Allegro™
Operator's Manual

As an Energy Star Partner, Datamax Corporation has determined that this product meets the Energy Star guidelines for energy efficiency.

Agency Compliance and Approvals:

UL: UL1950 Information Technology Equipment
CSA: C22.2 No. 950-M93
TUV: EN60950, IEC950
VDE: Class B Vfg. 243/1991

1. Nur für Gebrauch innerhalb eines Gebäudes geeignet.
2. Bei Gefahr, Kabel aus der Steckdose herausziehen
3. Falls kein Kabel mitgeliefert wurde, bitte Folgendes bei der Anschaffung eines Kabels beachten:

Für 230 Volt (Europa): Benützen Sie ein Kabel, das mit "HAR" markiert ist, bestehend mindestens aus einem H05VV-F Kabel, das mindestens 0,75 Quadratmillimeter Drahtdurchmesser hat; sowie eine IEC320 Steckdose und einen für das Land geeigneten Stecker, 6A, 250 Volt.

1. This unit is intended for indoor use only.
2. Disconnect power supply cord in case of emergency.
3. When power supply cord is not provided; for proper power supply cord selection please see below:

For 230 Volt Operation (Europe): Use a cord set, marked "HAR," consisting of a min H05VV-F cord which has a minimum 0.75 square mm diameter conductors, provided with an IEC 320 receptacle and a male plug for the country of installation rated 6A, 250V

FCC: This device complies with Part 15 of FCC rules.

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

Important Safety Instructions

Your Barcode Printer has been designed to give you many years of safe, reliable service. As with all electrical equipment, there are a few basic precautions you should take to avoid getting hurt or damaging the Printer.

- Carefully read the installation and operating instructions provided with your Printer.

- Read and follow all warning instruction labels on the Printer itself.

- Place the Printer on a flat, firm, solid surface.

- To protect your Printer from overheating, make sure all openings on the Printer are not blocked.

- Do not place the Printer on or near a heat source, (i.e., a radiator or heat register).

- Do not use your Printer near water, or spill liquid of any kind into it.

- Be certain that your power source matches the rating listed on the back of the Printer. If you are unsure, check with your dealer or with your local power company.

- Do not place the power cord where it will be walked on. If the power cord becomes damaged or frayed replace it immediately.

- Do not insert anything into the ventilation slots or openings on the Printer.

- Only qualified, trained service technicians should attempt to repair your Printer.

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♦ Getting Started

1.0   Introduction

The Allegro™ Label Printer, hereafter referred to as the "Printer", incorporates high-performance/low cost direct thermal and optional thermal-transfer label printing capabilities. The combination of powerful capabilities, easy-to-use features, a contemporary look, and affordable pricing set a new standard for direct-thermal and thermal-transfer label printers in retail, office and industrial applications.

1.1   Unpacking and Inspection

Inspect the shipping container(s) for damage, if damage is evident contact the carrier to specify the nature and extent of the damage.

Remove the Printer from the packaging material and check the contents of the package. In addition to this manual, the following items should be included:

- label printer
- front tear bar assembly
- special or additional items purchased.

1.2 Location of Parts on your Printer

The following illustrations show the major components of your Printer. Figure 1-2 is a detailed view of the print mechanism from the side. Figure 1-3 is a back view of the Printer. Figure 1-5 is a view of Printer's buttons and lights.

In this manual we will refer to the components and connectors depicted in these illustrations. If you are not installing the optional cutter or front rewind, then you should proceed to install the front Tear-off Assembly, (see Figure 1.4).
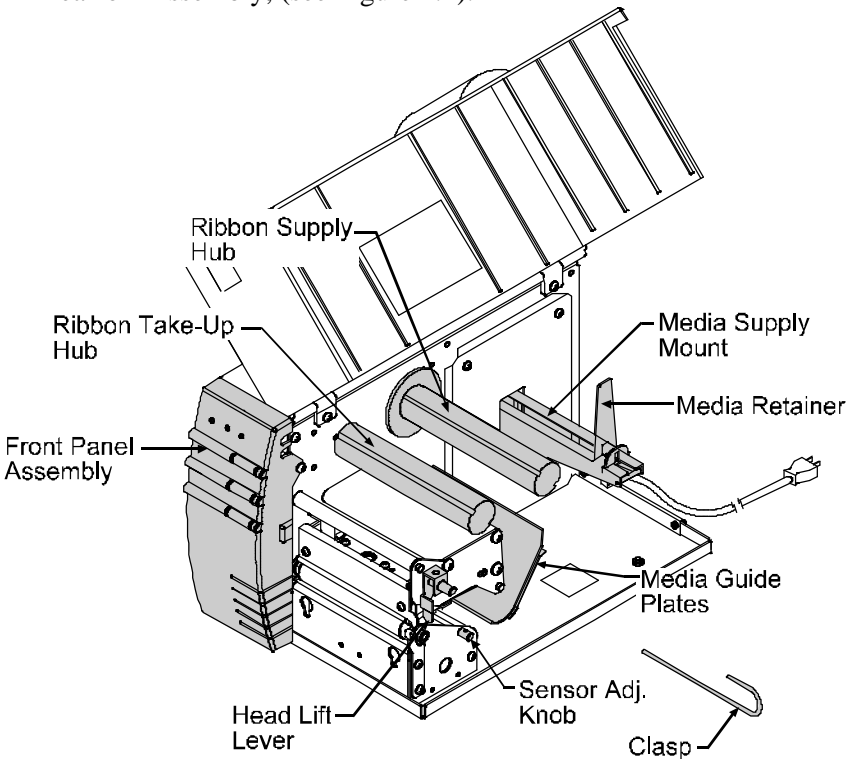
Figure 1-2   Mechanism Detail
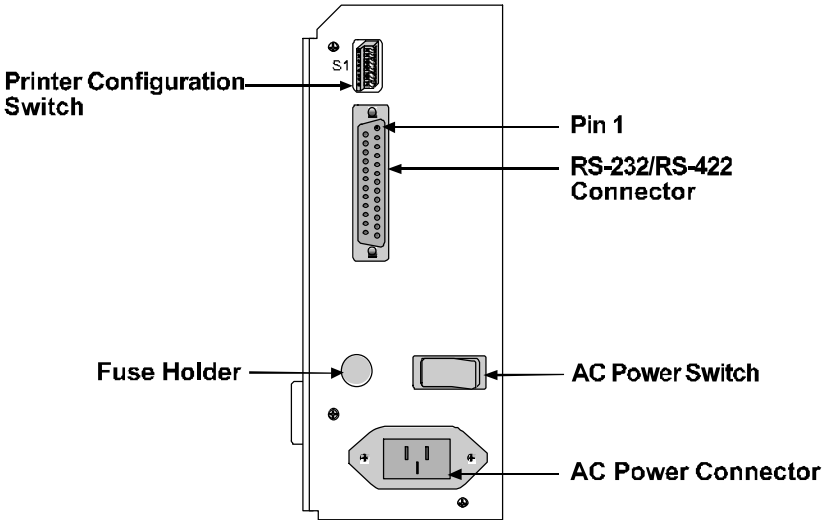
Figure 1-3   Rear View

