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Product Description

The Prodigy Label Printer, hereafter referred to as 'the Printer' is a high-performance, low-cost thermal and thermal transfer label Printer. Powerful capabilities and easy to use features set a new price/ performance standard for industrial direct thermal and thermal transfer label printers.

The Printer has a maximum print speed of up to 4 inches per second (101.6 mm/sec.) All popular bar codes are resident in the Printer's memory and can be printed with or without human readable interpretations. Nine different character fonts can be printed in any one of four directions. Each character font is unique, and can be multiplied into 14 different magnifications, each with its own set of dot tables. This feature allows the Printer to print characters from .035 inch (.9 mm) to 7.68 inches (195.1 mm) high.

In addition to the built-in human readable and bar code fonts, the Printer can accept “picture images” that directly address the dot generation of the Printer. Several PC-based scanning and image editing packages are compatible with the Printer’s imaging capabilities.

For printing high-density bar codes and very small characters, the printhead has an extremely fine 5 mil element size, which gives the Printer 203 DPI (dots per inch) print resolution. Although the Printer is able to produce 5 mil pixels, the actual pixel size can also be multiplied by two in the horizontal direction and by two or three in the vertical direction, this amounts to a maximum pixel size of 10 mil by 15 mil. An optional 152 dot per inch (6 dot/mm) printhead (Prodigy 152) is also available. It is approximately 25% less dense, yet can print 100% UPC/EAN and 9.6 cpi Code 39.

Several innovative new features are designed into the Printer. For example, label formatting can be done while printing is taking place, eliminating the need for slow memory-intensive bit-mapping. This not only reduces the size and cost of the Printer, but also allows an impressive maximum label size of 4.65" (118 mm) x 99.99" (2.5 meters). Labels generated in the 5 mil pixel mode can maintain 2" (50.8 mm) per second. For labels in the 10 mil and 15 mil pixel modes, print rates of 3" and 4" per second (76.2 mm and 101.6 mm) are easily attained. The optional 152 dpi printhead places less demand on the CPU, allowing longer labels to be printed at faster speeds.

Software-selectable printhead temperature, print speed, slew rates, and form dimensions provide the option of storing a wide variety of parameters, thus eliminating time for manual adjustments. This is especially helpful when using several different types or brands of label stock, or when switching between direct thermal printing and thermal transfer printing.

The Printer hosts both RS-232C and RS-422 computer interfaces. The Printer can be driven from almost any host computer, or in stand-alone configuration with built-in label batch software. For stand-alone label printing, the Printer is connected directly to a CRT. Label formats are stored in plug-in memory cartridges. Approximately 50 typical label formats can be stored in each module.

For applications that require a larger data base of label formats, refer to Datamax's PC-Batch™ Software for IBM PCs® and compatibles.

Applications

The Printer is designed for use in many different types of applications.

Examples include:

*Point of sale
*Parts count labeling
*Retail merchandise labeling
*Deli labeling
*VICS standard labels
*HIBC (Health Industry)
*UPC shipping container labels
*Bakery
*Asset management
*ID plates
*Time/attendance
*Shelf labeling
*Cataloging
*Item tracking
*AIAG (Auto Industry Action Group)
*Warehouse ticketing
*Inventory control labeling
*Pharmaceutical labels
*Retail garment
*Price marking
*Military LOGMARS
*Work in process
*Document tracking
*Serial numbering
*TALC tickets
*Product labeling
*Property identification
*Baggage/boarding tags/passes

Features

Additional features of the Printer include:

* Thermal transfer and direct thermal printing
* Extremely high dot density (203 dots/inch, 8 dots/mm); optional 152 dots/inch, (6 dots/mm)
* Prints up to 4.0" (101 mm)/sec
* Large maximum media size: 4.65"W x 99.99"L (118 mm x 2539 mm)
* Print area of 4.4"W x 99.99"L (112 mm x 2539 mm); optional 152 print area 4.15" W x 99.99"L (105mm x 2539mm)
* User-selectable bar code ratios and heights
* Printing on label, ticket, and tag stock; both die cut and continuous form
* Self-peeling demand mode, internal rewind mechanism for rewinding label backing
* Easy to load label stock and transfer ribbon mechanism
* Dot-addressable graphics function; IBM PC® compatible driven scanner packages
* Diagnostics - Self test
* Protocol - XON/XOFF; CTS/DTR
* User selectable and software-selectable:

Printhead temperatures	Slew rates
Form dimensions	Print speeds

Compliances

FCC: 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 instruction manual, 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 or her own expense.

UL: The Prodigy is listed under UL 1950 INFORMATION TECHNOLOGY EQUIPMENT, file number E156091

CSA: DATAMAX Corporation has been authorized by Canadian Standards Association to represent the Prodigy as CSA Certified under CSA Standard C22.2 No 220-M1986, file number LR68943-13.

VDE: DATAMAX Corporation certifies that the Prodigy label Printer complies with the RFI suppression requirement of Vfg 1046/1984 for VDE Class B equipment.

TUV-GS: The Prodigy Printer has been tested and complies with EN 60 950/06.88 and bears the TUV-GS mark. License Number: S9371819.

1.1 Specifications

Printing

Type:	Direct thermal or thermal transfer
Print Speed:	1.0" (25.4 mm) per second to 4.0" (101.6 mm) per second
White Space Slew Rate:	1.0" (25.4 mm) per second to 4.0"(101.6 mm) per second
Maximum Fields Per Label:	100
Minimum Dot Size:	0.005" (0.127 mm) square
Optional Dot Sizes:	0.010" (0.254 mm), 0.015" (0.381 mm) vertical, 0.010" (0.254 mm) horizontal
Font Styles:	***Prodigy:*** Nine alphanumeric fonts from 0.035"H (0.9 mm) to 7.68"H (195.1 mm) including OCR-A and OCR-B. ***Prodigy 152:*** has nine alphanumeric fonts from .047"H (1 mm) to 10.24"H (260 mm).
Character Density:	***Prodigy:*** 33.83 cpi FONT 0 at 1X, .70 cpi FONT 6 at 8X ***Prodigy 152:*** 25.64 cpi FONT 0 at 1X, .54 cpi FONT 6 at 8X

Bar Code Fonts:	Code 39, Interleaved 2 of 5, (maximum 8 interleaved 2 of 5 per label) CODABAR, Code 128, UPC-A and UPC-E, EAN-13 and EAN-8, Plessey, Universal Shipping Container Symbology, Code 39 variations to produce all industry standards such as LOGMARS, HIBC, and AIAG
Bar Code Density:	***Prodigy:*** 12.69 cpi, Code 3 of 9, 0.005" narrow bar, 3:1 ratio 6.34 cpi, Code 3 of 9, 0.010" narrow bar, 3:1 ratio ***Prodigy 152:*** 9.6 cpi, Code 39, 0.0066" narrow bar, 3:1 ratio, 4.81 cpi, Code 39, 0.013" narrow bar, 3:1 ratio

Media

Width:	0.75"(19 mm) to 4.65"(118 mm)
Length:	0.50"(13 mm) to 99.99"(2539 mm)
Thickness:	0.0023"(0.06 mm) to .010" (0.254 mm)
Type:	Roll-fed, die-cut labels, tags, tickets, and continuous forms
Supply Roll Capacity:	8" (203 mm) maximum outside diameter on standard 1.5" (38 mm) and 3"(76 mm) core. 6250" lineal stock, 0.0065 thick
Capacity in Rewind Mode:	5"(127 mm) maximum outside diameter on internal rewind spindle 1.5" core (38 mm). 2100" lineal stock, 0.0065 thick

Label Material:	Thermal transfer-plain coated papers, vinyl, Mylar, metalized paper, nonwoven fabric, fine woven fabric, thermal-visible light scannable paper, infrared scannable paper, thermal ticket/tag stock, thermally sensitive plastic stock
Thermal Transfer Ribbon:	Black or colored inks; 360 meters long, 4.6 microns, backcoated, ±10% label width

Indicators and Switches

Indicator Lights:	POWER, RIBBON/PAPER OUT, PAUSE
Switches:	POWER, STOP/CANCEL, PAUSE, FEED, TRANSFER ON, Rear configuration DIP switch (SW1), and Darkness potentiometer.

Communications Interfacing

Communications:	IEEE RS-232C and RS-422 at 150, 300, 600, 1200, 2400, 4800, or 9600 baud
Character Set:	ANSI ASCII character set
Word Length:	Selectable 7 or 8 bit data format
Handshaking:	XON/XOFF and CTS/DTR
Input Buffer:	15,359 bytes, XOFF is transmitted and DTR goes low when 15,059 bytes are in the buffer. XON is transmitted and DTR goes high when 255 bytes are left in the buffer.

Data is transmitted with no parity from the Printer.

Electrical

Input Voltage:	115 VAC ±10%, single phase 50/60 Hz 230 VAC ±10%, single phase 50/60 Hz
Circuit Protection:	At 115V = 1.5A Slo Blo; At 230V = circuit breaker at 1.2A
Grounding:	Unit must be connected to a properly grounded receptacle

Environmental

Temperature:	40° F to 100° F (4° C to 38° C)
Humidity:	10% to 95% noncondensing
Ventilation:	Free air movement
Dust:	Nonconducting, noncorrosive
Electromagnetic Radiation:	Moderate RF fields can be tolerated

Mechanical

Size:	10"H x 10"W x 18"D (25.4 cm H x 25.4 cm W x 45.72 cm D)
Weight:	35 lb. (15.87 kg.)

Options

32K SRAM Memory Module
Centronics Parallel Interface Adapter
Present Sensor
IBM PC compatible software for batch labeling systems; dot addressable graphics definition; and module programming

1.2 Printer Options

The Printer hosts a number of different options that can be added to the Printer for additional versatility. These options are described below.

CRT Terminal

A CRT terminal interface is available for configuring the Printer as a stand-alone label definition and batch label printing system. Application software is built into the Printer and can be turned "ON" or "OFF" by switches that are located on the rear of the Printer. When this internal application software is selected, prompts for label creation and label printing can be directly controlled by the Printer. Label formats are stored on optional 32K SRAM memory modules.

Memory Modules

Optional 32K SRAM memory modules can be purchased to extend the capabilities of the Printer in its CRT-based batch labeling system mode(s). These memory modules can also be used to store bit-mapped graphic images that are created by a host computing device. The memory module(s) can be dedicated for either label formats or bit-mapped graphic image arrays, or a 16K split of each.

PC-Batch Software

PC-Batch™ label creating and batch printing software is available for IBM PCs and compatibles. The software has the look and feel of the built-in application software, but uses a PC's memory and disk storage to extend the capabilities of the Printer.

Present Sensor

The Printer can be configured for a “one up” printing mode. With the sensor installed and enabled, the Printer will not print the next label in its internal buffer(s) until the last label printed has been removed from the Printer. Quantities of labels (printed one at a time) can still be requested by the internal batch labeling software or by remote computing devices.

1.3 Supplies

Print Media

The Printer is capable of both direct thermal and thermal transfer printing. The Printer allows for software and direct setting of many printing parameters, such as the head temperature, print speed, and slew rates. This enables the Printer to be compatible with many direct thermal or thermal transfer media.

Media sizes can range from 0.75"(19 mm) wide by 0.50"(13 mm) long to 4.65" (118 mm) wide by 99.99"(2539 mm) long. Label edge sensing is carried out by an optical photo sensor located 1/4" from the left edge of the media as it is fed out of the Printer. The sensor establishes the leading edge of a label, tag, or form by measuring levels of opaqueness. This sensor is controlled by the microprocessor in the Printer and requires no adjustment when changing media. Media thickness can range from 0.0023" (0.06 mm) to .008" (0.20 mm).

Supply rolls are to be wound on standard 1.5" (38 mm) or 3" (76 mm) inside diameter cores. The maximum roll diameter should not exceed 8" (203 mm).

Common direct thermal stocks include visible-light scannable paper, infrared scannable paper, thermal ticket, tag, and sensitive plastic stocks. A similar list of thermal transfer stocks includes plain coated vinyl, Mylar, metalized paper, and nonwoven and fine woven fabrics.

Consider three important factors when selecting direct thermal media:

1. The abrasive qualities of the material that covers the thermal reactive layer of the paper.
2. The ability of that layer to control the chemical reaction that occurs when the image is “burned.”
3. The amount of heat required to image the paper.

If the coating layer is too abrasive, the printhead will be “sanded off” at a faster rate than would normally occur. If the layer cannot contain the reaction, the printhead will become “pitted,” and the dots across the web of the printhead will fail.

The reaction temperature, or the temperature at which the chemical process causes an image to print, is important because the greater the degree of heat required to image the paper, the greater the amount of time needed for the printhead and paper to cool. This process reduces the maximum print speed that can be obtained with the media.

The abrasive qualities of the media are not as critical in thermal transfer applications because the thermal transfer ribbon not the media is in contact with the printhead .

Thermal Transfer Ribbons

Use of ribbons other than those supplied or approved by the manufacture's Value Added Resellers (VARs) or by the manufacture may result in a poor quality printing of bar codes and their ability to be scanned and /or may invalidate the printhead warranty. The manufacture's ribbons are:

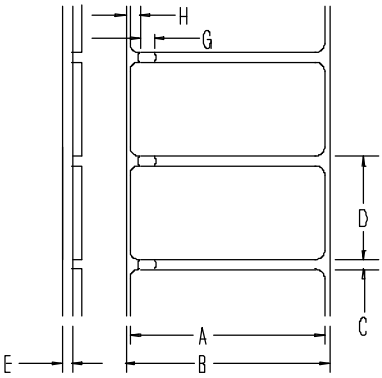
* Black ink, scratch, and smudge resistant
* 1182 feet long (360 meters), 4.6 microns thick
* 1 inch core, no notch required
* Ink side in
* 1 foot opaque leader for opaque ribbons; clear leader for transparent ribbons
* 1 foot clear trailer for opaque ribbons; opaque trailer for transparent ribbons
* Backcoating required.

One ribbon has the capacity to image two full 8" diameter rolls wound on 3" ID cores.

A wide variety of ribbon sizes, formulas, and colors are available from the manufacture.

It is recommended that the width of the thermal transfer ribbon be the same or nearly the same width (±10%) as the label width used in an application.

Label/Tag Media Specifications



	Description	MAX(in.)	MIN(in.)
A	**Label width**	**4.650**	**0.750**
B	**Backing width**	**4.650**	**0.750**
C	**Gap between labels**	**99.99**	**0.100**
D	**Label length**	**99.99**	**0.500**
E	**Backing thickness**	**0.010**	**0.0023**
F	**Label thickness**	**0.010**	**0.0023**
G	**Width of sensor opening**	**0.500**	**0.200**
H	**Distance from edge of media to edge of sensor opening**	**2.250**	**0.200**

Lists of Approved Media

For a current list of approved standard media for use in this Printer, please contact your Value Added Reseller or call the manufacture at the telephone or fax number indicated on inside front page.

2

Getting Started

2.1 Unpacking and Inspection

Inspect the shipping container(s) for signs of being dropped, crushed or punctured. If damage is evident, contact the carrier directly to specify the nature and extent of the damage.

The Printer is packed in custom styrofoam packaging. The Printer itself is enclosed in a plastic bag to reduce the chance of moisture damage during shipping. After removing the Printer from this plastic bag, remove any additional packing material from the Printer mechanism. (This material is placed in the Printer mechanism to prevent vibration during shipping).

The front door panel of the Printer is shipped in a separate bag and needs to be installed on the front of the Printer.

To install the front panel, locate the two hinge pins on the left-hand side of the Printer. Hold the panel vertically and perpendicular to the front of the Printer, align the two hinge pins with the panel and lower the panel into place.

2.2 Equipment Checklist

In addition to the Printer, the shipping container(s) should include the following standard items:

* Printer's Operators Manual
* Front door panel (packaged separately)
* 20 fan-folded labels
* Thermal transfer ribbon rewind clamp
* Back rewind/label rewind clamp
* Power cord

Additionally, items purchased separately may be included. These items might include:

* Additional labels
* Additional ribbons
* Interface cables
* CRT terminal
* Memory module cartridges
* PC-Batch software

2.3 Switches and Indicators

The Printer has 3 function buttons, 3 indicator lights, 3 switches including a 8 position DIP switch on the back of the Printer, and a Darkness potentiometer for print quality control. These buttons, switches and indicators are shown in figures 2-1 and 2-2, with descriptions for each in the section that follows.

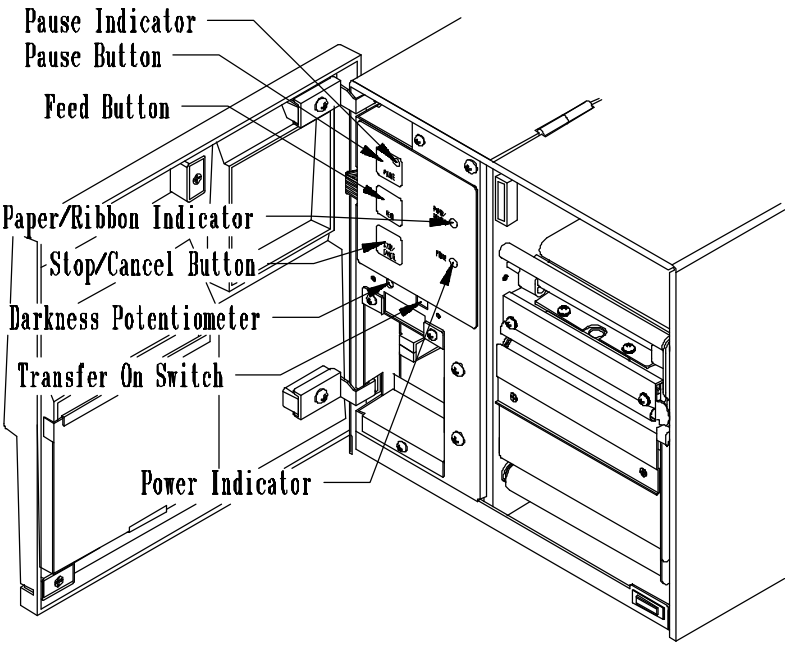


Figure 2-1 Front Panel (Front Cover Open)

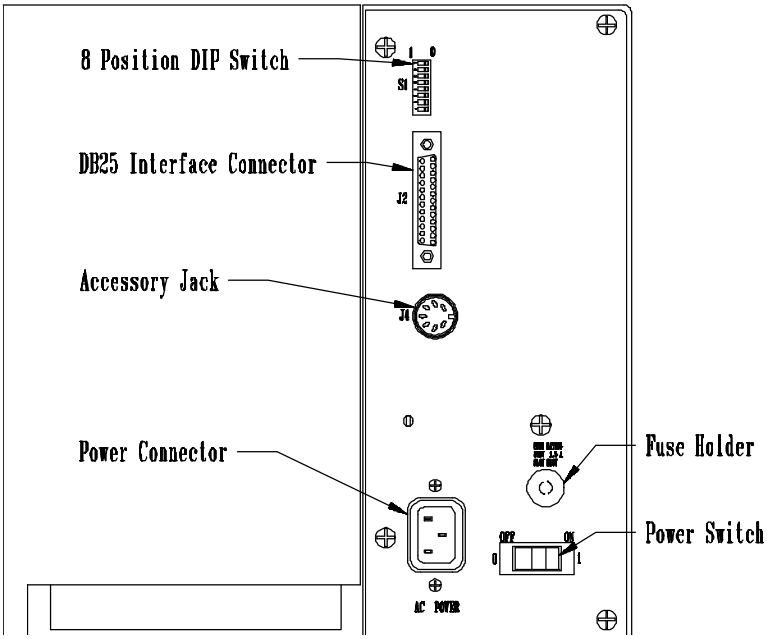


Figure 2-2 Rear View

PAUSE Button-- The **PAUSE Button**, when pressed, causes the Printer to temporarily stop the printing of labels after the current label is printed. All data is still held in memory. The Printer can resume printing by pressing the **PAUSE Button** a second time.

