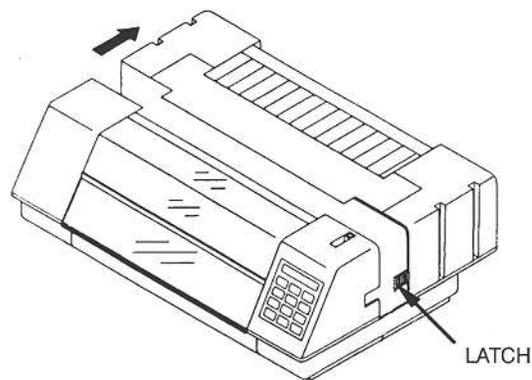
The following must be removed from the printer prior to operation.

Shipping Thumbscrews

Remove the two thumbscrews located on either side and rear bottom of the printer.



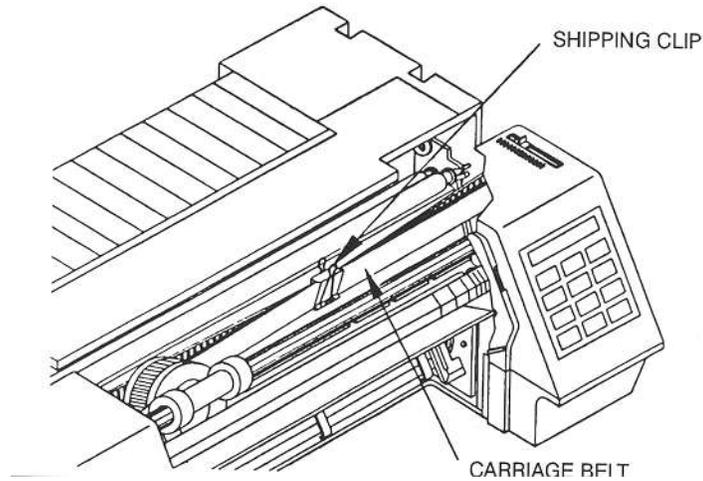
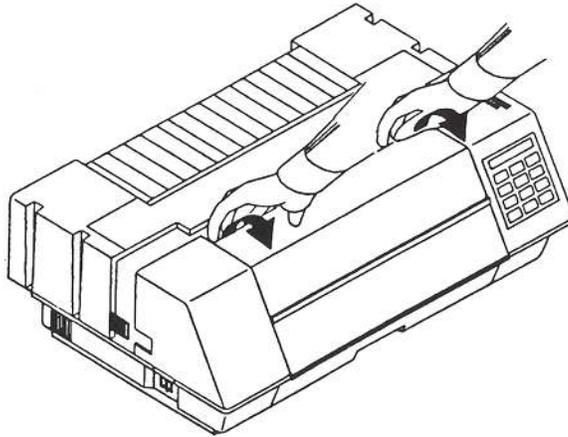
Locate cover latches on each side of printer. Simultaneously press each latch and slide rear cover toward the rear of printer.



Shipping Carriage Clip

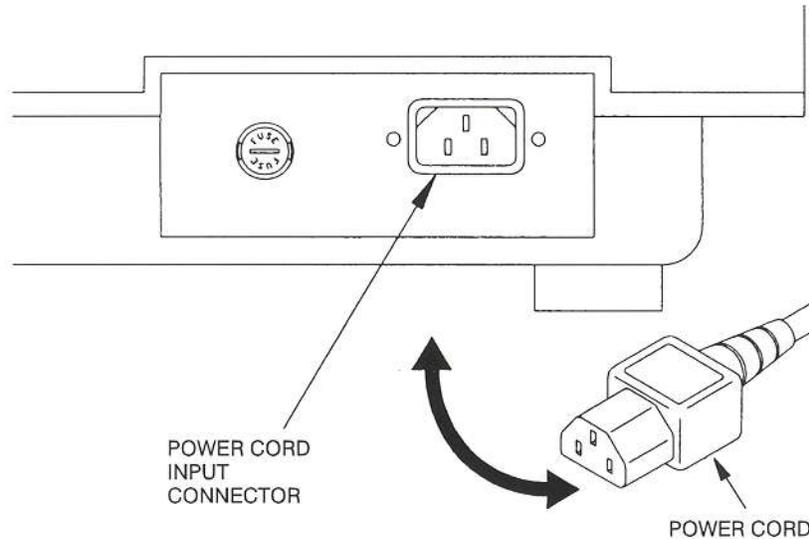
Make sure the bottom half of the access cover is fully closed. Pull on the top access cover and pivot the cover toward the front of the printer to expose the printhead and carriage assembly.

Remove shipping clip from carriage belt.



Installing the Power Cord

1. Set the power switch to **OFF**.
2. Install the power cord into the printer as shown.



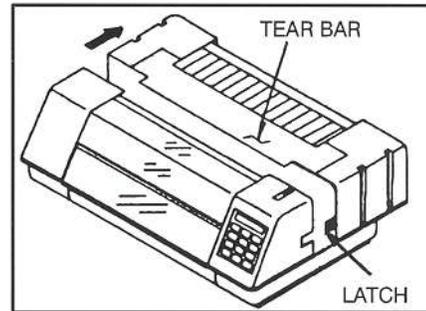
WARNING

CONNECTING THIS EQUIPMENT TO AN UNGROUNDED POWER RECEPTACLE CAN RESULT IN ELECTRICAL SHOCK.

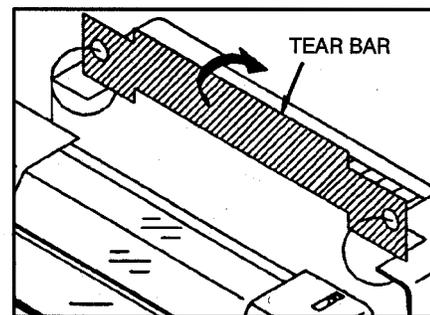
3. Plug the other end of the power cord into a grounded AC outlet. The voltage of the AC power receptacle must match the voltage rating on the power cord receptacle label. A grounded outlet must be used. Plugging the printer into an outlet which is not grounded may result in increased radio frequency noise generation and may also cause erratic printer operation.

To install a ribbon cartridge:

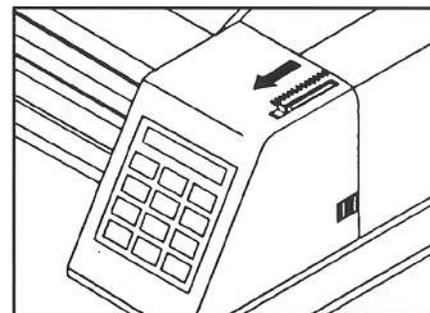
1. Take the printer off-line.
2. Press in on the latches at the sides of the printer to release the rear cover and slide the rear cover back.



3. Rotate the tear bar as shown and rest it on top of the rear cover.



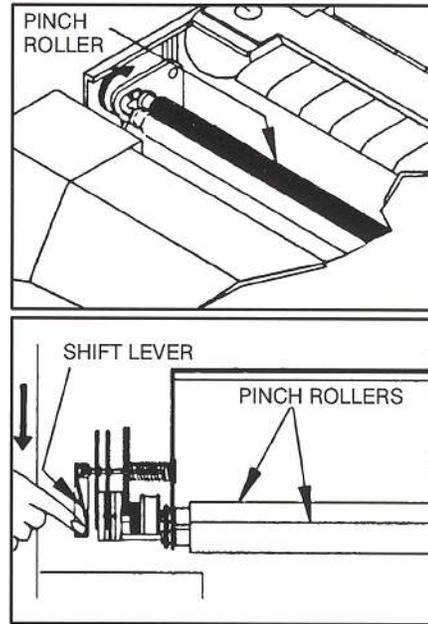
4. Slide the forms adjustment lever toward front of printer as shown. This moves the printhead away from the paper.



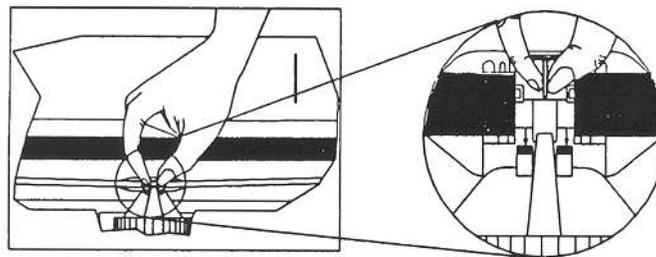
5. Move the pinch roller into the upper

recess area.

6. For units with the cut sheet option, move shift lever toward front of the printer.

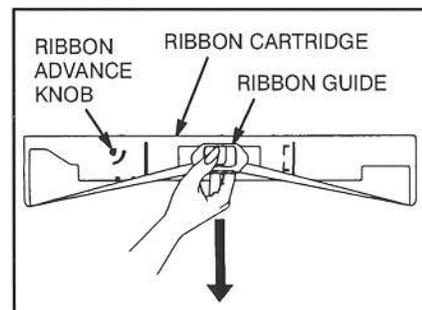


7. Remove the ribbon guide from printhead and remove existing ribbon cartridge from printer (if installed).



8. Remove the ribbon guide from the new ribbon cartridge.

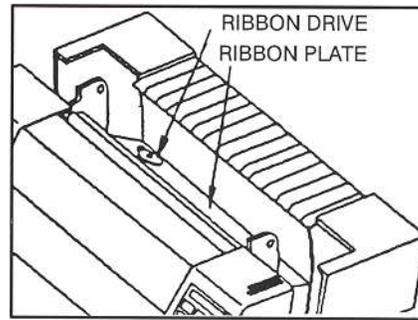
9. Remove the two shipping tabs BEFORE installation.



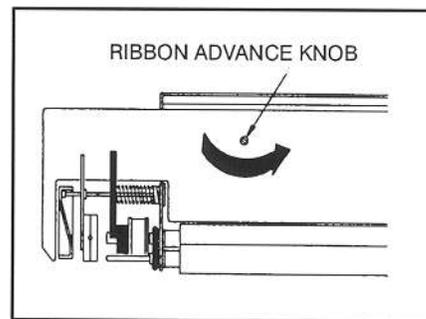
10. Install the ribbon onto the ribbon

plate located in the area behind the pinch rollers.

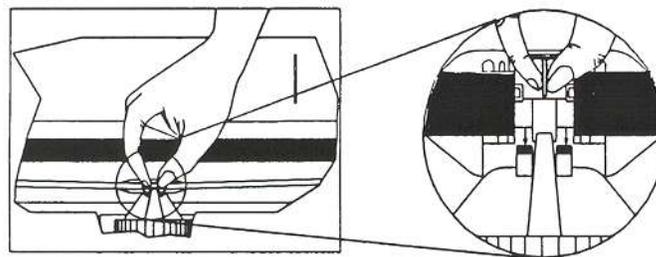
11. Lower the ribbon cartridge into the printer. Ensure that the ribbon loop is in front of the platen and that the ribbon is not twisted. Press the ribbon cartridge down onto the ribbon plate.



12. If the ribbon cartridge does not rest squarely on the ribbon plate, rotate the ribbon advance knob in the direction indicated by the arrow on the cartridge until the cartridge drops into place on the ribbon drive.

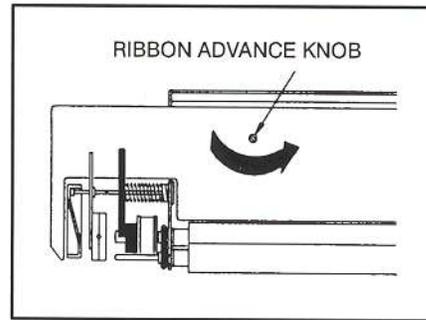


13. Move the printhead to the center of the printer and place the ribbon guide on the printhead nose. Push down on ribbon guide until it snaps into place.



14. Return the pinch roller to its normal position.

15. Remove any slack from the ribbon by turning the ribbon advance knob in the direction of the arrow marked on the ribbon cartridge.



16. Replace the tear bar. Make sure power is **ON** before closing the rear cover.

17. The following message should appear in the

Ribbon Replaced?
Y=Setup N=On Line display.

18. Press **Setup** key to reset ribbon usage value. Refer to **Appendix E** for additional information on Ribbon Life Monitor.

NOTE

**Make sure to reset Ribbon Life Monitor each time a new ribbon is installed.
Refer to Appendix E for information on Ribbon Life Monitor.**

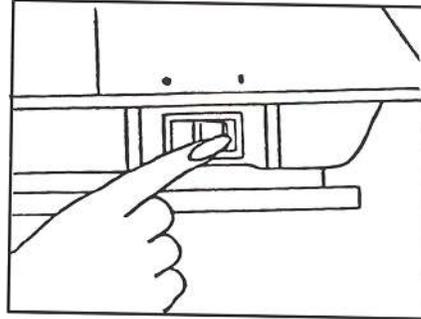
Refer to Chapter 2 for Forms Loading.

For instructions on Bottom Feed Path, see page 2-4.

For instructions on Front Feed Path, see page 2-9.

After paper is loaded in printer:

1. Set the power switch to **ON**.



2. After the printer initializes, press the **Load/Park** key to load paper.
3. Set right and left margins. See page 2-8

CAUTION

**IMPROPER MARGIN SETTINGS CAN LEAD TO PRINTHEAD DAMAGE!!
DO NOT PRINT OVER TRACTOR HOLES OR OFF PAPER EDGE.**

4. Refer to **Forms Thickness Adjustment** on page 2-13 prior to operating printer.

CAUTION

**IMPROPER FORMS THICKNESS ADJUSTMENT
CAN DAMAGE THE PRINTHEAD!!**

This test is used to verify printer operation. Once started, it will continuously print the printer's character set.

To start the test:

1. Press the **Off Line** key.
2. Press the **Setup** key to enter setup mode.
3. Press the **Feature** key once.
4. Press the **Enter** key.

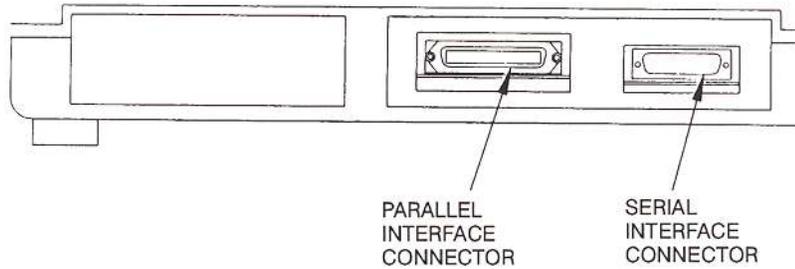
When the **Enter** key is pressed, the printer will begin printing the test.

5. The self-test may be stopped by pressing the **On/Off Line** key.

```
6789: ; <=> ?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` a
789: ; <=> ?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` ab
89: ; <=> ?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abc
9: ; <=> ?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcd
: ; <=> ?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcde
; <=> ?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdef
<=> ?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefg
=> ?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefgt
> ?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghi
?@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghij
@ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijk
ABCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijkl
BCDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijklm
CDEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijklmn
DEFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijklmno
EFGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijklmnop
FGHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijklmnopq
GHIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijklmnopqr
HIJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijklmnopqrs
IJKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijklmnopqrst
JKLMN OPQRSTUVWXYZ \ ] ^ _ ` abcdefghijklmnopqrstu
```

Self Test Sample

The three types of industry standard interfaces offered by the printer are: RS-232 serial interface, RS-422 serial interface and TTL level 8-bit IBM/Centronics compatible, parallel interface. Serial and parallel interface connectors are provided at the back of the printer. The 25-pin serial connector is compatible for both RS-232 and RS-422.



Refer to the documentation for your computer to determine the type of shielded interface cable needed and any unique pin-out configuration that may be required. This information should be given to your dealer or distributor to determine the correct cable for your use.

WARNING

BEFORE CONNECTING THE CABLE, MAKE CERTAIN BOTH THE HOST COMPUTER AND THE PRINTER ARE POWERED OFF.

Attach one end of the cable to the printer and the other end to the host computer. Secure the interface cable to the interface connector with the screws or wire clips which are provided.

RS-232 And RS-422 Serial Interface Configuration

After installing the serial cable, you must configure the printer to use the serial interface. This is done from the keypad.

1. Set the power switch to **ON**



2. Press the **Off Line** key.



3. Press the **Setup** key. The

G1 Forms Control

first group will appear on the top line of the display with the first feature of the group appearing on the bottom line.

Form Length 66

- 4. Press the **Group** key until you have accessed Group 4. The display will appear as shown.

G4 Serial Ctrl
Baud Rate 9600

The printer is factory set for RS-232 serial interface. If you are using the RS-232 interface, proceed to step 9. If you wish to select the RS-422 serial interface, proceed as follows:

- 5. Press the **Feature** key one time.

G4 Serial Ctrl
Serial RS-232

- 6. Press the **Value** key to select RS-422.

G4 Serial Ctrl
Serial RS-422

- 7. Press the **Enter** key to save your selection.

G4 Serial Ctrl
Serial RS-422

Next, determine the baud rate of the host computer. The printer is factory set for 9600 baud. If the baud rate for the printer must be changed, proceed as follows.

- 8. Press the **Feature** key one time.

G4 Serial Ctrl
Baud Rate 9600

- 9. Press the **Value** key to select the desired baud (19.2K for this example).

G4 Serial Ctrl
Baud Rate 19.2K rate

Continue configuration of interface setup until proper host-printer communication is complete.

- 10. Press the **Enter** key to save your selection.

G4 Serial Ctrl
Baud Rate 19.2K

- 11. Press the **Setup** key to

Save Profile?

exit setup mode. The "Save Profile?" message will be displayed.

Y=Enter N=Setup

12. Press the **Enter** key to save the profile setting.

P1 Profile One
Font DPI0

13. Press the On Line key to place the printer back on line.

P1 Profile One
Font DPI0

Recommended Types, Sizes and Weights



**IMPROPER MARGIN SETTINGS CAN LEAD TO PRINthead DAMAGE!!
DO NOT PRINT OVER TRACTOR HOLES OR OFF PAPER EDGE.**

Continuous Forms

Width - 3 to 15 inches
Individual Pan Thickness - .005 inch maximum
Total Form Thickness - .021 inch maximum
Number of Copies - original plus 5 copies

Individual parts of a multi-part should not exceed .005 inches without factory approval. Carbonless forms over 4 parts by factory approval only.

Single Part Cut Sheets

Width - up to 17 inches
Length - 5 inch minimum
Weight - 16 to 24 pound bond
Thickness - .003 to .005 inches

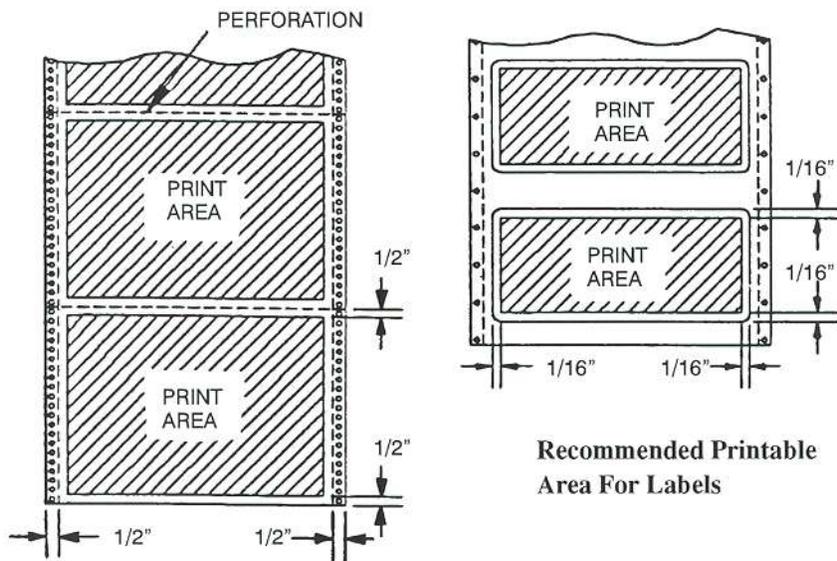
Multi-part Cut Sheets

Width - up to 14 inches
Length - 5 inch minimum
Individual Part Thickness - .005 inch maximum
Total Form Thickness - .021 inch maximum
Number of Copies - original plus 5 copies

Individual part of a multi-part form may not exceed .005 inch without factory approval. Carbonless forms over 4 parts by factory approval only.

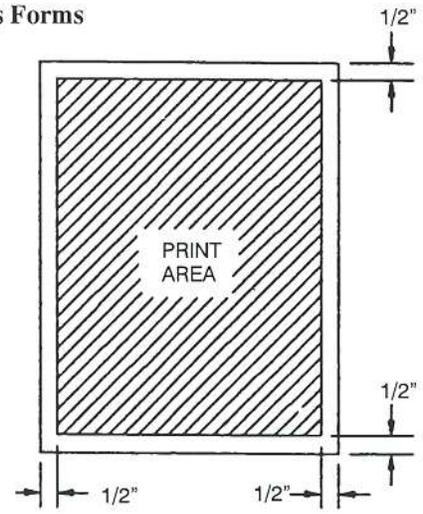
C-Size Drawing Paper

(17 x 22 inches), may be manually fed through the front feed path in portrait orientation only.



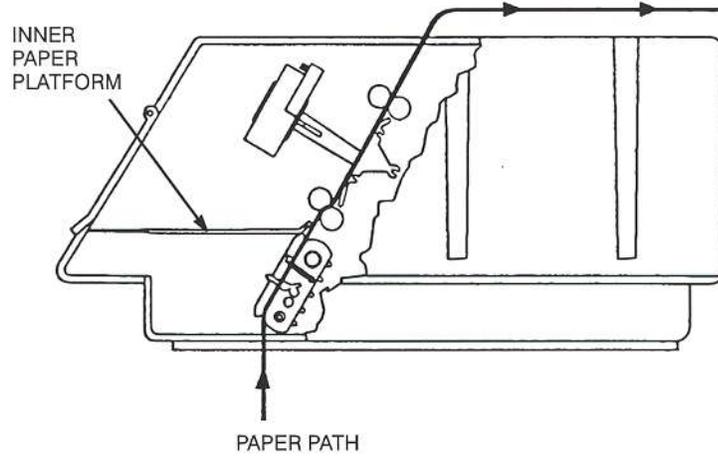
Recommended Printable Area For Labels

Recommended Printable Area For Continuous Forms

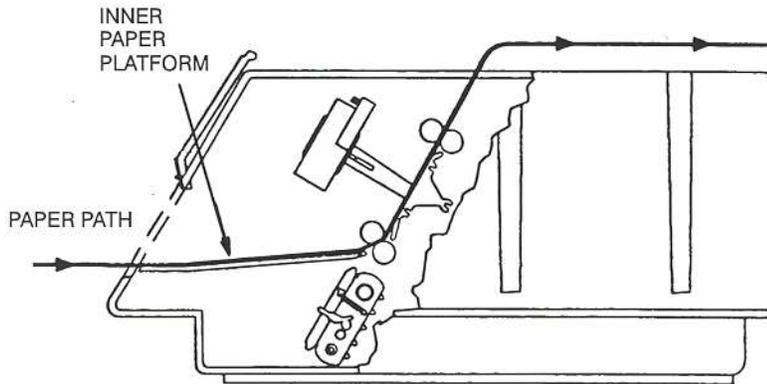


Recommended Printable Area For Cut Sheets (On Units So Equipped)

All printers provide a bottom feed path for continuous forms. Models which are so equipped also provide a front feed path for manually fed cut sheets.