1.3 Tear-off Assembly Installation

1. Open the cover.

2. Disengage the Printhead by rotating the Head-Lift Lever clockwise to the 'up' position.

3. Fit the Tear-off Assembly to the slots below the drive roller and push it down until it snaps into place.

4. Engage the Printhead by rotating the Head-Lift Lever counter-clockwise to the 'down' position.

Head Lift
Lever
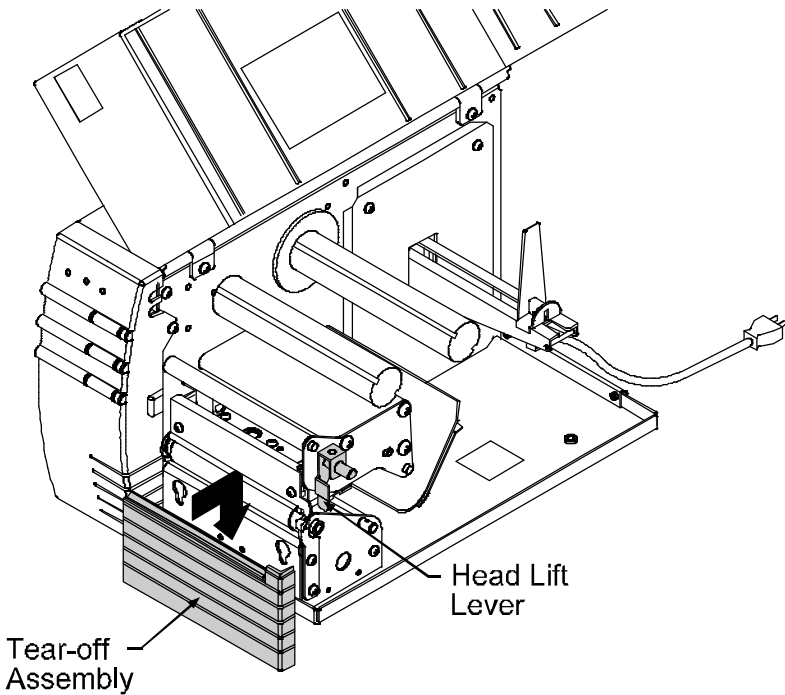
Tear-off
Assembly

Figure 1-4   Tear -off Assembly Installation

1.4   Using the Printer's Control Panel

The Printer has three operator-accessible buttons, three LED indicators (lights), one switch and one POT, (see Figure 1-5). A brief description of the buttons, lights, switch and POT are listed in this section.
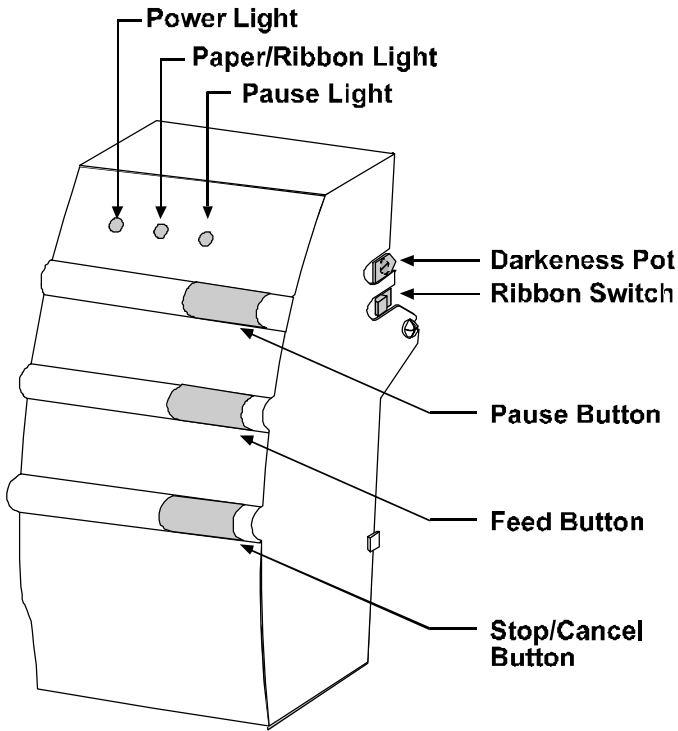
Figure 1-5   Buttons and Lights

Power Light: The power light is turned on after the power switch on the rear of the Printer is activated.

Pause Button: This Button allows the operator to stop printing a run of labels and then complete the job by pressing the Button again. Activation of the Button will:

- Stop the print mechanism when the label printing is complete.
- Turn on the Pause Light.
- Stop the label counter, but maintain the count balance.
- Hold all data in memory.

Pressing the Button a second time will:
- Restart the Printer.
- Print the balance of labels on the counter unless interrupted.
- Turn 'off' the pause light.

Pause Light: The pause light will turn on if any of the following occurs: the pause Button is pressed; a print job is canceled with the stop/cancel Button, or; a fault occurs with the Cutter or Rewind Option.