FEED Button-- The **FEED Button**, when pressed, automatically advances the media to the first print position on the next label.

STOP/CANCEL Button-- The **STOP/CANCEL Button**, when pressed, stops and cancels the current run of labels. The Printer will then begin to print the next (if any) batch of labels stored in the print buffer.

PAUSE Indicator Lamp-- The **PAUSE Indicator Lamp** will light when the **PAUSE Button** is pressed, the lamp will go out when the button is pressed again.

PAPER/RIBBON Indicator Lamp-- The **PAPER/RIBBON Indicator Lamp** will light when the Printer's sensors cannot detect the presence of media or ribbon or both, or if the Printer fails to sense T.O.F (Top of Form).

POWER Indicator-- The **POWER** indicator should be ON whenever the Printer's power switch on the rear of the unit is turned ON.

DARKNESS Control Potentiometer-- A Darkness adjustment potentiometer is located on the front panel. Turning the potentiometer clockwise increases the burn time of the printhead, thus producing a darker image on the label. Turning the potentiometer counter-clockwise decreases the burn time of the printhead thus lightening the image on the label. This adjustment should be used after printhead replacement to supplement the difference in printhead characteristics. Do not adjust the Darkness to make up for other Printer adjustments, this could lead to print quality problems in the future.

TRANSFER ON Switch--

In Thermal Transfer printing, the individual dot elements of the printhead apply heat to a ribbon. The “ink” on the ribbon is a specially formulated material that is literally melted into the print media, bonding with the media to produce an image. The **Transfer On Switch** (Figure 2-1) must be set to ON (to the right) to use this printing method.

3

Setup and Self Test

The Printer has a unique SETUP AND SELF TEST routine that should be run after unpacking and physical inspection to ensure the Printer was not damaged during shipment. The self test will save time and familiarize you with the Printer's function that can be set, such as temperature, print speed, and slew rate.

In the SETUP AND SELF TEST procedure, the Printer will be loaded and tested with both types of media and ran in both print modes (Direct & Thermal Transfer).

3.1 Checking Voltage Selection

The standard Printer is shipped in a configuration that allows it to be connected to a properly grounded 115 VAC single-phase 50/60 Hz outlet. The maximum current draw will not exceed 2 amps. The line voltage should not fluctuate more than 10% and the Printer should be connected to a properly grounded receptacle. The Printer has a small sticker next to CJ1 (the power cord connection) that states the power requirements.

The Printer is also manufactured for 230 VAC operation. Most of these Printers are shipped to international markets. If you are at all uncertain about the configuration of the Printer, or the outlet you are connecting to, check with a qualified service technician to verify the installation before connecting power.

3.2 Installing Print Media

The Printer is designed for easy label stock and ribbon installation. A diagram located under the cover of the Printer shows the feed path for print media(s). Simply lift the cover of the printer from the right-hand side and open the front cover for installation instructions.

Media Loading Instructions:

1. Slide the Media Retainer to the outer end of the Supply Hanger, and fold the Media Retainer to its down position.

2. Place a roll of the chosen media onto the Supply Hanger. Rotate the Media Retainer to its up position and slide it inward until its just touching the roll of media.

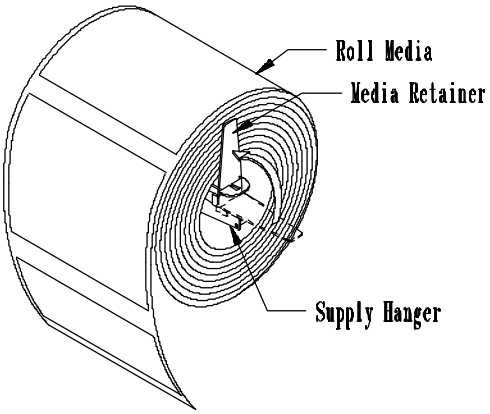


Figure 3-1 Installing Roll Media

3. Disengage the printhead by rotating the Head Lift Lever clockwise to the UP position.

4. Loosen the Label Adjust Guide and slide it outward.

5. Insert the label media as shown.

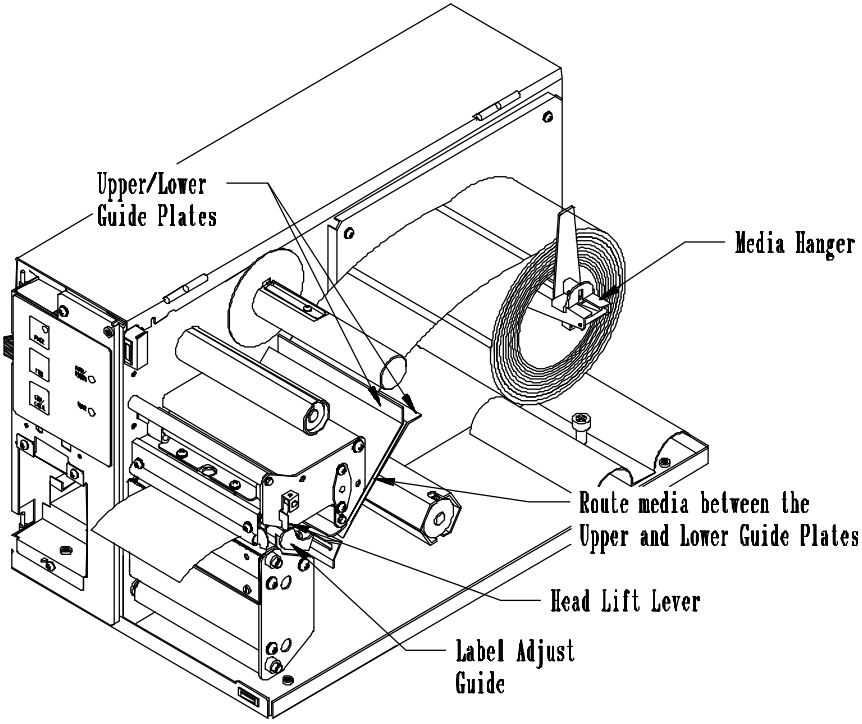


Figure 3-2 Media Routing

6. Slide the Label Adjust Guide inward until it just touches the media, tighten the guide in place.

7. Engage the printhead by rotating the Head Lift Lever counterclockwise to the DOWN position.

8. Press the FEED button a few times to insure proper alignment of the media.

NOTE:	Insure the TRANSFER switch is in the OFF position if a thermal transfer ribbon is not installed. If this is not done the Printer will only feed about .25" of media each time the FEED button is pushed.

Media Rewind Instructions

1. Remove the front door Window Cover.

2. Fasten the Rewind Adapter to the front of the Printer as shown.

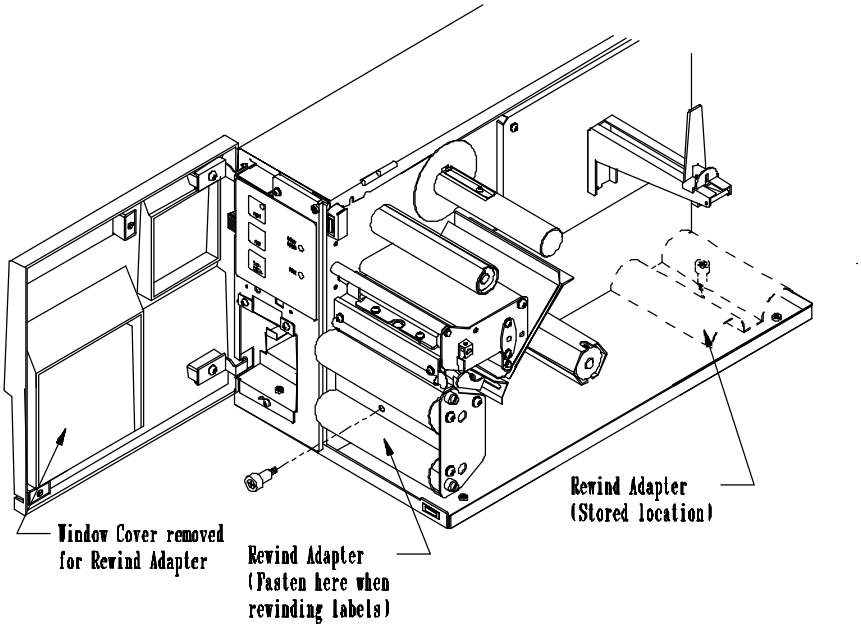


Figure 3-3 Attaching the Rewind Adapter

3. Route the media so that it passes over the Rewind Adapter as shown in Figure 3.4.

4. Route the end of the media around the Media Rewinder and replace the Clasp to hold it in place.

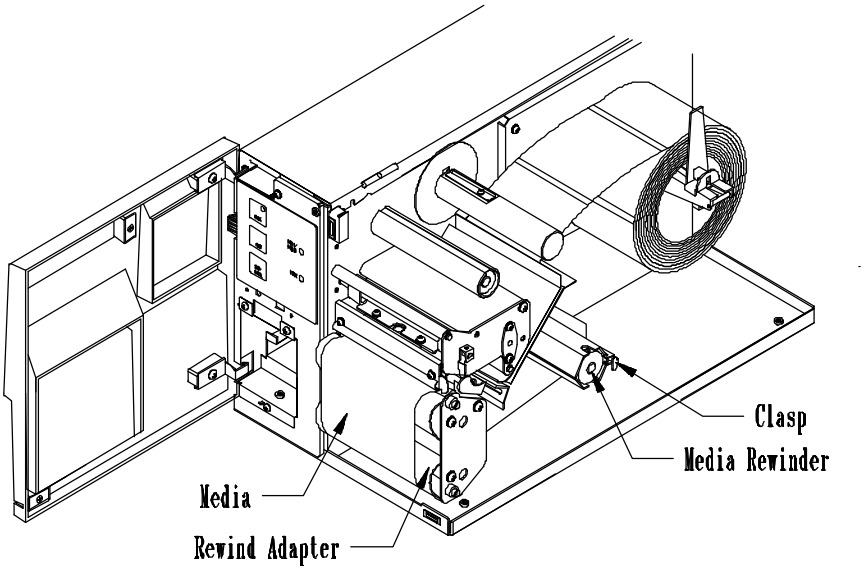


Figure 3-4 Routing Media for Rewinding

Ribbon Loading Instructions

1. Disengage the Printhead by rotating the Head Lift Lever clockwise to the UP position.

2. Slide the ribbon spool onto the Ribbon Supply Hub.

3. Route the ribbon and replace the clasp over the ribbon as shown in Figure 3.5.

4. Engage the printhead by rotating the Head Lift Lever counterclockwise to the DOWN position.

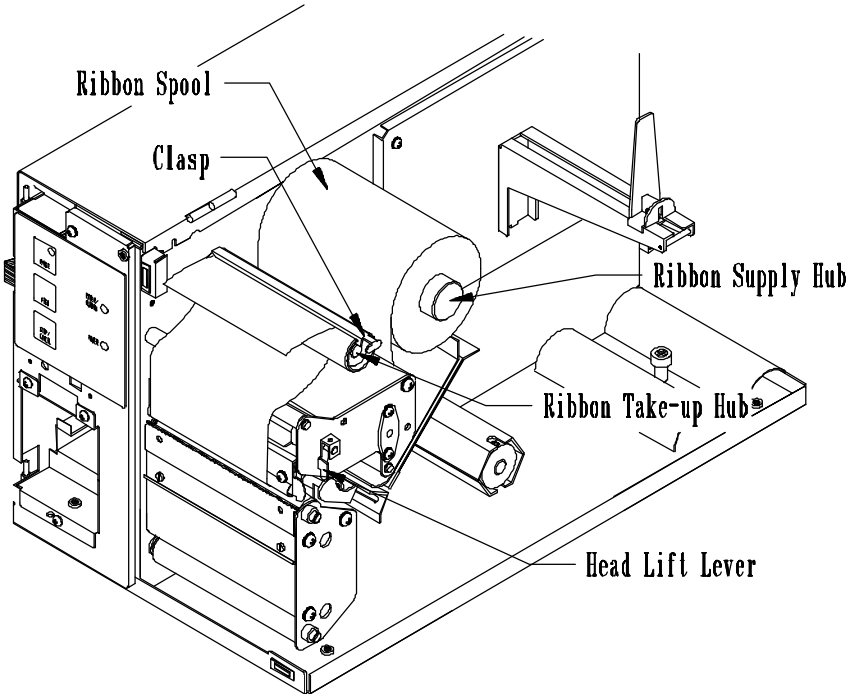


Figure 3-5 Ribbon Loading

5. Press the FEED button a few times to insure proper alignment of the ribbon.

Alternate Ribbon Loading Instructions

When loading partial ribbons, or ribbons with leaders that have a high elasticity, you may have some difficulty removing the clasp after the ribbon has been consumed. As an alternate method of loading the ribbon, you can neatly wrap the ribbon over a 1.3" paper ribbon core, turning the take up spindle until the ribbon appears to track smoothly through the Printer. When the ribbon has been consumed, the ribbon can easily be removed from the spindle.

3.3 Power Up Self Test

Once labels are installed in the Printer, a self test should be performed. The Printer will power up in the SELF TEST mode when the FEED button is depressed as the Printer is being turned on. The Printer should be loaded with 4.5" wide stock whenever this test is conducted. The self test prints across the entire width of the printhead.

If a label edge is not detected within 12" of stock, the Printer will stop feeding labels. If this occurs, refer back to section 3.2 and re-feed the media. If a label edge was detected, the Printer will begin to print the SELF TEST pattern.

3.4 Explanation of the Self Test Label

Below is an illustration of an actual Configuration Label. The label contains information of the Printer's current setup settings, as well as the RAM and ROM checksums, and other important information.

```
PROGRAM VERSION:  02.4  10/22/90

SYSTEM ROM CHECKSUM:  9D  IS  GOOD
FONT   ROM CHECKSUM:  A8  IS  GOOD
TOTAL  ROM SUM:  45  IS  GOOD
SYSTEM RAM-U15 CHECKS GOOD
SYSTEM RAM-U16 CHECKS GOOD
SYSTEM RAM-U17 CHECKS GOOD

SERIAL PORT BAUD RATE IS 9600

TRANSFER SWITCH IS ON
SETUP SWITCH 1   2   3   4   5   6   7   8
             OFF OFF OFF OFF OFF OFF OFF OFF

ANALOG INPUT VALUES:
PAPER: 236  EDGE: 184  TEMP  064  VOLT: 228
```

Figure 3-6 Configuration Label

The following is an explanation of the Configuration Label in Figure 3-6.

PROGRAM VERSION: 02.4 10/22/90

This line contains the Printers firmware version level.

```
SYSTEM ROM CHECKSUM:  9D  IS  GOOD
FONT   ROM CHECKSUM:  A8  IS  GOOD
TOTAL  ROM SUM:  45  IS  GOOD
SYSTEM RAM-U15 CHECKS GOOD
SYSTEM RAM-U16 CHECKS GOOD
SYSTEM RAM-U17 CHECKS GOOD
```

These lines list the results and values of all RAM and ROM Checksums.

```
SERIAL PORT BAUD RATE IS 9600
```

This line contains the Printer's Serial Port baud rate setting.

```
TRANSFER SWITCH IS ON
```

This line states whether the Transfer Switch on the front of the Printer is ON or OFF.

```
SETUP SWITCH 1   2   3   4   5   6   7   8
             OFF OFF OFF OFF OFF OFF OFF OFF
```

This line contains the positions of the Printer's DIP switches.

```
ANALOG INPUT VALUES:
PAPER: 236  EDGE: 184  TEMP  064  VOLT: 228
```

These lines list the values of the sensors and adjustment potentiometers within the Printer.

3.5 Print Test Label

The Print Test Label consists of a test pattern of printed bars, this label can be used to isolate problems in print quality and to determine bad printheads or rollers.

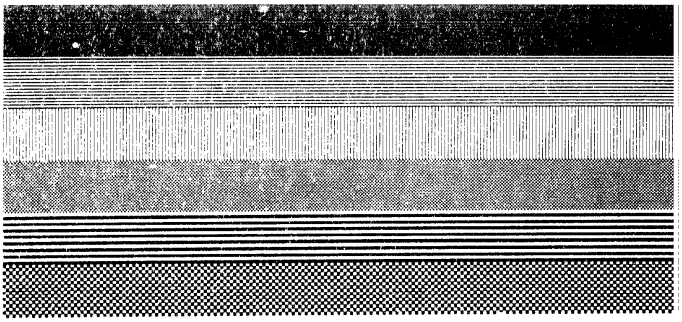


Figure 3-7 Print Test Label

If you want to perform the TXD/RXD and CTS/DTR loop checks, you will need to fabricate a test plug as illustrated below in Figure 3.8 Connect the plug to the RS-232 connector on the back of the Printer and run the self test again.

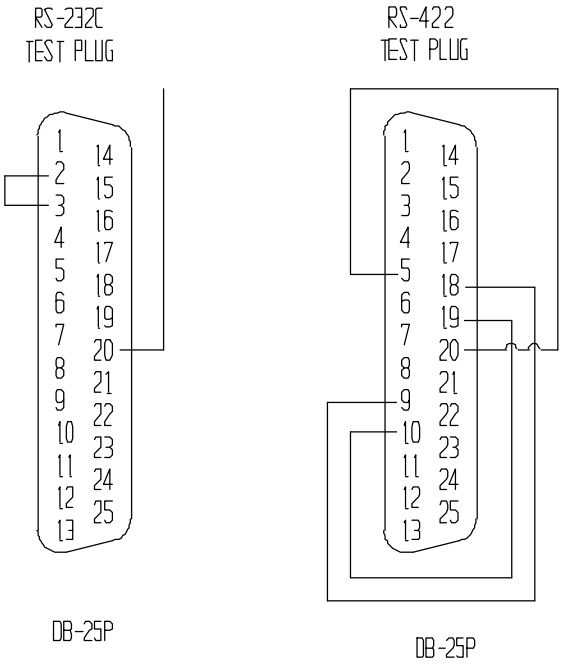


Figure 3-8 Test Plugs

If the Printer passes the loop back checks the following two line will print on the Self Test label.

```
SERIAL LOOP BACK CHECK IS GOOD
CTS & DTR LOOP BACK CHECK IS GOOD
```

3.6 Monitoring Input After Self Test

After the self test is complete, the Printer goes into a mode that is very useful in two major situations. The first situation involves checking serial transmissions from the sending device to the Printer. The second situation involves monitoring data that is to be interpreted as graphic control statements.

Any character received will be printed. The Printer will print the data in its buffer as soon as a full line of information has been received, or after a pause of 1/4 of a second in received data is registered.

The complete set of ASCII characters can be printed by the Printer including the characters that have values ranging from 0 to 31. These characters will be represented by their control codes. An ASCII NUL (DEC 00, HEX 00) character has a value of 0 and is represented by a control“@” or “^@”. The ASCII SOH character (DEC 01, HEX 01) has a value of 1 and is represented by a “^A”. The STX and ETX are “^B” and “^C” respectively. This pattern continues through ASCII value 31, the US character. Character values greater than 31 will print as the actual ASCII character. See APPENDIX A for a table of ASCII character values.

When you have finished with the self test, reset the Printer by turning the main POWER switch off and on.

3.7 Printhead Pressure and Support Adjustment

The Printers printhead pressure is not adjustable. Two springs in the head mount assembly apply a fixed 9.5 lbs of force upon the printhead.

The adjustment of the Printhead Support may be required if you are changing from wide full width media to narrow media that is significantly different in terms of thickness.