Bottom Feed Path



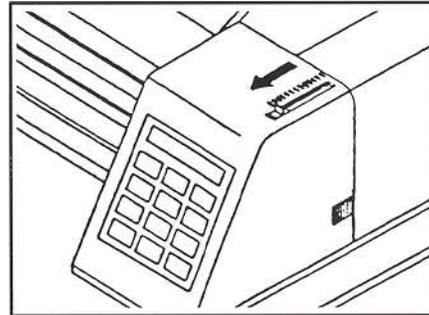
Front Feed Path (On Printers So Equipped)

Forms

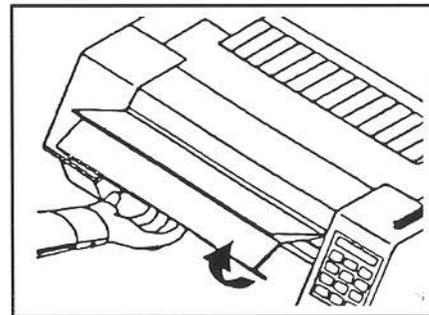
Bottom Feed Path

The bottom feed path is used whenever continuous forms are being used. To access the tractors and load a continuous form, proceed as follows:

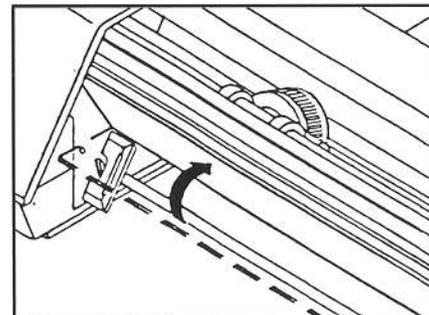
1. Raise the front access cover.



2. Slide the forms adjustment lever toward front of printer as shown. This moves the printhead away from the paper.



3. Raise the inner paper platform (on units so equipped). Open both tractor doors.



4. Unlock both tractors by

pushing down on the locking levers (left tractor shown).

5. Align left tractor pins with left most mark on base. Place the right tractor at the approximate forms width. Lock left tractor in place.

CAUTION

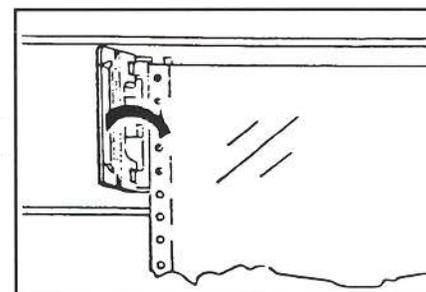
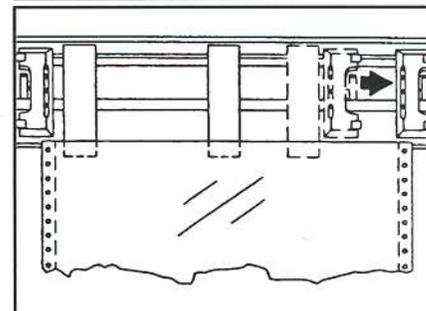
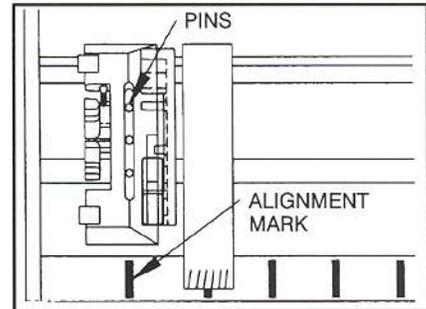
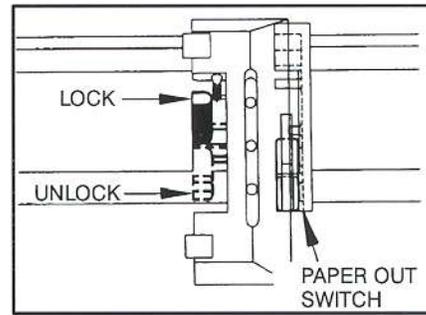
IMPROPER TRACTOR LOCATION RESULTING IN PRINTING PAST THE EDGE OF THE FORM CAN CAUSE DAMAGE TO THE PRINTHEAD.

6. Position the right and left paper supports next to the right and left tractors, respectively. Position the remaining support near the center of the paper to be loaded.

CAUTION

FAILURE TO USE PAPER SUPPORTS MAY CAUSE A PAPER JAM.

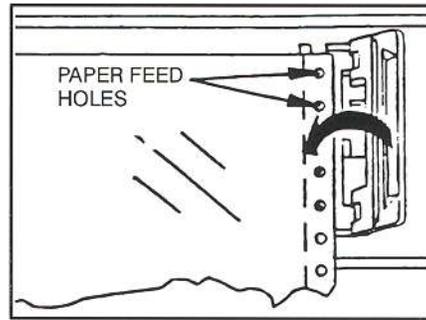
7. Place the left side of the form in the left tractor. Close the tractor door.



8. Load the paper into the right

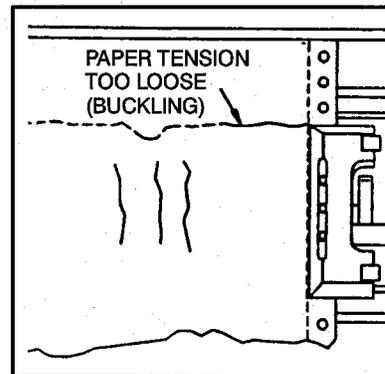
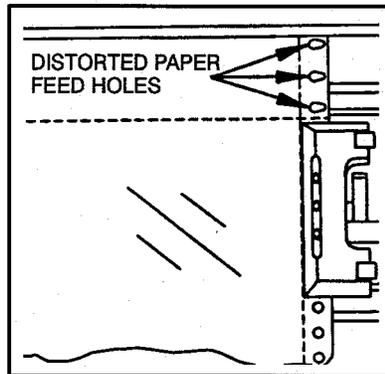
tractor. Compare position of paper in left and right tractors and adjust as necessary to keep paper even. Improper alignment of paper feed holes will result in paper jam. Close tractor door.

9. If necessary, move the right tractor to the right to tension the paper. Lock the tractor in this position.

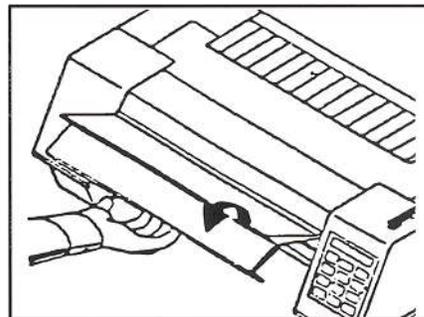


CAUTION

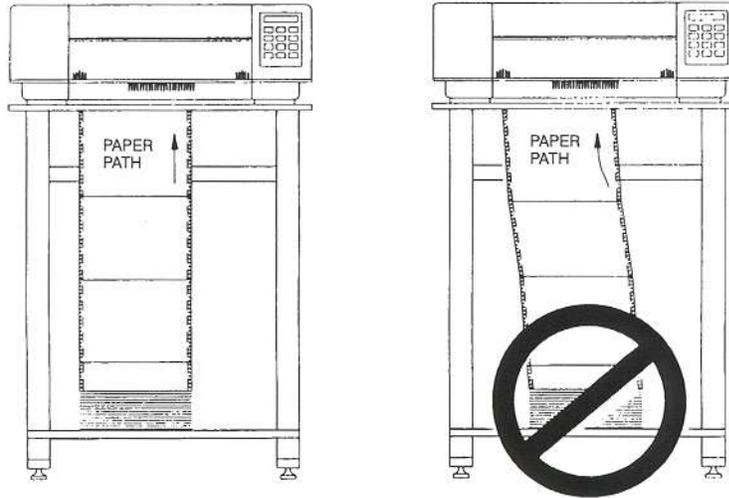
**IMPROPER PAPER TENSION MAY CAUSE PAPER JAMS.
PAPER SHOULD BE TENSIONED SUFFICIENTLY TO BE RELATIVELY FLAT
BETWEEN THE TRACTORS, WHILE AVOIDING DISTORTION OF THE PAPER FEED
HOLES. SEE ILLUSTRATIONS BELOW.**



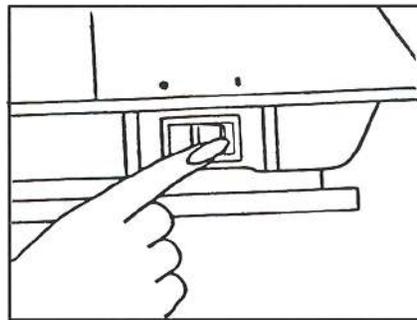
10. Lower paper platform (if equipped).
11. Close front access cover.



12. Make certain the continuous forms are located directly under the tractors. The paper must hang straight. Incorrect positioning of the forms, as shown in the right figure, may cause the forms to “walk” out of the tractors and cause a paper jam.



13. Set the power switch to **ON**.



14. After the printer initializes, press the **Load/Park** key to load paper.
15. Set right and left margins. See below.

To set margins, first measure the printed width of the form (in inches). Multiply the measured forms width by the font pitch. Set the right margin to this number. To set the right margin, press the **Setup** key, then press the feature down key until “**RIGHT MARGIN**” appears in the display. Use the value key to change the margin setting and press the **Enter** key. Press the **Setup** key and then the **Enter** key to save margin setting. If you shift the left margin, you may want to shift the right margin by the same amount.

CAUTION

**IMPROPER MARGIN SETTINGS CAN LEAD TO PRINTHEAD DAMAGE!!
DO NOT PRINT OVER TRACTOR HOLES OR OFF PAPER EDGE.**

16. Refer to **Forms Thickness Adjustment** on page 2-13 prior to operating printer.

CAUTION

IMPROPER FORMS THICKNESS ADJUSTMENT CAN DAMAGE THE PRINTHEAD!!

Front Feed Path

If your printer is equipped with a front feed path, it may be used for manually loading individual cut sheets. Any continuous forms must be out of the paper path before the front feed path can be used.

NOTE

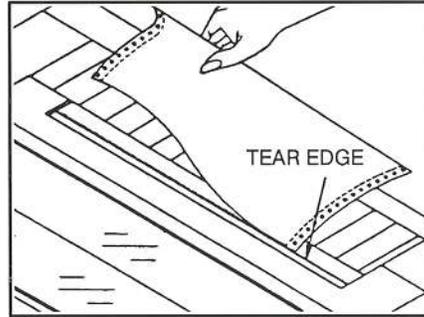
Attempts to load a cut sheet while tractor paper is loaded will cause an error bell to sound.

If there are continuous forms in the printer, begin with step 1. If there are no continuous forms in the printer, begin with step 5.

To use front feed path:

1. Make sure printer is **Off Line**.
2. Press the Tear Off key to advance the form to the tear off point.
3. Remove the last printed form.

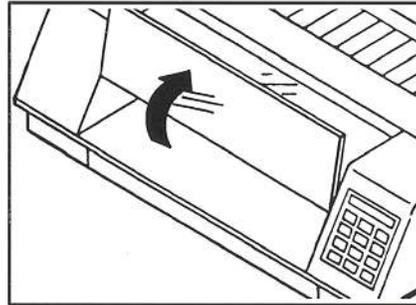
< Forms Tear Off >
Please Wait



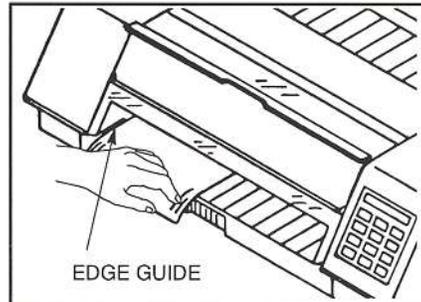
< Forms Parked >
Use Load Key

4. Press the **Load/Park** key. The continuous forms will be backed down out of the paper path and held in the forms tractors. The display will appear as shown.

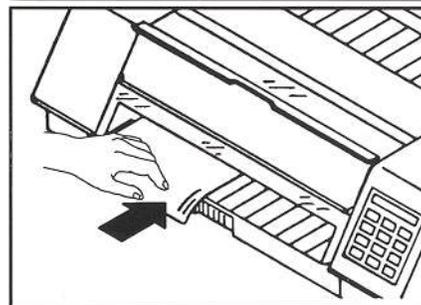
5. Open the paper platform door.



6. Place a cut sheet on the inner paper platform. Use the left edge guide for positioning only.



7. Insert paper into the front feed path until you feel it resting squarely against the front stops. The printer will assist you in this task by activating the paper feed motor.



The lower pinch rollers will close after a predefined time (see **Load Time** feature), and you may release the paper. The printer will automatically feed the paper up the platen.

The cut sheet may also be loaded into the printer by pressing the **Load/Park** key. See Load Time in Chapter 4.



**IMPROPER MARGIN SETTINGS CAN DAMAGE PRINTHEAD. SEE PAGE 2-8.
REFER TO FORMS THICKNESS ADJUSTMENT ON PAGE 2-13 PRIOR
TO RUNNING PRINTER. IMPROPER FORM THICKNESS
ADJUSTMENT CAN DAMAGE PRINTHEAD!!**

Top Of Form Adjustment

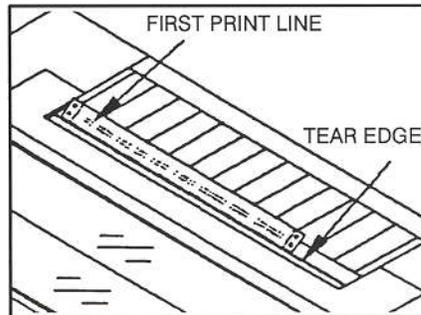
When paper is loaded into the printer, the printer automatically positions the paper to print on the first line of the form. To change the top-of-form using the **Set TOF** (Top of Form) key, proceed as follows:

1. Press the **Off Line** key.

2. To place the printer in Top-of-Form Adjust mode, press the **Set TOF** key. The form will advance so the first print line is positioned at the tear bar for viewing. The following message appears in the display:



3. Use the **Adjust** and **Adjust** keys to adjust the form position. Position the form so the bottom of the first print line is directly in front of the tear bar.

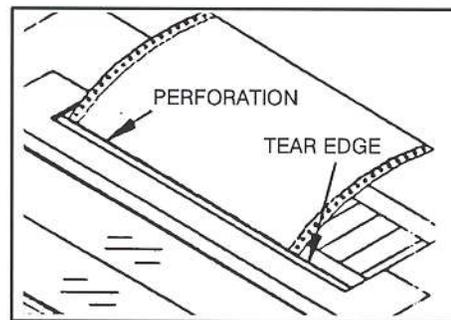


4. Press the **Set TOF** key to return the form back to print position.

5. This adjustment is automatically saved in memory for the current profile and will be applied the next time forms are loaded.

Tear Off Adjustment

The printer can be used in demand document application. A tear off distance is set so the forms come to rest as shown when the **Tear Off** key is pressed. When the forms are in this position, the last printed form may be removed by pulling the perforation against the tear edge of the cover.

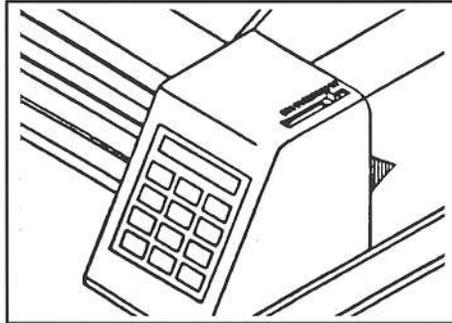


The distance the forms move when the **Tear Off** key is pressed is called the tear distance. If the perforation does not come to rest at the tear edge, the tear off distance may be adjusted as follows:

1. Load forms as described under **Bottom Feed Path** in this chapter.
2. Perform **Top-of-Form Adjustment** in this chapter.
3. Press the **Tear Off** key. The form should move up to the current tear location.
4. Using the Adjust key or the Adjust key, move the paper until the perforation is located at the tear bar.
5. Press the **Tear Off** key. The form will return to the current print position. This adjustment is automatically saved in memory for the current profile and will be applied when forms are reloaded.

Form Thickness Adjustment

The distance from the printhead to the platen must be changed to accommodate the thickness of the forms being used. When single part forms are used, the printhead must be closer to the platen. When multi-part forms are used, the printhead must be further away from the platen or printhead damage may occur. The adjustment control is located on the top of the printer cover above the keypad.

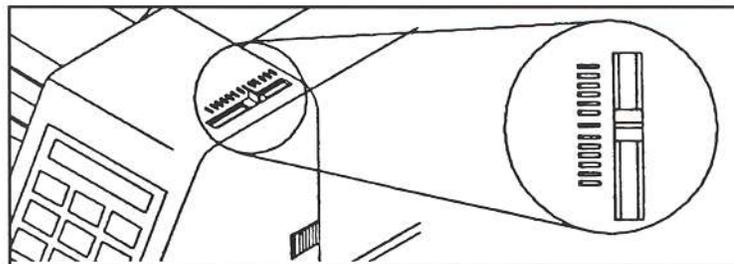


CAUTION

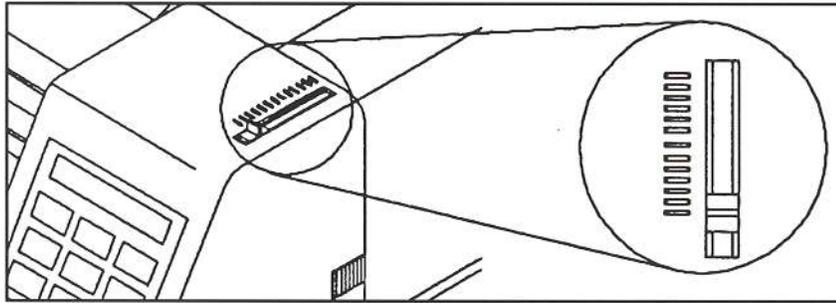
IMPROPER FORMS THICKNESS ADJUSTMENT CAN DAMAGE THE PRINTHEAD.

To correctly set the printhead-to-platen gap:

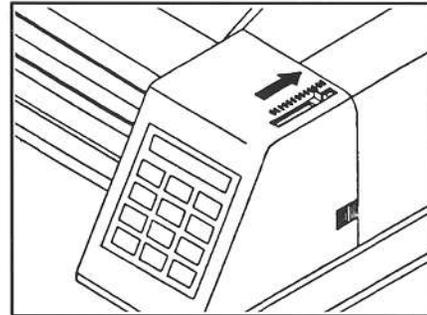
1. Install a ribbon cartridge and load forms into the printer.
2. If using 1 or 2 part forms, set the adjustment control to the middle of the adjustment range.



3. If using forms of 3 or more parts, set the adjustment control to the last mark.



4. Run the printer self-test (Maintenance Troubleshooting section).
5. Inspect the print sample. The characters should be easily read with no missing dots. Make certain you check the last copy of multi-part forms for properly formed characters.
6. If the print quality is unacceptable, move the print-head closer by one detent position and run another print sample (step 4).



NOTE

There is not a direct correlation between detent position and the number of parts in a multi-part form (e.g. the adjustment control is not set to the fourth mark for a four-part form).

7. Repeat this procedure until acceptable print quality is obtained.

Changing From Continuous Forms to Cut Sheets

If continuous forms are presently loaded in the printer, you may change to single cut sheets by proceeding as follows:

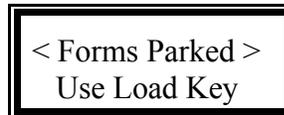
1. Press the **Off Line** key.
2. Press the **Tear Off** key to advance the form to the tear off point.
3. Remove the last printed form.

4. Press the **Load/Park** key.
The continuous forms will be backed down out of the paper path and held in the forms tractors. The display will appear as shown.



< Parking Forms >
Please Wait

5. This will be followed by the message:



< Forms Parked >
Use Load Key

6. The printer is now ready for cut sheets to be loaded. See **Front Feed Path** on page 2-9.

7. After the first cut sheet has been inserted, the display will appear as shown.



< Cut Sheet Mode >
Insert Sheet

Changing From Cut Sheets to Continuous Forms

If single cut sheets are presently loaded in the printer, you may change to continuous forms by proceeding as follows:

1. Press the **Off Line** key.
2. Press the **From Feed** key to eject any cut sheet which is presently in the printer.
The display will appear as shown.



<Cut Sheet Mode>
Insert Sheet

3. Press the **Load/Park** key. The continuous forms will automatically be reloaded to the previously set top-of-form and top margin. If no continuous forms are in the tractors, the

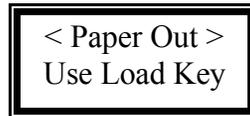
printer will indicate a paper out condition. Refer to **Bottom Feed Path** on page 2-4 for loading continuous forms.

4. Press the **On Line** key.

The printer is on line and ready to print.

Paper Out When Using Continuous Forms

When the printer runs out of paper, the following message will appear in the display:



< Paper Out >
Use Load Key

The printer will automatically go off line when the paper supply is depleted. To recover from a paper out condition when using continuous forms:

1. Load paper into the tractors.
2. Press the **Load/Park** key to load forms.
3. Press the **On Line** key to go back on line.

Paper Out When Using Cut Sheets

The printer will not indicate a paper out error but will provide the following message in the keypad display:



< Cut Sheet Mode >
Insert Sheet

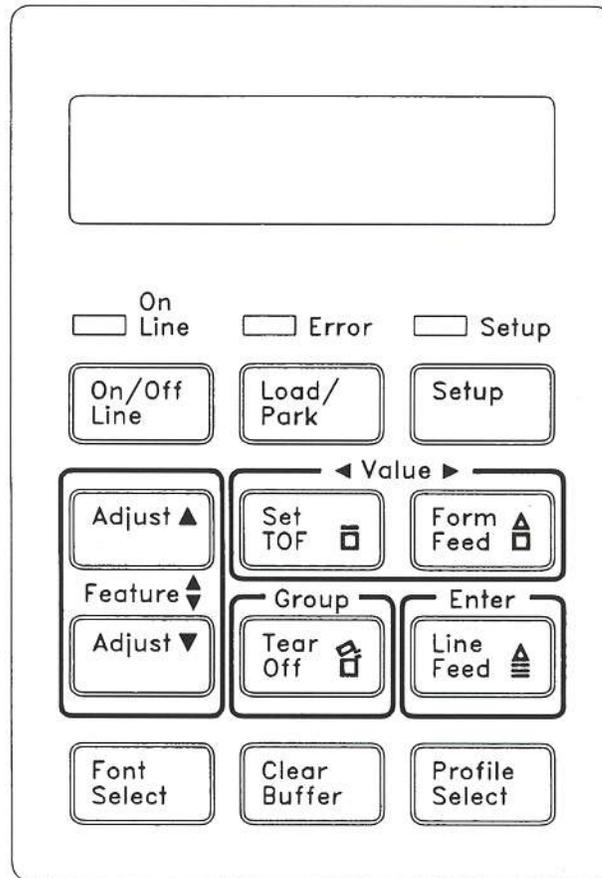
You should respond by doing the following:

1. Insert paper into the front feed path until you feel it resting squarely against the front stops. You will hear some motor noise at this point, but do not release the paper. The lower pinch rollers will close and you may release the paper. The printer will automatically feed the paper up to the platen and the printer will continue printing.

Chapter 3: Keypad Operation

Arrangement of Keys and Indicators

The purpose of this chapter is to familiarize you with the operator panel. The locations of all keys and indicators are illustrated below.



Description Of Indicators

On Line indicator

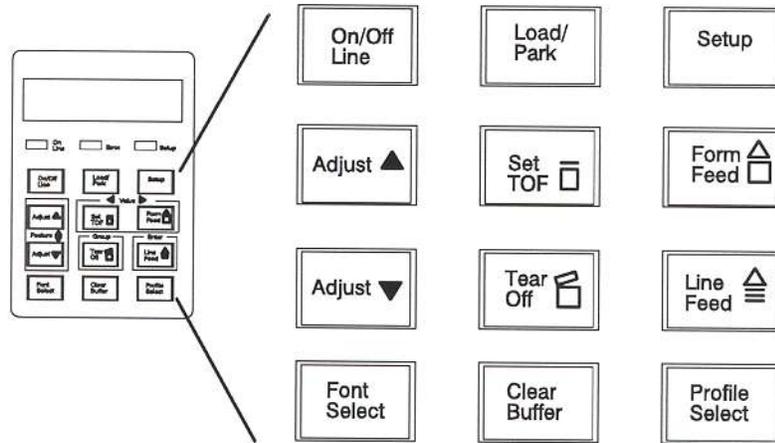
- on - Printer is on line.
- off - Printer is off line.
- blinking - Printer is off line and is retaining unprinted data in the print buffer.

Error indicator

- on - Printer has experienced a non-recoverable error. You should contact your distributor or service representative.
- off - No errors are present.
- blinking - This indicates the printer has experienced a recoverable error. The specific error such as < Paper Out> will be listed in the keypad display.