Stop/Cancel Button: This Button allows the operator to stop and cancel a run of labels in the process of being produced and continue on to the next run in the Printer's buffer.

Feed Button: Pressing this Button causes the paper to automatically advance to the first print position of the next label. On a new size label, two labels are usually fed before registration occurs.

Paper/Ribbon: This light is activated when:
- No label and/or ribbon is detected.
- The Internal Rewinder (if installed) is not rotating, (i.e., maximum rewind capacity has been reached).

Transfer Switch: This switch should be in the 'off' position for Direct-Thermal Printing and in the 'on' position for Thermal-Transfer Printing. When on, it has two functions: the ribbon sensor is enabled, and; the Printhead temperature is reduced, since most Thermal-Transfer Printing does not require as much heat as Direct-Thermal Printing.

Darkness Pot: This potentiometer is used to fine adjust print darkness to variations in the media

1.5 Using Print Media

Installation

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. Simply lift the cover of the Printer from the right-hand side for installation instructions.
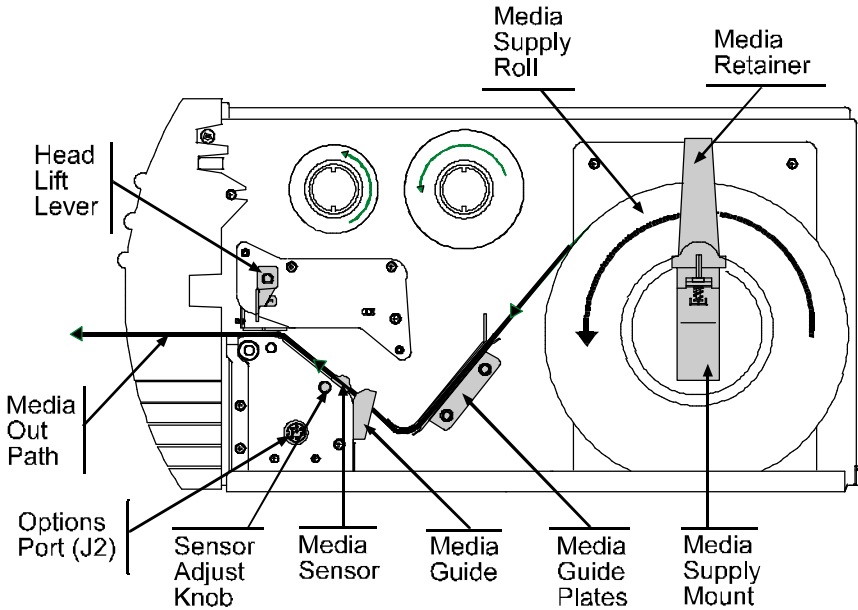
Figure 1-6   Label Loading Diagram

Labels

The Printer uses labels up to 4.65" (118 mm) wide. The maximum diameter of a roll of labels used in the Printer is 6" (152 mm). If a label is narrower than 3.5" (89 mm) then the Printhead must be adjusted. Please refer to Section 4.2., 'Aligning the Printhead' for more information.

1.5.1 Label Loading Instructions

1. Disengage the Printhead by rotating the Head-Lift Lever clockwise to the 'up' position.

2. Slide the Media Guide to the outer edge of the guide and rotate it to the 'down' position.

3. Slide the Retainer to the outer edge of the Supply Mount.

4. Place the label roll on the Supply Mount and slide the Retainer firmly against it.

5. Insert the label stock as shown in Figure 1-6.

6. Rotate the Media Guide 'up' and slide it to the edge of the Media.

7. Engage the Printhead by rotating the Head-Lift Lever counterclockwise to the 'down' position.

If the Media is not sensing, try adjusting the sensor position by turning the adjustment knob for the movable sensor. The gauge behind and below the Printhead can be viewed for making this adjustment. If the label's edge is not detected within 12" (305 mm) of feeding, the Printer will stop and the paper/ribbon light will remain on. In this case, check the threading of the Media around the bottom of the upper and lower Media Guides.

If the paper only feeds forward about 1-inch (26 mm) each time you press the feed button, and does not seem to be stopping on a label edge, the ribbon switch, (shown in Figure 1-5) was probably turned on without thermal-transfer ribbon being installed. Slide this switch toward the front of the Printer for direct-thermal printing.

1.6 Ribbon Loading

In thermal-transfer mode, ribbons must be installed on the Take-up Hub. The ribbon can be wound directly on to the hub and held with a clasp, or a used ribbon core can be placed on the hub.

1.6.1 Ribbon Loading Instructions

1. Disengage the Printhead by rotating the Head-Lift Lever clockwise to the 'up' position.

2. Slide the Ribbon on to the Ribbon Supply Hub. Route the ribbon, (see Figure 1-7), and attach the ribbon to the Ribbon Take-up Hub.

3. Engage the Printhead by rotating the Head-Lift Lever counterclockwise to the 'down' position.
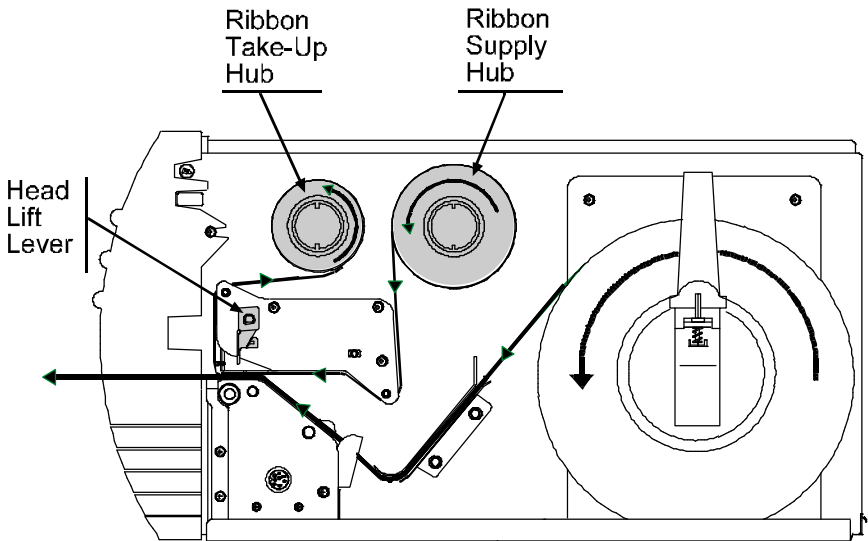
Figure 1-7   Ribbon Loading

1.7 Using the Printer's Options

1.7.1 Available modules

The Printer uses Memory modules to expand its built-in capabilities, primarily for the use of storing graphic images and bitmaps of smooth fonts. The Label Printer has one Module slot located on the left side for use with memory module Memory Cartridges.