The head support plate exists for the purpose of supporting the outer end of the printhead when narrow media is used. Without this support, the printhead would bear down on the drive roller, causing diminished print quality and premature wear. The head support plate needs to be engaged only when the media width is less than 4 inches.

To make the adjustment, loosen the two mount screws that fasten the head support plate, leaving the screw on the left snug (see Figure 3-9). Using the media to be printed on, cut a strip about 5 inches long. Place the strip between the drive roller and the printhead, and then engage the printhead by rotating the head lift lever to the down position. Then push down on the head support plate on the right hand side until it comes in contact with the roller bearing plate just below it. Finally, tighten the two mount screws to secure the support plate.

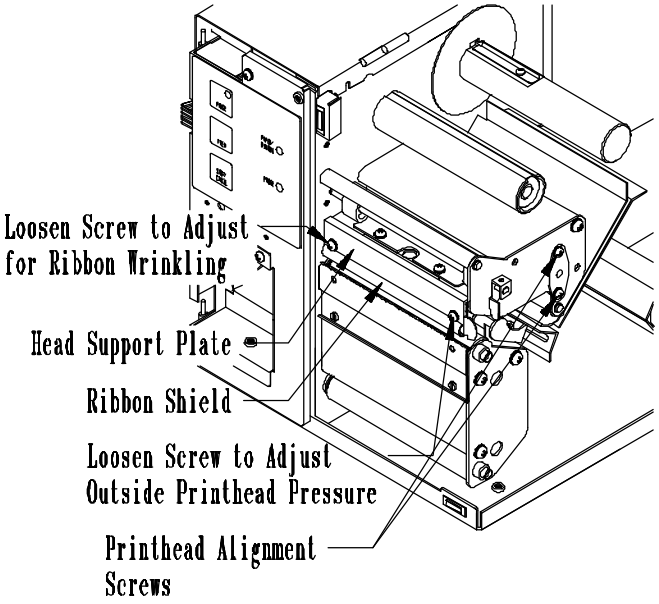


Figure 3-9 Printhead Adjustment

NOTE:	The mount screws which secure the head support plate also secure the ribbon shield. When loosening these screws, be aware that both the plate and the shield are adjustable. If you move one, the other may move also.

NOTE:	For narrow stock the head support plate should be adjusted so that the print image on the outside edge of the label begins to lighten. Then gradually lower the head support plate until the print quality becomes acceptable. This should keep the printhead off of the roller. It would be advisable for the print quality on the outer edge to be lighter—if possible. This will ensure that the printhead does not come in contact with the roller. When this procedure is done you will have to realign the ribbon shield to compensate for ribbon tracking.

3.8 Modes of Operation

Before operating the Printer, the correct mode of operation must be selected. Standard input and stand-alone batch labeling are the two different modes of operation available.

Standard Input

In this mode, the Printer receives ASCII data from the RS-232C/RS-422 serial data input port and prints characters on label media as requested by graphic control statements that the host device generates. All of the Printer commands can be accessed and the limits of the Printer are controlled by the host device.

This is the most widely used mode. Any Printer that is controlled by an intelligent host device performing the label formatting will use this mode of the printer. For example PC-Batch software (compatible with IBM PCs) uses this operating mode.

Stand-Alone Batch Labeling System

In this mode, a CRT terminal is connected to the Printer's serial data input/output port. Software that resides in the Printer is selected by special switch settings. The printer then manages a set of CREATE and PRINT screens where label formats can be designed and printed. Data entered while creating labels is stored on optional SRAM cartridges. These formats can be recalled by operators on the CRT screen during print sessions and quantities of a particular format can be printed.

Further information about this mode of operation can be found in Chapter 5.

3.9 Selecting the Mode

After the mode of operation is determined, the function switch on the back of the Printer can be changed to select the desired mode. Turn the Printer OFF while making changes to the switch settings (function switches are only read during power-up).

	SW1-5
STANDARD INPUT	OFF
STAND-ALONE BATCH	ON

3.10 Using Standard Input Mode

For most applications, the interface between the Printer and the host device will be RS-232C. The cable needed to connect the Printer to the host will be either a straight through or null modem cable. This cable connects the DB-25 connector labeled J2 on the back of the Printer to the serial data connector on the host device.

Several cables for typical interfaces are listed in Appendix C. The pin configuration of the Printer for most descriptions of the RS-232 interface on a DB-25 connector is DTE (Data Terminal Equipment), that is, pin 2 is transmit, 3 is receive, and 7 is ground.

The Printer supports both XON/XOFF and CTS/DTR handshaking. Whenever the Printer is interfaced in a mode that will be using XON/XOFF, a jumper must be placed between pins 5 and 4 to enable the operation of the Printer's transmit line.

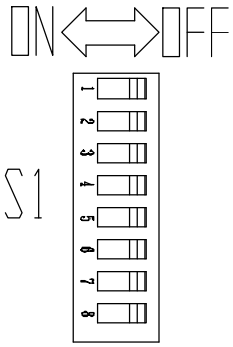
For connection to most host systems, the XON/XOFF handshaking works to reduce the number of wires needed in the interface cable. For interfacing RS-422 devices, the XON/XOFF handshake is the only appropriate method.

3.11 Setting the Baud Rate and Word Length

For all modes of operation, you must set the baud rate of the interface. On the back of the Printer, you will find a single eight-position DIP switch. Positions 1, 2, and 3 control the setting of the baud rate.

The following table gives the position of the three switches and the corresponding baud rate that can be obtained by each setting:

	S1-1	S1-2	S1-3
9600	OFF	OFF	OFF
4800	OFF	OFF	ON
2400	OFF	ON	OFF
1200	OFF	ON	ON
600	ON	OFF	OFF
300	ON	OFF	ON
19200	ON	ON	OFF
TEST/9600	ON	ON	ON



The Printer can accept 7- or 8-bit data, while ignoring parity. It also requires at least 1 stop bit. This configuration assures the greatest compatibility with most serial devices, even if the data format arrangement of the host cannot be modified. Switch S1-4, located on the back of the Printer, selects the word length.

	S1-4
7-BIT WORD	ON
8-BIT WORD	OFF

NOTE:	It will be necessary to select the 8-bit mode if you want to access the foreign language characters from the ASCII Code chart. These characters are available in fonts 1–6.

3.12 Using the Present Sensor Option

With the addition of the PRESENT SENSOR option, the Printer can be configured for “one up” printing mode. With the sensor installed and enabled, the Printer will not print the next label in its internal buffer(s) until the last label printed has been removed from the Printer. Quantities of labels (printed one at a time) can still be requested by remote computing devices.

S1-6 on the back of the Printer enables the sensor. The Printer must be reset in order to read in the switch setting.

	S1-6
ENABLE SENSOR	ON
DISABLE SENSOR	OFF

3.13 Maintenance

Very little Printer maintenance is required. Keeping the Printer clean will help insure trouble free operation. Points of interest include:

3.13.1 Printhead

WARNING:	Turn OFF the Printer and unplug the unit from the outlet before cleaning the printhead.

The Printhead can become dirty from operation. Regular cleaning (approx. every 2000 inches dependent on media material) of the printhead should be done to insure print quality. This printhead is easily cleaned by using a cotton swab and Isopropyl Alcohol (see Figure 3-10).

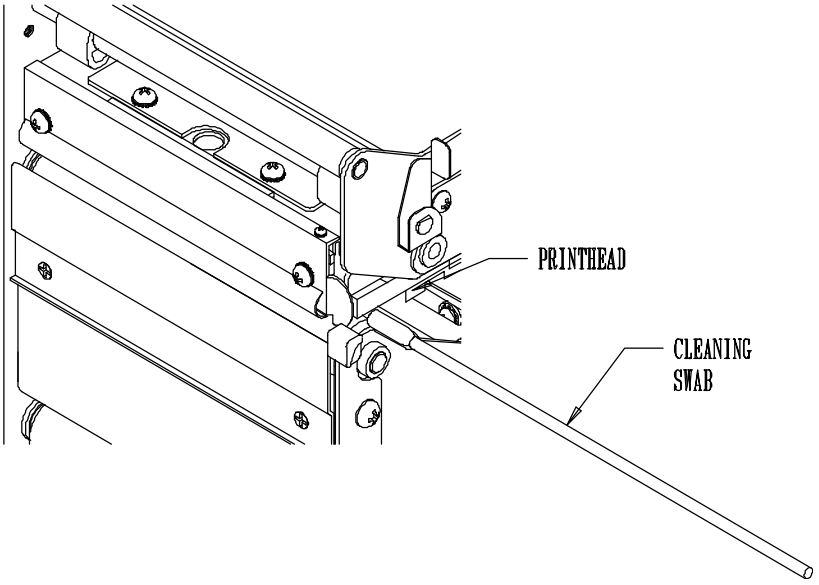


Figure 3-10 Printhead Cleaning

3.13.2 Internal/External Cleaning

WARNING:	**Turn OFF the Printer and unplug the unit from the outlet before cleaning any part on the Printer.**

A periodical cleaning should be done on all rollers, guides and assemblies. Isopropyl Alcohol can be used to clean these areas. This will insure all items are free from residue and will not contribute to any Printer malfunctions.

The outside of the Printer can be kept clean by using a soft damp (not wet) cloth. A mild detergent may be used to remove heavier stains. **Do not use abrasive cleaners**.

4

Using the Printer

4.1 Printer Command Interpreter

After the cable is connected and the baud rate of the interface is selected, you are ready to start formatting labels.

Typical line printers require little, if any, formatting of data to trigger printing. Nearly any string of characters sent to a line printer terminated with an ASCII CR (DEC 13, HEX 0D) will work. Many line printers include special features to increase or decrease the standard width of print, line spacing, page length, and so on. The ability to print graphics (lines, pie charts, large characters, and possibly bar codes) is generated by a host computer creating these patterns. This type of printing usually takes more processing time.

The Printer handles the printing of graphics in a manner that requires less system overhead by the host device. All of the dot patterns for nine different human readable fonts, and formulas for creating different types of bar codes are built directly into the Printer. All of these fonts and bar codes are presented in several different magnifications in APPENDIX D. Notice that each one has been assigned a single letter or digit. This character is used to select a font in the graphics request statement.

Unlike a line Printer whose only option is to print data received on the next line or to a line further down in a document, the Printer allows the host device to select where and how data is to appear on a label. The rotation of the data, the selection and magnification of the font style, and the data for each field can be controlled by the host through simple graphic request statements. The Printer has a 3000 character area that is able to store data that can be printed on a label in up to 99 different fields. Each field description may request the Printer to print up to 255 characters.

In addition to the control you have on “what” and “where” data is to be printed, the Printer also allows you to control the “how.” The how includes commands that control the burn temperature, the print speed, the slew rate during white space, and the amount of pre-calculation before images are printed on the stock.

4.2 Control Code Reference

The commands that are executed by the host device fall into two basic categories: SYSTEM and LABEL FORMATTING commands. SYSTEM commands control such functions as test pattern, setting and clearing the front panel switches, and interactive communications to a host device. LABEL FORMATTING commands include setting the head temperature, print speed, slew rate, dot size, etc. LABEL FORMATTING commands also describe the actual label to be printed.

The tables on the following pages list the SYSTEM and LABEL FORMATTING commands that the Printer recognizes. All commands at the SYSTEM level that are proceeded by an ASCII SOH (DEC 01, HEX 01) character are executed immediately as they are received. All commands at the SYSTEM level proceeded by the ASCII STX (DEC 02, HEX 02) character are placed in the input buffer and are executed in the order received after any current label printing job is completed. All commands are terminated by an ASCII CR (DEC 13, HEX 0D) unless otherwise noted.

By using the commands listed in these tables, the Printer can be programmed with parameters for printing specific label formats. Following the table listing is a section that explains in detail the outcome of each command.

4.3 System Level Commands — Immediate

These commands are interpreted before entry into the buffer; therefore, they happen immediately.

Upper level commands invoked after the attention getter: $01 (^A).

COMMAND	DESCRIPTION
#	Reset command, executes a power-on reset. Can be used as an operation cancel. Clears buffers and initializes memory. All variables are set to default values.
A	Send Printer status (ASCII String). Printer sends a string of 8 characters back to host device. **Character # Description** 1 Command interpreter Busy ? 2 Paper out ? 3 Ribbon out ? Only when enabled 4 Printing batch ? 5 Busy printing ? 6 Printer paused ? 7 Label presented ? Only when enabled 8 Always 0 Each character position contains either a “Y” or “N” representing whether that event is true.
B	Toggle pause. Same as pressing front panel button.
C	Set stop/cancel. Same as pressing front panel button.
D	SOH shutdown. Command causes the Printer to ignore $01 (^A) commands.
E	Send Batch Quantity. Printer sends back a four digit number followed by a carriage return.

4.3 System Level Commands — Immediate (continued)

COMMAND	DESCRIPTION
F	Send Printer status (1 byte Hex). Printer sends a single byte in which each bit represents one of the Printer's status flags. **Bit #** **Description** 1 Command interpreter Busy ? 2 Paper out ? 3 Ribbon out ? Only when enabled 4 Printing batch ? 5 Busy printing ? 6 Printer paused ? 7 Label presented ? Only when enabled 8 Always N Each bit position contains either a "1" or "0" representing whether that event is true.

4.4 System Level Commands

SYSTEM LEVEL COMMANDS invoked after the attention getter $02 (^B).

COMMAND	DESCRIPTION
A	Reserved for future option.
a	Enable feedback characters (characters 30 and 31) to be transmitted. (Default Mode with Version 1.x).
B	Reserved for future option.
b	Switches the cutter command (^BHnnnn) back to the Ver. 1.X mode
C	Module copy command Note: All Printer functions are shut down until copy sequence is complete (including serial input).

4.4 System Level Commands (continued)

COMMAND	DESCRIPTION
cnnnn	Set Continuous Paper Length. (For continuous forms applications) nnnn = length of paper to feed per label format. Set to zero for normal operation.
Dbaaaa	Memory dump (TEST MODE COMMAND). b = Bank address. aaaa = 4-digit address.
Ennnn	Set quantity to reprint (Followed by G command). nnnn = 4 digits. Max setting 9999 = quantity of labels.
F	Form feed.
G	Prints previously stored or printed label commands. May also be used to restart a canceled batch if it was the last processed label.
Hnnnn	Sets the delay after the 5 msec cut signal pulse. nnnn = # of 24 usec delays. System default = 3125 (75 msec).
Iabfnnn...	INPUT GRAPHICS DATA BLOCK a = MEMORY MODULE BANK A (1st 1/2), B (2nd 1/2), or C(16K+) b = (optional) A for 7 bit data, 8 bit if left out of command f = F for 7 bit IMG load file. I for .IMG 8-bit format (image will be flipped) i for .IMG 8-bit format (save image as received) P for .PCX 8-bit format (image will be flipped) p for .PCX 8-bit format (save image as received) n = up to 8 characters for image name

J	Request memory module status Response from Printer x-bt<cr> x=Y or N for bank checksum status b=Bank partition being reported t =G for graphics bank L for label format bank X for unformatted bank

4.4 System Level Commands (continued)

COMMAND	DESCRIPTION
Kbaaaa	Change memory (TEST MODE COMMAND). b = Bank address. aaaa = 4-digit address.
L	ENTER LABEL FORMATTING COMMAND input mode. After entering LABEL FORMATTING mode, the Printer expects FIELD RECORD definition and LABEL FORMATTING commands until command "E" or "X" is received.
Mnnnn	Set maximum label length. (0.01" steps) which is used for paper out sensing. nnnn = 4 digits. Max setting 9999 = 99.99 inches. Default setting = 1200.
m	Set METRIC flag. All parameters passed to the Printer that make reference in this manual to be by 0.01" will now reference 1 mm steps instead. All reference to measurement will be metric values until the Printer is reset.
N	Switch from Standard Input mode to Stand-alone Batch System.
Onnnn	Set form edge offset. nnnn = 4 digits for offset. where 250 is the "zero" setting. Settings below 50 are adjusted back to 250.
P	When this command is received, the Printer enters the "monitor" (self test) mode. Reset Printer to return to normal operation.
QaCLEAR	Clear memory module bank. a = Memory Module Bank A, B, or C.
Rnnn	Remove graphics images from memory module. nnn = name of image up to 8 characters.
STEST	Module Memory Test. You must have a CRT terminal connected to the Printer's communication port to answer testing questions and to receive results.

4.4 System Level Commands (continued)

COMMAND	DESCRIPTION
T	Print dot pattern test label.

Unnss..,	Format register fill.
	nn = String # in format, must be 2 digits.
	ss = New string data followed by a <CR>.
	Must equal original string length.

Vn	Set pseudo switch settings. n = 0-F System uses 4 bits to replace power-up status of switches 5, 6, 7, and 8.
Wa	Request memory module directory. a = G for directory of graphics images. L for directory of label format files.
Xatnnn	FORMAT memory module partition. a = Memory module bank A, B, or C. t = Type, G for Graphics, L for label format. nnn = Up to 8-character name of module bank.
Y	Display analog inputs (TEST MODE FUNCTION).
Z	Print human readable test data.

4.5 Label Formatting Commands

COMMANDS TO BE SENT AFTER "STX L" SYSTEM LEVEL COMMANDS AND BEFORE FIELD DESCRIPTIONS

COMMAND	DESCRIPTION
Cnnnn	Set column offset amount. nnnn = 4 digits of column offset. Default setting = 0000.
Dhv	Set horizontal and vertical dot size. h = Horizontal dot size; can be 1 or 2. v = Vertical dot size; can be 1, 2, or 3. (0.005" steps) Default is "D22"
E	Terminate field generation and print label.

4.5 Label Formatting Commands (continued)

COMMAND	DESCRIPTION
G	Enter last field's string into global table. Strings are consecutively named within a label format starting with A. Up to P strings may be stored into global table.
Hnn	Enter heat setting for label. nn = 2 digits. 1 - 20. 10 is nominal and default.
m	Set METRIC flag. Same function as ^Bm system level command. The Printer must be reset in order to return to standard measure.
Pa	Enter maximum speed for print cycle. 1 digit. **a** **Speed**. A 1 " per second. B 1.5" per second. C 2 " per second. D 2.5" per second. E 3 " per second. Default. F 3.5" per second. G 4 " per second.
Qnnnn	Quantity of labels to print. nnnn = 4 digits of quantity.
Rnnnn	Set row offset amount. (0.01" steps) nnnn = 4 digits of row offset. Default setting = 0000.
Sa	Enter maximum slew rate speed for feeding of labels. **a** **Speed.** A 1 " per second. B 1.5" per second. C 2 " per second. D 2.5" per second. E 3 " per second. F 3.5" per second. G 4 " per second. Default.

4.5 Label Formatting Commands (continued)

COMMAND	DESCRIPTION
W	Set to format label before printing. Will cause Printer to format 560 dot rows into bit mapped RAM before the first dot row is plotted to media.
X	Terminate field generation and exit to command processor. This command is used when the ^BE, ^BG, and ^BU commands will be used to modify a fixed format.
+pii...	Make last entered field incrementing. p = Zero fill character. ii... = Data added to field.
-pii...	Make last entered field decrementing. p = Zero fill character. ii... = Data subtracted from field.
>pii...	Make last entered field incrementing. 0 - Z. p = Zero fill character. ii... = Data added to field.
<pii...	Make last entered field decrementing. 0 - Z. p = Zero fill character. ii... = Data subtracted from field.
^nn	Set count by amount. nn = 2 digits. Skip # of labels before updating count fields and time fields.

4.6 Field Definition — Human Readable Fields

Field definition statements to be sent after “STX L” SYSTEM LEVEL command. LABEL FORMATTING mode terminated by “E” or “X” LABEL FORMATTING command.