Setup indicator

- off - Printer is out of setup mode, ready for normal operation.
- blinking - Printer is in setup mode.



Primary Keys

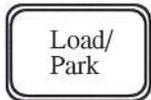
Primary Key Functions

The primary function is the function which is printed directly on the key. Primary key functions are used for normal operation. Secondary key functions are used in setup mode and are explained in Chapter 4.



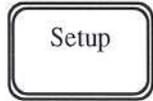
Pressing this key switches the printer between the on line state and the off line state. This key is used in conjunction with the **On Line** indicator which provides an indication of the printer state. The **On/Off Line** key is also used to continue after clearing an error condition.

After the rear cover has been opened then closed, pressing this key indicates the ribbon has not been replaced and does not reset the ribbon usage value.



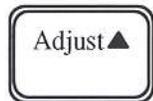
This key functions as a **Load** key when the printer is out of paper. Pressing this key will load paper from the front feed path if paper is available. If there is no cut sheet in the front feed path, the printer will load continuous forms from the tractors into print position.

This key functions as a **Park** key when continuous forms are already in print position. Pressing this key will reverse feed the paper and park it in the tractors. Forms do not have to be removed after they have been parked. Paper which is parked will be held by the tractors in a ready position and may be reloaded by pressing the **Load/Park** key.



When the printer is off line, this key is pressed to enter and to exit setup mode. This key works in conjunction with the Setup indicator.

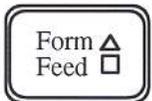
After the rear cover has been opened then closed, pressing this key indicates the ribbon has been replaced and resets the ribbon usage value.



Pressing this key moves the form upward 1/144 inch for precise form alignment. If the key is pressed for more than 1/2 second, the paper will advance continuously until the key is released.



When the printer is off line, this key places the printer in a top of form adjustment mode. Any adjustment made to the top-of-form in this mode is remembered and applied the next time a form is loaded.



When using continuous forms, pressing this key advances the forms to the top of the next form.

When using cut sheets, the **Form Feed** key is pressed to eject paper which is in the printer.



Pressing this key moves the form downward 1/144 inch for precise form alignment. If the key is pressed for more than 1/2 second, the paper will reverse continuously until the key is released.



Pressing this key advances the forms up so the last printed form can be removed. Pressing the key a second time will move the form back down into print position.



Pressing this key once will advance the paper by one line. If the key is pressed for more than 1/2 second, the paper will advance continuously until the key is released.



This key allows you to quickly select a font without entering setup mode. To use this key, place the printer off line. Available font names will be displayed in the display window each time the Font Select key is pressed. This key may be used only when the printer is off line.



When the printer is off line, pressing this key clears the printer's print buffer. This is normally used when a job is going to be restarted.

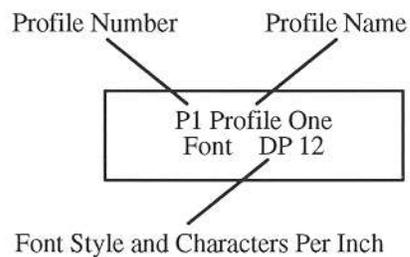


This key allows you to quickly select a profile without entering setup mode. To use this key, place the printer off line. Then press the **Profile Select** key. Available profile names will be displayed in the display window each time the **Profile Select** key is pressed. This key may be used only when the printer is off line. For more information about profiles, see Chapter 4.

After changing profiles, it is suggested that the user park and load the paper to reset the top-of-form.

LCD Display

When on line, the LCD display provides the following information:



Chapter 4: Features and Profiles

Features

This chapter describes the various user programmable features of the printer. Through the keypad, the printer can be configured to operate in a variety of host environments and provide print for common applications such as reports, checks, invoices, and labels.

The printer's features are grouped into the following seven categories:

	Group Name	Feature Examples
1.	Forms Control	Form length, margin settings
2.	Personality	Emulations, fonts, character sets
3.	Printer Control	Paper handling, print control
4.	Serial Control	Baud rate, parity, handshaking
5.	Parallel Control	Handshaking, ack after busy
6.	Profile Control	Naming, saving profiles
7.	Diagnostics	Print profile, print test, firmware revision

See pages 4-9 through 4-23 for a detailed listing and description of all features and values.

Profiles

This printer will store the feature settings for commonly used applications in what is called a PROFILE. Up to four profiles may be named, saved in the printer's non-volatile memory, and recalled with a few key strokes. This avoids time consuming setup and reprogramming each time you change applications.

The following shows how profiles can be named and how features may be programmed to suit the particular application.

Profile Name/Feature Value

Feature Name	P1 Report	P2 Invoice	P3 Checks	P4 Statements
Form Length	66	66	24	30
Lines/Inch	8	6	6	6
Right Margin	136	80	70	70
Track	135/144	135/144	100/144	200/144
Manual Tear	FF	TOF	TOF	TOF
Emulate	IBM PRO	IBM PRO	LA 120	LA 120
Font	DP 10	Draft 10	Prest. 12	Draft 10
Window Ctrl	12	12	1	12
Parallel	Enable	Disable	Disable	Enable

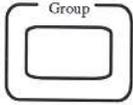
For example, to change from printing reports to checks, simply press the **Off Line** key, the **Profile Select** key (2 times), and the **On Line** key. Load the appropriate forms (checks) and you are ready to print.

For an application that is not stored in a profile, call up the profile whose features most closely match the application and reprogram only the features requiring change. These changes will not alter the profile's permanent settings unless you save them when you exit setup mode.

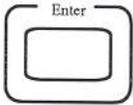
Secondary Key Functions

To change features, press the **Setup** key to enter setup mode and the “Secondary Key Functions” are in operation. The illustration below shows the secondary keys and their respective functions. Note that in setup mode, the keys operate according to the legend encircling the key, not the legend printed on the key.

A brief description of each key function follows:



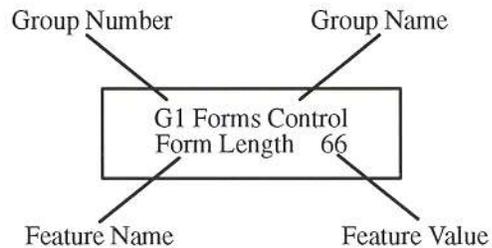
The **Group** key provides quick access to a specific group of features. When the printer is in setup mode, pressing this key steps through the printer features by group. This prevents having to “cycle through” the entire feature list in order to get to the desired feature.



The **Enter** key is used to accept new values for the printer features. After the value of a feature has been changed, or after a Profile has been modified, the **Enter** key is pressed to save the new settings into memory.

LCD Display

In setup mode, the LCD display provides the following information:



Profile Feature Listing

To print a listing of the feature settings of a particular profile, follow the steps below:

1. Press the **Off Line** key.
2. Before entering setup mode, press the **Profile Select** key until it displays the profile you wish to print.

3. Press the **Setup** key and follow the previously described procedures for changing features. Go to Group 7. The display will read:

Print Profile

4-4

4. Make certain 8 ½ inch or wider paper is loaded in the printer.
5. Press the **Enter** key. The printer will print a listing of the profile feature settings.
6. Press the **Setup** key to exit setup mode.
7. Press the **On Line** key to return to normal operation.

Changing Features In A Profile

Feature settings in a profile may be changed through the keypad by following the steps below:

1. Press the **Off Line** key. (The **On Line** light should be off.)

2. Press the **Setup** key. (The **Setup** light will be on.)
The display will read:

G1 Forms Control
Form Length XXX

NOTE

**If you are unable to enter setup mode, contact your system manager.
(The display will read “Key Lock”.)**

3. Press the Group key, as necessary, to scroll through the feature groups until you reach the group containing the feature you wish to change.

NOTE

Features and values are listed by group, on pages 4-9 through 4-23.

4. Press the **Feature** or Feature key to scroll the display up or down until you reach the feature to be changed.
5. Press the **Value** key or **Value** key to scroll the display backward or forward until you reach the value you wish to set.

6. Press the **Enter** key to record the new value. The bell will sound once.
7. Repeat steps 3 through 6 as necessary until all features are correctly set for your application.
8. Press the **Setup** key to exit setup mode. The display will read:

Save Profile? Y=Enter N=Setup

To answer “Yes”, press the **Enter** key. This will record the change in non-volatile memory for that profile.

To answer “No”, press the **Setup** key. This will make the change temporary, thus not changing the original profile setting. These settings will be valid until profiles are changed again or the printer is powered off.

9. Press the **On Line** key to return to operation.

NOTE

To maintain correct top-of-form alignment when a profile change is made, the paper should be parked (if not already parked) and reloaded so that the printer can reset the top-of-form for the new profile.

As an example, assume the profile you are presently using defines the lines per inch as 6. To permanently change the lines per inch to 8, proceed as follows:

1. Press the **Off Line** key.

P1 Profile One Font DP10

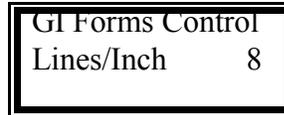
2. Press the **Setup** key to enter setup mode.

GI Forms Control Form Length 66

3. Press the **Feature** key to select Lines/inch.

GI Forms Control Lines/Inch 6

4. Press the **Value** key to change the Lines/inch to 8 lines.



4-6

5. Press the **Enter** key to save the new Lines/Inch value. The bell will sound once.



6. Press the **Setup** key to exit setup mode. The "Save Profile" message will be displayed.



7. Press the **Enter** key. This records the change into the profile.



8. Press the **On Line** key to place the printer back on line.



9. Press the **Load/Park** key to reset top of form.

After pressing the **On Line** key, the printer will operate with the vertical motion defined as 8 lines per inch. The next time this profile is selected, or if the printer power is switched off and back on, the lines per inch margin will remain at 8 lines per inch.

User Programmable Features

Group 1: Forms Control

CAUTION

IMPROPER MARGIN SETTINGS CAN LEAD TO PRINTHEAD DAMAGE.

Printer Displays	Values	Description
Form Length ###	1	Lines per page resets top and bottom margins.
	. 200	Sets top of form at current position.
Lines/Inch ###	1	Vertical pitch for printing text.
	2	
	3	
	4	
	6	
	8 12	
Top Margin ###	1	Number of lines from the top of form and the first print line.
	. 200	Value cannot exceed bottom margin.
Bottom Margin ###	1	Bottom margin
	.	The last print line allowed on the form.
	.	
	. 200	Value cannot exceed form length.
Left Margin ###	1	The left margin can be set from 1 to the right margin minus 1.
	. MLL	Maximum Line Length See Appendix A.
Right Margin ###	LM	The right most print position in the current horizontal pitch.
	. MLL	Maximum Line Length See Appendix A.

Group 1: Forms Control (Cont'd)

Printer Displays	Values	Description
Clear Horz Tabs		Clear Horizontal Tabs Pressing the Enter key will clear all horizontal tabs.
Horiz Tab ## xxx	Set/Clr	Horizontal Tabs Pressing the Value key selects the column (##) where a horizontal tab may be set or cleared. Pressing the Enter key will Set or Clr (clear) a tab in that column. Up to 32 horizontal tabs can be set.
Clear Vert Tabs		Clear Vertical Tabs Pressing the Enter key will clear all horizontal tabs.
Vert Tab ## xxx	Set/Clr	Vertical Tabs Pressing the Value key selects the line (##) where a vertical tab may be set or cleared. Pressing the Enter key will Set or Clr (clear) a tab in that line. Up to 32 vertical tabs can be set.
Load # ##/144	0 0/144 . . . 4 0/144	This feature is used to align the first print line of a form and the printhead. Increments are in inches or 1/144th of an inch. This feature is the same as the Set TOF key.

Group 1: Forms Control (Cont'd)

Printer Displays	Values	Description
Trac -> ##/144	0/144 216/144	Tractor feed left most print position. This feature is used for making fine adjustments to left most starting print position. Increments are in inches or 1/144th of an inch. This feature is for tractor feed only.
Sheet -> ##/144	0/144 216/144	Sheet feed left most print position. This feature is used for making fine adjustments to left most starting print position. Increments are in inches or 1/144th of an inch. This feature is for friction feed only.
Tear # ##/144	0 0/144 . . . 9 72/144	This feature determines the distance the paper is moved when the Tear Off key is pressed. Increments are in inches or 1/144th of an inch.
Manual Tear xxx	FF	The printer will perform a form feed before moving to the tear position.
	TOF	The printer will move to the tear position after printing crosses the next forms boundary.

Group 1: Forms Control (Cont'd)

Printer Displays	Values	Description
Manual Time ##s	OFF	The Tear Off key must be pressed to return the forms to the print position.
	1 . . . 30	The time in seconds that the form will be in the tear position before automatically returning to the print. This feature works only with the Manual Tear feature.
Auto Tear xxx	OFF	Value set for 'Off', the printer will not move the form into the tear off position at the end of a job.
	ON	Value set for 'On', the printer will move the form into the tear position if the form is at TOF and no data is being transmitted.
Auto Time ##s	1 . . . 30	This time in seconds that the form will be in the tear position after more data is sent to the printer. This feature works only with the Auto Tear feature. Values are in 1 to 30 seconds.
	OFF	Value set to 'Off' requires the pressing of the Park/Load key to load a friction form in the front feed slot.
Load Time ##s	1 . . 5	Values set for 1 to 5 seconds is the amount of time the printer will take to load a friction form after it is inserted into the front feed slot.
	2 . . 15	This feature controls the paper feed speed in inches per second. Slower speeds may improve paper handling of certain forms.

Group 2: Personality

Printer Displays	Values	Description
Emulate xxxxxx	IBM Pro IBM Grph LA 120 Epson Fx DS-180 Display	This feature selects the desired emulation. Escape sequences for each emulation are listed in Appendix H. Hex display feature. See "Troubleshooting and Maintenance" for further information.
Font xxxxxx	DP 10 DP 12 DP 13.3 DP 16 DP 18 DP 20	Data Processing fonts (9x9 matrix)
	Draft 10 Draft 12 Draft 15 Draft 16.4 Draft 17.1 Draft 20	Draft fonts (9x12 matrix)
	Courier 10 Prestige 12 OCR_A 10 OCR_B 10	NLQ font (18x36 10 cpi) NLQ font (18x30 12 cpi) NLQ font (10 cpi) NLQ font (10 cpi)
Symbol xxxx x	IBM_USA1 IBM_USA2 IBM_MUL1 IBM_MUL2 Epson DEC DEC_Sup	Refer to Appendix G for character tables.

Group 2: Personality (Cont'd)

Printer Displays	Values	Description
Nation xxxx x		Nationality selections depend upon selected Symbol set.
	ALL	IBM symbol sets
	USA FRANCE GERMANY ENGLAND DENMARK SWEDEN ITALY SPAIN JAPAN	Epson symbol sets
	USA UK FINLAND SWEDEN NOR/DEN GERMANY FRANCE	DEC symbol sets
Print Zero as #	0	Print Zero without a slash.
	ø	Print Zero with a slash.

Group 3: Printer Control

Printer Displays	Values	Description
Auto LF xxxxxxx	Disable	No line feed with carriage return.
	Enable	Perform a line feed with carriage return.
Auto CR xxxxxxx	Disable	No carriage return with line feed.
	Enable	Perform a carriage return with line feed.
Wrap xxxxxxx	Disable	Printable data past the right margin is ignored.
	Enable	Perform a carriage return line feed if data exceeds the right margin.
Print xxxxxxx	Bidirect	Bi-Directional printing.
	Unidirect	Unidirectional printing. Print left to right only.
Load Quick xxx	On	Printing begins immediately upon insertion of friction feed page.
	Off	User must press the On Line key upon insertion of friction feed page.
Power Up xx line	On	Printer powers up on line.
	Off	Printer powers up off line.
Quiet Mode xxx	On	Printer prints all data at 1/2 speed.
	Off	Print prints at full speed.

Group 3: Printer Control (Cont'd)

Printer Displays	Values	Description
Window Ctrol xxx	1-12K	<p>Window Control (FIFO size)</p> <p>This feature allows the user to define the amount of data the printer will receive before handshaking with the interface. This basically lowers the high water mark.</p> <p>This feature directly affects the printers throughput.</p>
Ribbon Used xx %	0..100%	<p>This feature indicates what percentage of the ribbon has been consumed.</p> <p>Reset this feature to 0% each time a new ribbon is installed. This may also be accomplished by pressing the Setup key in response to the Ribbon Replaced? message when the rear cover is closed.</p> <p>If a partially used ribbon is installed, estimate its usage and adjust this feature. Refer to Appendix E for a detailed description of the Ribbon Life Monitor feature.</p>
Barcode xxxxxxx	Disable Enable	<p>Disables recognition of Barcode Transparency commands.</p> <p>Enables recognition of Barcode Transparency commands.</p>

Group 3: Printer Control (Cont'd)

Printer Displays	Values	Description
Exit Mode xxxxxx	Adjust	Adjust the form to the next logical line feed boundary upon exiting the Barcode Task mode.
	Return	Return the form to the last active vertical position upon exiting the Barcode Task mode. See the ^J000 command.
	No Adj	Position the form directly below the last printable pass of the Task mode upon exiting the Task mode.
	BC-300	Emulates the Barcode 300 exit mode.
Command Char xxx	33	Defines the default command character.
	255	Example: 94 represents the ^\ character.
Overlap xxxxxxx	Disable	Disables one dot overlap when printing barcodes.
	Enable	Enables one dot overlap when printing barcodes.
Vert Graphic xxx	ON	Enables Anadex Graphics when DS-180 Emulation is selected.
	OFF	Disables Anadex Graphics when DS-180 Emulation is selected.
DW Term	Disable	Double wid print is not affected by line terminators.
	Enable	Double wide print is cancelled by CR, LF, FF, and VT. Valid only when DS-180 Emulation is selected.

Group 4: Serial Control

Printer Displays	Values	Description
Baud Rate xxxx	110 300 600 1200 1800 2400 4800 9600 19.2k 38.4k	Refer to the documentation of your host computer to determine the baud rate.
Serial xxxxxx	RS-232 RS-422	
Parity xxxx	None Even Odd Spacing Marking	Refer to the documentation for your host computer to determine parity. 8th Bit only 8th Bit only
Data Bits xx	7 8	Refer to the documentation for your host computer to determine databits.
DTR xx	Enable Disable	Hardware Handshaking DTR (Data Terminal Ready) Busy on when: Buffer filled to high water mark Printer off line Paper out condition Error conditions Busy off when: buffer is below low water mark. Will remain high at all times.

Group 4: Serial Control (Cont'd)

Printer Displays	Values	Description
Handshk xx	XON/XOFF1 XON/XOFF2 ETX_ACK ENQ_ACK NONE	Serial port software handshaking Transmits one XOFF to host on busy. Transmits one XOFF to host following each character sent after printer is busy. Busy on when: Buffer filled to high water mark Printer off line Paper out condition Cover open Error conditions Busy off when: buffer is below low water mark. No software handshaking.
Modem Ctrl xxx	On Off	RS-232 port only. Activates the following signals: RTS (Request to Send) CTS (Clear to Send) DSR (Data Set Ready) Disable the above signals.
Serial xxxxxx	Enable Disable	Serial port is enabled. Serial port is disabled. The printer will ignore any data sent to the serial port. Handshaking will indicate busy.

Group 5: Parallel Control

Printer Displays	Values	Description
Handshk on xxxx	Busy < or > Ack	Parallel interface handshaking. Active when: Buffer filled to high water mark. Printer off line. Paper out condition. Error conditions. Inactive when: buffer is below low water mark.
Ack xxxx Busy	after before	Ack will occur after busy. Ack will occur before busy.
8th Bit xxxxxx	Enable Disable	Printer will honor the 8th bit. Printer will ignore the 8th bit.
Parallel xxxxxx	Enable Disable	Parallel port is enabled. Parallel port is disabled. The printer will ignore any data sent to the parallel port. Handshaking will indicate busy.

Group 6: Profile Control

Printer Displays	Values	Description
P# xxxxxxxxxxxx	0....9 A....Z a....z space	<p>Profile Name</p> <p># is profile number.</p> <p>This feature allows you to give the current profile a customized name.</p> <p>To change the current name:</p> <ol style="list-style-type: none"> 1. Press the Value key until the desired “flashing” character is displayed. 2. Press the Enter key to store that character and to skip to the next character. <p>This new name will be displayed on the top line of the On Line display.</p>
Max Profile xx	1 2 3 4	<p>This feature is used to limit the number of active profiles, thus eliminating the need to cycle through unused profiles.</p> <p>This feature is universal and can be changed in any profile.</p>
Save Profile		Pressing the Enter key will save into non-volatile RAM all the current feature values.
Reset Profile		Pressing the Enter key will reset the current profile features to the factory default.

Group 7: Diagnostics

Printer Displays	Values	Description
Print Profile		<p>Pressing the Enter key will print the current profile features.</p> <p>Paper must be loaded in the printer before pressing the Enter key.</p>
P/N: #-##### xx		<p>Firmware revision number.</p> <p>Pressing the Value key will scroll through the printers firmware components.</p>
Test Printhead		<p>Pressing the Enter key will result in testing each printwire in the printhead.</p> <p>Paper must be loaded in the printer before pressing the Enter key.</p>
Alignment Tst #	1-10	<p>Pressing the Enter key will result in printing an alignment pattern. This may be used of fine adjust bi-directional print alignment.</p> <p>Determine best sample 1-10.</p> <p>Use the Value keys to select the corresponding value 1-10.</p> <p>Press the Enter key to save the new value. The test will now reprint. ** CURRENT SETTING ** will be printed beside the new setting.</p> <p>Paper must be loaded in the printer before pressing Enter key.</p>

Group 7: Diagnostics (Cont'd)

Printer Displays	Values	Description
Run Mode Test		<p>Pressing the Enter key will result in printing font renditions (Double-high, Emphasize, etc.) in the current symbol set.</p> <p>Paper must be loaded in the printer before pressing the Enter key.</p> <p>To stop the test press the On Line key again.</p>
Run Self Test		<p>Pressing the Enter key will result in printing an ASCII ripple pattern.</p> <p>Paper must be loaded in the printer before pressing the Enter key.</p> <p>To stop the test press the On Line key.</p>

Chapter 5: Troubleshooting and Maintenance

This chapter provides scheduled maintenance and troubleshooting procedures which may be performed by the operator. These procedures require no special knowledge of electronics or printers. Any troubleshooting or maintenance beyond the level presented in this chapter should be performed by a qualified technician.

Scheduled Maintenance

WARNING

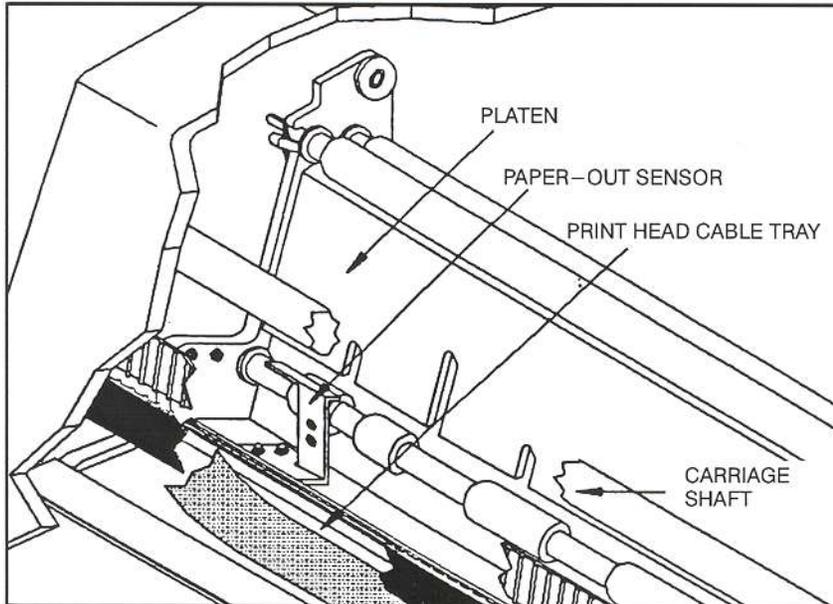
MAKE CERTAIN THE PRINTER IS DISCONNECTED FROM THE AC POWER SUPPLY BEFORE REACHING INTO THE PRINTER TO PERFORM ANY CLEANING OR MAINTENANCE TASK.