Font ROM modules

Font ROM modules contain additional fonts that extend the capabilities of the Internal Fonts. Each font ROM module comes with documentation detailing the type and sizes available on the module and the font number of each size used in label formatting. Font ROM modules are programmed at the factory and cannot be modified later for any other purpose.

256K and 512K RAM modules

RAM modules are the most flexible module option for the Printer. They provide temporary storage of data used in label-format printing. Each module contains 256K of data storage for fonts, graphic images or label formats.

An additional feature of the 512K RAM module is that the Printer will use a part of its memory to extend the Printer's bit-mapped label area from 8.25" (210 mm) to 20.25" (514 mm).

256K Flash EEPROM Module

Flash EEPROM modules provide the same features of RAM modules with the added benefit of virtually permanent storage. A write protect switch on the Flash EEPROM module can protect data stored on the cartridge from being overwritten or erased.

1.7.2 Cutter

The Printer can be ordered with an optional cutter and tray for cutting tags and labels, or the option can be installed at a later date. This option can be easily attached to the Printer and once installed can be enabled by turning 'on' switch 8 located on the back of your Printer.

♦ Setting Up Your Printer

2.0 Checking Voltage Selection

The standard Printer is configured for 115 VAC ± 10% single-phase 50/60 Hz with a properly-grounded outlet. A small sticker next to the power cord connection indicates the power requirements.

For international markets, there is a 230 VAC version available. If you are uncertain about the configuration of your Printer, or the outlet you are connecting to, check with a qualified service technician to verify the installation before connecting power.

2.1 Power Up Self-Test

Once labels are installed in the Printer as described in Section 1.5, a Self-Test should be performed. The Printer will power up in the Self-Test Mode when the feed button is pressed as the Printer is being turned on. Initial power up will take approximately 7 seconds. The Printer should be loaded with 4.25" (108 mm) wide stock whenever this test is conducted. The Self-Test prints across the entire width of the Printhead. Expect a brief hesitation of up to 15 seconds before the Self-Test begins to print.

If a label edge is not detected within 12" (305 mm) of stock, the Printer will stop feeding labels. If this occurs, refer to Section 1.5 and reload the media, see Figure 1-6. If a label edge is detected, the Printer will begin to print the Self-Test pattern. An example of a test label is shown in Figure 2-1. After the test pattern has printed successfully, the Printer must be turned 'off' and then turned 'on' again to reset the Printer.

```
THR   June 9 , 1997  11:54    030
VER : CA01-01 . 15   3/4/97

SYSTEM ROM CHECKSUM :  20A6  IS GOOD
SYSTEM ROM  CHECKS  GOOD
SERIAL  PORT  BAUD  RATE  IS  96ØØ

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

ANALOG  INPUT  VALUES:
   PAPER: 242    EDGE: 147    VOLT: 122
    TEMP:  066   POT: 169
```
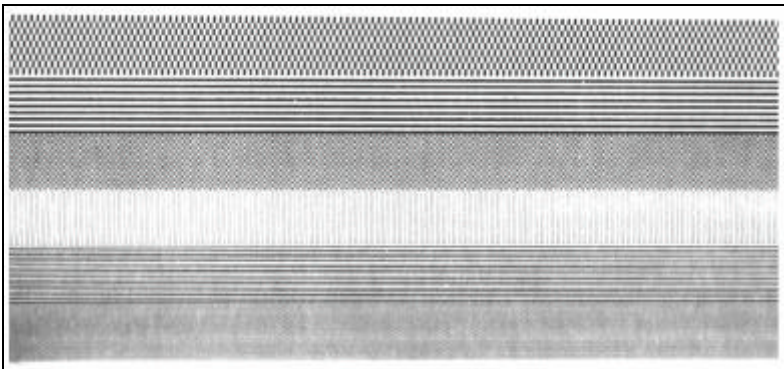

Figure 2-1   Test Label

2.2 Interfacing to the Printer

Depending on your application, the Printer can be set up in different ways. Table 2-1 lists the interface cables that should be used for each situation. If your application is not listed below, refer to Appendix E which contains the communications information necessary to connect the Printer to virtually any ASCII device.

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

Table 2-1   Interface Cables

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

The pin configuration of the Printer for most descriptions of the RS-232C interface on a DB-25 connector is DTE (Data Terminal Equipment). Pin 2 is transmit, pin 3 is receive and pin 7 is ground.

The Printer supports both Xon/Xoff and CTS/DTR handshaking. Whenever the Printer is interfaced in a mode that does not use the CTS/DTR pins, a jumper should be placed on the PC side of the cable between pins 4 and 5 (CTS/RTS) to bypass the operation of those control lines. A custom cable must be obtained for this purpose.

For connection to most host systems, Xon/Xoff handshaking reduces the number of wires necessary in the interface cable. For interfacing RS-422 devices, the Xon/Xoff handshake is the only appropriate method.

2.3 Sample Installations

In this section, four typical installations are reviewed, CRT terminal, PC, minicomputer, and mainframe computer. Cable connections for similar installations are listed in Appendix E.