Field Record for Label Input Mode
Human Readable Fields:

CHAR #	DESCRIPTION
1	Flag for rotation. 1 = 0 deg. 2 = 90 deg. 3 = 180 deg. 4 = 270 deg.
2	Font selected. Any valid font character. Bar codes automatically select bar code field format.
3	Horizontal multiplier. 1 = X1, 2 = X2, 4 = X4.
4	Vertical multiplier. 1 = X1, 2 = X2, 4 = X4, 8 = X8.
5, 6, 7	Always 0 0 0. Must be 3 digits.
8, 9, 10, 11	Row address. Must be 4 digits. (0.01"/step) 0000-9999
12, 13, 14, 15	Column address. Must be 4 digits. (0.01"/step) 0000-0447
16, . . .	String data. ASCII printable data for font selected. Terminate with a <CR>. ^B Switch to string input commands: Sn Select stored string from global table. Strings stored by the “G” label formatting command n = String location. A-P.

4.7 Field Definition — Bar Code Fields

Field definition statements to be sent after “STX L” SYSTEM LEVEL command. LABEL FORMATTING mode terminated by “E” or “X” LABEL FORMATTING command.

Field Record for Label Input Mode
Bar Code Fields:

CHAR #	DESCRIPTION
1	Flag for rotation. 1 = 0 deg. 2 = 90 deg. 3 = 180 deg. 4 = 270 deg.
2	Font selected. Any valid font character. Bar codes automatically select bar code field format. Fonts designated by uppercase ALPHA letters print with human readable interpretations. Lowercase ALPHA bar code fonts print as bars only.
3	Bar code wide bar width. .005 increments. Accepts 1-9 and A-K. For UPC and 128 fonts, only 1,2,3,4,6, & 8 are valid when interpretation is printed.
4	Bar code narrow bar width. .005 increments. Accepts 1-9 and A-K. For UPC and 128 fonts, narrow bar should be set equal to wide bar setting.
5, 6, 7	Bar code height. Must be 3 digits. (0.01" step) 001-999
8, 9, 10, 11	Row address. Must be 4 digits. (0.01" step) 0000-9999

12, 13, 14, 15	Column address. Must be 4 digits (0.01" step) 0000-0447
16,...	String data. ASCII printable data for font selected. Terminate with a <CR>. ^B Switch to string input commands: Sn Select stored string from global table. n = String location. A-P.

4.8 Graphic Images

To enter the graphic image input routine, the Printer must be outside of the LABEL INPUT command interpreter. The Printer must also receive a STX character followed by an ASCII "I", a bank designation, an optional word length modifier, a format designation, and up to an 8-character string to identify the stored image data. The data that follows is the image data.

If you use any of the 8-bit input formats, you must execute a "SOH D" command before the GRAPHIC IMAGE INPUT. This command disables the SYSTEM LEVEL command interpreter.

Iabfnnn... INPUT GRAPHICS DATA BLOCK
a = MEMORY MODULE BANK
A (1st 1/2), B (2nd 1/2), or C (16K+)
b = (optional) A for 7-bit data, 8-bit if left out of command
f = F for 7-bit IMG load file
I for .IMG 8-bit format (image will be flipped)
i for .IMG 8-bit format (save image as received)
P for .PCX 8-bit format (image will be flipped)
p for .PCX 8-bit format (save image as received)
n = up to 8 characters for image name

To print an image, select font type “Y”. The horizontal and vertical magnifications work with human readable fonts. The data sent into the field is also used as the name of the defined graphic image.

GRAPHICS INPUT TYPE I
.IMG 8-bit format. Same as 7-bit ASCII preceded by header record 00 01 00 08 00 01 00 00 00 00 00 XX XX where XX XX = high byte, low byte count of dot lines in image.

GRAPHICS INPUT TYPE P
.PCX 8-bit format

GRAPHICS INPUT TYPE F
7-bit ASCII

80nn			
	80	=	Generate following data
	nn	=	# of bytes for data
0000FFnn			
	0000FF	=	Generate following data line n times
	nn	=	# of lines to generate
FFFF			
	FFFF	=	Terminate input of graphics

To print an image, specify font “Y”. The horizontal and vertical magnifications will work as if it were a human readable font. The data sent into the field is used as the name of the defined graphics image.

Once images are in memory, they can be removed with the “R” SYSTEM COMMAND. The image is named after the STX and the “R” command will be cleared. Images are stored dynamically, meaning that removing any images stored in the middle of a directory will shift forward any images found in the outer area of the directory.

The following example creates and prints the image DATAMAX using the type “F” graphics formatting method. The character “^B” denotes the ASCII STX character. This example was created as a text file on an IBM compatible PC with the DOS EDIT line editor program, and sent to the Printer with the COPY command.

```
^BqA(CR)
^BIAAFLOGO(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFC00000007FFC0003FFFFC001FC0001FC0003FFFFC0018000FFC001FF8000C0003FFFFE000000FFFFE0001FFFFF0000(CR)
8030FFC00000000FFC0003FFFFC001FC0001FC0003FFFFC0018000FFC001FF800040001FFFFE0000007FFFC0001FFFFF0000(CR)
8030FFC000000003FC0001FFFFC001FC0001FC0001FFFFC0018000FFC001FF800040001FFFFE0000003FFFC0001FFFFF0000(CR)
8030FFC000000000FC0001FFFFC001FE0001FE0001FFFFC00180007FC000FF800060001FFFFE0000003FFFC0003FFFFF0000(CR)
8030FFE0000000007E0001FFFFC001FE0001FE0001FFFFC00180007FC000FFC00060000FFFFE0000001FFFC0003FFFFF0000(CR)
8030FFE0000000003E0000FFFFC001FE0000FE0000FFFFC00180007FC0007FC00020000FFFFE0000001FFF80003FFFFF0000(CR)
8030FFE0000000001E0000FFFFC001FE0000FF0000FFFFC001C0007FC0007FC00030000FFFFE0010000FFF80003FFFFF0000(CR)
8030FFE0000000000F0000FFFFC001FE0000FF0000FFFFC001C0007FC0007FC00030000FFFFE00180007FF80007FFFFF0000(CR)
8030FFE00000000000700007FFFC001FF0000FF80007FFFC001C0007FC0003FC000380007FFFE00180007FF80007FFFFF0000(CR)
8030FFF000000000000380007FFFC001FF0000FF80007FFFC001C0003FC0003FE000380007FFFE001C0003FF80007FFFFF0000(CR)
8030FFF000000000000380007FFFC001FF0000FF80007FFFC001C0003FC0003FE000380007FFFE001E0003FF80007FFFFF0000(CR)
8030FFF000000000000180003FFFC001FF00007FC0003FFFC001C0003FC0001FE0001C0003FFFE001E0001FF0000FFFFFF0000(CR)
8030FFF00000000001C0003FFFC001FF00007FC0003FFFC001E0003FC0001FE0001C0003FFFE001F0000FF0000FFFFFF0000(CR)
8030FFF00007C00000C0003FFFC001FF00007FE0003FFFC001E0003FC0000FF0001E0003FFFE001F0000FF0000FFFFFF0000(CR)
8030FFF80007F80000E0001FFFC001FF80007FE0001FFFC001E0003FC0000FF0001E0001FFFE001F80007F0000FFFFFF0000(CR)
8030FFF80007FC0000E00000000001FF80007FE00000000001E0001FC0000FF0001E00000000001FC0007F0000FFFFFF0000(CR)
8030FFF80007FE0000600000000001FF80003FF00000000001E0001FC00007F0000F00000000001FC0003F0001FFFFFF0000(CR)
8030FFF80003FF0000700000000001FF80003FF00000000001F0001FC00007F0000F00000000001FE0001E0001FFFFFF0000(CR)
8030FFF80003FF0000700000000001FF80003FF00000000001F0001FC00007F8000F00000000001FE0001E0001FFFFFF0000(CR)
8030FFFC0001FFC0003C0000000001FFE0001FFE0000000001F8000FC00000FC0007E0000000001FFE00000003FFFFFF0000(CR)
8030FFFE0001FFC0001E0000000001FFE0001FFE0000000001F8000FC00000FC0007E0000000001FFF00000003FFFFFF0000(CR)
8030FFFE0001FFC0001E0000000001FFE0001FFE0000000001F8000FC00000FC0007F0000000001FFF00000007FFFFFF0000(CR)
8030FFFE0000FFC0001F0000000001FFE0000FFF0000000001F8000FC000007C0003F0000000001FFF80000007FFFFFF0000(CR)
8030FFFE0000FFC0001F0000000001FFE0000FFF0000000001FC0007C000007E0003F0000000001FFF80000007FFFFFF0000(CR)
8030FFFE0000FFE0001F0001FFC001FFE0000FFF8001FFC001FC0007C000003E0003F8000FFE001FFFC0000007FFFFFF0000(CR)
8030FFFE0000FFE0000F8001FFC001FFF0000FFF8000FFC001FC0007C000003E0003F8000FFE001FFFE000000FFFFFFF0000(CR)
8030FFFF0000FFE0000F8000FFC001FFF0000FFF8000FFC001FC0007C000003E0003F8000FFE001FFFE000000FFFFFFF0000(CR)
8030FFFF0000FFE0000F8000FFC001FFF00007FFC000FFC001FC0007C000001F0001FC000FFE001FFFF000000FFFFFFF0000(CR)
8030FFFF00007FE0000FC000FFC001FFF00007FFC0007FC001FE0007C002001F0001FC0007FE001FFFF000000FFFFFFF0000(CR)
8030FFFF00007FF0000FC0007FC001FFF00007FFE0007FC001FE0003C002001F0001FE0007FE001FFFF800000FFFFFFF0000(CR)
8030FFFF00007FF0000FE0007FC001FFF80007FFE0007FC001FE0003C003000F0001FE0007FE001FFFFC00001FFFFFFF0000(CR)
8030FFFF80007FF00007E0007FC001FFF80007FFE0003FC001FE0003C003000F0001FE0003FE001FFFFC00001FFFFFFF0000(CR)
8030FFFF80007FF00007E0003FC001FFF80003FFF0003FC001FE0003C00300078001FF0003FE001FFFFE00001FFFFFFF0000(CR)
8030FFFF80003FF00007F0003FC001FFF80003FFF0003FC001FE0003C00380078000FF0003FE001FFFFE00001FFFFFFF0000(CR)
8030FFFF80003FF80007F0003FC001FFF80003FFF0001FC001FF0003C00380078000FF8001FE001FFFFE00001FFFFFFF0000(CR)
8030FFFF80003FF80007F0001FC001FFF80003FFF8001FC001FF0001C003C0038000FF8001FE001FFFFE00001FFFFFFF0000(CR)
8030FFFFFFC0000000007FFC000001F80000000000FC000001FFF0000003FFE0000007FFC000001FFFC0003F80007FFF0000(CR)
8030FFFFFFE000000000FFFC000001F80000000000FE000001FFF8000003FFE0000007FFE000001FFFC0003FC0003FFF0000(CR)
8030FFFFFFF000000000FFFE000001F80000000000FE000001FFF8000003FFF0000007FFE000001FFFC0003FC0003FFF0000(CR)
8030FFFFFFFC00000000FFFE000001FC0000000000FE000001FFF8000003FFF0000007FFE000001FFFC0003FE0001FFF0000(CR)
8030FFFFFFFE00000000FFFE000001FC00000000007F000001FFF8000003FFF0000007FFF000001FFFC0003FE0001FFF0000(CR)
8030FFFFFFFF00000001FFFF000001FC00000000007F000001FFF8000003FFF8000007FFF000001FFF80003FF0000FFF0000(CR)
8030FFFFFFFFC0000001FFFF000001FC00000000007F000001FFF8000003FFF8000003FFF800001FFF80007FF0000FFF0000(CR)
8030FFFFFFFFE0000003FFFF800001FC00000000007F800001FFFC000003FFF8000003FFF800001FFF80007FF80007FF0000(CR)
8030FFFFFFFFF0000007FFFF800001FC00000000007F800001FFFC000003FFFC000003FFF800001FFF80007FF80007FF0000(CR)
8030FFFFFFFFF800000FFFFF800001FE00000000003FC00001FFFC000003FFFC000003FFFC00001FFF00007FFC0003FF0000(CR)
8030FFFFFFFFFE00001FFFFFC00001FE00000000003FC00001FFFC000003FFFE000003FFFC00001FFF00007FFC0003FF0000(CR)
8030FFFFFFFFFF00007FFFFFC00001FE00000000003FC00001FFFC000003FFFE000003FFFE00001FFF00007FFE0001FF0000(CR)
8030FFFFFFFFFF8003FFFFFFC00001FE00000000003FE00001FFFC000003FFFF000003FFFE00001FFF00007FFE0001FF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
FFFF(CR)
^BL(CR)
1Y1100000000000LOGO(CR)
E(CR)
```

The graphic printed by this command sequence is:

FIGURE 4-1

4.9 Printing Lines and Boxes

Lines and boxes can be created by requesting font “X” from within the LABEL COMMAND interpreter. The horizontal and vertical multipliers work with the line and box routines in the same manner as human readable fonts. The format of the data area is as follows:

Lhhhvvv
Where L = L to specify line drawing (solid box)
hhh = horizontal width of line (solid box)
vvv = vertical height of line (solid box)
or,
Bhhhvvvbbbsss
Where B = B to specify box drawing
hhh = horizontal width of box
vvv = vertical height of box
bbb = thickness of bottom and top box edges
sss = thickness of sides of box

4.10 Defining and Printing a Label

The following is the procedure for formatting labels:

1. The ASCII STX (DEC 02, HEX 02) followed by an ASCII “L” (DEC 76, HEX 4C) must be sent to the Printer. This sets the Printer up to accept LABEL FORMATTING COMMANDS. At the entrance into the LABEL FORMATTING mode, the Printer does several things. It clears the field register area and loads the FIELD GENERATION interpreter. The interpreter will scan the data as it is received, placing completed fields into registers. The paper is in the “home position” at the time the STX L command is received and set. References made by the statements that follow will consider the current paper position as 0,0.

2. The Printer begins to look for strings terminated by ASCII CRs (DEC 13, HEX 0D). The interpreter takes the data in the string and places the appropriate pieces into the appropriate registers. Whenever the Printer encounters an ASCII control code that has a value of less than 32, the data is not accepted. The beginning of that field is considered invalid and is discarded.

   The rules that the interpreter uses for placing data into registers are detailed in the previous tables. The tables show that the first 15 bytes received control the rotation, font, magnification, bar height, and print location of the data to be printed. The remaining characters in the string are the actual data.

3. The first character of a field that is received is shown in the table to be an ASCII character that selects the rotation. The possible choices for rotation are 1, 2, 3, and 4. If the Printer receives any other character as the first character in a command string, it will not consider this data to specify a field. It will check the string as a possible command for other action. If the string cannot be matched to a command, it will be discarded by the Printer.

   The diagram on the next page details the direction of data that each rotation will give with respect to the label feed direction and the label opening in the front of the Printer.

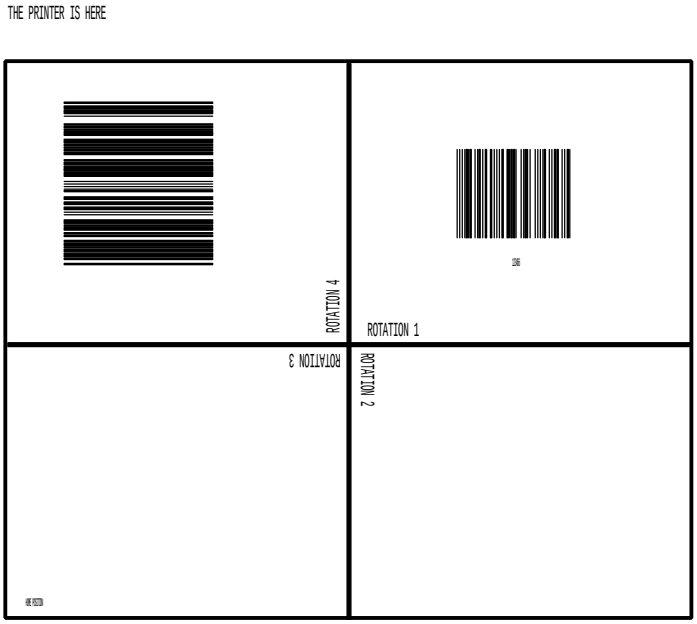


FIGURE 4-2

4. After the rotation field, the next character received is the font type. It must be one of the characters 0 through 8 to select a human readable font or A through L to select a bar code font. Uppercase bar code fonts will print with human readable interpretation, lowercase bar code fonts do not include the interpretation. The selection of the font is made from the samples available in APPENDIX D.

5. The following digit, character number 3, is the horizontal multiplier for human readable fonts. The magnification factor represents the number of times the dot tables for the font selected are multiplied in the horizontal direction. For human readable fonts, the valid choices for magnification are 1, 2, 4, and 8 times the normal dot pattern.

If the font selected is a bar code, this character specifies the wide bar width. The range of allowable values for bar code fonts is 1 to 9 and A through K. This range will give a wide bar width of 0.005" to 0.300" when added to the Printer's ability to vary the dot size.

For UPC and 128 fonts, the valid multipliers are 1, 2, 3, 4, 6, and 8 when selecting the uppercase version of these fonts. If other multipliers are selected, the Printer rounds down to one of these values.

6. The next digit, character number 4, is the vertical multiplier for human readable fonts. The magnification factor represents the number of times the dot table for the selected font is multiplied in the vertical direction. For human readable fonts, the valid choices for magnification are 1, 2, 4, and 8 times the normal dot pattern.

   If the font selected is a bar code, this character specifies the narrow bar width. The range of allowable values for bar code fonts is 1 to 9 and A through L. This range will give a narrow bar width of 0.005" to 0.300" when added to the Printer's ability to vary the dot size.

   For UPC and 128 fonts, this number should be the same as the horizontal multiplier because these bar codes are element-based and not ratio-based bar codes.

7. The next three characters, bytes 5, 6, and 7 for all human readable fonts will be discarded, but must be sent to the Printer as zeros. These characters only affect the printing of bar codes. When a bar code font has been selected, the height of the bar code is controlled in 0.010" increments. The minimum value is "001", the maximum value is "999". This gives a variable bar height of 0.01" to 9.99". (Note: Bar heights below 0.08" may vary depending on the starting row position. To suppress this variance, the row position should be given as a value evenly divisible by eight.)

8. The next four digits, bytes 8 through 11, are the vertical offset. This offset determines the placement, from the home position, of the data that is specified at the end of the string received. The home position is the lower left hand corner of the next print media currently held under the printhead. Field offset data is always expressed in hundredths of an inch on the Printer's graphic interfaces unless the toggle to metric measure has been made. This value can be thought of as “how far up” from the bottom of the label the data is to be printed.

9. The next four digits in the string, bytes 12 through 15, are used as the horizontal offset, in inches, for the data string. This value can be thought of as “how far over” to the right on the label the data is to be printed.

10. The remaining data in the string up to the CR or LF is the data to be printed. This data can be from 1 to 255 characters. Characters that are placed in this field may or may not actually be able to print on the label. The Printer will print all of the characters that fall within the possible range of the printhead. For example: you direct the Printer to print “HELLO WORLD” in rotation 1, font 6, and to magnify 2X in the horizontal and the vertical direction. The characters “HELLO W” and part of the “O” will appear at the very bottom of the label. The “RLD” will not show up on the label since it is outside the physical limits of the Printer.

11. The Printer can accept up to 3000 characters of field data per label, in up to 99 fields. Each field follows the same format as described in the preceding instructions. Fields and LABEL FORMATTING commands are sent to the Printer until the desired label format is formatted.