CAUTION

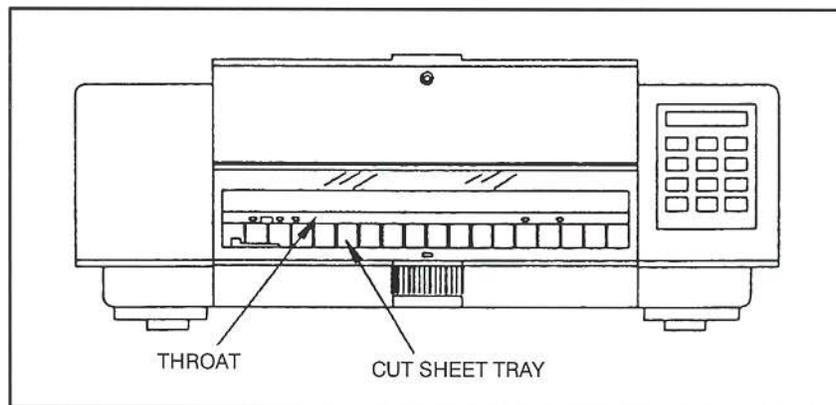
DO NOT USE ANY CLEANERS, SOLVENTS OR LUBRICANTS ON ANY OF THE WORKING PARTS OF THE PRINTER.

The only scheduled maintenance which can be performed is periodic cleaning (approximately every 3 months). Clean the cover sections with a soft, non-abrasive cloth. Do not use paper to clean the access covers.

Use a vacuum cleaner with a plastic nozzle to remove dirt from the carriage and the platen. Make certain the paper out sensor is not blocked by dirt and dust. A dry, lint-free cloth may be used to clean accumulated dirt from the carriage shafts and the platen.



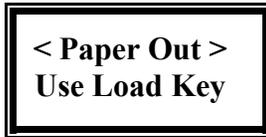
Use a vacuum cleaner with a plastic nozzle to remove dirt and dust from the cut sheet tray and throat.



Error Messages

Paper Out Condition

When the printer runs out of paper, the following message will appear in the display:



**< Paper Out >
Use Load Key**

The printer will automatically go off line when the paper supply is depleted. To recover from a paper out condition:

1. Load paper into the tractors.
2. Press the **Load/Park** key to load forms.
3. Press the **On Line** key to go back on line.

The error message will be cleared from the display after paper is loaded.

Non-Volatile Memory Error

If the printer experiences a non-volatile memory error, the following message will appear in the display:

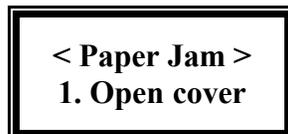


**< NVM Ramfail >
On Line to Cont.**

Press **On Line** to continue. If error repeatedly occurs, call for service.

Paper Jam

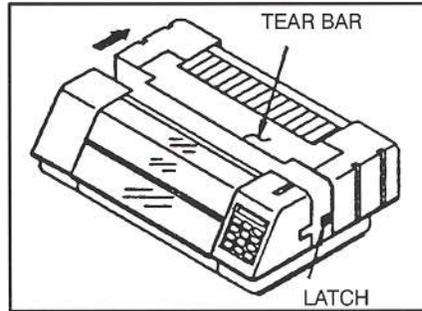
Paper jams may occur for several different reasons such as: paper pulling out of the tractor, paper binding somewhere in the paper path or using cut sheets that are shorter than the minimum length. When paper jams in the printer the following message will appear in the display:



**< Paper Jam >
1. Open cover**

To clear a paper jam:

1. Press in on the latches at the side of the printer to release the cover. Flush the rear cover back to open.

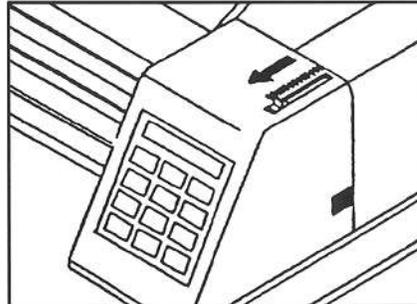


After opening the rear cover, the display will show:

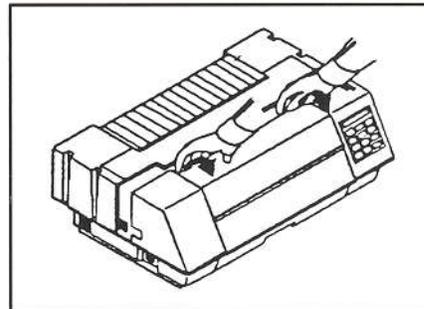
appear as

- | |
|---|
| <ol style="list-style-type: none">2. Clear Jam3. Close Cover |
|---|

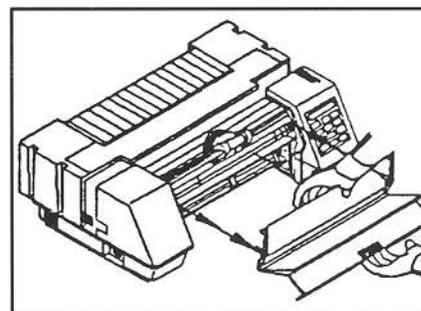
2. Move the forms adjustment lever so the printhead is the maximum distance away from the platen.



3. Pull up on the window assembly to unlatch it from the cover.

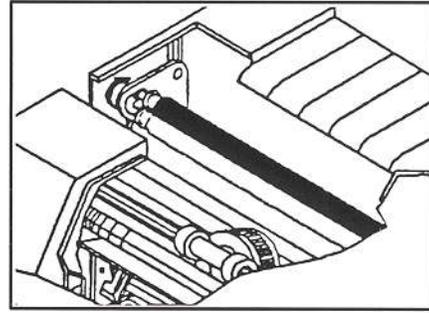


4. Pull the front access/window assembly forward to remove it from the printer.

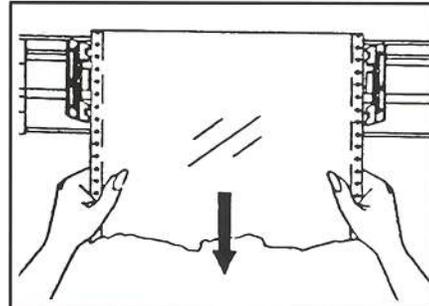


5. Paper that is jammed in the

upper pinch rollers may be removed by opening the rollers and removing the paper. Make certain you place the pinch rollers back in their normal position.



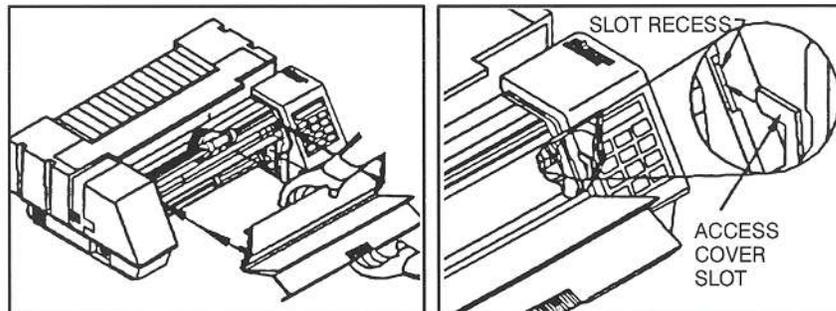
6. Paper that has not reached the platen may be removed by opening the tractors and pulling the paper straight down.



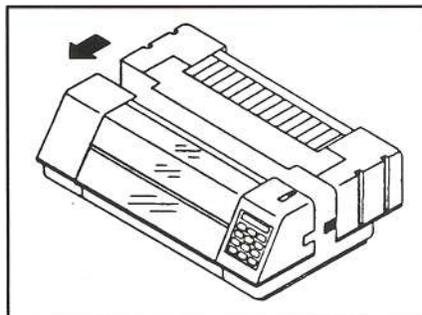
7. Remove all paper fragments. Make certain no fragments are left on the platen, ribbon guide, or on any paper sensor. Make certain ribbon and guide are in the correct position.

paper

8. Replace the window assembly in reverse order.



9. Close the rear access cover.



When all cover sections are closed, the display will appear as shown:

Ribbon Replaced?
Y = Setup N = On Line

10. Press the **On Line** key. When the **On Line** key is pressed, the printer resets the carriage, checks the paper path, and the error message is cleared from the display. The printer will indicate a paper out condition if paper needs to be reloaded.

If the ribbon is replaced, press the **Setup** key. This will reset the ribbon life monitor.

11. Reload paper.
12. Reposition the printhead for normal operation.

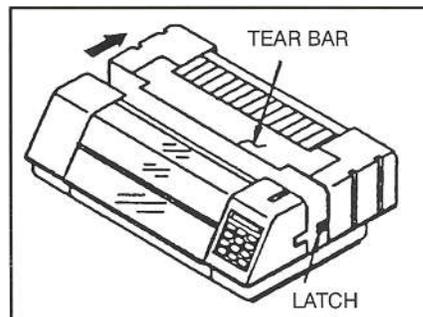
Carriage Jam

When the carriage is unable to move because of foreign objects in the printer or because of mechanical failure, the following message is displayed.

< Carriage Jam >
1. Open Cover

To recover from this error condition:

1. Press in on the latches at the side of the printer to release the cover. Push the rear cover back to open.

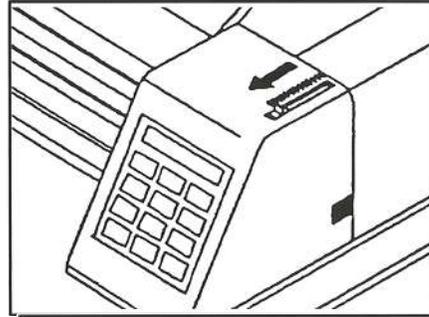


After opening the rear cover, the display will appear as shown:

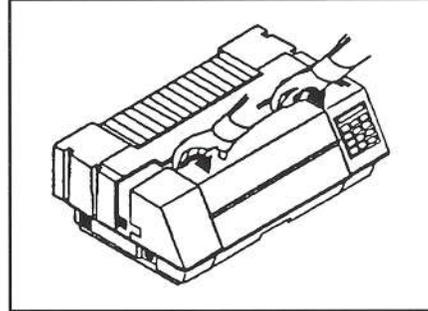
2. Clear Jam
3. Close Cover

2. Move the forms adjustment

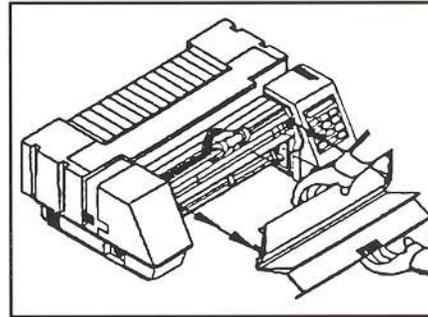
lever so the printhead is the maximum distance away from the platen.



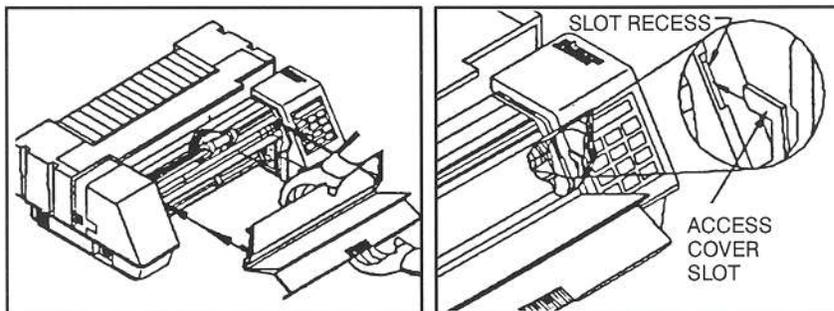
3. Pull up on the window assembly to unlatch it from the cover.



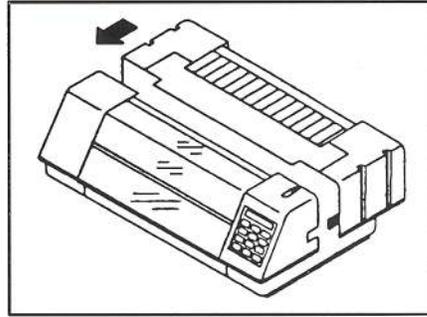
4. Pull the window assembly forward to remove it from the printer.



5. Clear the obstruction and make certain the carriage can move freely.
6. Replace the window assembly in reverse order.



7. Close the rear access cover.



The display will appear as shown:

Ribbon Replaced?
Y = Setup N = On Line

8. Make certain all sections of the cover set are closed or the printer will not exit the carriage jam mode.
9. Press the **On Line** key. When the **On Line** key is pressed, the printer resets the carriage, checks the paper path, and the error message is cleared from the display. The printer will indicate a paper out condition if the paper needs to be reloaded.

If the ribbon was replaced, press the **Setup** key. This will reset the Ribbon Life Monitor.

10. Reposition the printhead for normal operation.

Parity Error

The serial interface requires the printer to operate with the same parity status as the host computer. If parity has not been set correctly at the printer, the following error message is displayed.

< Parity Error >

To recover from this error, first determine what the parity setting for the printer should be by referring to the documentation for your host computer. The correct parity setting should then be made as follows:

1. Press the **Off Line** key.

P1 Profile
One Font DPI0

2. Press the **Setup** key. The

G1 Fonts Control

first group will appear on the top line of the display, with the first feature of the group appearing on the bottom line.

3. Press the **Group** key until you have accessed Group 4. The display will appear as shown.

Form Length 66

4. Press the **Feature** key to select parity.

G4 Serial Ctrl
Serial RS-232

5. Press the **Value** key to select the desired parity.

G4 Serial Ctrl
Parity

6. Press the **Enter** key to save your selection.

G4 Serial Ctrl
Parity

7. Press the **Setup** key to exit setup mode. The “Save Profile?” message will be displayed.

G4 Serial Ctrl
Parity

Save Profile?
Y = Enter N = Setup

8. Press the **Enter** key.

P1 Profile One
Font DP10

9. Press the **On Line** key to place the printer back on line.

P1 Profile One
Font DP10

When the ribbon usage value reaches 0%, all printing will stop and the following message will appear in the display:

**< Ribbon Life End >
1. Open Cover**

To recover from this error, replace the ribbon as follows:

1. Open rear cover. The display will change to the message as shown.

**2. Replace Ribbon
3. Close Cover**

2. Replace ribbon cartridge and close the cover. The display will change to the message as shown.

**Ribbon Replaced?
Y = Setup N = On Line**

3. Press the **Setup** key (Y) to reset the ribbon usage value to 0% and resume normal operation.

Cover Open

If any of the cover sections are open (front access, rear cover or tear bar), the following message is displayed:

**< Cover Open >
Close To Cont.**

To recover from this error condition:

1. Close the cover section which is open. The following message is displayed.

**Ribbon Replaced?
Y = Setup N = On Line**

2. Press the **On Line** key to continue operation. If a new ribbon cartridge has been installed, press the **Setup** key. This will reset the Ribbon Life Monitor feature.

Access Open

The following message is displayed when the unit is out of paper and the front access door is open:

**< Access Open >
Close to Cont.**

Cut sheets cannot be loaded in this condition. To recover from this condition, close the access door. Cut sheets may now be loaded if desired.

Keypad Lockout

The following message is displayed momentarily after pressing a key which has been locked out or delayed.

**P1 Profile One
>> Key Locked <<**

Printer Diagnostics

The following diagnostics are available to aid in troubleshooting printer malfunctions. They are accessed while in the Setup mode under **G7 Diagnostics**.

Print Profile

This test will print a complete listing of feature settings for the current profile. This is normally used to obtain a quick list of the printer feature settings that can be compared with the computer system.

P1 Profile One

G1 Forms Control		Manual Tear	FF
Form Length	66	Manual Time	15s
Lines/Inch	6	Auto Tear	Off
Top Margin	1	Auto Time	15s
Bottm Margin	66	Load Time	1s
Left Margin	1	Paper Speed	15
Right Margin	136		
Load	0 72/144		
Tract ->	135/144		
Sheet ->	0/144		
Tear	3 110/144		

Print Profile (Cont'd)

```
G2 Personality
  Emulate  IBM Pro
  Font     OCR_B 10
  Symbol   IBM_USA1
  Nation   ALL
  Print Zero as 0

G3 Printer Ctrl
  Auto LF  Disable
  Auto CR  Disable
  Wrap     Enable
  Print    Bidirect
  Load Quick On
  Power Up Online
  Quiet Mode Off
  Window Ctrl 396K
  Ribbon    0X Used
  Barcode   Enable
  Exit Mode Adjust
  Command Char 94
  Overlap   Disable

G4 Serial Ctrl
  Baud Rate 9600
  Serial     RS-232
  Parity     None
  Data Bits 8
  DTR        Enable
  Handshk XON/OFF1
  Modem Ctrl Off
  Serial     Enable

G5 Parallel Ctrl
  Handshak on BUSY
  ACK before BUSY
  8th Bit Enable
  Parallel Enable

G6 Profile Ctrl
  Max Profile 4

G7 Diagnostics
  Alignment Tst 5

G8 System Ctrl
  Check Ribbon 85%
  Replace Ribn 95%
  Ribbon Life 15 M
```

Firmware Test

This test is normally used by service personnel. Scrolling this feature displays the firmware part numbers to determine what level and type of firmware is installed in the printer.

P/N: 0-103215 *2, 1-103110 *, 2-103214 *
3-103145 A, 4-103114 A

Printhead Test

This test (**requiring 80 column paper**) is used to test the printhead print wires. The printer prints one complete line using each wire. This test is normally run when missing dots are noticed on a printout. The **Forms Adjustment Lever** must be set correctly for the forms being used, or a false indication may result. Refer to Chapter 2 for this adjustment.

WIRE 1 A
WIRE 1 B
WIRE 2 A
WIRE 2 B
WIRE 3 A
WIRE 3 B
WIRE 4 A
WIRE 4 B
WIRE 5 A
WIRE 5 B
WIRE 6 A
WIRE 6 B
WIRE 7 A
WIRE 7 B
WIRE 8 A
WIRE 8 B
WIRE 9 A
WIRE 9 B

This test (**requiring 80 column paper**) will print an ASCII ripple pattern. This will test the internal logic of the printer. It can also be used in the **Forms Adjustment Lever** procedure (Chapter 2) when setting up new forms. If this test runs, the printer has passed all internal diagnostics.

```

"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLM
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOP
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQ
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRST
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVW
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWX
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`a
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`ab
789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abc
89:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcd
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcde
:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdef
;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefgh
>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghi
?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghij
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijkl
ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklm
BCDEFGHIJKLMN:OPQRSTUVWXYZ[\]^_`abcdefghijklm.
CDEFGHIJKLMN:OPQRSTUVWXYZ[\]^_`abcdefghijklmn.

```

This test (**requiring 80 column paper**) is accessed while in setup mode under **G2 Emulation**. It is used to aid in program debugging or problem isolation. When Enabled, all data being sent to the printer from the computer is passed through the normal printer logic and printed in a hex dump format. Escape sequences and control codes are not executed. The output from the display mode can be compared to the control codes and escape sequences listed in the “Programmer’s Manual”. With this information you can determine if escape sequences are correct for the emulation selected.

Example: Assume that the printer is set up for Proprinter Emulation. The illustration below shows two lines of text that were printed by the printer. The display dump of this data is shown on the right.

Starting at the top left corner of the display dump is the ASCII code (in hexadecimal) ‘OF’. Referring to the Proprinter Emulation in the “Programmer’s Manual”, under “Select Condensed Printing”, you will find the hexadecimal code ‘OF’ with a description of what the command does for that emulation. This tells you that this ASCII code is valid for this emulation. It also tells you that the data following this code should print in 17.1 cpi and is canceled by receiving a DC2 (cancel condensed printing) control code.

The data following the ‘OF’ are the ASCII “HEX” codes for the text shown below:

```
OF 43 6F 6E 64 65 6E 73      65 64 20 70 72 69 6E 74      .Condensed print  
69 6E 67 2E 0D 0A           ing...
```

Troubleshooting

Please read this section before continuing to symptom analysis.

The following diagnostic tests are used to aid in isolating possible printer malfunctions. These tests will assist the operator in determining printer/host problems. Additional information for printer error recovery is described under **Error Messages**. For host to printer communication problems, it is suggested that the operator read the Interface Functional Description of this manual prior to symptom analysis. The operator should also be familiar with displaying and setting of printer features. Refer to the chapter on “Features” for this information.

The following section lists symptoms and corrective actions to be performed for each symptom. Prior to starting the symptom analysis, it is suggested that the printer be powered off for approximately 30 seconds and then powered back on. This will clear data in memory and reload **Profile** settings. Verify settings by running the diagnostic shown,

**'G7 Diagnostics'
'Print Profile'**

and compare the output to your desired configuration. If no changes are needed, rerun the print job. If problem persists, go to the Symptom Table and locate the symptom that best describes the problem you are experiencing. Perform the corrective actions listed for the symptom. If the problem still exists after performing the corrective actions, or if there is not a symptom that corresponds to the problem you are experiencing, call a qualified technician for further assistance.

In the following table, some corrective actions indicate to the operator to check a 'Feature Value' to make sure it is set correctly. An incorrect feature value can vary between host systems, applications, configurations, etc., and may cause the particular symptom. For example:

**'G5 Parallel Ctrl'
'Parallel Enabled'**

The operator may need to check the setting of the Parallel Enable/Disable feature found under Group 4 (Parallel Control), and verify that the Parallel port is Enabled.

Symptom	Corrective Action
No Host Communication Serial	Verify properly selected profile.
	Check interface cable (pin outs), cable connections, or try a new cable.
	Verify emulation selected.
	Verify baud rate, serial type (RS-232, RS-422), parity, data bits, DTR, handshaking.
	Is serial port disabled?
	Reset profile and re-setup the printer.
No Host Communication Parallel	Verify properly selected profile.
	Check interface cable (pin outs), cable connections, or try a new cable.
	Verify emulation selected.
	Handshaking (Ack and/or Busy), 8th bit control.
	Is parallel port disabled?
	Reset profile and re-setup the printer.
No Power/Blank Display	Verify power plug connection to the printer.
	Verify power plug connection to power outlet.
	Try another power outlet.
	Check main fuse located on the rear of the printer.
Carriage Jam	Turn off power, open front access cover, and check for foreign object.
	If error occurs during setup, verify the removal of the carriage restraining clip.
	Verify label is not stuck to the ribbon guide.
	Verify detent setting as described under the 'Form Thickness Adjustment' of this manual.

Symptom	Corrective Action
No Print	Verify installation of ribbon and ribbon guide.
	Run a self test. See 'Diagnostic Tests'.
	Verify detent setting as described under the 'Form Thickness Adjustment' of this manual.
Short Ribbon Life	Inspect failed ribbon. Ribbon should have two distinct wear bands. If only one band is visible, ribbon is not fully seated in printer.
	If ribbon fabric shows vertical runs, printhead gap is too small or printhead is damaged. Check print gap and printhead.
	Ribbon life can be affected by application. Graphics, Barcode and NLQ printing can shorten ribbon life.
	Check Ribbon Life Monitor feature. This feature must be reset when a new ribbon is installed. Refer to Appendix E.
Prints Garbage Parallel	Verify properly selected profile.
	Check interface cable (pin outs), cable connections, or try a new cable.
	Verify emulation selected.
	Handshaking (Ack and/or Busy), 8th bit control.
	Reset profile and re-setup the printer.
Prints Garbage Serial	Verify properly selected profile.
	Check interface cable (pin outs), cable connections, or try a new cable.
	Verify emulation selected.
	Verify baud rate, serial type (RS-232, RS-422), parity, data bits, DTR, handshaking.
	Reset profile and re-setup the printer.

Symptom	Corrective Action
Loss Of Data Buffer Overflow Parallel	Check interface cable (pin outs), cable connections, or try a new cable.
	Verify emulation selected.
	Handshaking (Ack and/or Busy), 8th bit control.
	Reset profile and re-setup the printer.
Loss Of Data Buffer Overflow Serial	Check interface cable (pin outs), cable connections, or try a new cable.
	Verify emulation selected.
	Verify baud rate, serial type (RS-232, RS-422), parity, data bits, DTR, handshaking.
	Reset profile and re-setup the printer.
Printhead Moves But No Printing Occurs	Check Form Length feature. Form length must be equal to the length of the form being used.