CRT Connection

A typical application for a CRT-based system is generating and printing labels that are stored on an optional Flash Module. First, connect the Printer to the CRT with the cable number 556000 and turn on switch 7 at the rear of the Printer. Next, plug the Module into the slot on the side of the Printer to store label formats on the Module. For a detailed explanation of the operation of this configuration, refer to Chapter 3, "Creating Labels Using Internal Batch Software."

PC Connection

A cable should be selected (refer to Table 2-1), and connected to a PC via a RS-232C port. It is recommended that you use a RS-232C port to allow for two-way communication with the Printer. The RS-232C communications port can be connected with one of two possible configurations: a 9 pin cable (part number 556001) or a 25 pin cable (part number 556002).

> **Note:**   DB25S (socket/female) connectors on most PCs are normally parallel ports; DB25P and DB9P (pin/male) are normally serial ports.

If your Printer is controlled by a third-party software package, please refer to the operator's manual supplied with the software package for operating instructions. For detailed explanations of the Printer's commands and label format structure, refer to the Programmer's Manual.

A typical application for a PC-based system is printing labels for manufacturing production in a batch mode. In these applications, a data-base of part numbers, descriptions, warehouse locations, and shipping weight information may be obtained through the PC. Through an entry screen, the operator selects the type and quantity of labels to be printed. The PC sends the data via serial cables to the Printer and the operator receives the labels requested.

Minicomputer Connection

Connecting the Printer to most minicomputers is similar to connecting to a PC. Most minicomputers made by Digital Equipment, Hewlett Packard, Unisys, etc., have ASCII RS-232C serial ports similar to PCs. Interfacing to IBM systems sometimes requires a protocol converter. The cable you select for connecting the Printer to a minicomputer will vary depending on the type of computer system you have. Diagrams in Appendix E describe a straight serial cable and a null modem cable. One of these two cables should work on your system.

Non-ASCII Device Connection

The Printer uses the standard ASCII for conversion of byte patterns to characters. The standard port for receiving data expects asynchronous ASCII serial data. If your host system uses an interface other than ASCII character-based RS-232C, you will need an interface converter. Some hosts, such as IBM mainframe equipment, do not use the ASCII standard for data encoding, rather many IBM machines use EBCDIC.

To connect the Printer to EBCDIC devices, or devices with any other data encoding standard, a protocol converter must be used. A protocol converter translates the bit patterns of one standard to the bit patterns of another standard. Some protocol converters are also interface converters, combining two functions into one box. Many of these products are available from the manufacturer of your computer equipment or your local reseller. Please note that additional commands may be needed to control the protocol converter you select for your data interface.

2.4 Switch Settings

There are eight switches located on the back of the Printer as shown in Figure 2-2. The function of the switches is to control communications and are explained on the following pages.
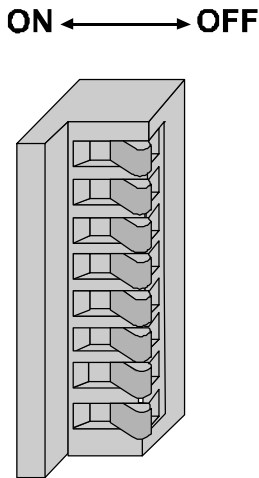
Figure 2-2   Switch Settings

2.4.1 Setting the Baud Rate

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 provides the position of the three switches and the corresponding baud rate that can be obtained by each setting:

Baud	9600	4800	2400	1200	600	300	9600 Test
SW-1	off	off	off	off	on	on	on
SW-2	off	off	on	on	off	off	on
SW-3	off	on	off	on	off	on	on

Table 2-2   Baud Rate

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

SW-4	Data Bits	Parity	Stop Bits
on	7	none	2
off	8	none	1

Table 2-3   Word Length

Note: It will be necessary to select the 8-bit mode if you want to access the foreign language characters. These characters are available in fonts 1 through 6 and 9.

Other Switches

Switch SW-5: Controls the label edge offset, when the switch is on, the label edge offset will default to 0250. When the switch is off, the label edge offset will default to 0220. Prodigy-compatible switch.

Switch SW-6: Unused

Switch SW-7: Enables the Internal Batch Software Program. This program is explained in Chapter 3. There is a software command that will perform the same option as this switch — <STX> g Command.

Switch SW-8: Controls the optional Cutter.

SW-5	Prodigy Compatibility
On	Prodigy
Off	Allegro
SW-6	Unused
On	N/A
Off	N/A
SW-7	Internal Batch Software
On	Internal Batch Enabled
Off	Internal Batch Disabled
SW-8	Cutter
On	Cutter Enabled
Off	Cutter Disabled

Table 2-4   Switches

2.5   Programming Commands

In order to be ready for a command sequence, the Printer must first receive a special character called an "attention getter" that informs the Printer that it is about to receive a command and the type of command it will be. Immediate Commands, System-Level Commands, and Font-Loading Commands each have their own attention getter. The attention getter character is followed by a command character that tells the Printer what action to take.

ASCII Char.	Decimal Value	HEX Value	DOS Prompt	Attention Getter For
SOH	1	01	Ctrl A	Immediate Commands
STX	2	02	Ctrl B	System-Level Commands
ESC	27	1B	Ctrl [	Font-Loading Commands

Table 2-5   Attention Getters

When the Printer receives an Immediate Command it will cease whatever it is doing and perform that command. Commands of all types must be in this sequence:

1.   Attention Getter
2.   Command Character
3.   Parameters that must be entered by the user (if any).

Command Character	Must Enter Parameters	Printer Responds	Command
#	N	Y	Reset
A	N	Y	Send ASCII status string
B	N	N	Toggle pause
C	N	N	Cancel
D	N	N	SOH shutdown
E	N	Y	Send batch quantity
F	N	Y	Send status byte

Table 2-6   Immediate Commands

The System-Level Commands are used to create formats, load and store graphic information, and control the Printer.