    If any received string does not meet the requirements to become a field, the Printer checks to see if the string is an internal command of the LABEL FORMATTING interpreter. If the command does not match, the field is discarded.

12. After the last field is sent, the host device terminates the formatting session by sending an ASCII “E” (DEC 69, HEX 45) as a single character string terminated by an ASCII CR (DEC 13, HEX 0D). The label Printer will print the label from the field registers created and return to the SYSTEM command processor.

The following is an example of the process explained in Section 4.10. Power up the Printer, press FORM FEED and then the host device sends out the following ASCII characters:

```
STX   L       CR
1     3   2     1    000  0100 0050 TEST123  CR
1     a   3     1    090  0000 0110 123456   CR
E
```

(Spaces in example are shown only for clarity.)
A label will print that looks like the sample below.

FIGURE 4-3

The STX L is a SYSTEM command that sends the Printer into the LABEL FORMATTING interpreter.

The first string “132100001000050TEST 123” is defined as the register number “01” in the Printer. On the label, it appears as the human readable message “TEST 123” located above the bar code. You can see from the sample label that the data printed in the standard left-to-right rotation “1”, in font “3”, at a 2X width and 1X height magnification. The lower left-hand corner of the field was located approximately 1" up from the bottom “0100”, and over from the edge .5" “0050”. This is the position specified by the eight digits that precede the data string “TEST 123”.

The bar code field is defined by the string “1a3109000000110123456”. This field is printed in the standard rotation, font a (Code 3 of 9 without human readable interpretation), with a wide-to-narrow bar ratio of 3:1. The bar code is positioned to print on the label 0" from the bottom and over from the edge 1.10". The data in the bar code was “123456”.

The last character sent is the ASCII “E” character. It requests the Printer to begin plotting the characters and bar codes as specified in the memory stored registers.

4.11 Register Loading

The Printer prints labels in one of two modes. The standard mode is described in the previous section. It requires that the complete format be sent to the Printer each time a label is to be created. However, there is a more efficient way of creating labels on the Printer. This method involves programming for a fixed label format. At the end of the format the host device sends an ASCII X (DEC 88, HEX 58) instead of the E character. This stores the register data in memory and returns the Printer to the SYSTEM command processor. However, a label is not produced. From this point, the SYSTEM command processor allows single or multiple labels to be printed from the stored field registers.

The ASCII character STX G is sent to instruct the Printer to print a label from its internal register data. After the label has finished printing, the host device may send additional STX G characters to print additional copies of the same label.

The host device may also reload a particular register with new data and send another STX G command. This will generate a new label from the previously created font and positioning parameters.

When data is entered into the Printer's label format memory, each properly formatted string creates a register. The registers are numbered 01, 02, 03, etc. to 99. To fill the register responsible for printing the bar code in the following example, the host device uses the "STX U## DATA..." command to fill a new string into an existing field.

STX U 02 112233 CR

The Printer recognizes "STX U" as the FILL REGISTER COMMAND. The "02" instructs the Printer to fill register 02 with the following data: "112233". The CR terminates the fill register command. Then the host can send a STX G command. The Printer begins printing a label from this stored data in the registers of graphics memory.

This process can be repeated as many times as necessary to print all of the labels following a particular format. The host device must resend a label format if the Printer is sent a RESET command, or if the Printer is powered down.

NOTE:	The data string length of any register is set by the length of the string when it is created. If you attempt to load a register with a new string that is longer than the original string, the Printer will truncate the field to match the original size. If you load a register with a string shorter than the original, the new characters replace the old characters in position, leaving behind the characters from the previous field.

4.12 Label Formatting Commands

There are several commands listed in the label formatting tables in Section 4.5 that have not been covered in the examples. This section examines these commands. The following commands are sent to the Printer after the STX L command, which causes the Printer to switch from the SYSTEM level command processor to the LABEL FORMATTING command processor. Any commands received while in the LABEL FORMATTING command processor not starting with a 1, 2, 3, or 4 (specifying a field rotation) are interpreted as printing process commands.

1. "R####" COMMAND. SETTING THE ROW OFFSET VALUE.

   "SETTING THE ROW OFFSET VALUE" is a FORMATTING command that is used to adjust the printing of data on a label. This feature is useful when you need to print a single format on several different types of preprinted labels. If the preprinted data does not appear in the same place every time, the data you image onto the label may overlap the preprinted data. The "R####" command instructs the Printer to print the following label formats further up on the label than the format actually specifies. The numbers in the command are digits 0 to 9, which can specify a number from 0000 to 9999. This value is the number of 1/100th of an inch of label to feed before the printing of the label format data begins.

2. "H##" COMMAND. CHANGING THE BURN TIME.

   The "H##" formatting command changes the "dot on time" for the individual dot rows on the Printer. The Printer powers up with a default value of 10. Varying this number changes the amount of time the dots are "turned on." This changes the amount of heat that is transferred from the head to the media, causing lighter and darker images to be burned. The range of valid settings are from 01 to 20. Each step increases or reduces the burn time by 100 µS.

The control on the front of the Printer labeled “DARKER” —>” is for matching replacement printheads to the Printer during the head replacement procedure. It has very little control over the actual burn temperature used for imaging.

This command is beneficial when the Printer is used with several different media types. When a label format is sent to the Printer and the media requires more or less heat than the amount set by the default temperature, the host device may send a command before or after the format to correct for the media.

3. “C####” COMMAND. SETTING THE COLUMN OFFSET VALUE.

   The Printer has a FORMATTING command function that is used to adjust the printing of data on a label horizontally. This feature is useful when you need to print a single format on several different types of labels that have preprinted information. If the preprinted data does not show up in the same place every time, the data you image on the label may overlap the preprinted data. The “C####” command instructs the Printer to print the following label formats over #### increments to the right of where the format actually specifies. The numbers in the command are digits 0 to 9 which can specify a number from 0000 to 0400.

4. “Pa” COMMAND. SETTING THE PRINT SPEED.

The print speed of the Printer can be adjusted by the host device to meet specific requirements of particular applications. The command “Pa” will set the print speed according to the single digit represented by the “a” in the command. The print speeds are listed below:

A	1.0" per second
B	1.5" per second
C	2.0" per second
D	2.5" per second
E	3.0" per second
F	3.5" per second
G	4.0" per second

5. “Sa” COMMAND. SETTING THE SLEW RATE.

The slew rate, which is the rate at which the label is advanced when no printing is taking place, can be set by the “Sa” command where the “a” is replaced by an alpha character A through G to get slew rates of:

A	1.0" per second
B	1.5" per second
C	2.0" per second
D	2.5" per second
E	3.0" per second
F	3.5" per second
G	4.0" per second

6. “W” COMMAND. SETTING THE FORMATTING MODE.

The formatting mode of the Printer is to begin printing immediately once the command to generate is executed. Some printers create an entire video image of the label in memory before printing begins. Sending the “W” command will enable the Printer to fill its format buffer before printing.

7. “+pii...” COMMAND. THE INCREMENT FUNCTION.

The Printer formatter is capable of incrementing data fields between each print. To cause a field to increment, send the field in the normal manner to the Printer. After the ASCII CR that terminates the field, send the string “+pii...” where the “p” is a fill character for the far left-hand characters of the field and the “ii” is the string to increment by. The data in the field will increment by the value after the “+” sign each time a label is printed.

The “+” character may be replaced by a “>” character to make the field increment alphanumerically instead of just numerically.

To generate a single field label format that prints the first label with a value of 10000 and increments by 1 for three labels, refer to the commands below:

```
STX    L        CR
1   3      2     2      000   0000  0000  10000   CR
+01 CR
Q0003  CR
E   CR
```

8. “-pii_” COMMAND. THE DECREMENT FUNCTION.

The Printer is capable of decrementing data fields between each print. To cause a field to decrement, send the field in the normal manner to the Printer. After the ASCII CR that terminates the field, send the string “-pii_” where “p” is the fill character used for characters farthest on the left. The “ii” is the string to decrement the field by.

The “-” character may be replaced by a “<” character to make the field decrement alphanumerically instead of just numerically.

To generate a single field label format that prints the first label with a value of 10000 and decrements by 1 for three labels, refer to the following commands:

```
STX     L     CR
1  3    2     2     000   0000  0000  10000   CR
-01 CR
Q0003   CR
E       CR
```

9. “^##” COMMAND. INCREMENT AND DECREMENT ON COUNT.

An application that requires incrementing or decrementing fields will occasionally require that a duplicate label be printed with the same values before the update of field data occurs. The Printer handles this feature with the “^##” command. The “##” after the “^” is a two digit value. It specifies how many labels are to be generated before the modification of the incrementing or decrementing field is to occur. This command can only be sent once per label format.

The same commands from the previous example, with two labels printed per decrement instead of one, would look like this:

```
STX     L     CR
1  3    2     2     000   0000  0000  100000  CR
-01     CR
^02     CR
Q0006   CR
E  CR
```

10. PLACE DATA IN GLOBAL REGISTER

    The Printer also contains a utility for printing duplicate data fields (for example, several different places on a label). After a field has been created, the "G" command may be sent as the next string to the Printer. The data in the field is placed into a global register. Global registers are named in the order created, starting with A and assigned consecutively through register P.

11. TAKE DATA FROM GLOBAL REGISTER AND PLACE IT INTO DATA FIELD

    Once a global register has been defined, it can be used as the data in other fields. Simply send "STX S?" where "?" is the register A to P in the command string as data. The Printer will place the data from the global register into the field.

    A set of commands to use this feature would be:

```
STX     L     CR
1  2    1     1     000   0000  0000  PRINTER  CR
G  CR
1  A    6     2     100   0100  0000  STX SA   CR
E  CR
```

    The "G CR" command after the first field will place the string "PRINTER" into the next available global register, which in this case will be A. The "STX SA" in the second field will take the data out of global register A and place it in field number 2.

4.13 System and Formatting Commands

Other than the "F", "L", and "G" commands that have been used in the examples, other SYSTEM commands listed in the tables in the beginning of the chapter have not been discussed. This section examines these very powerful commands and their typical uses in label production.

1. “SOH A” COMMAND. CHECKING THE PRINTER STATUS.

   The Printer can be polled as to the current Printer status. The SYSTEM command to cause the Printer to send this data is “SOH A”.

   The Printer will respond as soon as it is able to with an 8-character response followed by an ASCII CR (DEC 13, HEX 0D). Each character will be a “Y” or “N” for the status of the condition. The string will be of the following format:

1	Command interpreter busy
2	Paper out
3	Ribbon out (only when enabled)
4	Printing batch
5	Busy printing
6	Printer paused
7	Label presented (only when enabled)
8	Always N

2. “SOH #” COMMAND. SERIAL PRINTER RESET.

   The host device may cause the Printer to reset itself. In effect, the Printer powers down and back up again. This command is the “SOH #” command. When the Printer receives this command, all of the Printer’s programmable parameters are set back to default values.

3. “STX T” COMMAND. TEST MODE.

   Sending the “STX T” command to the Printer will cause it to print the test pattern that is generated on a POWER UP SELF TEST.

4. “STX Vn” COMMAND. SETTING THE PSEUDO SWITCHES.

Switch SW1, mounted on the back of the Printer, is read on power-up or on soft reset. The positions of switches 5 through 8 can be modified through this command. Send “STX Vn” where “n” is a hex value of 0 to F to define the settings.

*	5	Mode switch, RS-232/batch
	6	Label present sensor
	7	Ignore ribbon out
	8	Undefined

*This setting is of no value.

5. “M####” COMMAND. SETTING THE MAXIMUM LABEL SIZE.

The Printer was designed to accept labels with a maximum length of 99.99". The maximum label size can be reduced by sending the Printer a “M####” command where the numbers 0 to 9 represent the maximum length of the label. “####” is expressed to the nearest 1/100th of an inch; decimal place removed.
This command is a nice feature while designing labels. It prevents the Printer from feeding out tremendously long strips of media if an error is made by the host device. The Printer defaults to a value of “1200”.

It is recommended that the label-out value be set to 2.5 times the actual label length that is being used. This will allow for a label to be missing on a roll without stopping the printing.

6. “O####” COMMAND. CHANGING THE DEFAULT LABEL OFFSET.

   The “O####” command changes the label offset. The Printer will accept the “####” string to be in the range of 0000 to 0999. The Printer normally stops the label media at 0.20" past the printhead. This means that the last label printed is still attached to the label backing and can be removed by an operator.

   If you are printing in batch mode and rewinding the labels, you may want to have the label offset changed so that printing can begin on the very bottom of a label.

   This command is different from the “C####” command, which changes the location of the print on the label. The “O####” command actually changes the zero reference point of the label.

4.14 Controlling Print Quality

The Printer provides maximum flexibility by offering a direct thermal and thermal transfer print capability. To provide this diverse printing option, the Printer has a flexible set of printing controls.

The amount of heat applied per dot row and the rate at which the paper moves under the head have the most effect on the images that are printed. The Printer allows you to control these factors but also limits them so you cannot ask the Printer to print an image that could be damaging. For example, low cost direct thermal stocks have very high reaction temperatures. It takes a lot of heat to make clear images on this type of paper. The Printer allows two methods of compensation. The burn time can be set to a greater value by using the “H” LABEL FORMATTING command. This would cause more heat to be transferred into the media, which would generate a darker image. The second method would be to reduce the print speed with the “P” LABEL FORMATTING command. This would allow the paper to remain under the head for a longer amount of time. This would also allow more heat to transfer into the media.

You will find that printing fine images on the less expensive direct thermal and thermal transfer media at the higher speeds can be tricky. At one heat setting the image will fade and at the next higher heat setting the image can bleed. This is because the reaction temperature of the media is so high that at higher rates of speed, it cannot react quick enough.

To print fine images at higher speed, media with lower reaction or release temperatures are required. On the slower end of the print rate settings, crisper images are possible because the media is not being stretched beyond its limits.

5

Using the Printer's Internal Labeling Software

The program is very easy to learn and operate. Just two screens are used to create or modify and then print labels. A system maintenance screen is included for printing test labels, copying and formatting memory modules, and several other functions. 32K RAM memory modules store up to 50 label formats each. Modules can be divided in a 16K/16K split between label formats and graphic images (pictures). As many memory modules as are necessary can be purchased, which effectively allows unlimited memory capacity.

5.1 Preparing the Printer for Use With a LINK CRT

Several steps are necessary before you can begin to format and print labels on the Printer. These steps are explained in the next two sections.

5.1.1 Connect Cables

Verify that the LINK CRT and the Printer main power switches are OFF. Connect the LINK CRT terminal to the Printer with the supplied cable, or construct an MXM-type cable as described in APPENDIX C. Plug in the supplied power cords for the Printer and the LINK CRT terminal.

NOTE:	The Printer does not connect to the Link Parallel Port.

5.1.2 LINK CRT Settings

The LINK CRT is shipped ready for use with the Printer. (NOTE: The settings should be changed only when necessary.) If the terminal's settings have been changed since shipment from the factory, follow the terminal's set-up procedure to re-establish all default values. For reference, the following values are necessary. The Printer will set all remaining parameters. However, these settings are not saved in CRT's RAM. To save them, follow the CRT's "save changes" routine after normal operation is established.

Handshake:	NONE
Mode:	FDX
Data Bits:	8
Stop Bits:	1
Parity:	NONE
Baud Rate:	9600
Keys:	US
Blk End:	US/CR
Auto NL:	ON
CR:	CR
Compatible:	LINK MC 2
Function keys equivalent to: F1: CNTL W F2: CNTL X F3: CNTL Y F4: CNTL Z	

5.1.3 Select Stand-Alone Labeling Software Mode

The Printer is typically shipped in the RS-232 mode for use with PCs. To use the CRT instead, a DIP switch setting needs to be changed. Before changing any switch settings, turn the Printer's main power switch to the OFF position. DIP switch changes are read only upon power up.

To enable the internal stand-alone labeling software, set DIP switch SW1-5, located on the back panel of the Printer, to the ON (toward numbers) position.

Also verify that the proper baud rate is set. Select 9600 baud by turning SW1-1, 2, and 3 to the OFF (away from numbers) positions.

5.1.4 Verify Setup, Power Up, and Load Media

Check that all connections are made and that you have correctly configured DIP switch SW-1. Turn on the CRT first and then the Printer's power switch. Press the F1 key on the CRT several times. The CREATE/MODIFY LABEL and PRINT LABEL screens should toggle back and forth. If they don't, something is wrong. Check the CRT settings again, check the interface cable, check that you have power to both the Printer and CRT, and then try again. Contact your Value Added Reseller (VAR) or the manufacture if you cannot get the screens to appear.

You should load the Printer with media at this time.

5.1.5 Install and Configure a Memory Module

Memory modules are used to store label formats, graphics, or a combination of both. At least one memory module is required to operate the internal labeling software program. Properly configured, up to 50 typical label formats can be stored in each module.

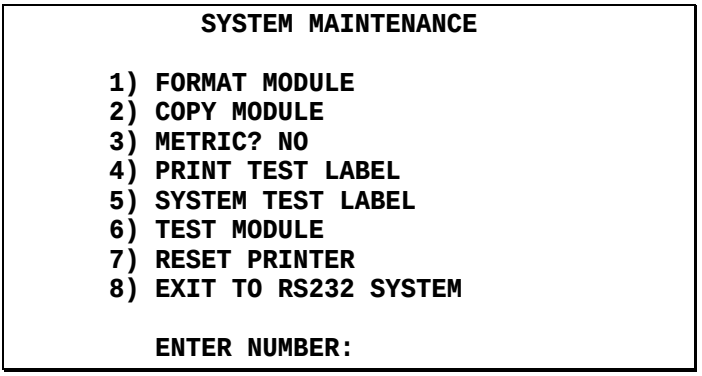
To install a module and configure it for use, follow these steps:

1. Use a small screwdriver or a similar tool to turn the module's Write Protect Switch to the OFF position. Label formats cannot be sent to the module if the switch is in the ON position. Later, to prevent accidental changes or modifications to formats, you will probably want to turn the Write Protect Switch back to the ON position.

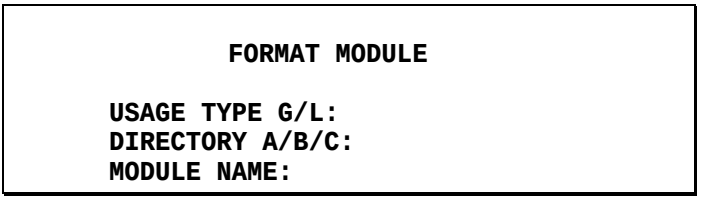
2. Open the front door of the Printer.

3. Place the module in the Memory Module Bay to the left bottom of the front of the Printer. The label side should be facing up and the printing upside down. Press the module firmly into place and shut the front door of the Printer.

4. Press and hold the ALT key and press the “S” key at the same time. This screen will appear:



5. Press the “1” key to select FORMAT MODULE. This screen will appear:



6. Now you need to decide how to partition the module's memory. The memory module can be configured into two single 16K banks or joined together into one continuous bank. The two banks are referred to as bank A and bank B. For most applications involving the internal batch program, you should format the module so that bank A and B are both formatted to accept label formats.
If you are using the graphics, the host computer should format the module as bank A-labels, bank B-graphics and load the graphics into bank B. The only time you need to format a memory module with directory C is if you have a graphic image bigger than 16K bytes. You cannot use modules formatted for bank C graphics with the internal batch program.

   In this example we will format the module for storing label formats. Enter "L" for label formats at the USAGE TYPE prompt and press the RETURN key. The cursor moves to the DIRECTORY position. Enter "A" to select bank A to be formatted as type "L", label formats. The cursor moves to the MODULE NAME position. Enter up to a 16-character name for this module, then press the RETURN key. Repeat the procedure selecting "B" instead of "A". Both banks of the module will then be ready to accept label format data.