Printer Characteristics

- **Printhead:**

18 wire with a rated life of 300,000,000 draft characters.

- **Maximum Line Length:**

Cut Sheet: 16 inches

160 characters @ 10 cpi
192 characters @ 12 cpi
212 characters @ 13.3 cpi
240 characters @ 15 cpi
256 characters @ 16 cpi
262 characters @ 16.4 cpi
273 characters @ 17.1 cpi
288 characters @ 18 cpi
320 characters @ 20 cpi

Tractor: 14.875 inches

148 characters @ 10 cpi
178 characters @ 12 cpi
200 characters @ 13.3 cpi
223 characters @ 15 cpi
238 characters @ 16 cpi
247 characters @ 16.4 cpi
257 characters @ 17.1 cpi
267 characters @ 18 cpi
301 characters @ 20 cpi

- **Vertical Pitch:**

1, 2, 3, 4, 6, 8 and 12 lines per inch and variable spacing, depending on the emulation.

- **Print Speed For Various Fonts:**

Pitch (dpi)	Character Matrix (h x w)	Font Type	Print Speed (ch/sec)
10	9 x 9	dp	622
10	9 x 12	dft	467
10	18 x 36	nlq	117
12	9 x 10	dp	560
12	9 x 12	dft	467
12	18 x 30	nlq	140
13.3	9 x 9	dp	609
15	9 x 12	dft	467
16	9 x 9	dp	622
16.4	9 x 11	dft	501
17.1	9 x 14	dft	380
18	9 x 10	dp	560
20	9 x 9	dp	622
20	9 x 12	dft	467

- **Graphic Densities:**

**Horizontal
Dots/In**

60
72
80
90
120
240

**Vertical
Dots/In**

72 dots/inch and variable spacing,
depending on emulation.

Emulations

- EpsonFX-100
- DEC LA-120
- IBM Graphics Printer
- IBM Proprinter XL

Font Specifications

- **Available Fonts/Typefaces:**

Data Processing 10, 12, 13.3, 16, 18, 20 pitch
Draft 10, 12, 15, 16.4, 17.1, 20 pitch
Courier 10 pitch
Prestige 12 pitch
OCR-A and OCR-B 10 pitch

- **International Character Sets:**

US ASCII
UKASCII
German
French
Swedish
Danish
Italian
Spanish
Japanese

- **Symbol Sets:**

IBM USA 1
IBM USA 2
IBM Multinational 1
IBM Multinational 2
Epson DEC
DEC Supplemental

Paper Feed Specifications

- **Paper Types:**

Tractor – 3” to 15”, 1 to 6 part, .021” max. thickness.
Individual parts not to exceed .005” thickness without factory approval.

Single part cut sheet - Up to 17 inches wide.
5 inch minimum length.

Multi-part cut sheet - Up to 14 inches wide.
5 inch minimum length.

C-Size Drawing - (17 x 22 inches, manual feed, portrait only)

- **Access:**

Front - Manually fed cut sheets

Bottom - Tractor paper

- **Feed Direction:**

Forward - Continuous
Reverse - Up to 22 inches

- **Forms Tear Off:**

Zero forms tear off.

- **Paper Slew:**

Slew speed is 15 IPS.
Reverse slew is 4 IPS.

Forms Mode Change

- **Parking Forms:**

The forms are backed down into the tractors out of the front paper path, so that cut sheet or card stock may be used. The continuous forms are reloaded to the TOF and top margin previously set.

- **Tear Off:**

A key may be used to advance the forms a predefined distance, so the last printed form can be removed. The distance advanced is specified by the user. The forms are returned to print position when the key is pressed again, or after user specified timeout period.

Communications Interface

- **Communications Buffer Size:**

12K bytes min.

- **RS-232/RS-422 Serial Interface Characteristics:**

Baud Rates: 110, 300, 600, 1200, 1800, 2400, 4800, 9600,
19.2Kb, 38.4 Kb - standard

Protocol Types: X-ON/X-OFF, DTR/DSR, ETX/ACK, ENQ/ACK

- **Centronics - Compatible Parallel Interface Characteristics:**

36 pin Amphenol Configuration

Protocol Types: BUSY, ACK

Operator Panel Functional Description

- **Display Description:**

2 line by 16 character LCD. In addition, the following LED's are used:

On/Off Line

Error

Setup Mode

- **Keyswitch Layout:**

12 keys

Ribbon Cartridge/Drive

- Stationary harmonica cartridge with an average life of 15 million characters, minimum.

Physical

- 26.25" W x 9.00" H x 18.14" D
- Weight: 47 lbs.

Electrical

- **Power Requirements:**

115V at 50/60 Hz.

230V at 50/60 Hz.

Environmental

- **Temperature:**

Non-operating: -30° to 180° F (-34° to 82° C)

Operating: 40° to 104° F (5° to 40° C) up to 7000 ft.

Derate linearly from 104 to 78 between 7000 ft. and 10,000 ft.

- **Humidity:**

Non-operating: 10 to 90% RH non-condensing

Operating: 20 to 80% RH non-condensing

- **Noise Level:**

53.1 to 56.4 dbA per ISO 7779 depending on font style selected.

- **Frequency:**

50/60 hz +/-2 Hz

- **Electrostatic Discharge:**

Will withstand 25kV discharge with shielded cables.

Shock And Vibration

- **Shock:**

Operating: 1/4 g on any axis

- **Vibration:**

Frequency: 10-500 Hz

- **Amplitude:**

.000078 inches (.02mm). Not to exceed 10 g acceleration.

- **Exposure:**

3 minute linear sweep of each axis.

Compliances

This unit will comply with the following at the time of production.

- Safety: UL 1950
CSA C22.2 No 220-MI986
IEC 950
- EMI: FCC Class A

A-6

Appendix B: Interface Specifications

Parallel Interface

- **Data Transmission:**

7 or 8 bit

- **Synchronization:**

Externally supplied Data Strobe

- **Handshaking:**

Acknowledge (Busy before Acknowledge or Busy after Acknowledge) Busy (Acknowledge before Busy or Acknowledge after Busy)

- **Logic Level:**

Input data and all interface signals are TTL compatible.

Two output signals control the handshaking on the parallel interface, the BUSY signal and the ACKNOWLEDGE signal. An incoming DATA STROBE will cause BUSY to go high.

PAPEREND: The PAPER END signal is an active high signal that will go high when paper out is detected.

ERROR: The ERROR signal will go low with the detection of an error condition. A fatal printer error condition exists when ERROR is low, PAPER END is low and SELECT is high.

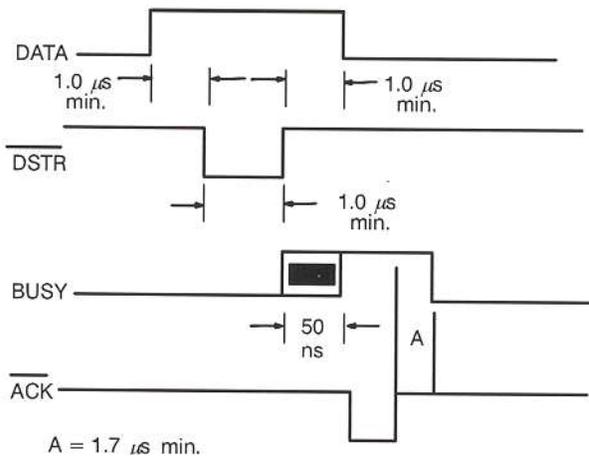
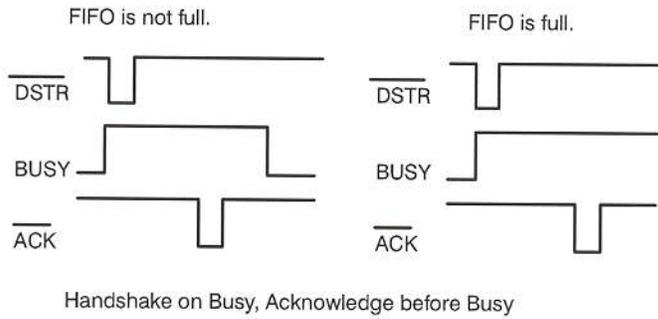
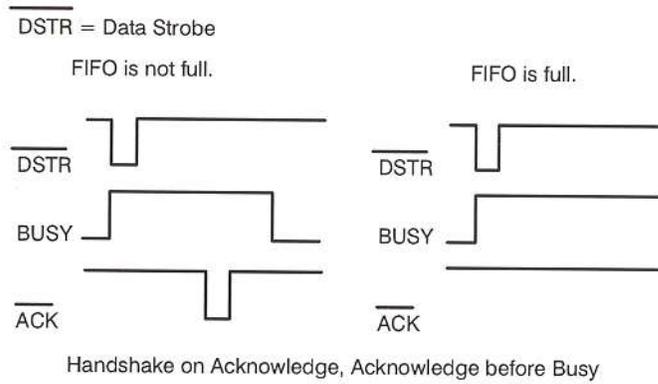
SELECT- When the printer is ready to receive data, the SELECT signal is set high. This signal will go low when:

The **Off Line** key is pressed.
There is a carriage jam.
Paper out is detected.
The cover is open.
Fatal errors.

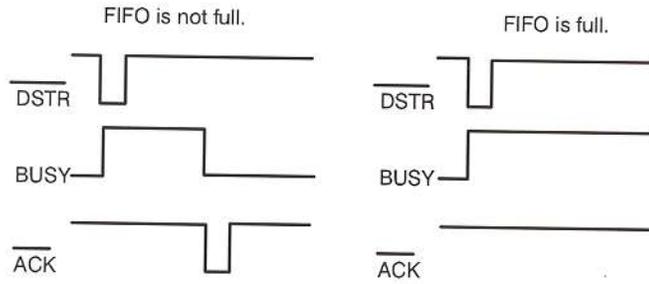
CONDITION	SIGNAL			
	+BUSY	+PAPER END	+SELECT	-ERROR
READY	LOW	LOW	HIGH	HIGH
FIFO FULL	HIGH	LOW	HIGH	HIGH
PAPER OUT	HIGH	HIGH	LOW	LOW
CRG JAM	HIGH	LOW	LOW	LOW
COVER OPEN	HIGH	LOW	LOW	LOW
OFF LINE	HIGH	LOW	LOW	HIGH
FATAL ERROR	HIGH	LOW	HIGH	LOW

Active low

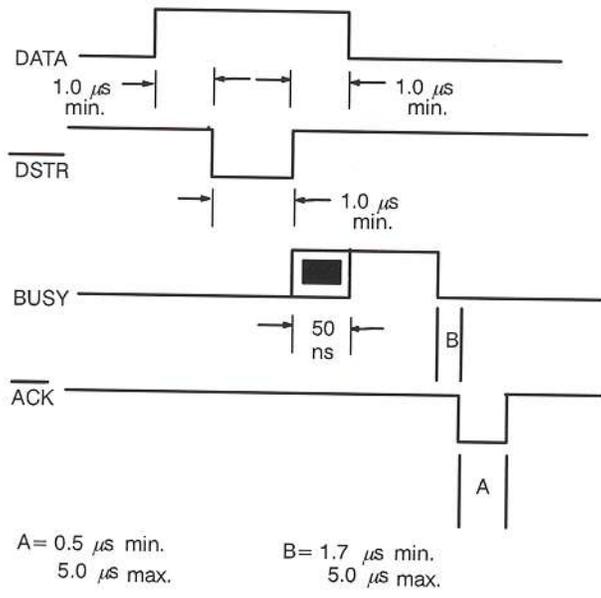
The following diagrams illustrate the signal timing of the parallel interface when Acknowledge is issued before Busy.



The following diagrams illustrate the signal timing of the parallel interface when Acknowledge is issued before Busy.



Handshake on Acknowledge, Acknowledge after Busy.
 Handshake on Busy, Acknowledge after Busy.



Parallel Interface Timing. Acknowledge after Busy.

Parallel Interface Connector Pin Assignment

PIN	SIGNAL NAME
1	-Data Strobe
2	Data Bit 1
3	Data Bit 2
4	Data Bit 3
5	Data Bit 4
6	Data Bit 5
7	Data Bit 6
8	Data Bit 7
9	Data Bit 8
10	-Acknowledge
11	Busy
12	Paper Out
13	Select
14	Ground
15	NC
16	Ground
17	Chassis Ground
18	+5 Volts DC
19-30	T.W.G.
31	-Init
32	-Error
33	Ground
34	No Connect
35	No Connect
36	No Connect

- Active low

- Max. current = 0.375 amp

- T.W.G. = Twisted Wire Ground

Parallel Interface Enable/Disable

1. Set the power switch to ON.

P1 Profile One
Font DP10

2. Press the **Off Line** key.

P1 Profile One
Font DP10

3. Press the **Setup** key. The first group will appear on the top line of the display, with the first feature of the group appearing on the bottom line.

G1 Forms Ctrl
Form Length 66

4. Press the **Group** key until you have accessed Group 5. The display will appear as shown.

G5 Parallel Ctrl
Handshake Busy

5. Press the **Feature** key to select the Parallel feature.

G5 Parallel Ctrl
Parallel Enable

6. Press the **Value** key to select Enable.
Press the **Value** key to select Disable.

G5 Parallel Ctrl
Parallel Disable

7. Press the **Enter** key to accept your selection.

G5 Parallel Ctrl
Parallel Disable

There are three additional features which allow you to configure the parallel interface to suit your needs: Handshake, ACK BUSY and 8th Bit. All three features are contained in Group 5, Parallel Control. Each feature is explained in detail in Chapter 4. After you finish your parallel interface configuration, continue with Step 8.

8. Press the **Setup** key to exit setup mode. The “Save Profile” message will be displayed.

Save Profile
Y=Enter N=Setup

9. Press the Enter key to save the setting in non-volatile memory.



10. Press the On Line key to place the printer back on line.



RS-232C Serial Interface

- **Data Transfer Rates (Baud Rate):**

110	2400
300	4800
600	9600
1200	19200
1800	38400

- **Synchronization:**

Start-Stop Bits

- **Data Format:**

Start Bit:	1
Data Bits:	7 or 8
Parity:	odd, even or no parity
Stop Bit:	1 or 2 for reception 1 for transmission

If the host serial interface is configured for 7 bit data with no parity, data from host computer must contain two stop bits.

- **Handshaking Protocols:**

X-ON/X-OFF: (DCI/DC3) In this protocol, the printer will respond with the DC3 (X-OFF) character when:

Print buffer is nearly full.
The cover is open.
Paper out condition exists.
Carriage jam or paper jam condition detected.
Printer is off line.

When the printer is ready for more data, it will transmit the DC1 (X-ON) character.

ETX/ACK: The host will include the ETX character at the end of a string of data. When the printer detects the ETX character, it transmits an ACK character to the host, indicating it is ready for more data.

ENQ/ACK: The host will include the ENQ character at the end of a string of data. When the printer detects the ENQ character, it transmits an ACK character to the host indicating it is ready for more data.

Serial port configuration can only be selected through the front panel. Only one handshaking protocol can be selected at a time. The DTR protocol can be selected with any handshaking protocol. If the user selects modem control, the printer will only receive and transmit data if RTS, CTS and DSR are honored and provided by the host.

SIGNAL	PIN	NO MODEM CONTROL	MODEM CONTROL
DTR	20 11	When the printer is ready to accept data, this line will be high (+ EIA LEVEL). This line will go low (- EIA LEVEL) when: <ul style="list-style-type: none"> a. Print buffer is nearly full (within 512 bytes). b. The cover is open. c. Paper out condition exists. d. Carriage jam or paper jam condition detected. e. Printer is off line. 	When the printer is ready to accept data, this line will be high (+ EIA LEVEL). This line will go low (- EIA LEVEL) when: <ul style="list-style-type: none"> a. Print buffer is nearly full (within 512 bytes). b. The cover is open. c. Paper out condition exists. d. Carriage jam or paper jam condition detected. e. Printer is off line.
RTS	4	This signal will always be held high.	RTS will be held high when the interface is ready to transmit data.
CTS	5	CTS is always assumed high.	The interface will monitor the CTS signal generated by the host in response to RTS. When this signal goes on (high), the host is ready to receive data.
DSR	6	DSR is always assumed high.	If DSR is low, the interface will ignore all data received on the serial port. This signal must hold high for the interface to receive and transmit data.
DCD	8	Same as DSR.	Same as DSR.

Serial Interface Enable/Disable

1. Set the power switch to ON.

P1 Profile One
Font DP10

2. Press the **Off Line** key.

P1 Profile One
Font DP10

3. Press the **Setup** key. The first group will appear on the top line of the display, with the first feature of the group appearing on the bottom line.

G1 Forms Control
Form Length 66

4. Press the **Group** key until you have accessed Group 4. The display will appear as shown.

G4 Serial Ctrl
Baud Rate 9600

5. Press the **Feature** key to select the Serial feature.

G4 Serial Ctrl
Serial Enable

6. Press the **Value** key to select Enable. Press the .4 key to select Disable.

G4 Serial Ctrl
Serial Disable

7. Press the Enter key to accept your selection.

G4 Serial Ctrl
Serial Disable

The printer is factory set for RS-232 serial interface. If you are using the RS-232 interface, proceed to Step 11. If you wish to select the RS-422 serial interface, proceed as follows:

8. Press the **Feature** key to select the Serial feature.

G4 Serial Ctrl
Serial RS-232

9. Press the **Value** key to select the RS-422.

G4 Serial Ctrl
Serial RS-422

10. Press the **Enter** key to accept your selection.

**G4 Serial Ctrl
Serial RS-422**

Determine the baud rate of the host computer. The printer is factory set for 9600 baud. If the baud rate for the printer must be changed, proceed as follows:

11. Press the **Feature** key to select Baud Rate.

**G4 Serial Ctrl
Baud Rate 9600**

12. Press the **Value** key to select desired baud rate, (19.2K for this example).

**G4 Serial Ctrl
Baud Rate 19.2K**

13. Press the **Enter** to save your selection.

**G4 Serial Ctrl
Baud Rate 19.2K**

There are five additional features which allow you to configure the serial interface to suit your needs: Parity, Data Bits, DTR, Handshake and Modem Control. All five features are contained in Group 4, Serial Control. Each feature is explained in detail in Chapter 4. After you finish your serial interface configuration, continue with Step 14.

14. Press the **Setup** key to exit setup mode. The “Save Profile?” message will be displayed.

**Save Profile?
Y = Enter N = Setup**

15. Press the **Enter** key.

**P1 Profile One
Font DP10**

16. Press the On Line key to place the printer back on line.

**P1 Profile One
Font DP10**

RS-232 Serial Interface Connector Pin Assignment

PIN	SIGNAL NAME
1	Frame Ground
2	Transmitted Data
3	Received Data
4	Request To Send
* 5	Clear To Send
* 6	Data Set Ready
* 7	Signal Ground
* 8	Data Carrier Detects
9	No Connect
10	No Connect
11	Data Terminal Ready
12	No Connect
13	No Connect
14	Reserved
15	Reserved
16	Reserved
17	Reserved
18	Reserved
19	Reserved
20	Data Terminal Ready
21	No Connect
22	No Connect
23	No Connect
24	No Connect
25	No Connect

* These signals are available only when the Modem Control feature is enabled.

RS-422 Serial Interface Connector Pin Assignment

PIN	SIGNAL NAME
1	Frame Ground
2	Reserved
3	Reserved
4	Reserved
5	Reserved
6	Reserved
7	Signal Ground
8	Reserved
9	No Connect
10	No Connect
11	No Connect
12	No Connect
13	No Connect
14	Transmitted Data (+)
15	Transmitted Data (-)
16	Received Data (+)
17	Received Data (-)
18	Data Terminal Ready (+)
19	Data Terminal Ready (-)
20	Reserved
21	No Connect
22	No Connect
23	No Connect
24	No Connect
25	No Connect

Appendix C: Default Tables

All profiles are defaulted to the same factory settings.

Group 1 Forms Control

Feature Default	User P1	User P2	User P3	User P4
Form Length 66				
Lines/Inch 6				
Top Margin 1				
Bottom Margin 66				
Left Margin 1				
Right Margin 136				
Clear Horz Tabs	*****	*****	*****	*****
Horiz Tab ## xxx				
Clear Vert Tabs	*****	*****	*****	*****
Vert Tab ## xxx				
Load 0 72/144	/144	/144	/144	/144
Trac -> 135/144	/144	/144	/144	/144
Sheet -> 0/144	/144	/144	/144	/144
Manual Tear FF				
Manual Time 15s	sec	sec	sec	sec
Auto Tear Off				
Auto Time 15s	sec	sec	sec	sec
Load Time 3s	sec	sec	sec	sec
Paper Speed 15				

%

% Set for every 8th column beginning with column 9.

%% None set

*** These features cannot be user defined.

**Group 2
Personality**

Emulate	IBM PRO				
Font	DP 10				
Symbol	IBM_MNL1				
Nation	All				
Print Zero as	0				

**Group 3
Printer Control**

Auto LF	Disable				
Auto CR	Disable				
Wrap	Enable				
Print	Bidirect				
Load Quick	On				
Power Up On Line					
Quiet Mode	Off				
Window Ctr	12				
Ribbon xxx%	Used				
Barcode Enable					
Exit Mode Adjust					
Comm Char	94				
Overlap Disable					

**Group 4
Serial Interface**

Device Addr	None				
Baud Rate	9600				
Serial	RS-232				
Parity	None				
Data Bits	0				
DTR	Enable				
Handshk XON_XOFF	1				
Modem Ctrl	Off				
Serial	Enable				

**Group 5
Parallel Interface**

Handshk On	Busy				
Ack After	Busy				
8th Bit	Enable				
Parallel	Enable				

**Group 6
Forms Control**

P#	Profile ####	P1	P2	P3	P4
Max Profile	4				
Save Profile		*****	*****	*****	*****
Reset Profile		*****	*****	*****	*****

*** These features cannot be user defined.

Group 7 Diagnostics

Print Profile	*****	*****	*****	*****
P/N: #-##### xx	*****	*****	*****	*****
Test Printhead	*****	*****	*****	*****
Alignment Tst 5	*****	*****	*****	*****
Run Mode Test	*****	*****	*****	*****
Run Self Test	*****	*****	*****	*****

*** These features cannot be user defined.

To change these settings follow the direction in Chapter 4 “Features”. It is suggested that the user execute the “Print Profile” feature for each used profile and enter each altered value into this default table or attach it to this manual.

Appendix D: System Administration Features

This appendix describes how to access features which are not normally available while the printer is in Setup Mode. These features are found in a hidden group called “G8 System Ctrl”.

By accessing this hidden group, you may:

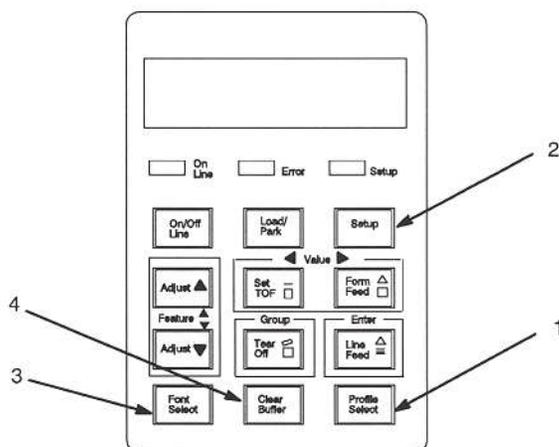
- Reset all profiles to factory defaults and reset the Key Lock Out feature to factory defaults.
- Selectively lock out or delay individual keypad functions such as “Setup Mode” using the Key Lock Out feature.
- Set the ribbon life monitor check and replace limits.

NOTE

Use of these features may be restricted by removing this appendix from the manual.

To access this hidden group, do the following:

1. Load paper in the printer and place the printer On Line (On Line LED ON).
2. Press the four keys in the order indicated below.



- The printer will automatically enter Setup Mode and Group 8 may now be found using the “Group Key”.