Char	Description	Format
A	Set time and date	Format: A*wmmddyyyyhhMMjjj* 16 digits total. *w* = 1 digit week, 1 is Monday *mm* = 2 digits for month *dd* = 2 digits for day *yyyy* = 4 digits for year *hh* = 2 digits for hour (24 hr ft) *MM* = 2 digits for minutes *jjj* = 3 digits for Julian I.D. value
a	Enable feedback characters	Returns 30 after each label and 31 after each batch of labels
B	Get Printer time and date information	Print time and date to port
c	Set continuous paper length	c*nnnn* = length of paper to feed per label
d	Set Printer to double buffer mode	Used to print a label while a second is formatting in memory
E	Set quantity for stored label	E*nnnn* = Set Quantity for stored label
e	Select edge sensor	Used for "see through" media sensing
F	Form feed	Feeds one label at a time
f	Set form stop position (Backfeed)	Set distance to peel (tear off) position f*nnn* = 3 digits from sensor
G	Print last label format	
I	Input graphics data block "See Programmer's Manual for format"	A bank designation, an optional word length modifier, a format designation, and up to a 16-character string to identify the stored image data
i	Download scalable font	
J	Set pause for each label	
k	Test RS-232 Port Y=ok	Sends character "Y" to RS-232 port
L	Enter Label Formatting Mode	
M	Set maximum label length	M*nnnn* = 4 digits (default) Maximum 12 inches

Table 2-7   System-Level Commands

Char	Description	Format
m	Set metric flag, enter metric mode	All references set to metric until reset
n	Clear metric flag, return to inch mode	All references set to inch mode
O	Form edge offset (start of print position)	O*nnn* = 4 digits, in/100 or mm/10
o	Cycle cutter	
P	Enter character dump mode	
p	Controlled pause	
Q	Clear all memory modules	
q	Clear module	q*x* = Module I.D. (Uppercase)
r	Select reflective sensor	Used for "black-strip" media sensing, (e.g. continuous tags, butt-cut labels. Stripe must be printed on back side of media)
S	Slew (feed) speed	S*x* *x* = C (2.0 ips)
s	Set up for one print buffer	Set for 1 dot buffer processing. Use for full length dot buffer processing.
T	Printhead dot pattern test label	
t	Test RAM memory module (Must be in Test Mode)	a bbbK 'Module Good' bbb = 256 or 512, for size of module
U	Label format field replacement	
V	Software switch settings	Vn n = 4-Label Present, 2-Internal Batch, 1-Cutter Enable
v	Firmware version information	Sends version string to Host
W	Request memory module information	Wx x = F-font, G-graphic, L-label
w	Test FLASH module memory	Takes about 90 seconds
X	Set default module bank	X*a* *a* - A = Memory Module A
Y	Output sensor values	Dumps sensor values status to RS-232 port
Z	Print internal information and dot pattern	

Table 2-7   System-Level Commands (Continued)

A STX L Command switches the Printer from the System Level to the Label-Formatting Mode. All command characters after STX L are interpreted as Label Formatting Commands until the Label-Formatting Mode is terminated with the Command Character E. All Label - Formatting Commands are terminated with hex value 0D.

CC	Description	Format
:	Set cut by amount (4 digits) The cutter function will perform a cutting action after the number of labels specified	:*nnnn* *nnnn* = 4 digits of labels printed before cut. Default = 0001
A	Set format attribute	A*n* *n*=1-XOR, 2-Transparent, 3-Opaque, 5-Inverse
C	Set column offset amount	C*nnnn* *nnnn* = in/100 or mm/10
c	Set cut by amount (2 digits)	c*nn* *nn* = 2 cut amount
D	Set height and width dot size	h = Horiz. dot size; can be 1 or 2 v = Vert. dot size; can be 1,2, or 3 (0.005" steps) Default is "D22"
E	Terminate field generation and print label	
G	Place data in global register	
H	Enter heat setting (The amount of heat applied per dot row, can be used to help control print quality)	H*nn* *nn* = 2 digits. 1 - 30 10 is nominal and default
m	Set metric mode	The Printer must be reset in order to return to standard measure
P	Print speed	P*x* *x* = C (2.0 ips)
p	Set label backup speed	p*x* *x* x C (2.0 ips)
Q	Enter quantity of labels to print	Q*nnnn* *nnnn* = quantity
R	Set row offset amount	R*nnnn* *nnnn* = in/100 or mm/10
r	Recall stored label format	r*nn...n* *nn...n* Label name of up to 16 char. terminated by CR
S	Slew (feed) speed	S*x* *x* = A (2.0 ips)
s	Store label format in module	s*ann...n* a - destination module A Memory Module A *nn...n* - label name (16 char. max)
T	Set field data line terminator	T*nn* *nn* = 2 digit ASCII Hex 00 - FF
U	Make previous field a string replace field	

Table 2-8   Label-Formatting Commands

CC	Description	Format
X	Terminate label formatting mode	
y	Select font symbol set (optional scalable fonts only)	y S xx y = ASCII (0x79) S = ASCII (0x54) xx = symbol selection
z or Z	Zero (**0**) conversion to "O" eliminates slash (/)	
+	Make last field entered increment numeric	+*pii* Make last entered field incrementing *p* = Zero fill character *ii* = Data added to field
-	Make last field entered decrement numeric	-*pii* Make last entered field decrementing *p* = Zero fill character *ii* = Data subtracted from field
>	Make last field entered increment alphanumeric	>*pii* Make last entered field incrementing 0 - Z *p* = Zero fill character *ii* = Data added to field
<	Make last field entered decrement alphanumeric	<*pii* Make last entered field decrementing 0 - Z *p* = Zero fill character *ii* = Data subtracted from field
^	Set count by amount	^*nn* Set count by amount *nn* = 2 digits Skip # of labels before updating count fields and time fields

Table 2-8   Label-Formatting Commands (Continued)

There are two special commands used by the Printer, the STX S, (Recall Global Data), and the STX T (print date and time) Commands. Unlike the other Label-Formatting Commands, which follow the STX L Command, these special commands are entered directly into the data field.

Character	Description
<STX>S	Recall global data and place in field
<STX>T	Print time and date

Table 2-9   Special Label-Formatting Commands

The commands used for bit mapped font loading are usually generated by font-creation software. However, the Assign Font ID Number command <u>must</u> be sent to the Printer <u>before</u> the font file. Font-Loading Commands are listed in Table 2-6.