   The screen returns to the SYSTEM MAINTENANCE menu after the formatting procedure. Press the ESC key to return to the PRINT LABEL or CREATE/ MODIFY LABEL screen. You may want to verify that the module has been configured correctly by pressing the F2 key from either screen. F2 calls up a directory listing of that module. You will see that it lists the name, TYPE, and MEMORY AVAILABLE for each bank of memory you've partitioned.

5.2 Function Keys

Four function keys are used extensively in the label formatting process. They are labeled F1, F2, F3, and F4. These keys have the following functions:

F1 or ESC (SWITCH)
Toggles between the PRINT and CREATE/MODIFY LABEL screens. F1 can only be used in the LABEL NAME: position of the CREATE/MODIFY or PRINT screens.

F2 (LIST)
Displays a library listing of every label format and/or graphic image loaded in the current memory module. Used only when the prompt is in the LABEL NAME: position of the CREATE/MODIFY or PRINT screens.

F3 (COPY)
Used in the CREATE/MODIFY LABEL screen only. Enter a new label name, then press the F3 key. The message "COPY FROM:" will appear. Enter the name of an existing label already in memory, then press the ENTER key. A new label is then created with the same data as the source label, which allows immediate editing of the new label format.

The F3 COPY feature will also copy the current field to the next field when the cursor is at the farthest left position of the CREATE/MODIFY LABEL screen.

F4 (KILL)
Used in the CREATE/MODIFY LABEL screen only. Enter an existing label name, followed by the F4 key. The message "REMOVE LABEL? (Y/N)" will appear. Answer yes or no with the "Y" or "N" key. If "Y", the label is permanently removed from the memory module (if the WRITE PROTECT SWITCH is OFF).

When creating or modifying a label format, the F4 KILL feature also deletes a single format line at a time. Move the cursor to the farthest left position of the screen, then press F4. The current line will be deleted.

5.2.1 ALT Keys

Several very important and powerful Printer settings are called up and/or controlled by the ALT key. To use the ALT functions, press and hold the ALT key as you press another key. The ALT functions are:

ALT-P
While in the far left position (ROT) of the CREATE/MODIFY LABEL screen or the SAMPLE? position of the PRINT LABEL screen, press ALT-P to bring up the PRINT PARAMETERS window. It looks like this:

```
          PRINTER ADJUSTMENTS

     HEAT FACTOR:              10
     PRINT SPEED:              E
     SLEW SPEED:               G
     DOT PATTERN(5 mil):       2x2
     FORMAT W/Z:               Z
     ROW OFFSET:               00.00
     COLUMN OFFSET:            00.00
     COUNT BY:                 01
     MAX LABEL WIDTH:          04.47
     MAX LABEL LENGTH:         12.00
     CONTINUOUS FORMS:         NO
```

Print parameters include row and column offsets, label edge offset, pixel (dot) size, print speed, slew (feed) rate, heat setting, and the type of print mode desired (“WAIT” OR “ZIP”).

Use the arrow keys to move from one position to the next. Key in any values that need to be changed. Press the ESC key to exit the window.

Valid settings, defaults, and a description of each print parameter are listed below:

HEAT FACTOR:	0 to 20. Default is 10.
PRINT RATE:	A to G. A = 1 inch/sec. G = 4 inches/sec. Default is E (3.0 inches/sec.).
SLEW RATE:	A to G. A = 1 inch/sec. G = 4 inches/sec. Default is G (4 inches/sec.).
DOT PATTERN:	1 or 2 wide. Default is 2 (10 mil dot). 1, 2, or 3 high. Default is 2 (10 mil dot).
FORMAT W/Z:	W = “WAIT” - format first in bit map memory. Z = “ZIP” - format while printing.
FORM EDGE OFFSET:	0.00" to 9.99". Default is 2.50" .
ROW OFFSET:	0.00" to 99.99". Default is 0.00". Moves entire format up or down.
COLUMN OFFSET:	0.00" to 4.50". Default is 0.00". Moves entire format side to side.
UPDATE COUNT ON:	0 to 99. Default is 1. Number of labels printed before updating consecutive number.
MAX LABEL WIDTH:	0.00" to 99.99". Default is 4.47". Maximum width and length settings are used by Printer to calculate maximum number of characters that will fit in a particular field.
MAX LABEL LENGTH:	0.00" to 99.99". Default is 12.00".

If ALT-P parameters are changed while in the CREATE/MODIFY LABEL screen, the changes are saved with the label format. If they are changed in the PRINT LABEL screen, they are not saved and will affect only the current print job. Changing parameters in the PRINT LABEL screen is useful when testing a new label to determine optimum print parameter settings for that particular format.

ALT-S
Calls up the SYSTEM MAINTENANCE screen.

ALT-I
This function is used in the CREATE/MODIFY LABEL screen to insert a new field description line between existing field description lines on the screen. It is especially useful when the REPEAT function is used and other lines on the screen are already below the field to be repeated.

ALT-F
Feeds one label at a time. It operates the same as the front panel FEED switch. This function is useful when loading new media to register the photoelectric sensor.

ALT-X
May be pressed while at the ROT field of the CREATE screen. It will cause the PRINT screen to come up with a preset quantity of 1 for the purposes of printing a test label.

5.3 Other Important Keys

Several other keys are used in the editing and printing steps. These keys have the following functions:

RETURN
Enters an answer for the prompt and moves to the next position if the answer is acceptable.

ARROW KEYS
Used to move left and right and up and down in the CREATE/MODIFY and PRINT screens. Up and down arrows in the CREATE screen are restricted to the ROT position.

ESC
Ends the formatting for that particular label, returns the cursor to the top of the screen, and allows the F1 key to be used to switch screens. The ESC key is also used to exit ALT-S and ALT-P screens.

DEL or DELETE
Erases one character.

HOME
Deletes the current field and moves the cursor to the beginning of that field.

5.4 Create/Modify Label Screen

This section describes how to create a new label. Before starting, a good tool to have on hand is a ruler marked in tenths of an inch. All label format print positions are specified in tenths and hundredths of an inch. The procedure for creating a new label is as follows:

1. Power up the CRT terminal with the switch on the front of the unit, then turn the Printer on with the POWER switch (located on the rear of the Printer). The CRT screen will look like this:

```
                PRINT LABEL

              LABEL NAME:
                QUANTITY:0
```

Press the F1 key, and the screen will look like this:

```
          CREATE/MODIFY LABEL
      DIRECTORY:    MEMORY LEFT:99%
   LABEL NAME:----------------------

ROT FNT XW XH BH ROW COL TYPE DATA/PROMPT
--- --- -- -- -- --- --- ---- -----------
```

2. The software has only two operating screens: CREATE/MODIFY LABEL and PRINT LABEL. Both have already appeared on your CRT!

   All data is entered in fields. A field is some individual group of information—a product name, an address, a bar code, a consecutive number, and so on—that is specified on individual lines on the CRT screen. Because fields are independent of each other, it is possible and sometimes quite desirable to place two or more fields on the same horizontal or vertical measurement. Be careful, however, to not print one field over another.

   You will notice in the upper left-hand corner of the screen that the current FIELD NUMBER is displayed. The program can handle up to 80 fields per format. Use the RETURN key or the arrow keys to move around within the 80 fields, one field at a time.

   To CREATE a label, press the F1 key to return to the CREATE/MODIFY LABEL screen. Operation begins in the LABEL NAME position.

3. Enter up to a 16-character alphanumeric name for this label, followed by the RETURN key. The message “NEW LABEL FORMAT?” appears. Answer “Y” for yes or “N” for no. If yes, the operation moves to the ROT position. If the cursor won’t proceed past the “NEW LABEL FORMAT” position, the memory module’s “write protect” switch is ON. Turn it OFF to continue.

4. The Printer can print fonts, bar codes, and graphics at 0, 90, 180, or 270 degrees rotation. Valid responses to the ROT prompt are:
   1 = 0 degrees
   2 = 90 degrees
   3 = 180 degrees
   4 = 270 degrees

5. In the FNT position, enter the type of font you want to print. This can be an alphanumeric font or a bar code. Enter one of the following:
   a. An alphanumeric font type, followed by the RETURN key. Choices are: 0 through 8. See APPENDIX D for examples of each available font type and for the actual printed size of the various fonts using different multiplications.
   b. A bar code, followed by the RETURN key. Choices are uppercase A through L for bar codes that include the human readable interpretation line, or lowercase a through l for bar codes without human readable lines. Again, see APPENDIX D for examples of each available bar code.
   c. The “Y” and “X” special font choices are not actually fonts. The “Y” font selects a graphic image that has already been loaded into the memory module. If this font is selected, you will enter the name of the graphic image in the DATA/PROMPT field.

The “X” font selects box and line drawing. Later, in the DATA/PROMPT field, you will enter the following format for lines or boxes:

LINES: Lhhhvvv

Where:

L = “L” specifies line drawing
hhh = horizontal width of line
vvv = vertical height of line

NOTE:	Reverse printing is accomplished by printing a very high (or wide) solid line. Any text placed at the same coordinates (inside the line) is reversed with white letters on a black background.

BOXES: Bhhhvvvbbbsss

Where:

B = “B” specifies box drawing
hhh = horizontal width of box
vvv = vertical height of box
bbb = thickness of bottom and top box edges
sss = thickness of sides of box

If any letter or number is entered in the FNT position other than those specified above, the following error message will appear:

INVALID FONT TYPE

You will have to re-enter the data. After entering the desired font and pressing the RETURN key, the prompt moves to the XW position.

6. The XW and XH positions are used to magnify widths and heights of fonts and to change the X/Y ratio of bar codes.
   a. If a font, valid responses are 1, 2, 4, and 8. Default is 1 for fonts.
   b. If a bar code, valid responses are 1 through 9 and A through K. The default is 3 for ratio-based bar codes and 1 for all other bar code fields. 1 is a 5 mil narrow bar if the pixel width is 1 or a 10 mil narrow bar if the pixel width is 2. Pixel sizes by label format are specified in the PRINT PARAMETERS screen (ALT-P). Enter the desired XW dimension and press the RETURN key. The cursor moves to the XH position.

7. Enter the desired XH dimension. The default for fonts is 1. The default for element bar codes such as UPC or 128 is 1. For ratio-based bar codes, the default is 1. Enter the desired XH dimension and press the RETURN key. The prompt moves to the bar height (BH) position.

8. In the BH position, a 3-digit number defines the printed bar height for this field. For UPC/EAN bar codes, the default is .80". For all other bar code fields, the default is .40". On all alphanumeric fonts, the BH value is set at 0.00". Enter the desired bar height and press the RETURN key. The cursor moves to the ROW position.

9. The 4-digit ROW field tells the Printer “how far up” on the label you want to print the data. The default is 0.00" and the maximum number cannot exceed the maximum label length set in the PRINT PARAMETERS window. Use the bottom left corner as the starting point for ROW and COLUMN positioning in all rotations.

Enter up to a 4-digit number for the desired vertical placement of your field, followed by the RETURN key. If the measurement you have entered is acceptable, the prompt moves to the COL position. If the measurement you select is too large for the given space or the capability of the Printer, the following error message will appear:

NUMBER OUT OF RANGE

You will have to re-enter the data.

When specifying measurements, always measure to the bottom of the field. For example, if using font "6", the measurement will be to the bottom of the alphanumeric letters. If using a bar code, the measurement will be to the bottom of the bar code's human readable line. If the bar code you are printing does not have a human readable line, measure to the bottom of the bars.

When rotating a bar code or alphanumeric field, the ROW measurement is specified as the amount of space from the starting point of the label to the top of the field (wherever you want printing to begin).

10. The 4-digit COLUMN number tells the Printer "how far over" from the left edge of the label data is to be printed. Enter the number for this field, then press the RETURN key. If the measurement is acceptable, the prompt moves to the TYPE position. If the measurement is too large for the given space or the capability of the Printer, the NUMBER OUT OF RANGE error message will appear and you will have to re-enter your data. The cursor moves to the TYPE position.

11. The TYPE position tells the Printer how the DATA/PROMPT area is to be used. You have eight choices: C, D, P, R, +, -, <, and >.
    a. The most common TYPE is “D” for data. It tells the Printer that fixed data will be entered in this field. In other words, whatever alpha and/or numeric characters you enter in the DATA/ PROMPT position will be printed on the label exactly as entered on the screen. After pressing the “D” key, the prompt moves to the DATA/PROMPT position. Enter the data you want printed on the label, and press the RETURN key. Type “D” is also specified when using special fonts “X” and “Y” for graphic lines, boxes, and illustrations.
    b. Press the “P” key to signify “this is a prompt.” Whatever is typed in the DATA/PROMPT position will reappear on the PRINT LABEL screen. This allows you to set up the desired label format ahead of time, but to change variable information every time you print that format.
    For example, if you are printing inventory labels, you may want the same company name, date, and factory location printed on every label in exactly the same position. However, the stock number for the part changes every 100 or so labels. You could set up the stock number field as a prompt, perhaps entering in the DATA/PROMPT position the phrase “ENTER STOCK NUMBER." Every time you select the format in the PRINT LABEL screen, the phrase “ENTER STOCK NUMBER” appears. You then enter the desired stock number for that label run and that information is printed on every label.
    c. + - < > Enter one of the following to signify a consecutive number or alpha character:

        + for numeric increment
        - for numeric decrement
        > for alpha increment
        < for alpha decrement

If any of the above are entered, you will be printing either incrementing or decrementing numbers or letters in the label position you specified earlier in this field. Information you add in the DATA/PROMPT field in the next step will tell the Printer by what increment you want to count. When you are on the PRINT LABEL screen, it will ask you "INITIAL INCREMENT? or INITIAL DECREMENT?". The number you enter at this time will be incremented or decremented every time a label is printed. The number of labels printed with the same number before an increment or decrement occurs can also be set in the ALT-P window, described earlier. The default is 1.

d. Press the "C" key to signify a comment. Any data entered in DATA/PROMPT will appear on the PRINT LABEL screen as a comment. This function is useful to give the operator special instructions, such as to load a particular type of media for the labels to be printed. Comment fields do not affect the printing of the label.
e. Press the "R" key to request a repeat of the previous field's data. After entering one of the above choices, the prompt moves to the DATA/PROMPT position.

12. In the DATA/PROMPT position, you have three choices, explained in a, b, and c.
    a. If a "D" was selected in the preceding step, enter the desired data. The Printer automatically computes how many characters you have room for on the label width specified in your ALT-P label width and/or label length settings. If there is not enough room specified in the ROW and/or COLUMN measurements, the screen will show the following error message:

       NOT ENOUGH ROOM FOR FIELD DATA

       You will have to re-enter some of the data.

Use the DEL or HOME key or the arrow keys to change any information. Also, if the Printer does not allow you to enter as many characters as you need, you may have to back up with the arrow keys to allow more room on the label or change font size. For special font “X”, enter the required information. For special font “Y”, enter the name of the picture image you want to call from the memory module for printing at this field position.

b. Enter the desired PROMPT information. The field allows up to 44 characters.

c. Enter the desired consecutive number fill character and increment value. The field has this format: xnn . Use this chart to specify the parameters:

x = fill character.
It can be any character, including a space. For example, if * is used, all insignificant characters will be filled with “*”. If 0 is used, the field will fill with zeros.

nn... = increment value desired.
If 01, it will increment by ones (i.e. 1, 2, 3 etc.). If 02, it will increment by twos (i.e. 1, 3, 5, 7 etc.). Can be any value up to 99.

For example, an entry of 02 will print like this:

02
04
06
08
10

Once in the PRINT LABEL screen, the operator is prompted for an initial increment or decrement value. The value entered is the starting value for that run of labels. As a separate function, an increment every “x” number of labels can be set in the PRINT PARAMETERS screen (ALT-P).

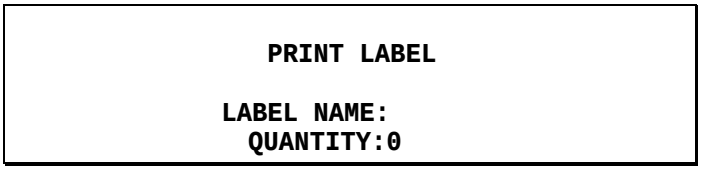
d. For comment fields, enter the data you wish to have appear on the PRINT screen in the DATA/PROMPT field.
e. Repeat Fields. Enter the data in the DATA/PROMPT field just as if the field were a type "D" field. Place a "^" character in the data string at the place you wish to insert the data from the previous field into this field.
After you enter the desired data, prompt, comment, or consecutive number information, press the RETURN key. The prompt moves to the next line on the screen and is ready for another field of information.

13. Enter additional fields of information as desired. To print a sample label, press the "ALT-X" keys and the PRINT screen will appear with a quantity of "0001". Press ENTER again and a sample label will be printed and the CREATE screen will return.
After all fields are completed, press the ESC key from any fields in the "ROT" columns. This brings the cursor back to the LABEL NAME position.

14. To print a quantity of the label defined, press the F1 key (SWITCH). The PRINT LABEL screen appears. See the next section for information on the PRINT LABEL screen.

5.5 Print Label Screen

The PRINT LABEL screen is used to print labels that have been formatted and/or modified in the CREATE/MODIFY LABEL screen. From the CREATE/MODIFY LABEL screen, press the F1 key to toggle to the PRINT LABEL screen. It should look like this:



When on the PRINT LABEL screen, the procedure for printing a label is as follows:

1. Enter the LABEL NAME you want to print and press the RETURN key. The prompt moves to the QUANTITY position. (If for some reason the Printer does not find the label name you entered, you will receive an error message and will have to re-enter the label name.) The F2 key (LIST) is available when in the LABEL NAME position to list all names entered in the currently installed memory module.

2. Enter up to a 4-digit number for the quantity you want to print and press the RETURN key. The maximum number of labels per run is 9999.

3. Depending on how you set up the label, the cursor may have moved to the INITIAL INCREMENT or INITIAL DECREMENT position (if a consecutive number or letter was specified as a data type) or to a prompting position (if a "P" was specified as a data type). Enter the starting number or the prompt information, followed by the RETURN key, for each consecutive number or prompt. After this information is completed, the cursor moves to the SAMPLE? position.

4. In the SAMPLE? position, you have two choices:
   a. You can print a sample label to check data placement by pressing the "Y" key for yes. A sample label is then printed and the prompt returns to the SAMPLE? position. At this point, you can go to step b. below, or you can stop the run by pressing the up arrow key to move the prompt back to the LABEL NAME position. Press the F1 key (SWITCH) to re-edit your format in the CREATE/MODIFY LABEL screen.
   b. If you do not need a sample, press the "N" or the RETURN key for no, and the number of labels you requested will be printed. After the print job request is sent to the Printer, the prompt moves back to the LABEL NAME position. Additional print jobs can now be sent to the Printer or you can go back to the CREATE/MODIFY LABEL screen.

5.6 System Maintenance Screen

The third screen, SYSTEM MAINTENANCE, is used to format and copy memory modules, print test labels, and perform several other maintenance functions.

Access the screen in the LABEL NAME position of the CREATE/MODIFY LABEL or PRINT LABEL screens by keying in ALT-S. This screen will appear:

```
          SYSTEM MAINTENANCE

     1) FORMAT MODULE
     2) COPY MODULE
     3) METRIC? NO
     4) PRINT TEST LABEL
     5) SYSTEM TEST LABEL
     6) TEST MODULE
     7) RESET PRINTER
     8) EXIT TO RS232 SYSTEM

        ENTER NUMBER:
```

To exit the screen, press the ESC key. All SYSTEM MAINTENANCE screen choices are explained below:

1. FORMAT MODULE. Used to initially format or to reformat a memory module.

2. COPY MODULE. Copies graphic images and/or label formats from one memory module to another. Be certain that the WRITE PROTECT SWITCH is ON for the source module, and OFF for the destination module. Follow the screen prompts to perform the copy routine.