D-1

Features Available in the Hidden System Control Group

Group 8 System Control

Displayed Function	Values	Description Of Features
Reset Printer NVM		<p>Pressing the Enter key will reset All profiles to their factory defaults. This will also set Top Of Form to the current position.</p> <p>To clear the printer buffer and all features set in RAM, turn the printer OFF.</p> <p>To reset the physical Top Of Form , park and load the paper.</p> <p>The LCD will momentarily display “NVM Initialized” when the Enter key is pressed.</p>
Reset Key Lock		<p>Pressing the Enter key will reset all Key Lock features to factory defaults.</p> <p>The LCD will momentarily display “Key Lock Reset” when the Enter key is pressed.</p>

**Group 8
System Control (Cont'd)**

Displayed Function	Values	Description Of Features
<p>Key Lock Functions</p> <ul style="list-style-type: none"> Off Line Load/Park Setup Adjust Up Set TOP Form Feed Adjust Down Tear Off Line Feed Font Select Clear Buffer Profile Select <p>(See Page D-6 for descriptions of key functions which may be locked or delayed).</p>	<p>On</p> <p>1....5</p> <p>Off</p>	<p>The blinking area indicates the value to be changed (Key Function or Current Key Status). Pressing the Enter key will change the blinking area from Key Function to Current Key Status. Pressing the Value key will change the display blinking area.</p> <p>Key Function is the left side of the LCD. Current Key Status is the right side of the LCD.</p> <p>This feature can be set or reset from any profile.</p> <p>Any Key Functions necessary to clear an error, such as Paper Out, Carriage Jam, etc., are functional immediately regardless if that key has been turned off or delayed.</p> <p>The Key Function displayed will be active when pressed.</p> <p>The Key Function displayed will be active only when the key is pressed for the displayed number of seconds. Pressing a key in this mode will cause the bottom line of the LCD to display ">> Key Locked <<" before becoming active.</p> <p>The Key Function displayed will be inactive. The user will not be able to activate the function. Pressing an inactive key causes the bottom line of the LCD to display ">> Key Locked <<".</p>

**Group 8
System Control (Cont'd)**

Displayed Function	Values	Description Of Features
Check Ribbon xx%	0..100	<p>This feature sets the % limit at which the printer displays:</p> <p style="text-align: center;">< Check Ribbon> Ribbon xx% Used</p> <p>The printed media should be checked for acceptable print contrast.</p> <p>This message will disappear from the display whenever the printer is taken off line. It will then only be displayed on power up.</p>
Replace Ribn xx%	0..100	<p>This feature sets the % usage limit at which the printer displays:</p> <p style="text-align: center;">< Replace Ribbon > Ribbon xx% Used</p> <p>This indicates the ribbon is near its end of life and should be replaced.</p>

Displayed Function	Values	Description Of Features
Ribbon Life xx M	1....50	<p>This feature indicates the ribbon cartridge life in millions of characters.</p> <p>When the Ribbon xx% Usage feature reaches 100%, the printer displays:</p> <p style="text-align: center;">< Ribbon Life End > 1. Open Cover</p> <p>The ribbon must be replaced.</p> <p>The feature value should not be changed unless otherwise specified on the ribbon cartridge box.</p> <p>This feature defaults to 15 M characters which is based on the DP font. The number of characters printed per ribbon will vary based on actual application. The printer stores this value in dots per ribbon to ensure percent usage is correct for any font or print mode including barcodes.</p>

Key Functions Which May Be Locked Or Delayed

Displayed Function	Description Of Function
Off Line	Disables the ability to place the printer Off Line. This function is disabled only when paper is properly installed in the printer. Profile Select, Clear Buffer, Font Select, Set TOF, Setup, Park/Load keys are also disabled because they are only active when the printer is off line
Load/Park	Disables the ability to Park the form.
Setup	Disables the ability to enter into the Setup Mode. The only method of entering the setup mode with this feature set is to use the Special Setup Mode Sequences.
Adjust Up	Disables the ability to make minor adjustments in the print position.
Set TOF	Disables the ability to move the paper from the print position to the tear bar in order to adjust the Load Distance feature.
Form Feed	Disables the ability to perform a form feed from the key pad.
Adjust Down	Disables the ability to make minor adjustments in the print position.
Tear Off	Disables the ability to move the paper to the tear off position from the key pad. The Automatic Tear Off feature, if set, is still active.
Line Feed	Disables the ability to perform a line feed from the key pad.
Font Select	Disables the ability to change the displayed font from the key pad.
Clear Buffer	Disables the ability to clear the printers FIFO.
Profile Select	Disables the ability to change profiles.

This page intentionally left blank

Appendix E: Ribbon Life Monitor Feature

This feature provides the ability to control the usage level of the ribbon and helps prevent inadvertent usage past its functional life. The printer displays a “Check” or “Replace” message on the keypad at user designated limits. If the ribbon reaches the end of its life, the printer will stop printing and indicate the ribbon must be replaced.

By adjusting the check and replace limits, the operator can be prompted to replace the ribbon at a usage level best suited for that specific application. This feature may also be used for monitoring ribbon wear before starting a long unattended print job.

The Ribbon Life Monitor feature counts all dots printed on the ribbon regardless of print mode (graphics, barcodes, NLQ ...). The percent of total ribbon life is then calculated. This percent usage may be checked by entering setup mode and selecting the “Ribbon xx% Used” feature located in the G3 Printer Control Group.

**G3 Printer Ctrl
Ribbon xx% Used**

Each time the Rear Access cover is opened and then closed, the display will then question if the ribbon has been replaced. If the response is YES, and the Setup key is pressed, this feature is reset to zero percent used. If the response is NO, and the On Line key is pressed, printing operation will resume.

This feature may be adjusted like any other feature in the Setup mode. Normally the Ribbon Usage feature is not adjusted in Setup mode unless a partially used ribbon is installed. In this case the percent usage should be estimated and the features set accordingly.

The user definable Check, Replace, and Ribbon Life features are found in the G8 System Ctrl feature group. For more information on these features, refer to Appendix D.

Ribbon Monitor Operation Check Ribbon

As the printer operates, the Ribbon Life Monitor maintains a running total of the number of dots which have been printed since the feature was last reset. The ribbon usage value is determined by dividing the total number of dots printed by the ribbon life limit. When the ribbon usage value exceeds the “Check Ribbon” value, the printer will continue printing and will flash the following message on the keypad display:

**< Check Ribbon >
Ribbon xx% Used**

This message indicates that the ribbon cartridge is approaching the life limit and should be checked for wear. The user should install a new ribbon, if it needs to be replaced. This message will appear from the keypad display whenever the user takes the printer off line. It will then be displayed only at power up.

Replace Ribbon

If the current ribbon cartridge is left in the printer after the “Check Ribbon” message, printing will continue until the ribbon usage exceeds the “Replace Ribbon” value. At this point, the printer will continue printing and will flash the following message on the keypad display:

**< Replace Ribbon >
Ribbon xx% Used**

This message indicates that it is now time to replace the ribbon cartridge. It will remain in the keypad display in place of the “On Line” display text.

If the current ribbon cartridge is left in the system, printing will continue until the ribbon cartridge usage value reaches 100%. At this point the printing will stop, the error LED will blink, and the following message will be displayed on the keypad display:

**< Ribbon Life End >
1. Open Cover**

This message indicates that the end of the ribbon life has been reached. No further printing will take place until the ribbon cartridge is changed and the ribbon life monitor feature is reset, or the ribbon usage value is changed to a value less than 100%.

There are two methods to change the value of the Ribbon Life Monitor Feature:

1. Replace the ribbon by using the following procedure:

Open rear access cover to replace the ribbon cartridge. At this point the message on the keypad display will change to:

**2. Replace Ribbon
3. Close Cover**

When the rear access cover is closed the keypad display will change to:

Ribbon Replaced?
Y = Setup N = No

****This message will be displayed whenever the rear access cover is opened and then closed.

Pressing the Setup key (Y) in response to this message will cause the printer to reset the ribbon usage feature to 0%, reset the carriage, and resume operation. Pressing the On Line (N) in response to this message will cause the printer to reset the carriage and resume operation without effecting the ribbon usage value. However, if the ribbon is at 100% usage, it must be replaced before printing may continue.

2. Enter Setup mode and manually change the value of the ribbon usage feature to some value less than 100%. For additional information on setting features, refer to Chapter 4 in the User's Manual.

ASCII CHR	DECIMAL VALUE	HEX VALUE	ASCII CHR	DECIMAL VALUE	HEX VALUE
NUL	0	00	ESC	27	1B
SOH	1	01	FS	28	1C
STX	2	02	GS	29	1D
ETX	3	03	RS	30	1E
EOT	4	04	US	31	1F
ENQ	5	05	SP	32	20
ACK	6	06	!	33	21
BEL	7	07	”	34	22
BS	8	08	#	35	23
HT	9	09	\$	36	24
LF	10	0A	%	37	25
VT	11	0B	&	38	26
FF	12	0C	,	39	27
CR	13	0D	(	40	28
SO	14	0E	)	41	29
SI	15	0F	*	42	2A
DLE	16	10	+	43	2B
DC1	17	11	,	44	2C
DC2	18	12	-	45	2D
DC3	19	13	/	47	2F
DC4	20	14	0	48	30
NAK	21	15	1	49	31
SYN	22	16	2	50	32
ETB	23	17	3	51	33
CAN	24	18	4	52	34
EM	25	19	5	53	35
SUB	26	1A	6	54	36

ASCII CHR	DECIMAL VALUE	HEX VALUE	ASCII CHR	DECIMAL VALUE	HEX VALUE
7	55	37	U	85	55
8	56	38	V	86	56
9	57	39	W	87	57
:	58	3A	X	88	58
;	59	3B	Y	89	59
<	60	3C	Z	90	5A
=	61	3D	[	91	5B
>	62	3E	\	92	5C
?	63	3F	]	93	5D
@	64	40	^	94	5E
A	65	41	_	95	5F
B	66	42	`	96	60
C	67	43	a	97	61
D	68	44	b	98	62
E	69	45	c	99	63
F	70	46	d	100	64
G	71	47	e	101	65
H	72	48	f	102	66
I	73	49	g	103	67
J	74	4A	h	104	68
K	75	4B	i	105	69
L	76	4C	j	106	6A
M	77	4D	k	107	6B
N	78	4E	l	108	6C
O	79	4F	m	109	6D
P	80	50	n	110	6E
Q	81	51	o	111	6F
R	82	52	p	112	70
S	83	53	q	113	71
T	84	54	r	114	72

ASCII CHR	DECIMAL VALUE	HEX VALUE	ASCII CHR	DECIMAL VALUE	HEX VALUE
s	115	73	y	121	79
t	116	74	z	122	7A
u	117	75	{	123	7B
v	118	76	|	124	7C
w	119	77	}	125	7D
x	120	78	~	126	7E
			DEL	127	7F

This page intentionally left blank

Appendix G: ASCII Character Sets

DEC Character Chart

HEX	0	1	2	3	4	5	6	7
0	NUL <small>0</small>			0 <small>48</small>	@ <small>64</small>	P <small>80</small>	` <small>96</small>	p <small>112</small>
1			! <small>33</small>	1 <small>49</small>	A <small>65</small>	Q <small>81</small>	a <small>97</small>	q <small>113</small>
2			" <small>34</small>	2 <small>50</small>	B <small>66</small>	R <small>82</small>	b <small>98</small>	r <small>114</small>
3			# <small>35</small>	3 <small>51</small>	C <small>67</small>	S <small>83</small>	c <small>99</small>	s <small>115</small>
4			\$ <small>36</small>	4 <small>52</small>	D <small>68</small>	T <small>84</small>	d <small>100</small>	t <small>116</small>
5			% <small>37</small>	5 <small>53</small>	E <small>69</small>	U <small>85</small>	e <small>101</small>	u <small>117</small>
6			& <small>38</small>	6 <small>54</small>	F <small>70</small>	V <small>86</small>	f <small>102</small>	v <small>118</small>
7	BEL <small>7</small>		' <small>39</small>	7 <small>55</small>	G <small>71</small>	W <small>87</small>	g <small>103</small>	w <small>119</small>
8	BS <small>8</small>	CAN <small>24</small>	(<small>40</small>	8 <small>56</small>	H <small>72</small>	X <small>88</small>	h <small>104</small>	x <small>120</small>
9	HT <small>9</small>		) <small>41</small>	9 <small>57</small>	I <small>73</small>	Y <small>89</small>	i <small>105</small>	y <small>121</small>
A	LF <small>10</small>		* <small>42</small>	: <small>58</small>	J <small>74</small>	Z <small>90</small>	j <small>106</small>	z <small>122</small>
B	VT <small>11</small>	ESC <small>27</small>	+ <small>43</small>	; <small>59</small>	K <small>75</small>	[<small>91</small>	k <small>107</small>	{ <small>123</small>
C	FF <small>12</small>		, <small>44</small>	< <small>60</small>	L <small>76</small>	\ <small>92</small>	l <small>108</small>	: <small>124</small>
D	CR <small>13</small>		- <small>45</small>	= <small>61</small>	M <small>77</small>	] <small>93</small>	m <small>109</small>	} <small>125</small>
E	SO <small>14</small>		. <small>46</small>	> <small>62</small>	N <small>78</small>	^ <small>94</small>	n <small>110</small>	~ <small>126</small>
F	SI <small>15</small>		/ <small>47</small>	? <small>63</small>	O <small>79</small>	_ <small>95</small>	o <small>111</small>	

Epson Character Chart

HEX	0	1	2	3	4	5	6	7
0	NUL <input type="checkbox"/> 0 <input type="checkbox"/> 16 <input type="checkbox"/> 32 <input type="checkbox"/> 48			0 <input type="checkbox"/> 48	@ <input type="checkbox"/> 64	P <input type="checkbox"/> 80	` <input type="checkbox"/> 96	p <input type="checkbox"/> 112
1	<input type="checkbox"/> 1	DC1 <input type="checkbox"/> 17	! <input type="checkbox"/> 33	1 <input type="checkbox"/> 49	A <input type="checkbox"/> 65	Q <input type="checkbox"/> 81	a <input type="checkbox"/> 97	q <input type="checkbox"/> 113
2	<input type="checkbox"/> 2	DC2 <input type="checkbox"/> 18	" <input type="checkbox"/> 34	2 <input type="checkbox"/> 50	B <input type="checkbox"/> 66	R <input type="checkbox"/> 82	b <input type="checkbox"/> 98	r <input type="checkbox"/> 114
3	<input type="checkbox"/> 3	DC3 <input type="checkbox"/> 19	# <input type="checkbox"/> 35	3 <input type="checkbox"/> 51	C <input type="checkbox"/> 67	S <input type="checkbox"/> 83	c <input type="checkbox"/> 99	s <input type="checkbox"/> 115
4	<input type="checkbox"/> 4	DC4 <input type="checkbox"/> 20	\$ <input type="checkbox"/> 36	4 <input type="checkbox"/> 52	D <input type="checkbox"/> 68	T <input type="checkbox"/> 84	d <input type="checkbox"/> 100	t <input type="checkbox"/> 116
5	<input type="checkbox"/> 5	<input type="checkbox"/> 21	% <input type="checkbox"/> 37	5 <input type="checkbox"/> 53	E <input type="checkbox"/> 69	U <input type="checkbox"/> 85	e <input type="checkbox"/> 101	u <input type="checkbox"/> 117
6	<input type="checkbox"/> 6	<input type="checkbox"/> 22	& <input type="checkbox"/> 38	6 <input type="checkbox"/> 54	F <input type="checkbox"/> 70	V <input type="checkbox"/> 86	f <input type="checkbox"/> 102	v <input type="checkbox"/> 118
7	BEL <input type="checkbox"/> 7	<input type="checkbox"/> 23	' <input type="checkbox"/> 39	7 <input type="checkbox"/> 55	G <input type="checkbox"/> 71	W <input type="checkbox"/> 87	g <input type="checkbox"/> 103	w <input type="checkbox"/> 119
8	BS <input type="checkbox"/> 8	CAN <input type="checkbox"/> 24	(<input type="checkbox"/> 40	8 <input type="checkbox"/> 56	H <input type="checkbox"/> 72	X <input type="checkbox"/> 88	h <input type="checkbox"/> 104	x <input type="checkbox"/> 120
9	HT <input type="checkbox"/> 9	<input type="checkbox"/> 25) <input type="checkbox"/> 41	9 <input type="checkbox"/> 57	I <input type="checkbox"/> 73	Y <input type="checkbox"/> 89	i <input type="checkbox"/> 105	y <input type="checkbox"/> 121
A	LF <input type="checkbox"/> 10	<input type="checkbox"/> 26	* <input type="checkbox"/> 42	: <input type="checkbox"/> 58	J <input type="checkbox"/> 74	Z <input type="checkbox"/> 90	j <input type="checkbox"/> 106	z <input type="checkbox"/> 122
B	VT <input type="checkbox"/> 11	ESC <input type="checkbox"/> 27	+ <input type="checkbox"/> 43	; <input type="checkbox"/> 59	K <input type="checkbox"/> 75	[<input type="checkbox"/> 91	k <input type="checkbox"/> 107	{ <input type="checkbox"/> 123
C	FF <input type="checkbox"/> 12	<input type="checkbox"/> 28	, <input type="checkbox"/> 44	< <input type="checkbox"/> 60	L <input type="checkbox"/> 76	\ <input type="checkbox"/> 92	l <input type="checkbox"/> 108	; <input type="checkbox"/> 124
D	CR <input type="checkbox"/> 13	<input type="checkbox"/> 29	- <input type="checkbox"/> 45	= <input type="checkbox"/> 61	M <input type="checkbox"/> 77] <input type="checkbox"/> 93	m <input type="checkbox"/> 109	} <input type="checkbox"/> 125
E	SO <input type="checkbox"/> 14	<input type="checkbox"/> 30	. <input type="checkbox"/> 46	> <input type="checkbox"/> 62	N <input type="checkbox"/> 78	^ <input type="checkbox"/> 94	n <input type="checkbox"/> 110	~ <input type="checkbox"/> 126
F	SI <input type="checkbox"/> 15	<input type="checkbox"/> 31	/ <input type="checkbox"/> 47	? <input type="checkbox"/> 63	O <input type="checkbox"/> 79	_ <input type="checkbox"/> 95	o <input type="checkbox"/> 111	<input type="checkbox"/> 127

Epson Character Chart (Cont'd)

HEX	8	9	A	B	C	D	E	F
0	NUL <small>128</small>	<small>144</small>	<small>160</small>	0 <small>176</small>	@ <small>192</small>	P <small>208</small>	` <small>224</small>	p <small>240</small>
1	<small>129</small>	DC1 <small>145</small>	! <small>161</small>	1 <small>177</small>	A <small>193</small>	Q <small>209</small>	a <small>225</small>	q <small>241</small>
2	<small>130</small>	DC2 <small>146</small>	" <small>162</small>	2 <small>178</small>	B <small>194</small>	R <small>210</small>	b <small>226</small>	r <small>242</small>
3	<small>131</small>	DC3 <small>147</small>	# <small>163</small>	3 <small>179</small>	C <small>195</small>	S <small>211</small>	c <small>227</small>	s <small>243</small>
4	<small>132</small>	DC4 <small>148</small>	\$ <small>164</small>	4 <small>180</small>	D <small>196</small>	T <small>212</small>	d <small>228</small>	t <small>244</small>
5	<small>133</small>	<small>149</small>	% <small>165</small>	5 <small>181</small>	E <small>197</small>	U <small>213</small>	e <small>229</small>	u <small>245</small>
6	<small>134</small>	<small>150</small>	& <small>166</small>	6 <small>182</small>	F <small>198</small>	V <small>214</small>	f <small>230</small>	v <small>246</small>
7	BEL <small>135</small>	<small>151</small>	' <small>167</small>	7 <small>183</small>	G <small>199</small>	W <small>215</small>	g <small>231</small>	w <small>247</small>
8	BS <small>136</small>	CAN <small>152</small>	(<small>168</small>	8 <small>184</small>	H <small>200</small>	X <small>216</small>	h <small>232</small>	x <small>248</small>
9	HT <small>137</small>	<small>153</small>	) <small>169</small>	9 <small>185</small>	I <small>201</small>	Y <small>217</small>	i <small>233</small>	y <small>249</small>
A	LF <small>138</small>	<small>154</small>	* <small>170</small>	: <small>186</small>	J <small>202</small>	Z <small>218</small>	j <small>234</small>	z <small>250</small>
B	VT <small>139</small>	ESC <small>155</small>	+ <small>171</small>	; <small>187</small>	K <small>203</small>	[<small>219</small>	k <small>235</small>	{ <small>251</small>
C	FF <small>140</small>	<small>156</small>	, <small>172</small>	< <small>188</small>	L <small>204</small>	\ <small>220</small>	l <small>236</small>	: <small>252</small>
D	CR <small>141</small>	<small>157</small>	- <small>173</small>	= <small>189</small>	M <small>205</small>	] <small>221</small>	m <small>237</small>	} <small>253</small>
E	SO <small>142</small>	<small>158</small>	. <small>174</small>	> <small>190</small>	N <small>206</small>	^ <small>222</small>	n <small>238</small>	~ <small>254</small>
F	SI <small>143</small>	<small>159</small>	/ <small>175</small>	? <small>191</small>	O <small>207</small>	_ <small>223</small>	o <small>239</small>	<small>255</small>

IBM Multinational All Characters Chart

HEX	0	1	2	3	4	5	6	7
0	ø <small>0</small>	► <small>16</small>		0 <small>48</small>	@ <small>64</small>	P <small>80</small>	` <small>96</small>	p <small>112</small>
1	☺ <small>1</small>	◄ <small>17</small>	! <small>33</small>	1 <small>49</small>	A <small>65</small>	Q <small>81</small>	a <small>97</small>	q <small>113</small>
2	● <small>2</small>	↑ <small>18</small>	" <small>34</small>	2 <small>50</small>	B <small>66</small>	R <small>82</small>	b <small>98</small>	r <small>114</small>
3	♥ <small>3</small>	!! <small>19</small>	# <small>35</small>	3 <small>51</small>	C <small>67</small>	S <small>83</small>	c <small>99</small>	s <small>115</small>
4	♦ <small>4</small>	¶ <small>20</small>	\$ <small>36</small>	4 <small>52</small>	D <small>68</small>	T <small>84</small>	d <small>100</small>	t <small>116</small>
5	♣ <small>5</small>	§ <small>21</small>	% <small>37</small>	5 <small>53</small>	E <small>69</small>	U <small>85</small>	e <small>101</small>	u <small>117</small>
6	♠ <small>6</small>	- <small>22</small>	& <small>38</small>	6 <small>54</small>	F <small>70</small>	V <small>86</small>	f <small>102</small>	v <small>118</small>
7	♣ <small>7</small>	‡ <small>23</small>	' <small>39</small>	7 <small>55</small>	G <small>71</small>	W <small>87</small>	g <small>103</small>	w <small>119</small>
8	▣ <small>8</small>	↑ <small>24</small>	(<small>40</small>	8 <small>56</small>	H <small>72</small>	X <small>88</small>	h <small>104</small>	x <small>120</small>
9	○ <small>9</small>	↓ <small>25</small>	) <small>41</small>	9 <small>57</small>	I <small>73</small>	Y <small>89</small>	i <small>105</small>	y <small>121</small>
A	■ <small>10</small>	→ <small>26</small>	* <small>42</small>	: <small>58</small>	J <small>74</small>	Z <small>90</small>	j <small>106</small>	z <small>122</small>
B	♂ <small>11</small>	← <small>27</small>	+ <small>43</small>	; <small>59</small>	K <small>75</small>	[<small>91</small>	k <small>107</small>	{ <small>123</small>
C	♀ <small>12</small>	└ <small>28</small>	, <small>44</small>	< <small>60</small>	L <small>76</small>	\ <small>92</small>	l <small>108</small>	! <small>124</small>
D	♪ <small>13</small>	↔ <small>29</small>	- <small>45</small>	= <small>61</small>	M <small>77</small>	] <small>93</small>	m <small>109</small>	} <small>125</small>
E	♫ <small>14</small>	▲ <small>30</small>	· <small>46</small>	> <small>62</small>	N <small>78</small>	^ <small>94</small>	n <small>110</small>	~ <small>126</small>
F	⊗ <small>15</small>	▼ <small>31</small>	/ <small>47</small>	? <small>63</small>	O <small>79</small>	- <small>95</small>	o <small>111</small>	⊞ <small>127</small>