CC	P	PR	Description
*c###D	N	N	Assign Font ID Number ### = ID Number 100 to 999
)s#W	Y	N	Font Descriptor
*c#E	N	N	Character Code # = ASCII Value of Character
(s#W	Y	N	Character Download Data # = Bytes of Bit-mapped Data

Table 2-10   Font-Loading Commands

CC = Command Character
P = Must Supply Parameters? (Y/N)
PR = Printer Responds? (Y/N)

2.6   **Programming Examples**

```
<STX> L <CR>
H07 <CR>
D11 <CR>
19110080100002510K OHM 1/4 WATT <CR>
1a6210000000050590PCS <CR>
E
```


Figure 2-3   Sample Label

The example shown below prints out a Code 3 of 9 bar code with a wide to narrow bar ratio of 3:1 and can be used to print any of the bar codes shown in Appendix B by altering the example's fields. Refer to Figures 2-4 and 2-5 for a brief explanation of the data fields.

<STX>L<CR>
D11<CR>
1A930400015010001234567 89<CR>
121100000000100Barcode A<CR>
E

Barcode A

<STX>L   Syntax L on line 1 is used to enter the label formatting mode.
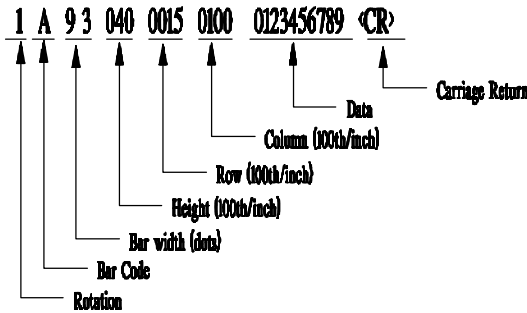
Figure 2-4 Example line 3
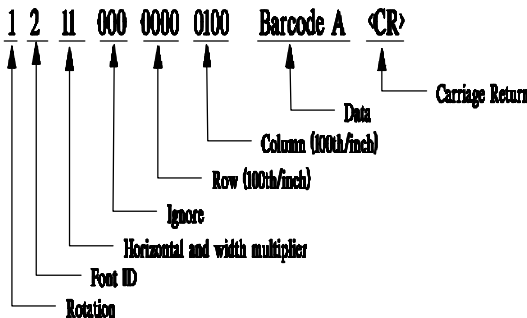
Figure 2-5 Example line 4

♦ Creating Labels Using Internal Batch Software

3.0 Introduction

The Printer can be used in any one of three different operating modes: RS-232C to a host computer; a PC with a compatible software package or; LINK MC2 CRT with Internal Batch Software. This chapter focuses on the Printer's internal labeling software program.

The program uses two screens that for creating/modifying labels and printing labels. A system maintenance screen is included for printing test labels, copying and formatting memory modules, and performing several other functions.

Internal batch modules can store up to 200 label formats per Flash Module and each can hold up to 128K of memory shared between label formats and graphic images (pictures). You can purchase as many internal batch modules as you need for your applications as they essentially provide you with unlimited memory capacity.

3.1 The Printer Used With a LINK CRT

The following steps are required before you can begin to format and print labels with the Printer.

1. Connect Cables

Verify that the LINK CRT and the Printer's main power switches are 'off'. Connect the LINK CRT terminal to the Printer with the supplied cable. Plug in the supplied power cords for the Printer and the LINK CRT terminal.

> **Note:** The Printer connects to the LINK MAIN port, not the LINK parallel port.

2. Check LINK CRT Settings

The LINK CRT is shipped ready for use with the Printer and the settings are pre-set and 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 reset all default values (see Table 3-1). The Printer will set all remaining parameters; however, these settings are not saved in the CRT's RAM. To save them, follow the CRT's "save changes" routine after normal operation is established.

Function	Settings	Function	Settings
Handshake:	none	F1	CTRL W
Mode:	FDX	F2	CTRL X
Data Bits:	8	F3	CTRL Y
Stop Bits:	1	F4	CTRL Z
Parity:	none	F5	ALT S
Baud Rate:	9600	F6	ALT P
Keys:	US	F7	ALT I
Blk End:	US/CR	F8	ALT X
Auto NL:	on	F9	ALT F
CR:	CR		
Compatible:	LINK MC 2		

Table 3-1   LINK CRT Settings

3. Select Stand-Alone Labeling Software Mode

The Printer is shipped in the RS-232C mode for use with PCs. To use the CRT, turn DIP Switch S1-7 to the 'on' position and insert the 256K Flash Module into the Printer before turning the power on. Plug the module into the module slot as described in Section 1.8. Ensure that the lettering is facing toward the front of the Printer. When the Printer is turned on it will recognize that the Module has been formatted as an Internal Batch Software Module and will run the Internal Batch Program. If the Module has not been formatted, the following screen will appear:

```
BATCH SYSTEM INITIALIZATION

INSERT Flash MEMORY MODULE AND PRESS:
I:     INITIALIZE NEW MODULE.
ENTER: ENTER BATCH SYSTEM.
Esc:   EXIT TO RS-232C MODE.
```

To format the module hit "I" and the following screen will appear:

```
MODULE MEMORY TEST AND FORMAT
WARNING !! MODULE DATA WILL BE LOST !!
PLUG IN MODULE. PRESS ENTER (Esc TO CANCEL)
```

Hit "Enter" to begin formatting the module, the following screen will appear:

```
MODULE MEMORY TEST AND FORMAT
WARNING !! MODULE DATA WILL BE LOST !!
MODULE UNDER TEST PLEASE WAIT !!
        ppppppppppvvvvvvvv

MODULE MEMORY IS GOOD
PRESS ENTER TO TEST ANOTHER "Esc TO EXIT"
```

once the module has been formatted, hit "Esc" to enter the Internal Batch Mode.

Note:	Use a small screwdriver 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. To prevent accidental changes or modifications to formats, turn the write protect switch back to the 'on' position.