3. METRIC. Each time number 3 is pressed, the screen will toggle between METRIC NO and METRIC YES. When in the METRIC mode, all references to dimensions will be of METRIC measure.

4. PRINT TEST LABEL. Prints a head test label. Used as a relative gauge of head condition and wear.

5. SYSTEM TEST LABEL. Lists all current Printer settings and checks both ROM and RAM. Prints a head test label after the system test.

6. TEST MODULE. Tests a memory module to see if the battery is functioning and that it is capable of erasing and loading data. WARNING: this test destroys all existing memory module data! Follow the prompts to perform the test.

7. RESET PRINTER. Same as turning the main power switch on and off. Resets the Printer's processor circuit. Used if the processor locks up or "goes off in the weeds" due to a power surge, spike, or other power line interference.

8. EXIT TO RS-232 SYSTEM. Same as turning DIP switch SW-1, #5 off and turning main power switch off and on. Useful if connecting an A/B switch box to the CRT and a PC at the same time for downloading graphic images to memory modules.

Appendix A

ASCII Control Code Chart

	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
Ctrl **@**	NUL	0	00		32	20	@	64	40	`	96	60
Ctrl **A**	SOH	1	01	!	33	21	A	65	41	a	97	61
Ctrl **B**	STX	2	02	Ò	34	22	B	66	42	b	98	62
Ctrl **C**	EXT	3	03	#	35	23	C	67	43	c	99	63
Ctrl **D**	EOT	4	04	$	36	24	D	68	44	d	100	64
Ctrl **E**	ENQ	5	05	%	37	25	E	69	45	e	101	65
Ctrl **F**	ACK	6	06	&	38	26	F	70	46	f	102	66
Ctrl **G**	BEL	7	07	Ô	39	27	G	71	47	g	103	67
Ctrl **H**	BS	8	08	(	40	28	H	72	48	h	104	68
Ctrl **I**	HT	9	09	)	41	29	I	73	49	i	105	69
Ctrl **J**	LF	10	0A	*	42	2A	J	74	4A	j	106	6A
Ctrl **K**	VT	11	0B	+	43	2B	K	75	4B	k	107	6B
Ctrl **L**	FF	12	0C	,	44	2C	L	76	4C	l	108	6C
Ctrl **M**	CR	13	0D	-	45	2D	M	77	4D	m	109	6D
Ctrl **N**	SO	14	0E	.	46	2E	N	78	4E	n	110	6E
Ctrl **O**	SI	15	0F	/	47	2F	O	79	4F	o	111	6F
Ctrl **P**	DLE	16	10	0	48	30	P	80	50	p	112	70
Ctrl **Q**	DC1	17	11	1	49	31	Q	81	51	q	113	71
Ctrl **R**	DC2	18	12	2	50	32	R	82	52	r	114	72
Ctrl **S**	DC3	19	13	3	51	33	S	83	53	s	115	73
Ctrl **T**	DC4	20	14	4	52	34	T	84	54	t	116	74
Ctrl **U**	NAK	21	15	5	53	35	U	85	55	u	117	75
Ctrl **V**	SYN	22	16	6	54	36	V	86	56	v	118	76
Ctrl **W**	ETB	23	17	7	55	37	W	87	57	w	119	77
Ctrl **X**	CAN	24	18	8	56	38	X	88	58	x	120	78
Ctrl **Y**	EM	25	19	9	57	39	Y	89	59	y	121	79
Ctrl **Z**	SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
Ctrl **[**	ESC	27	1B	;	59	3B	[	91	5B	{	123	7B
Ctrl \	FS	28	1C	<	60	3C	\	92	5C	|	124	7C
Ctrl **]**	GS	29	1D	=	61	3D	]	93	5D	}	125	7D
Ctrl ^	RS	30	1E	>	62	3E	^	94	5E	~	126	7E
Ctrl _	US	31	1F	?	63	3F	_	95	5F		127	7F

Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
Ç	128	80	á	160	A0		192	C0	Ó	224	E0
ü	129	81	í	161	A1		193	C1	ß	225	E1
é	130	82	ó	162	A2		194	C2	Ô	226	E2
â	131	83	ú	163	A3		195	C3	Ò	227	E3
ä	132	84	ñ	164	A4		196	C4	õ	228	E4
à	133	85	Ñ	165	A5		197	C5	Õ	229	E5
å	134	86	ª	166	A6	ã	198	C6	µ	230	E6
ç	135	87	º	167	A7	Ã	199	C7	þ	231	E7
ê	136	88	¿	168	A8		200	C8	Þ	232	E8
ë	137	89	®	169	A9		201	C9	Ú	233	E9
è	138	8A		170	AA		202	CA	Û	234	EA
ï	139	8B	1/2	171	AB		203	CB	Ù	235	EB
î	140	8C	1/4	172	AC		204	CC	ý	236	EC
ì	141	8D	¡	173	AD		205	CD	Ý	237	ED
Ä	142	8E		174	AE		206	CE		238	EE
Å	143	8F	¯	175	AF		207	CF		239	EF
É	144	90		176	B0	ð	208	D0		240	F0
æ	145	91		177	B1	Ð	209	D1	±	241	F1
Æ	146	92	²	178	B2	Ê	210	D2		242	F2
ô	147	93	³	179	B3	Ë	211	D3	3/4	243	F3
ö	148	94	´	180	B4	È	212	D4		244	F4
ò	149	95	Á	181	B5		213	D5		245	F5
û	150	96	Â	182	B6	Í	214	D6	÷	246	F6
ù	151	97	À	183	B7	Î	215	D7	¸	247	F7
ÿ	152	98	©	184	B8	Ï	216	D8	º	248	F8
Ö	153	99	¹	185	B9		217	D9	¨	249	F9
Ü	154	9A		186	BA		218	DA	·	250	FA
ø	155	9B	»	187	BB		219	DB		251	FB
£	156	9C		188	BC		220	DC		252	FC
Ø	157	9D	¢	189	BD		221	DD		253	FD
x	158	9E	¥	190	BE	Ì	222	DE		254	FE
f	159	9F		191	BF		223	DF		255	FF

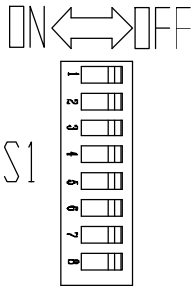
NOTE: For the hardware handshake XON/XOFF commands
XON = (DC1) **XOFF** = (DC3)

Appendix B

DIP Switch Settings

S1 FUNCTION SELECTION

	S1-1	S1-2	S1-3
9600	OFF	OFF	OFF
4800	OFF	OFF	ON
2400	OFF	ON	OFF
1200	OFF	ON	ON
600	ON	OFF	OFF
300	ON	OFF	ON
19200	ON	ON	OFF
TEST/9600	ON	ON	ON



WORD LENGTH	S1-4
8,1,N-BIT WORD	OFF
7,2,N-BIT WORD	ON

MODE SELECTION	S1-5
STANDARD RS-232/RS-422 INPUT	OFF
INTERNAL BATCH LABELING	ON

PRESENT SENSOR	S1-6
DISABLE SENSOR	OFF
ENABLE SENSOR	ON

RIBBON SENSOR	S1-7
STANDARD SENSING	OFF
INVERTED SENSING	ON
(Colored and Special Ribbons)	

CUTTER ENABLE	S1-8
REMOTE CUT ENABLED	ON
REMOTE CUT DISABLED	OFF

Appendix C

Interface Cable Applications

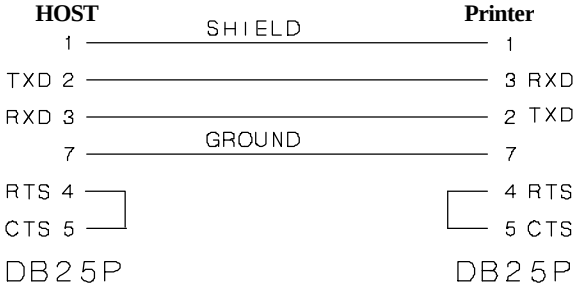
Part Number	Description
556000	Printer to CRT Terminal (DB25P) RS-232
556001	Printer to PC 9 Pin (DB9S) RS-232
556002	Printer to PC 25 Pin (DB25S) RS-232
899516	Printer to PC Parallel Port (DB25P)

Pin Connections

All unlisted pins are not connected.

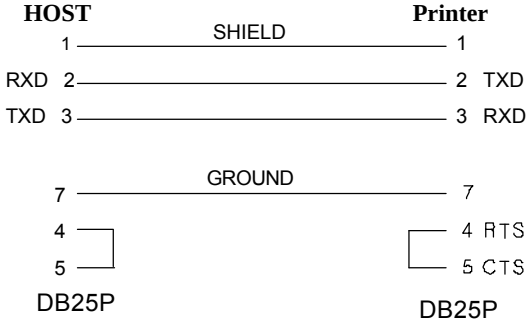
Pin	Description
1	CHASSIS
2	TXD (RS-232)
3	RXD (RS-232)
4	RTS (4.7k ohm to +5VDC)
5	CTS (input)
7	LOGIC GROUND
20	BUSY (output)
9	TXD +
10	TXD -
18	RXD +
19	RXD -

Null Modem Cable



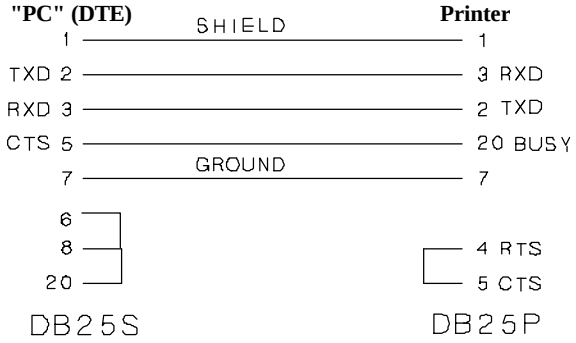
NOTE:	Cable is used for typical connection to other DCE equipment with XON/XOFF flow control.

Straight Cable (MM)



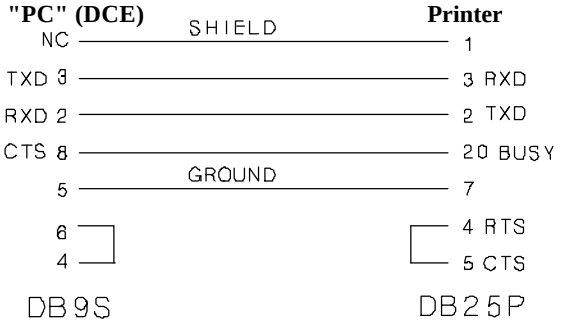
NOTE:	Cable is used for typical connection to other DCE equipment with XON/XOFF flow control.

PC (DB25P) to Printer



NOTE:	Cable is used for connection to "PC" compatible with DB25P communication Ports. Flow control is either XON/XOFF or CTS/DTR.

PC (DB9P) to Printer



NOTE:	Cable is used for connection to "PC" compatible with DB25P communication Ports. Flow control is either XON/XOFF or CTS/DTR.

Appendix D

Available Fonts and Bar Codes

All character fonts and bar codes available on the Printer are illustrated on the following pages. Each font and bar code has a "name" associated with it for use in programming. Human readable fonts have been given numeric names while bar code fonts are selected by alpha names. Uppercase alpha font names will print bar codes with human readable interpretations. Lowercase alpha fonts will be the same bar codes printed as bars only.

Human readable fonts use the slash zero convention for distinguishing between the zero and the alphabetic O. Fonts 0, 1, and 2 include the upper and lowercase ASCII characters, which include commonly used international characters.

I. Standard Human Readable Fonts

CPI at 1, 2, & 3X Dot Pattern Rotations				**203 DPI PRINTER**			**152 DPI PRINTER**		
				1x1	2X2	2X3	1x1	2X2	2X3
				ALL ROT 2&4	ALL ROT	ROT	ALL ROT	ALL ROT	ROT 2&4
DPI				200	100	66.7	153.8	76.3	51.3
Dot Size				0.005	0.010	0.015	0.0065	0.0130	0.0195
FONT	Dot H	Dot W	Dot Sp						
0	7	5	1	33.83	16.92	11.28	25.64	12.82	8.55
1	13	7	2	22.56	11.28	7.52	17.09	8.55	5.70
2	18	10	2	16.92	8.46	5.64	12.82	6.41	4.27
3	27	14	2	12.69	6.34	4.23	9.62	4.81	3.21
4	36	18	3	9.67	4.83	3.22	7.33	3.66	2.44
5	52	18	3	9.67	4.83	3.22	7.33	3.66	2.44
6	64	32	4	5.64	2.82	1.88	4.27	2.14	1.42
7	32	15	5	10.15	5.08	3.38	7.69	3.85	2.56
8	28	15	5	10.15	5.08	3.38	7.69	3.85	2.56

II. BAR CODES With Interpretation Line
(UPPERCASE)

Ratio Based Barcodes

203 DPI Printer (actual dpi - 203)						
Ratio (i.e. 2:1, 3:1, 5)	2:1	5:2	3:1	2:1	5:2	3:1
Narrow Bar Name	0.005	0.005	0.005	0.010	0.010	0.010
A 30F9	15.62	7.00	12.69	7.81	3.50	6.34
D 120F5	14.50	6.34	11.28	7.25	3.17	5.64
H HIBC	15.62	7.00	12.69	7.81	3.5	6.34
I CODABAR	14.50	6.34	11.28	7.25	3.17	5.64
J 120F5 W/BARS	16.92	7.25	12.69	8.46	3.63	6.34
K PLESSEY	20.30	9.23	16.92	10.15	4.61	8.46
L UPC CASE	14.50	6.34	11.28	7.25	3.17	5.64
152 DPI Printer (actual dpi - 153.8)						
	2:1	5:2	3:1	2:1	5:2	3:1
Narrow Bar Name	0.006	0.006	0.006	0.0130	0.0130	0.0130
A 30F9	11.83	5.31	9.62	5.92	2.65	4.81
D 120F5	10.99	4.81	8.55	5.49	2.40	4.27
H HIBC	11.83	5.31	9.62	5.92	2.65	4.81
I CODABAR	10.99	4.81	8.55	5.49	2.40	4.27
J 120F5 W/BARS	12.82	5.49	9.62	6.41	2.75	4.81
K PLESSEY	15.38	6.99	12.82	7.69	3.50	6.41
L UPC CASE	10.99	4.81	8.55	5.49	2.40	4.27

Element Based Barcodes

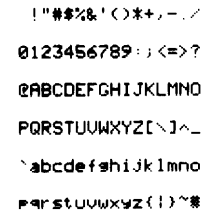
203 DPI Printer (actual dpi - 203)						
Multiplier = Narrow Bar Width	1 0.0049	2 0.0049	3 0.0049	4 0.0049	6 0.0049	8 0.0049
B UPC-A	38%	76%	114%	152%	227%	303%
C UPC-E	38%	76%	114%	152%	227%	303%
E CODE128 (B)	9.23	3.69	6.15	4.61	1.85	3.08
F EAN-13	38%	76%	114%	152%	227%	303%
G EAN-8	38%	76%	114%	152%	227%	303%
M UPC 2DIG ADD	38%	76%	114%	152%	227%	303%
N UPC 5DIG ADD	38%	76%	114%	152%	227%	303%
O CODE 93	11.28	4.51	7.52	5.64	2.26	3.76
152 DPI Printer (actual dpi - 153.8)						
Multiplier = Narrow Bar Width	1 0.0065	2 0.0065	3 0.0065	4 0.0065	6 0.0065	8 0.0065
B UPC-A	50%	100%	150%	200%	300%	400%
C UPC-E	50%	100%	150%	200%	300%	400%
E CODE128 (B)	6.99	2.80	4.66	3.50	1.40	2.33
F EAN-13	50%	100%	150%	200%	300%	400%
G EAN-8	50%	100%	150%	200%	300%	400%
M UPC 2DIG ADD	50%	100%	150%	200%	300%	400%
N UPC 5DIG ADD	50%	100%	150%	200%	300%	400%
O CODE 93	8.55	3.42	5.70	4.27	1.71	2.85

ALL EXAMPLES ARE PRINTED WITH A 10 x 10 MIL PIXEL SIZE, AND A 1X MAGNIFICATION ON THE HORIZONTAL AND VERTICAL DOT PATTERNS.

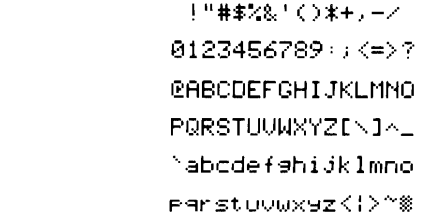
III. Standard Fonts - Human Readable Examples

0: Identifies a 96-character alphanumeric font. Uppercase and lowercase. Characters are 7 dots high, 5 dots wide, and 1 dot spacing.

203 DPI Printer

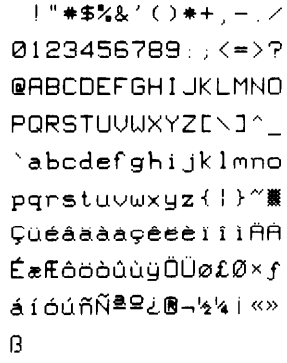


152 DPI Printer

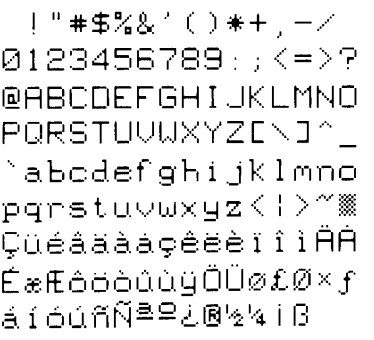


1: Identifies a 145-character uppercase and lowercase alphanumeric font that includes descenders and ascenders. Characters are 9 dots high, 9 dots wide, and 2 dots spacing (International characters are 13 dots high, 7 dots wide, and 2 dots spacing).

203 DPI Printer

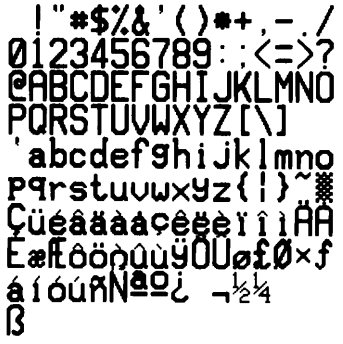


152 DPI Printer

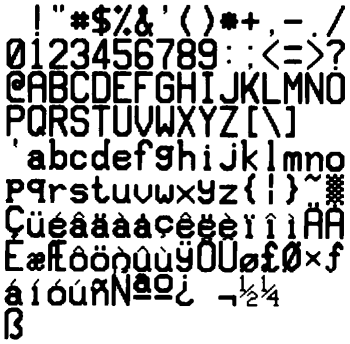


2: Identifies a 138-character alphanumeric upper and lowercase font. Characters are 18 dots high, 10 dots wide, and 2 dots spacing.

203 DPI Printer

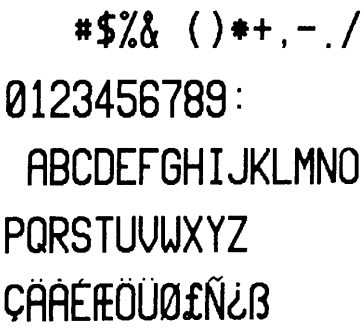


152 DPI Printer

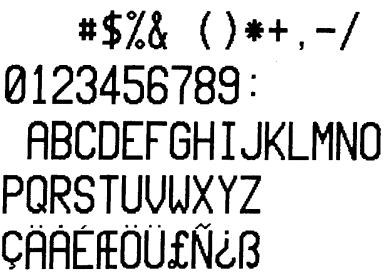


3: Identifies a 62-character alphanumeric font, uppercase. Characters are 27 dots high, 14 dots wide, and 2 dots spacing.