IBM Multinational All Character Chart (Cont'd)

HEX	8	9	A	B	C	D	E	F
0	ç 128	é 144	á 160	⋮ 176	Ł 192	ð 208	ó 224	— 240
1	ü 129	æ 145	í 161	⋮ 177	ł 193	Ð 209	ß 225	± 241
2	é 130	Æ 146	ó 162	⋮ 178	ṽ 194	È 210	ô 226	— 242
3	à 131	ø 147	ú 163	ı 179	ı 195	É 211	ö 227	¾ 243
4	ä 132	ö 148	ñ 164	ı 180	— 196	Ê 212	õ 228	¶ 244
5	à 133	ò 149	ñ 165	À 181	ı 197	ı 213	ø 229	§ 245
6	á 134	ú 150	æ 166	À 182	ä 198	í 214	µ 230	÷ 246
7	ç 135	ù 151	ó 167	À 183	À 199	ı 215	þ 231	· 247
8	è 136	ÿ 152	ı 168	© 184	Ł 200	ÿ 216	þ 232	° 248
9	ë 137	ö 153	© 169	ı 185	Ł 201	ı 217	Û 233	°° 249
A	è 138	Û 154	ı 170	ı 186	Ł 202	ı 218	Û 234	— 250
B	ÿ 139	ø 155	½ 171	ı 187	Ł 203	■ 219	Û 235	¹ 251
C	ı 140	ƒ 156	¼ 172	ı 188	ı 204	■ 220	ÿ 236	² 252
D	ı 141	ø 157	ı 173	¢ 189	— 205	ı 221	ÿ 237	² 253
E	À 142	× 158	« 174	ı 190	ı 206	ı 222	— 238	■ 254
F	À 143	ƒ 159	» 175	ı 191	ı 207	■ 223	ı 239	■ 255

HEX	0	1	2	3	4	5	6	7
0	NUL <small>0</small>	<small>16</small>	<small>32</small>	0 <small>48</small>	@ <small>64</small>	P <small>80</small>	` <small>96</small>	p <small>112</small>
1	<small>1</small>	DC1 <small>17</small>	! <small>33</small>	1 <small>49</small>	A <small>65</small>	Q <small>81</small>	a <small>97</small>	q <small>113</small>
2	<small>2</small>	DC2 <small>18</small>	" <small>34</small>	2 <small>50</small>	B <small>66</small>	R <small>82</small>	b <small>98</small>	r <small>114</small>
3	<small>3</small>	DC3 <small>19</small>	# <small>35</small>	3 <small>51</small>	C <small>67</small>	S <small>83</small>	c <small>99</small>	s <small>115</small>
4	<small>4</small>	DC4 <small>20</small>	\$ <small>36</small>	4 <small>52</small>	D <small>68</small>	T <small>84</small>	d <small>100</small>	t <small>116</small>
5	<small>5</small>	<small>21</small>	% <small>37</small>	5 <small>53</small>	E <small>69</small>	U <small>85</small>	e <small>101</small>	u <small>117</small>
6	<small>6</small>	<small>22</small>	& <small>38</small>	6 <small>54</small>	F <small>70</small>	V <small>86</small>	f <small>102</small>	v <small>118</small>
7	BEL <small>7</small>	<small>23</small>	' <small>39</small>	7 <small>55</small>	G <small>71</small>	W <small>87</small>	g <small>103</small>	w <small>119</small>
8	BS <small>8</small>	CAN <small>24</small>	(<small>40</small>	8 <small>56</small>	H <small>72</small>	X <small>88</small>	h <small>104</small>	x <small>120</small>
9	HT <small>9</small>	<small>25</small>	) <small>41</small>	9 <small>57</small>	I <small>73</small>	Y <small>89</small>	i <small>105</small>	y <small>121</small>
A	LF <small>10</small>	<small>26</small>	* <small>42</small>	: <small>58</small>	J <small>74</small>	Z <small>90</small>	j <small>106</small>	z <small>122</small>
B	VT <small>11</small>	ESC <small>27</small>	+ <small>43</small>	; <small>59</small>	K <small>75</small>	[<small>91</small>	k <small>107</small>	{ <small>123</small>
C	FF <small>12</small>	<small>28</small>	, <small>44</small>	< <small>60</small>	L <small>76</small>	\ <small>92</small>	l <small>108</small>	| <small>124</small>
D	CR <small>13</small>	<small>29</small>	- <small>45</small>	= <small>61</small>	M <small>77</small>	] <small>93</small>	m <small>109</small>	} <small>125</small>
E	SO <small>14</small>	<small>30</small>	. <small>46</small>	> <small>62</small>	N <small>78</small>	^ <small>94</small>	n <small>110</small>	~ <small>126</small>
F	SI <small>15</small>	<small>31</small>	/ <small>47</small>	? <small>63</small>	O <small>79</small>	_ <small>95</small>	o <small>111</small>	<small>127</small>

HEX	8	9	A	B	C	D	E	F
0	NUL <small>128</small>	<small>144</small>	á <small>160</small>	⋮ <small>176</small>	Ł <small>192</small>	ð <small>208</small>	ó <small>224</small>	— <small>240</small>
1	<small>129</small>	DC1 <small>145</small>	í <small>161</small>	⋮ <small>177</small>	ł <small>193</small>	Ð <small>209</small>	ß <small>225</small>	± <small>241</small>
2	<small>130</small>	DC2 <small>146</small>	ô <small>162</small>	⋮ <small>178</small>	ŧ <small>194</small>	È <small>210</small>	ø <small>226</small>	= <small>242</small>
3	<small>131</small>	DC3 <small>147</small>	ú <small>163</small>	| <small>179</small>	† <small>195</small>	É <small>211</small>	ò <small>227</small>	¼ <small>243</small>
4	<small>132</small>	DC4 <small>148</small>	ñ <small>164</small>	‡ <small>180</small>	— <small>196</small>	Ê <small>212</small>	ó <small>228</small>	¶ <small>244</small>
5	<small>133</small>	<small>149</small>	Ń <small>165</small>	À <small>181</small>	‡ <small>197</small>	ı <small>213</small>	ø <small>229</small>	§ <small>245</small>
6	<small>134</small>	<small>150</small>	à <small>166</small>	Á <small>182</small>	ä <small>198</small>	İ <small>214</small>	μ <small>230</small>	÷ <small>246</small>
7	BEL <small>135</small>	<small>151</small>	Ω <small>167</small>	À <small>183</small>	Ä <small>199</small>	ı̇ <small>215</small>	ƒ <small>231</small>	· <small>247</small>
8	BS <small>136</small>	CAN <small>152</small>	¿ <small>168</small>	⊖ <small>184</small>	Ĳ <small>200</small>	İ̇ <small>216</small>	ƒ̇ <small>232</small>	° <small>248</small>
9	HT <small>137</small>	<small>153</small>	⊖ <small>169</small>	‡̇ <small>185</small>	ƒ̇ <small>201</small>	ı̇ <small>217</small>	Ů <small>233</small>	°° <small>249</small>
A	LF <small>138</small>	<small>154</small>	¬ <small>170</small>	‡̇ <small>186</small>	Ĳ̇ <small>202</small>	ŕ <small>218</small>	Ů̇ <small>234</small>	— <small>250</small>
B	VT <small>139</small>	ESC <small>155</small>	½ <small>171</small>	¶̇ <small>187</small>	ƒ̇ <small>203</small>	■ <small>219</small>	Ů̇ <small>235</small>	¹ <small>251</small>
C	FF <small>140</small>	<small>156</small>	¼ <small>172</small>	¶̇ <small>188</small>	ƒ̇ <small>204</small>	■ <small>220</small>	Ÿ <small>236</small>	² <small>252</small>
D	CR <small>141</small>	<small>157</small>	ı̇ <small>173</small>	¢̇ <small>189</small>	— <small>205</small>	ı̇ <small>221</small>	Ÿ̇ <small>237</small>	² <small>253</small>
E	SO <small>142</small>	<small>158</small>	« <small>174</small>	¥̇ <small>190</small>	‡̇ <small>206</small>	İ̇ <small>222</small>	— <small>238</small>	■ <small>254</small>
F	SI <small>143</small>	<small>159</small>	» <small>175</small>	ŧ̇ <small>191</small>	ƒ̇ <small>207</small>	■ <small>223</small>	— <small>239</small>	<small>255</small>

HEX	0	1	2	3	4	5	6	7
0	NUL <small>0</small>			0 <small>48</small>	@ <small>64</small>	P <small>80</small>	` <small>96</small>	p <small>112</small>
1		DC1 <small>17</small>	!	1 <small>49</small>	A <small>65</small>	Q <small>81</small>	a <small>97</small>	q <small>113</small>
2		DC2 <small>18</small>	"	2 <small>50</small>	B <small>66</small>	R <small>82</small>	b <small>98</small>	r <small>114</small>
3	♥ <small>3</small>	DC3 <small>19</small>	#	3 <small>51</small>	C <small>67</small>	S <small>83</small>	c <small>99</small>	s <small>115</small>
4	♦ <small>4</small>	DC4 <small>20</small>	\$	4 <small>52</small>	D <small>68</small>	T <small>84</small>	d <small>100</small>	t <small>116</small>
5	♣ <small>5</small>		%	5 <small>53</small>	E <small>69</small>	U <small>85</small>	e <small>101</small>	u <small>117</small>
6	♠ <small>6</small>		&	6 <small>54</small>	F <small>70</small>	V <small>86</small>	f <small>102</small>	v <small>118</small>
7	BEL <small>7</small>		'	7 <small>55</small>	G <small>71</small>	W <small>87</small>	g <small>103</small>	w <small>119</small>
8	BS <small>8</small>	CAN <small>24</small>	(	8 <small>56</small>	H <small>72</small>	X <small>88</small>	h <small>104</small>	x <small>120</small>
9	HT <small>9</small>		)	9 <small>57</small>	I <small>73</small>	Y <small>89</small>	i <small>105</small>	y <small>121</small>
A	LF <small>10</small>		*	: <small>58</small>	J <small>74</small>	Z <small>90</small>	j <small>106</small>	z <small>122</small>
B	VT <small>11</small>	ESC <small>27</small>	+	; <small>59</small>	K <small>75</small>	[<small>91</small>	k <small>107</small>	{ <small>123</small>
C	FF <small>12</small>		,	< <small>60</small>	L <small>76</small>	\ <small>92</small>	l <small>108</small>	! <small>124</small>
D	CR <small>13</small>		-	= <small>61</small>	M <small>77</small>	] <small>93</small>	m <small>109</small>	} <small>125</small>
E	SO <small>14</small>		.	> <small>62</small>	N <small>78</small>	~ <small>94</small>	n <small>110</small>	~ <small>126</small>
F	SI <small>15</small>		/	? <small>63</small>	O <small>79</small>	— <small>95</small>	o <small>111</small>	<small>127</small>

HEX	8	9	A	B	C	D	E	F
0	ç <small>128</small>	é <small>144</small>	á <small>160</small>	⋮ <small>176</small>	ł <small>192</small>	ð <small>208</small>	ó <small>224</small>	— <small>240</small>
1	ü <small>129</small>	æ <small>145</small>	í <small>161</small>	⋮ <small>177</small>	ł <small>193</small>	ð <small>209</small>	β <small>225</small>	± <small>241</small>
2	é <small>130</small>	Æ <small>146</small>	ó <small>162</small>	⋮ <small>178</small>	ł <small>194</small>	È <small>210</small>	ó <small>226</small>	— <small>242</small>
3	ä <small>131</small>	ø <small>147</small>	ú <small>163</small>	| <small>179</small>	ł <small>195</small>	È <small>211</small>	ó <small>227</small>	¼ <small>243</small>
4	ä <small>132</small>	ö <small>148</small>	ñ <small>164</small>	ł <small>180</small>	— <small>196</small>	È <small>212</small>	ö <small>228</small>	¶ <small>244</small>
5	à <small>133</small>	ò <small>149</small>	Ñ <small>165</small>	À <small>181</small>	ł <small>197</small>	ı <small>213</small>	ø <small>229</small>	§ <small>245</small>
6	á <small>134</small>	ó <small>150</small>	à <small>166</small>	À <small>182</small>	ä <small>198</small>	ı <small>214</small>	μ <small>230</small>	÷ <small>246</small>
7	ç <small>135</small>	ù <small>151</small>	ó <small>167</small>	À <small>183</small>	À <small>199</small>	ı <small>215</small>	þ <small>231</small>	· <small>247</small>
8	e <small>136</small>	ÿ <small>152</small>	ı <small>168</small>	⊙ <small>184</small>	ł <small>200</small>	ı <small>216</small>	þ <small>232</small>	° <small>248</small>
9	ë <small>137</small>	ö <small>153</small>	⊙ <small>169</small>	ł <small>185</small>	ł <small>201</small>	ı <small>217</small>	ú <small>233</small>	°° <small>249</small>
A	e <small>138</small>	ú <small>154</small>	ł <small>170</small>	ł <small>186</small>	ł <small>202</small>	ı <small>218</small>	ó <small>234</small>	— <small>250</small>
B	ÿ <small>139</small>	ø <small>155</small>	½ <small>171</small>	¶ <small>187</small>	ł <small>203</small>	■ <small>219</small>	ú <small>235</small>	ı <small>251</small>
C	ı <small>140</small>	ƒ <small>156</small>	¼ <small>172</small>	ł <small>188</small>	ł <small>204</small>	■ <small>220</small>	Ÿ <small>236</small>	³ <small>252</small>
D	ł <small>141</small>	ø <small>157</small>	ı <small>173</small>	¢ <small>189</small>	— <small>205</small>	ı <small>221</small>	Ÿ <small>237</small>	² <small>253</small>
E	À <small>142</small>	× <small>158</small>	« <small>174</small>	≠ <small>190</small>	ł <small>206</small>	ı <small>222</small>	— <small>238</small>	■ <small>254</small>
F	À <small>143</small>	f <small>159</small>	» <small>175</small>	ł <small>191</small>	ł <small>207</small>	■ <small>223</small>	— <small>239</small>	— <small>255</small>

HEX	0	1	2	3	4	5	6	7
0	∅ ₀	▶ ₁₆	₃₂	0 ₄₈	@ ₆₄	P ₈₀	` ₉₆	p ₁₁₂
1	☉ ₁	◀ ₁₇	! ₃₃	1 ₄₉	A ₆₅	Q ₈₁	a ₉₇	q ₁₁₃
2	● ₂	↕ ₁₈	" ₃₄	2 ₅₀	B ₆₆	R ₈₂	b ₉₈	r ₁₁₄
3	♥ ₃	!! ₁₉	# ₃₅	3 ₅₁	C ₆₇	S ₈₃	c ₉₉	s ₁₁₅
4	♦ ₄	¶ ₂₀	\$ ₃₆	4 ₅₂	D ₆₈	T ₈₄	d ₁₀₀	t ₁₁₆
5	♣ ₅	§ ₂₁	% ₃₇	5 ₅₃	E ₆₉	U ₈₅	e ₁₀₁	u ₁₁₇
6	♠ ₆	- ₂₂	& ₃₈	6 ₅₄	F ₇₀	V ₈₆	f ₁₀₂	v ₁₁₈
7	♣ ₇	‡ ₂₃	' ₃₉	7 ₅₅	G ₇₁	W ₈₇	g ₁₀₃	w ₁₁₉
8	▣ ₈	↑ ₂₄	(₄₀	8 ₅₆	H ₇₂	X ₈₈	h ₁₀₄	x ₁₂₀
9	○ ₉	↓ ₂₅	)₄₁	9 ₅₇	I ₇₃	Y ₈₉	i ₁₀₅	y ₁₂₁
A	■ ₁₀	→ ₂₆	* ₄₂	: ₅₈	J ₇₄	Z ₉₀	j ₁₀₆	z ₁₂₂
B	♂ ₁₁	← ₂₇	+ ₄₃	; ₅₉	K ₇₅	[₉₁	k ₁₀₇	{ ₁₂₃
C	♀ ₁₂	└ ₂₈	, ₄₄	< ₆₀	L ₇₆	\ ₉₂	l ₁₀₈	! ₁₂₄
D	♫ ₁₃	↔ ₂₉	- ₄₅	= ₆₁	M ₇₇	]₉₃	m ₁₀₉	} ₁₂₅
E	♫ ₁₄	▲ ₃₀	. ₄₆	> ₆₂	N ₇₈	ˆ ₉₄	n ₁₁₀	˜ ₁₂₆
F	♁ ₁₅	▼ ₃₁	/ ₄₇	? ₆₃	O ₇₉	- ₉₅	o ₁₁₁	⊠ ₁₂₇

HEX	8	9	A	B	C	D	E	F
0	ç <small>128</small>	ê <small>144</small>	á <small>160</small>	⋮ <small>176</small>	Ł <small>192</small>	ł <small>208</small>	α <small>224</small>	≡ <small>240</small>
1	ü <small>129</small>	æ <small>145</small>	ı <small>161</small>	⋮ <small>177</small>	Ł <small>193</small>	τ <small>209</small>	β <small>225</small>	± <small>241</small>
2	é <small>130</small>	Æ <small>146</small>	ó <small>162</small>	⋮ <small>178</small>	τ <small>194</small>	π <small>210</small>	Γ <small>226</small>	≈ <small>242</small>
3	à <small>131</small>	ø <small>147</small>	ú <small>163</small>	ı <small>179</small>	ı <small>195</small>	ł <small>211</small>	π <small>227</small>	≤ <small>243</small>
4	ä <small>132</small>	ö <small>148</small>	ñ <small>164</small>	ı <small>180</small>	- <small>196</small>	Ł <small>212</small>	Σ <small>228</small>	ƒ <small>244</small>
5	á <small>133</small>	ò <small>149</small>	ñ <small>165</small>	ı <small>181</small>	ı <small>197</small>	Ł <small>213</small>	σ <small>229</small>	ı <small>245</small>
6	ä <small>134</small>	ó <small>150</small>	ä <small>166</small>	ı <small>182</small>	ı <small>198</small>	Ł <small>214</small>	μ <small>230</small>	÷ <small>246</small>
7	ç <small>135</small>	ù <small>151</small>	ó <small>167</small>	π <small>183</small>	ı <small>199</small>	ı <small>215</small>	τ <small>231</small>	≈ <small>247</small>
8	è <small>136</small>	ÿ <small>152</small>	ı <small>168</small>	ı <small>184</small>	ł <small>200</small>	ı <small>216</small>	φ <small>232</small>	° <small>248</small>
9	ë <small>137</small>	ö <small>153</small>	ı <small>169</small>	ı <small>185</small>	Ł <small>201</small>	ı <small>217</small>	θ <small>233</small>	° <small>249</small>
A	è <small>138</small>	ü <small>154</small>	ı <small>170</small>	ı <small>186</small>	ł <small>202</small>	ı <small>218</small>	Ω <small>234</small>	- <small>250</small>
B	ÿ <small>139</small>	¢ <small>155</small>	½ <small>171</small>	π <small>187</small>	τ <small>203</small>	■ <small>219</small>	ó <small>235</small>	√ <small>251</small>
C	ı <small>140</small>	£ <small>156</small>	¼ <small>172</small>	ı <small>188</small>	ı <small>204</small>	■ <small>220</small>	∞ <small>236</small>	n <small>252</small>
D	ı <small>141</small>	¥ <small>157</small>	ı <small>173</small>	ı <small>189</small>	- <small>205</small>	ı <small>221</small>	ø <small>237</small>	² <small>253</small>
E	ˆ <small>142</small>	ƒ <small>158</small>	« <small>174</small>	ı <small>190</small>	ı <small>206</small>	ı <small>222</small>	ε <small>238</small>	■ <small>254</small>
F	ˆ <small>143</small>	f <small>159</small>	» <small>175</small>	ı <small>191</small>	ı <small>207</small>	■ <small>223</small>	∩ <small>239</small>	■ <small>255</small>

HEX	0	1	2	3	4	5	6	7
0	NUL <small>0</small>			0 <small>48</small>	e <small>64</small>	P <small>80</small>	` <small>96</small>	p <small>112</small>
1		DC1 <small>17</small>	! <small>33</small>	1 <small>49</small>	A <small>65</small>	Q <small>81</small>	a <small>97</small>	q <small>113</small>
2		DC2 <small>18</small>	" <small>34</small>	2 <small>50</small>	B <small>66</small>	R <small>82</small>	b <small>98</small>	r <small>114</small>
3		DC3 <small>19</small>	# <small>35</small>	3 <small>51</small>	C <small>67</small>	S <small>83</small>	c <small>99</small>	s <small>115</small>
4		DC4 <small>20</small>	\$ <small>36</small>	4 <small>52</small>	D <small>68</small>	T <small>84</small>	d <small>100</small>	t <small>116</small>
5			% <small>37</small>	5 <small>53</small>	E <small>69</small>	U <small>85</small>	e <small>101</small>	u <small>117</small>
6			& <small>38</small>	6 <small>54</small>	F <small>70</small>	V <small>86</small>	f <small>102</small>	v <small>118</small>
7	BEL <small>7</small>		' <small>39</small>	7 <small>55</small>	G <small>71</small>	W <small>87</small>	g <small>103</small>	w <small>119</small>
8	BS <small>8</small>	CAN <small>24</small>	(<small>40</small>	8 <small>56</small>	H <small>72</small>	X <small>88</small>	h <small>104</small>	x <small>120</small>
9	HT <small>9</small>		) <small>41</small>	9 <small>57</small>	I <small>73</small>	Y <small>89</small>	i <small>105</small>	y <small>121</small>
A	LF <small>10</small>		* <small>42</small>	: <small>58</small>	J <small>74</small>	Z <small>90</small>	j <small>106</small>	z <small>122</small>
B	VT <small>11</small>	ESC <small>27</small>	+ <small>43</small>	; <small>59</small>	K <small>75</small>	[<small>91</small>	k <small>107</small>	{ <small>123</small>
C	FF <small>12</small>		/ <small>44</small>	< <small>60</small>	L <small>76</small>	\ <small>92</small>	l <small>108</small>	! <small>124</small>
D	CR <small>13</small>		- <small>45</small>	= <small>61</small>	M <small>77</small>	] <small>93</small>	m <small>109</small>	} <small>125</small>
E	SO <small>14</small>		· <small>46</small>	> <small>62</small>	N <small>78</small>	^ <small>94</small>	n <small>110</small>	~ <small>126</small>
F	SI <small>15</small>		/ <small>47</small>	? <small>63</small>	O <small>79</small>	— <small>95</small>	o <small>111</small>	

HEX	8	9	A	B	C	D	E	F
0	NUL <small>128</small>	<small>144</small>	á <small>160</small>	⋮ <small>176</small>	Ł <small>192</small>	⋈ <small>208</small>	α <small>224</small>	≡ <small>240</small>
1	<small>129</small>	DC1 <small>145</small>	í <small>161</small>	⋮ <small>177</small>	Ł <small>193</small>	⋈ <small>209</small>	β <small>225</small>	± <small>241</small>
2	<small>130</small>	DC2 <small>146</small>	ó <small>162</small>	⋮ <small>178</small>	Ł <small>194</small>	⋈ <small>210</small>	Γ <small>226</small>	≥ <small>242</small>
3	<small>131</small>	DC3 <small>147</small>	ú <small>163</small>	| <small>179</small>	Ł <small>195</small>	⋈ <small>211</small>	π <small>227</small>	≤ <small>243</small>
4	<small>132</small>	DC4 <small>148</small>	ñ <small>164</small>	† <small>180</small>	— <small>196</small>	Ł <small>212</small>	Σ <small>228</small>	∫ <small>244</small>
5	<small>133</small>	<small>149</small>	ñ <small>165</small>	‡ <small>181</small>	‡ <small>197</small>	Ł <small>213</small>	σ <small>229</small>	∫ <small>245</small>
6	<small>134</small>	<small>150</small>	ä <small>166</small>	‡ <small>182</small>	‡ <small>198</small>	Ł <small>214</small>	μ <small>230</small>	÷ <small>246</small>
7	BEL <small>135</small>	<small>151</small>	ø <small>167</small>	‡ <small>183</small>	‡ <small>199</small>	‡ <small>215</small>	τ <small>231</small>	≈ <small>247</small>
8	BS <small>136</small>	CAN <small>152</small>	¿ <small>168</small>	‡ <small>184</small>	Ł <small>200</small>	‡ <small>216</small>	Φ <small>232</small>	° <small>248</small>
9	HT <small>137</small>	<small>153</small>	ƒ <small>169</small>	‡ <small>185</small>	Ł <small>201</small>	∩ <small>217</small>	θ <small>233</small>	• <small>249</small>
A	LF <small>138</small>	<small>154</small>	ƒ <small>170</small>	‡ <small>186</small>	Ł <small>202</small>	∩ <small>218</small>	Ω <small>234</small>	ˆ <small>250</small>
B	VT <small>139</small>	ESC <small>155</small>	½ <small>171</small>	‡ <small>187</small>	‡ <small>203</small>	■ <small>219</small>	δ <small>235</small>	✓ <small>251</small>
C	FF <small>140</small>	<small>156</small>	¼ <small>172</small>	‡ <small>188</small>	‡ <small>204</small>	■ <small>220</small>	∞ <small>236</small>	∞ <small>252</small>
D	CR <small>141</small>	<small>157</small>	ı <small>173</small>	‡ <small>189</small>	= <small>205</small>	■ <small>221</small>	∅ <small>237</small>	² <small>253</small>
E	SO <small>142</small>	<small>158</small>	« <small>174</small>	∩ <small>190</small>	‡ <small>206</small>	■ <small>222</small>	ε <small>238</small>	■ <small>254</small>
F	SI <small>143</small>	<small>159</small>	» <small>175</small>	∩ <small>191</small>	⊥ <small>207</small>	■ <small>223</small>	∩ <small>239</small>	<small>255</small>

HEX	0	1	2	3	4	5	6	7
0	NUL <small>0</small>	<small>16</small>	<small>32</small>	0 <small>48</small>	@ <small>64</small>	P <small>80</small>	` <small>96</small>	p <small>112</small>
1	<small>1</small>	DC1 <small>17</small>	! <small>33</small>	1 <small>49</small>	A <small>65</small>	Q <small>81</small>	a <small>97</small>	q <small>113</small>
2	<small>2</small>	DC2 <small>18</small>	" <small>34</small>	2 <small>50</small>	B <small>66</small>	R <small>82</small>	b <small>98</small>	r <small>114</small>
3	♥ <small>3</small>	DC3 <small>19</small>	# <small>35</small>	3 <small>51</small>	C <small>67</small>	S <small>83</small>	c <small>99</small>	s <small>115</small>
4	♦ <small>4</small>	DC4 <small>20</small>	\$ <small>36</small>	4 <small>52</small>	D <small>68</small>	T <small>84</small>	d <small>100</small>	t <small>116</small>
5	♣ <small>5</small>	<small>21</small>	% <small>37</small>	5 <small>53</small>	E <small>69</small>	U <small>85</small>	e <small>101</small>	u <small>117</small>
6	♠ <small>6</small>	<small>22</small>	& <small>38</small>	6 <small>54</small>	F <small>70</small>	V <small>86</small>	f <small>102</small>	v <small>118</small>
7	BEL <small>7</small>	<small>23</small>	' <small>39</small>	7 <small>55</small>	G <small>71</small>	W <small>87</small>	g <small>103</small>	w <small>119</small>
8	BS <small>8</small>	CAN <small>24</small>	(<small>40</small>	8 <small>56</small>	H <small>72</small>	X <small>88</small>	h <small>104</small>	x <small>120</small>
9	HT <small>9</small>	<small>25</small>	) <small>41</small>	9 <small>57</small>	I <small>73</small>	Y <small>89</small>	i <small>105</small>	y <small>121</small>
A	LF <small>10</small>	<small>26</small>	* <small>42</small>	: <small>58</small>	J <small>74</small>	Z <small>90</small>	j <small>106</small>	z <small>122</small>
B	VT <small>11</small>	ESC <small>27</small>	+ <small>43</small>	; <small>59</small>	K <small>75</small>	[<small>91</small>	k <small>107</small>	{ <small>123</small>
C	FF <small>12</small>	<small>28</small>	/ <small>44</small>	< <small>60</small>	L <small>76</small>	\ <small>92</small>	l <small>108</small>	; <small>124</small>
D	CR <small>13</small>	<small>29</small>	- <small>45</small>	= <small>61</small>	M <small>77</small>	] <small>93</small>	m <small>109</small>	} <small>125</small>
E	SO <small>14</small>	<small>30</small>	· <small>46</small>	> <small>62</small>	N <small>78</small>	^ <small>94</small>	n <small>110</small>	~ <small>126</small>
F	SI <small>15</small>	<small>31</small>	/ <small>47</small>	? <small>63</small>	O <small>79</small>	_ <small>95</small>	o <small>111</small>	<small>127</small>

HEX	8	9	A	B	C	D	E	F
0	ç 128	é 144	á 160	⋮ 176	Ł 192	⋈ 208	α 224	≡ 240
1	ü 129	æ 145	ı 161	⋮ 177	⊥ 193	⦏ 209	β 225	± 241
2	é 130	Æ 146	ó 162	⋮ 178	⊤ 194	⦏ 210	Γ 226	≈ 242
3	á 131	ò 147	ú 163	| 179	† 195	⋈ 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	† 180	- 196	⋈ 212	Σ 228	∫ 244
5	à 133	ò 149	Ñ 165	† 181	† 197	⦏ 213	σ 229	∫ 245
6	á 134	ó 150	ä 166	⋈ 182	† 198	⦏ 214	μ 230	÷ 246
7	ç 135	ù 151	ó 167	⦏ 183	⋈ 199	⋈ 215	τ 231	≈ 247
8	é 136	ÿ 152	ı 168	⦏ 184	⋈ 200	† 216	Φ 232	° 248
9	ë 137	ö 153	⌈ 169	⋈ 185	⦏ 201	∫ 217	θ 233	° 249
A	è 138	ù 154	⌈ 170	⋈ 186	⋈ 202	⌈ 218	Ω 234	- 250
B	ÿ 139	ø 155	½ 171	⦏ 187	⦏ 203	■ 219	δ 235	√ 251
C	ı 140	ƒ 156	¼ 172	⋈ 188	⋈ 204	■ 220	∞ 236	n 252
D	ı 141	¥ 157	ı 173	⋈ 189	= 205	■ 221	ø 237	² 253
E	Ä 142	ƒ 158	« 174	∫ 190	⋈ 206	■ 222	ε 238	■ 254
F	À 143	f 159	» 175	⌈ 191	⊥ 207	■ 223	∩ 239	■ 255

Language Selection	ASCII Decimal value											
	35	36	64	91	92	93	94	96	123	124	125	126
USA	#	\$	@	[	\	\]	^	~	{	|	}	-
FRANCE	#	\$	à	•	ç	§	^	~	é	ù	è	**
GERMANY	#	\$	§	À	ö	ü	^	~	ä	ö	ü	ß
ENGLAND	£	\$	@	[	\	\]	^	~	{	|	}	-
DENMARK	#	\$	@	Æ	Ø	Å	^	~	æ	ø	å	-
SWEDEN	#	¤	£	À	ö	Å	ü	é	ä	ö	å	ü
ITALY	#	\$	@	•	\	é	^	ù	à	ò	è	ì
SPAIN	₧	\$	@	ı	Ñ	¿	^	~	**	ñ	}	-
JAPAN	#	\$	@	[	¥	]	^	~	{	|	}	-

DEC LA-120 International Selection

Language Selection	ASCII Decimal value										
	35	64	91	92	93	94	96	123	124	125	126
USA	#	@	[	\	\]	^	~	{	|	}	-
UK	£	@	[	\	\]	^	~	{	|	}	-
FINLAND	#	@	Å	ö	Ä	ü	é	ä	ö	ä	ü
SWEDEN	#	£	Å	ö	Ä	ü	é	ä	ö	ä	ü
NORWAY/DENMARK	#	Å	Æ	Ø	Ä	Ü	ä	æ	ø	Ä	Ü
GERMANY	#	§	Å	ö	ü	~	~	ä	ö	ü	ß
FRANCE	£	à	•	ç	§	~	~	é	ù	è	••

DEC Supplement Character Set

HEX	0	1	2	3	4	5	6	7
0	NUL <small>128</small>	<small>144</small>	<small>160</small>	° <small>176</small>	À <small>192</small>	<small>208</small>	à <small>224</small>	<small>240</small>
1	<small>129</small>	DC1 <small>145</small>	ı <small>161</small>	± <small>177</small>	Á <small>193</small>	Ñ <small>209</small>	á <small>225</small>	ñ <small>241</small>
2	<small>130</small>	DC2 <small>146</small>	¢ <small>162</small>	² <small>178</small>	Â <small>194</small>	Ö <small>210</small>	â <small>226</small>	ö <small>242</small>
3	<small>131</small>	DC3 <small>147</small>	£ <small>163</small>	³ <small>179</small>	Ã <small>195</small>	Ó <small>211</small>	ã <small>227</small>	ó <small>243</small>
4	<small>132</small>	DC4 <small>148</small>	<small>164</small>	<small>180</small>	Ä <small>196</small>	Ô <small>212</small>	ä <small>228</small>	ô <small>244</small>
5	<small>133</small>	<small>149</small>	¥ <small>165</small>	µ <small>181</small>	Å <small>197</small>	Õ <small>213</small>	å <small>229</small>	õ <small>245</small>
6	<small>134</small>	<small>150</small>	<small>166</small>	¶ <small>182</small>	Æ <small>198</small>	Ö <small>214</small>	æ <small>230</small>	ö <small>246</small>
7	BEL <small>135</small>	<small>151</small>	§ <small>167</small>	• <small>183</small>	Ç <small>199</small>	Œ <small>215</small>	ç <small>231</small>	œ <small>247</small>
8	BS <small>136</small>	CAN <small>152</small>	¨ <small>168</small>	<small>184</small>	È <small>200</small>	Ø <small>216</small>	è <small>232</small>	ø <small>248</small>
9	HT <small>137</small>	<small>153</small>	© <small>169</small>	¹ <small>185</small>	É <small>201</small>	Ù <small>217</small>	é <small>233</small>	ù <small>249</small>
A	LF <small>138</small>	<small>154</small>	ª <small>170</small>	º <small>186</small>	Ê <small>202</small>	Ú <small>218</small>	ê <small>234</small>	ú <small>250</small>
B	VT <small>139</small>	ESC <small>155</small>	« <small>171</small>	» <small>187</small>	Ë <small>203</small>	Û <small>219</small>	ë <small>235</small>	û <small>251</small>
C	FF <small>140</small>	<small>156</small>	<small>172</small>	¼ <small>188</small>	Ï <small>204</small>	Ü <small>220</small>	ï <small>236</small>	ü <small>252</small>
D	CR <small>141</small>	<small>157</small>	<small>173</small>	½ <small>189</small>	Í <small>205</small>	Ý <small>221</small>	í <small>237</small>	ý <small>253</small>
E	SO <small>142</small>	<small>158</small>	<small>174</small>	<small>190</small>	Î <small>206</small>	<small>222</small>	î <small>238</small>	<small>254</small>
F	SI <small>143</small>	<small>159</small>	<small>175</small>	¿ <small>191</small>	Ï <small>207</small>	ß <small>223</small>	ï <small>239</small>	<small>255</small>

Appendix H: Escape Sequence Quick Reference

Epson FX Quick Reference

ASCII Command	Epson FX Command Description
NUL	Terminates horizontal and vertical tab escape sequences.
BEL	Sounds the print buzzer.
BS	Backspace.
HT	Horizontal tab.
LF	Line feed.
VT	Vertical tab.
FF	Form feed.
CR	Carriage return.
SO	Shift out. Selects enlarged mode for the current line.
SI	Shift in. Selects condensed printing.
DC1	Device control 1. Enable printer.
DC2	Device control 2. Cancels condensed printing.
DC3	Device control 3. Disable printer.
DC4	Device control 4. Cancels enlarged mode.
CAN	Cancel. Cancel text in the print buffer.
ESC SO	Selects enlarged mode.
ESC SI	Selects condensed printing.
ESC !	Master Print mode selection.
ESC #	Cancel Most Significant Bit (MSB) function.

ASCII Command	Epson FX (Continued) Command Description
ESC %	Select character set from ROM or from RAM.
ESC &	Define User-defined characters in RAM.
ESC*	Select Graphic mode.
ESC –	Select/Cancel underlining.
ESC /	Select Vertical Tab Channel.
ESC 0	Set line spacing to 1/8 inch.
ESC 1	Set line spacing to 7/72 inch.
ESC 2	Set line spacing to 1/6 inch.
ESC 3	Set line spacing to n/216 inch.
ESC 4	Select italic character set.
ESC 5	Cancel italic character set.
ESC 6	Enable upper character set (80 hex to 9F hex and FF hex).
ESC 7	Enable extended control codes (Turns off ESC 6).
ESC 8	Disable paper out detector.
ESC 9	Enable paper out detector.
ESC :	Copies resident characters (ROM) to RAM.
ESC <	Enable one line unidirectional printing.
ESC =	Set MSB to 0 (Sets 8th bit low).
ESC >	Set MSB to 1 (Sets 8th bit high).
ESC ?	Reassign graphic codes.
ESC @	Resets printer.
ESC A	Set line spacing to n/72 inch.
ESC B	Set vertical tabs.
ESC C	Set forms length in lines.
ESC C	Set forms length in inches when first variable is a null.
ESC D	Set horizontal tab.
ESC E	Select emphasized printing.
ESC F	Cancel emphasized printing.
ESC G	Select double-strike printing.

ASCII Command	Epson FX (Continued) Command Description
ESC H	Cancel double-strike printing.
ESC I	Enable/disable printing of characters stored in the lower control code area (00hex to 31 hex).
ESC J	Perform an immediate line feed of n/216 inch.
ESC K	Select single-density graphics.
ESC L	Select double-density graphics.
ESC M	Select Elite (12 cpi) mode.
ESC N	Set perforation skip to n lines.
ESC O	Disable perforation skip mode.
ESC P	Select Pica (10 cpi) mode.
ESC Q	Set right margin.
ESC R	Select international character set.
ESC S	Select Superscript or Subscript characters.
ESC T	Cancel Superscript or Subscript characters.
ESC U	Select/Cancel Unidirectional print mode.
ESC W	Select/Cancel Enlarged print mode.
ESC Y	Select high speed double-density graphics.
ESC Z	Select quadruple-density graphics.
ESC ^	Select 9-pin graphics.
ESC b	Set up vertical tabs for Vertical tab channel c.
ESC l	Set left margin.
ESC j	Perform an immediate reverse line feed of n/216 inch.
ESC k	Select NLQ Typestyle.
ESC p	Select/Cancel Proportional printing.
ESC s	Select/Cancel half-speed printing.
ESC x	Select NLQ or Draft Print.
DEL	Deletes the last text character in the print buffer.

ASCII Command	IBM Proprinter Command Description
NUL	Terminates horizontal and vertical tab escape sequences.
BEL	Sounds the print buzzer.
BS	Backspace.
HT	Horizontal tab.
LF	Line feed.
VT	Vertical tab.
FF	Form feed.
CR	Carriage return.
SO	Shift out. Selects Double wide mode for the current line.
SI	Shift in. Selects condensed printing.
DC1	Device control 1. Enable printer.
DC2	Device control 2. Selects 10 character per inch (10 cpi).
DC3	Device control 3. Disable printer.
DC4	Device control 4. Cancels double wide printing.
CAN	Cancel. Cancel text in the print buffer.
ESC -	Select/Cancel underlining.
ESC /	Select Vertical Tab Channel.
ESC 0	Set line spacing to 1/8 inch.
ESC 1	Set line spacing to 7/72 inch.
ESC 2	Activate line spacing set by ESC A.
ESC 3	Set line spacing to n/216 inch.
ESC 4	Set top of form at current position.

ASCII Command	IBM Proprinter (Continued) Command Description
ESC 5	Select/Cancel automatic line feed.
ESC 6	Select character set 2.
ESC 7	Select character set 1.
ESC 8	Disable paper out detector.
ESC 9	Enable paper out detector.
ESC :	Select 12 characters per inch.
ESC <	Enable one line unidirectional printing.
ESC =	Start downloading characters.
ESC A	Set line spacing to n/72 inch.
ESC B	Set vertical tabs.
ESC C	Set forms length in lines.
ESC C	Set forms length in inches when first variable is a null.
ESC D	Set horizontal tab.
ESC E	Select emphasized printing.
ESC F	Cancel emphasized printing.
ESC G	Select double-strike printing.
ESC H	Cancel double-strike printing.
ESC I	Enable/disable printing of characters stored in the lower control code area (00hex to 31 hex).
ESC J	Perform an immediate line feed of n/216 inch.
ESC L	Select double-density graphics.
ESC N	Set perforation skip to n lines.
ESC O	Disable perforation skip mode.
ESC P	Select/Cancel proportional printing.
ESC Q	Disable the printer.
ESC R	Reset tabs to default settings.

ASCII Command	IBM Proprinter (Continued) Command Description
ESC S	Select Superscript or Subscript characters.
ESC T	Cancel Superscript or Subscript characters.
ESC U	Select/Cancel Unidirectional print mode.
ESC W	Select/Cancel Double-wide printing.
ESC X	Set left and right margin.
ESC Y	Select high speed double-density graphics.
ESC Z	Select quadruple-density graphics.
ESC [@	Select double-high printing.
ESC \	Select Characters from All Characters table.
ESC ^	Select a character from the All Characters table.
ESC _	Select/Cancel overlining.

ASCII Command	DEC LA-120 Command Description
NUL	Null character.
BEL	Sounds the printer buzzer.
BS	Backspace.
HT	Horizontal tab.
LF	Line feed.
VT	Vertical tab.
FF	Form feed.
CR	Carriage return.
SO	Shift out. Selects the Secondary character set.
SI	Shift in. Selects the Primary character set.
CAN	Cancel. Cancel text in the print buffer.
ESC (A	Select UK character set language.
ESC (B	Select USA character set language.
ESC (C	Select Finland character set language.
ESC (E	Select Norway/Denmark character set language.
ESC (H	Select Sweden character set language.
ESC (K	Select Germany character set language.
ESC (R	Select France character set language.
ESC 20h	Enable auto carriage return.
ESC 20L	Disable auto carriage return.
ESC 3	Set vertical tab at current line.
ESC D	Execute a line feed.
ESC E	Execute a carriage return line feed.
ESC H	Set horizontal tab at current column.
ESC J	Set vertical tab at current line.

ASCII Command	DEC LA-120 (Continued) Command Description
ESC [2	Clear all horizontal tabs.
ESC [4	Clear all vertical tabs.
ESC [n1 a	Advance by n1 columns.
ESC [c	Request for product ID.
ESC [0c	Request for product ID.
ESC [n1 d	Goto line number n1.
ESC [n1 e	Advance by n1 lines.
ESC [g	Clear horizontal tab at current column.
ESC [0g	Clear horizontal tab at current column.
ESC [2g	Clear all horizontal tabs.
ESC [3g	Clear all horizontal tabs.
ESC [1g	Set vertical tab at current line.
ESC [4g	Clear all vertical tabs.
ESC [n1 r	Set top margin.
ESC [n1;0;r	Set top margin.
ESC [;n2 r	Set bottom margin.
ESC [0;n2 r	Set bottom margin.
ESC [n1;n2 r	Set top and bottom margins.
ESC [n1 s	Set left margin.
ESC [n1;0 s	Set left margin.
ESC [;n2 s	Set right margin.
ESC [0;n2 s	Set right margin.
ESC [n1;n2 s	Set left and right margins.
ESC [n1 u	Set horizontal tab at column n1.
ESC [n1;n2 ..;n16 u	Set horizontal tabs at column n1 ... n16.
ESC [n1 v	Set vertical tab at line n1.

ASCII Command	DS-180 Command Description
NUL	Null Character
BEL	Sound The Printer Bell
BS	Backspace
HT	Horizontal Tab
LF	Line Feed
VT	Vertical Tab
FF	Form Feed
CR	Carriage Return
SO	Select Double Wide Print
SI	Cancel Double Wide Print
ESC	Escape
DEL	Delete
ENQ or FS	Enter Anadex Graphics
ACK or GS	Exit Anadex Graphics With Forms Correction
ETX	Exit Anadex Graphics With No Forms Correction
ESC [5w	Select 5-Pitch Characters
ESC [6w	Select 6-Pitch Characters
ESC [7w	Select 6.6-Pitch Characters
ESC [8w	Select 8.25-Pitch Characters
ESC [w or ESC [0w	Select 10-Pitch Characters
ESC [1w	Select 10-Pitch Characters
ESC [2w	Select 12-Pitch Characters
ESC [3w	Select 13.2-Pitch Characters
ESC [4w	Select 16.5-Pitch Characters
ESC \$ 1	Enable Continuous Underline
ESC \$ 2	Disable Continuous Underline
ESC (A	Select Character Set – United Kingdom

ASCII Command	DS-180 (Continued) Command Description
ESC (B	Select Character Set – US ASCII
ESC (C	Select Character Set – Finland
ESC (H	Select Character Set – Sweden
ESC (E	Select Character Set – Norway/Denmark
ESC (R	Select Character Set – France
ESC (K	Select Character Set – Germany
ESC \$ 5	Select Alternate Character Set
ESC \$ 6	Cancel Alternate Character Set
ESC [ns or ESC [n;0s	Set Left Margin
ESC [;ns or ESC [0;ns	Set Right Margin
ESC [n1;n2s	Set Left And Right Margin
ESC [nr or ESC [n;0r	Set Top Margin
ESC [;nr or ESC [0;nr	Set Bottom Margin
ESC [n1;n2r	Set Top And Bottom Margin
ESC [nt	Set Form Length
ESC 1	Set Horizontal Tab At Current Print Column
ESC [g or ESC [0g	Clear Horizontal Tab At Current Print Column
ESC [nu	Set A Horizontal Tab
ESC [n1;n2;n16u	Set Horizontal Tabs
ESC [2g	Clear All Horizontal Tabs
ESC [3g	Clear All Horizontal Tabs
ESC 2	Clear All Horizontal Tabs
ESC 3	Set Vertical Tab At Current Print Line
ESC [1g	Clear Vertical Tab At Current Print Line

ASCII Command	DS-180 (Continued) Command Description
ESC [nv	Set A Vertical Tab
ESC [n1;n2;nxv	Set Vertical Tabs
ESC [4g	Clear All Vertical Tabs
ESC 4	Clear All Vertical Tabs
ESC [20h	Enable Auto Carriage Return
ESC [20l	Disable Auto Carriage Return
ESC [4z	Set Line Spacing To 2 Lines Per Inch
ESC [5z	Set Line Spacing To 3 Lines Per Inch
ESC [6z	Set Line Spacing To 4 Lines Per Inch
ESC [z or ESC [0z	Set Line Spacing To 6 Lines Per Inch
ESC [1z	Set Line Spacing To 6 Lines Per Inch
ESC [2z	Set Line Spacing To 8 Lines Per Inch
ESC [3z	Set Line Spacing To 12 Lines Per Inch
ESC [n'	Set Print Column
ESC [na	Advance Print Column By "n" Columns
ESC [nd	Set Print Line To Line "n"
ESC [ne	Advance Print Line By "n" Lines
ESC E	Execute Carriage Return And Line Feed
ESC D	Perform Line Feed
ESC \$ 7 or ESC \$ P	Perform Half Line Feed
ESC \$ 8 or ESC \$ N	Perform Reverse Half Line Feed
ESC \$ S n or ESC \$ s n	Set DS-180 Discrete (boolean) Feature
ESC \$ C n or ESC \$ c n	Clear DS-180 Discrete (boolean) Feature
ESC \$ F n 1 ; n2 .	Change DS-180 Value (Integer) Feature