203 DPI Printer

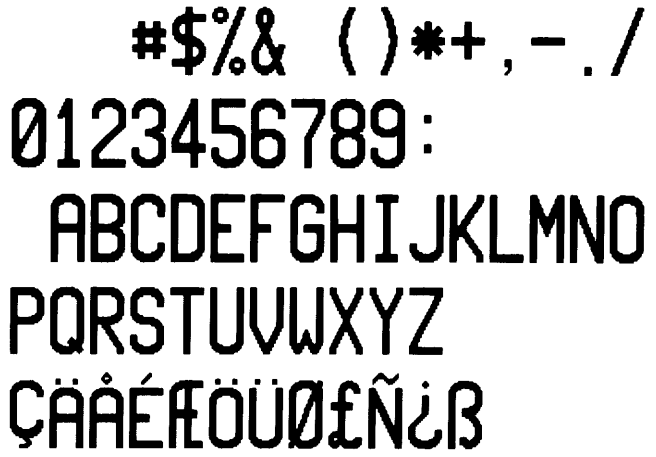


152 DPI Printer

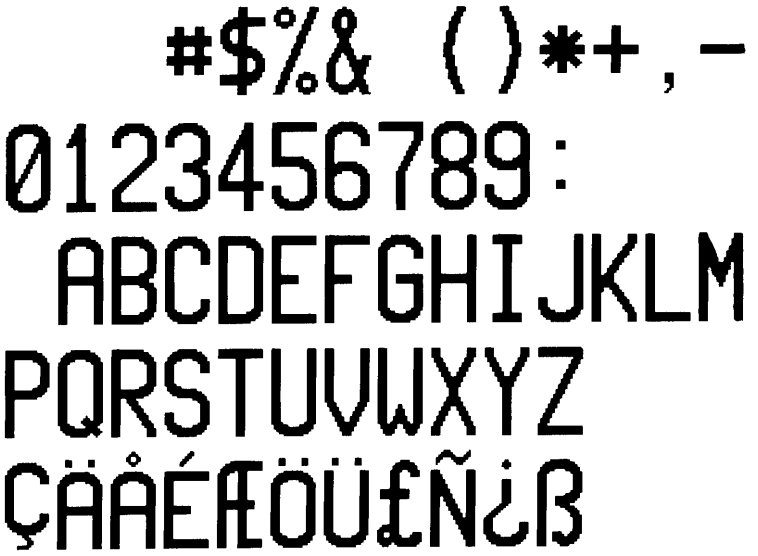


4: Identifies a 62-character alphanumeric font, uppercase. Characters are 36 dots high, 18 dots wide, and 3 dots spacing.

203 DPI Printer

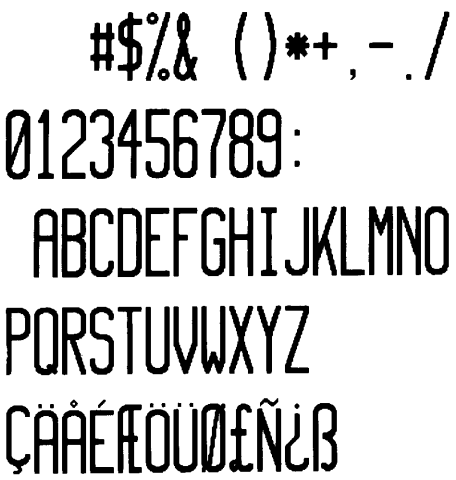


152 DPI Printer

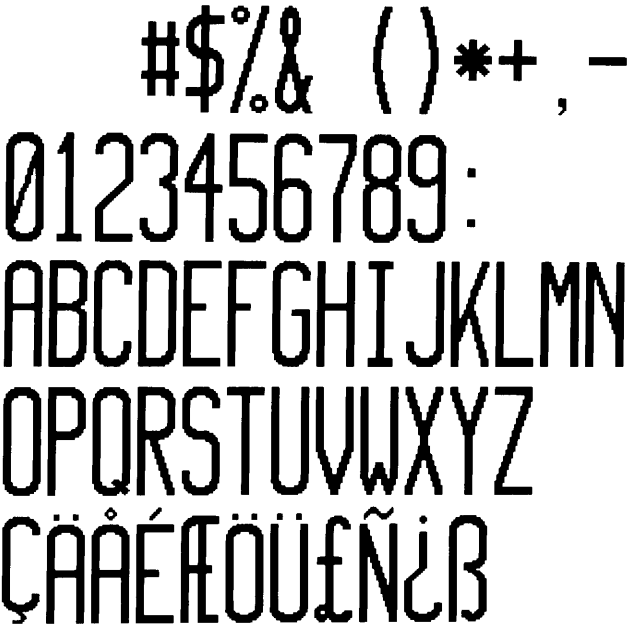


5: Identifies a 62-character alphanumeric font, uppercase. Characters are 52 dots high, 18 dots wide, and 3 dots spacing.

203 DPI Printer

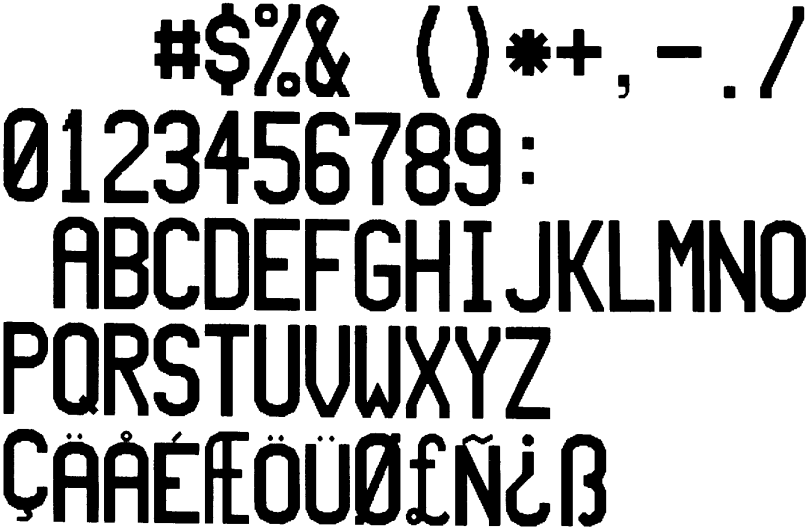


152 DPI Printer



6: Identifies a 62-character alphanumeric font, uppercase. Characters are 64 dots high, 32 dots wide, and 4 dots spacing.

203 DPI Printer

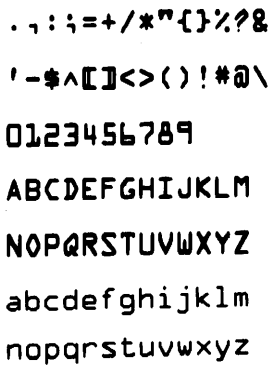


6. (Continued)

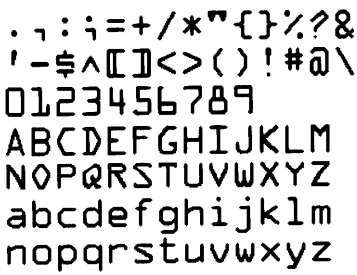
152 DPI Printer

7: Identifies a font that prints OCR-A, size I. Characters are 32 dots high, 15 dots wide, and 5 dots spacing.

203 DPI Printer

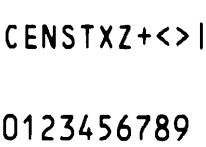


152 DPI Printer

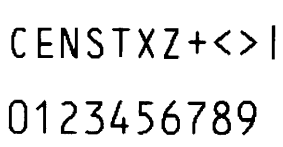


8: Identifies a font that prints OCR-B, size III. Characters are 28 dots high, 15 dots wide, and 5 dots spacing.

203 DPI Printer



152 DPI Printer



IV Bar Code Examples

A: Identifies the Code 3 of 9 bar code. Code 39 is an uppercase, alphanumeric bar code that is variable in length. The valid ASCII characters for this font are: 32, 36-37, 42-43, 45-47, 48-57, 65-90. Code 3 of 9's normal wide to narrow bar ratio is 3:1.

203 DPI Printer

152 DPI Printer

B: Identifies the UPC-A bar code. Numeric-only bar code with a fixed length of 12 characters. Eleven digits supplied by host or application software, 12th digit checksum supplied by Printer. If the 12th digit is sent by the host, the Printer will check that character against the calculated checksum and will print the bar code as all zeros if they do not match. Addendum codes for this font are described by fonts M and N. The normal ratios that the Printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since UPC type bar codes are element based and not ratio based. (Maximum 10 bar codes per label.)

203 DPI Printer

113%

76%

152 DPI Printer

100%

Option V: Identifies Random Weight UPC bar code. The seventh digit supplied by the host or application software must be an uppercase V followed by 4 digit weight information. Eleven digit checksum is supplied by the Printer.

203 DPI Printer

152 DPI Printer

100%

C: Identifies the truncated UPC-E bar code. Numeric-only bar code with a fixed length of 7 characters. Six digits supplied by host or application program, 7th digit checksum supplied by the Printer. If the 7th digit is sent by the host, the Printer will check that character against the calculated checksum and will print the bar code as all zero if they do not match. Addendum codes for this font are described by fonts M and N. The normal ratios that the Printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since UPC type bar codes are element based and not ratio based.

203 DPI Printer

113%

76%

152 DPI Printer

100%

D: Identifies the Interleaved 2 of 5 bar code. I 2 of 5 is a numeric-only code. The ASCII range for the numeric codes is 48-57. Code I 2 of 5's normal wide to narrow bar ratio is 5:2. (Maximum 8 bar codes per label.)

203 DPI Printer

152 DPI Printer

E: Identifies the Code 128 variable length bar code with modulo 103 checksum calculation. Code 128 can encode the entire 128 ASCII character set, including both uppercase and lowercase alpha characters. Code 128 is an element based bar code similar to the UPC fonts. Therefore ratios must be equal to one. The valid ratios are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8.

The Printer supports Code 128 Code Subset A, B, and C. You can select the Printer to start on any code subset and switch to another with the data area (default is subset B).

Code Subset A includes all of the standard upper case alphanumeric keyboard characters plus the control and the special characters. To select Code Subset A, precede the data to be encoded with an ASCII A (DEC 65, HEX 41).

Code Subset B includes all of the standard upper case alphanumeric keyboard characters plus lower case alphabetic and special characters. To select Code Subset B, precede the data to be encoded with an ASCII B (DEC 66, HEX 42). If no start character is sent for the 128 font, Code Subset B will be selected by default.

Code Subset C includes the set of 100 digit pairs from 00 through 99 inclusive, as well as special characters. Code Subset C is used for double density encoding of numeric data. To select Code Subset C, precede the data to be encoded with an ASCII C (DEC 67, HEX 43). You must not try to encode alpha data if you select Code Subset C.

Special Character Handling

Characters above ASCII value 95 are considered special characters. To access these values, a two character reference table has been built into the Printer. The following table describes this reference.

ASCII	2 CHAR	CODEA	CODEB	CODEC
95	&A	FNC3	FNC3	–NA–
96	&B	FNC2	FNC2	–NA–
97	&C	SHIFT	SHIFT	–NA–
98	&D	CODEC	CODEC	–NA–
99	&E	CODEB	FNC4	CODEB
100	&F	FNC4	CODEA	CODEA
101	&G	FNC1	FNC1	FNC1

As an example, to get FNC2 to be encoded into a Code Subset A bar code, send the ASCII & (ASCII 38, HEX 26) followed by an ASCII B (DEC 66, HEX 41), code FNC2 will be encoded.

Example: ATEST&B123

Data Encoded: TEST<FNC2>123

Control Codes:

Control characters can be encoded into Code Subset A by sending the lowercase ASCII characters “a-z”, “a” = SOH, “b” = STX, “c” = ETX and so on.

Font Sizing:

Font sizing for 128 on Rotation #2 is not consistent because of the variable character code to character correlation. Therefore the row address may have to be adjusted to place it properly.

203 DPI Printer

152 DPI Printer

F: Identifies the standard EAN-13 bar code. Numeric-only bar code; fixed in length. Twelve digits supplied by host or application software, 13th digit checksum supplied by Printer. If the 13th digit is sent by the host, the Printer will check that character against the calculated checksum and will print the bar code as all zero if they do not match. Addendum codes for this font are described by fonts M and N. The normal ratios that the Printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since EAN type bar codes are element based and not ratio based. Maximum 12 bar codes per label.

203 DPI Printer

113%

76%

152 DPI Printer

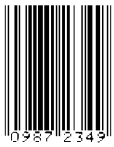
100%

G: Identifies the truncated EAN-8 bar code. Numeric-only bar code; fixed in length. Seven digits supplied by host or application software, 8th digit supplied by the Printer. If the 8th digit is sent by the host, the Printer will check that character against the calculated checksum and will print the bar code as all zero if they do not match. Addendum codes for this font are described by fonts M and N. The normal ratios that the Printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since EAN type bar codes are element based and not ratio based.

203 DPI Printer

113%

76%



152 DPI Printer

100%

H: Identifies the HIBC (modulo 43 checksum) version of the code 3 of 9 bar code. The checksum will be placed at the end of the data string that is received from the host. The host device must supply the leading "+"s to identify the data format type. Code 39 is an uppercase, alphanumeric bar code that is variable in length. The valid ASCII characters for this font are: 32, 36-39, 42-43, 45-47, 48-57, 65-90. Code 3 of 9's normal wide to narrow bar ratio is 3:1.

203 DPI Printer

152 DPI Printer

I: Identifies the 20-character CODABAR bar code. CODABAR is basically a numeric bar code with some special additional characters. These characters are "0123456789ABCD$+-./:" excluding the " characters. The length of the code is variable and is normally printed with a 3:1 ratio. CODABAR needs a start and stop character.

203 DPI Printer

152 DPI Printer

J: Identifies an I 2 of 5 bar code with modulo 10 checksum calculation. The ASCII range for the numeric codes is 48-57. Code I 2 of 5's normal wide to narrow bar ratio is 5:2. Font D and L also print different forms of the I 2 of 5 bar code. Maximum 8 bar codes per label.

203 DPI Printer

152 DPI Printer

K: Identifies the Plessey bar code.

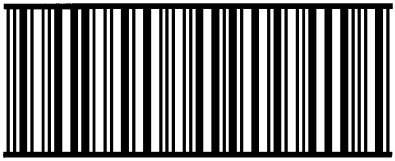
203 DPI Printer

152 DPI Printer

L: Identifies an I 2 of 5 bar code with modulo 10 checksum (UPC shipping container symbology) that does the special human readable formatting and adds bearer bars to the top and bottom of bars when encoding 13 digits. The ASCII range for the numeric codes is 48-57. Code I 2 of 5's normal wide to narrow bar ratio of 5:2. Font D and J also print different forms of the I 2 of 5 bar code. There must be a maximum of 8 bar codes per label.

203 DPI Printer

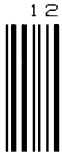
152 DPI Printer



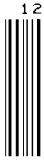
M: Identifies the 2 digit addendum code for UPC fonts. It is a numeric-only bar code with a fixed length of 3 characters. Two characters supplied by the host or application software, the third digit checksum supplied by Printer. If the third digit is sent by the host, the Printer will check that character against the calculated checksum and will print the bar code as all zero if they do not match. The normal ratios that the Printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since UPC type bar codes are element based and not ratio based. It must be placed after the UPC/EAN code manually. This code should be placed 9 modulus away from the end of preceding bar codes.

<u>203 DPI Printer</u>

113%



76%



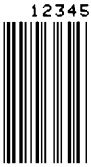
<u>152 DPI Printer</u>

100%

N: Identifies the 5 digit addendum code for UPC fonts. It is a numeric-only bar code with a fixed length of 6 characters. Five characters supplied by the host or application software, the sixth digit checksum supplied by Printer. If the sixth digit is sent by the host, the Printer will check that character against the calculated checksum and will print the bar code as all zero if they do not match. The normal ratios that the Printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These ratios actually specify size of elements since UPC type bar codes are element based and not ratio based. It must be place after the UPC/EAN code manually. This code should be placed 9 modulus away from the end of preceding bar codes.

<u>203 DPI Printer</u>

113% 

76% 

<u>152 DPI Printer</u>

100%

O: Identifies the Code 93 bar code. Code 93 is an upper and lower case alpha numeric bar code. The normal ratios that the Printer can print are 1:1, 2:2, 3:3, 4:4, 6:6, and 8:8. These numbers actually specify size of magnification and are element based; not ratio based. The ASCII characters that are permissible for Code 93 are ":,&#0$%*+ABCDEFGHIJKLMNOPQRSTUVWXYZ 0123456789abcdefghijklmnopqrstuvwxyz".

203 DPI Printer

152 DPI Printer

Appendix E

Transmitted Error Codes

Small “c” The Printer received a data byte from the host that contains a framing error (corrupted) usually due to noise.

Small “v” Input buffer overflow.

Warranty Information

LIMITED WARRANTY STATEMENT
PRODIGY AND PRODIGY 152
LABEL PRINTERS

Printer

DATAMAX Bar Code Products Corporation, (hereinafter referred to as "DATAMAX"), warrants to Purchaser that under normal use and service, the PRODIGY and PRODIGY 152 Label Printers (with the exception of the thermal printhead) purchased hereunder shall be free from defects in material and workmanship for a period of (365) days from the date of shipment by DATAMAX.

Expendable and/or consumable items or parts such as lamps, fuses, labels and ribbons are not covered under this warranty. This warranty does not cover equipment or parts which have been misused, altered, neglected, handled carelessly, or used for purposes other than those for which they were manufactured. This warranty also does not cover loss, damages resulting from accident, or damages resulting from unauthorized service.

Thermal Printhead

This warranty is limited to a period of ninety (90) days, or 1,000,000 linear inches of use, whichever comes first, for the PRODIGY and PRODIGY 152 Label Printers thermal printhead. This ninety (90) day warranty is valid only if a DATAMAX- approved thermal or thermal transfer label media is used, as defined on the then current DATAMAX list of Approved Thermal/Thermal Transfer Media, a copy of which is available from DATAMAX. Failure to use DATAMAX-approved media is justification for invalidation of this thermal printhead warranty. This warranty does not cover printheads which have been misused, altered, neglected, handled carelessly, or damaged due to improper cleaning or unauthorized repairs.

Warranty Service Procedures

If a defect should occur during the warranty period, the defective unit shall be returned, freight and insurance prepaid, in the original shipping containers, to DATAMAX at: 4501 Parkway Commerce Blvd., Orlando, Florida 32808. Attached to the defective unit, include contact name, action desired, a detailed description of the problem(s) and examples when possible. DATAMAX shall not be responsible for any loss or damages incurred in shipping. Any warranty work to be performed by DATAMAX shall be subject to DATAMAX's confirmation that such product meets DATAMAX's warranty. In the event of a defect covered by its warranty, DATAMAX will return the repaired or replaced product to Purchaser at DATAMAX's cost.

With respect to a defect in Hardware covered by the warranty, the warranty shall continue in effect until the end of the original warranty period or for sixty (60) days after the repair or replacement, whichever is later.

General Warranty Provisions

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SOFTWARE IS LICENSED ON AN 'AS IS' BASIS WITHOUT WARRANTY.

EXCEPT AND TO THE EXTENT EXPRESSLY PROVIDED IN THIS WARRANTY AND IN LIEU OF ALL OTHER WARRANTIES, THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Purchaser shall be solely responsible for the selection, use, efficiency and suitability of DATAMAX's products.

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