4. Verify Setup, Power Up, and Load Media

Check that all connections are made and that DIP Switch S1 is correctly configured. Turn on the CRT and the Printer's power switches. Press the F1 key on the CRT several times. The create/modify label screen and print label screen should toggle back and forth. If this does not happen, re-check the CRT settings, check the interface cable. If the screens still do not appear, contact your local representative. If the module has not been formatted for internal batch, the set up screen will appear until you hit the I option. If steps 1-4 have been successfully completed, load the Printer with media.

3.2   Formatting and Printing Labels

Formatting labels is designed to be a 3-process procedure that involves the following steps:

- Selecting an operating screen.
- Specifying where on the label to place text and/or barcodes.
- Printing the actual labels.

Available Fonts and Barcodes

All available character font sizes, barcodes, multiplication parameters, and resulting character sizes are illustrated and explained in Appendix C. Each font and bar code has a name associated with it for use in the create/modify label screen. Alphanumeric fonts are 0 through 9, bar codes with human-readable interpretation lines are uppercase A through R, except P (Postnet). Bar codes without human-readable interpretation lines are lowercase a through r, all fonts and bar codes can be magnified in height and width.

Menu Screens

The following three menu screens are available in the Printer's internal labeling software program:

- Create/Modify Label
- Print Label
- System Maintenance.

Function Keys

Nine function keys labeled F1 to F9 are used in the label-formatting process. Some functions can also be controlled by the ALT keys. To use the ALT functions, press and hold the ALT key at the same time as you press another key. The ALT functions and the function keys include the following functions:

F1 or Esc: Toggles between the print and create/modify label screens. F1 can be used only 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. F2 can be 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 below will appear.

```
LABEL NAME:_____
NEW LABEL NAME:_____
```

Enter the name of an existing label already in memory and press the 'Enter" key. A new label will be 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 one at a time. Move the cursor to the farthest left position of the screen, then press F4. The current line will be deleted.

F5 and ALT-S: Calls up the system maintenance screen. All system maintenance functions are described in Section 3.5.

F6 and ALT-P: While in the far left position 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 will look like this:

```
                    PRINT ADJUSTMENTS

        HEAT FACTOR:                   10
        PRINT SPEED:                    C
        SLEW SPEED:                     C
        DOT PATTERN (5 mil):     1 X 1
        LABEL ADVANCE:              02.20
        FORM EDGE OFFSET:          02.20
        ROW OFFSET:             00.00
        COLUMN OFFSET:             00.00
        COUNT BY:                     01
        MAX. LABEL WIDTH:          04.10
        MAX. LABEL LENGTH:         12.00
        CONTINUOUS FORMS:            NO
        ACTIVE BUFFERS (1/2)       01
        CUT BY (# PER CUT):       0001
        SENSOR TYPE:             EDGE
        EDGE/REFLECTIVE            E
```

Figure 3-1   ALT-P Screen

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. A description of each print parameter along with default values and valid settings are listed in Table 3-2.

Description	Default	Range
Heat Factor	10	0 to 20
Print Speed	C	C
Slew Speed	C	C
Dot Pattern Wide	1	1 or 2
Dot Pattern High	1	1 to 3
Label Advance (Back Feed)	220	Form Edge Offset to Form Edge Offset + 200
Form Edge Offset	220	050 to 999
Row Offset	000	000 to 999
Column Offset	000	000 to 410
Update Count on	01	01 to 99
Max. Label Width	410	050 to 410
Max. Label Length	1200	0500 to 9999
Active Buffers	1	1 or 2
Cut By Amount	0001	0001 to 9999
Edge/Reflective	E	E or R

Table 3-2 Print Parameters

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.

F7 and 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.

F8 and ALT-X: May be pressed while the cursor is located at the ROT field of the create/modify label screen. It will cause the print screen to show a pre-set quantity of 1 for the purposes of printing a test label.

F9 and ALT-F: Feeds one label at a time from the print label screen. It operates the same way as the front panel feed button. This function is useful when loading new media to register the photoelectric sensor.

Other Important Keys

Several other keys are used in the editing and printing steps and are described below.

Return: Enters an answer for the prompt and moves the cursor to the next position if the answer is acceptable.

Arrow Keys: Used to move the cursor 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 a particular label and returns the cursor to the top of the screen. The Esc key allows the F1 key to be used to switch screens. It is also used to exit ALT-S and ALT-P screens.

Backspace: Erases one character.

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

3.3 Create/Modify Label Screen

This section describes how to create a new label. Before beginning, a good tool to have on hand is a ruler marked in tenths of an inch because all the 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. Turn the Printer on with the power switch located in the back of the Printer. The CRT screen will look like this:

```
        PRINT LABEL
   MODULE NAME: _____
   LABEL  NAME: _____
   QUANTITY:    _____
```

Figure 3-2   Print Label Screen Header

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

```
     CREATE/MODIFY LABEL

     MODULE NAME: _____
     LABEL  NAME: _____


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

Figure 3-3   Create/Modify Label Screen Header

2. The software's two operating screens are create/modify label and print label.

All data is entered into fields. A field is a set of information such as a product name, address, bar code, number, etc., that is specified on individual lines on the CRT screen. Because fields are independent of each other, it is possible and sometimes desirable, to place two or more fields on the same horizontal or vertical measurement. Be careful not to print one field over another.

Notice in the upper left-hand corner of the screen that the current field number is displayed. This program can accommodate up to 200 fields per format. Use the return key or the arrow keys to move the cursor around within the 200 fields, one field at a time. A sample label format is illustrated in Figure 3-4. To create a label, press the F1 key to return to the create/modify label screen. The cursor will be in the label name position.

```
                    CREATE/MODIFY LABEL

                    MODULE NAME: _____
                    LABEL  NAME: _____

ROT  FNT  XW  XH  BH     ROW    COL   TYPE   DATA/PROMPT
---  ---  --  --  ----   ----   ----  -----  ------------------------
 1    2    2   2  0.00   03.70  00.20   D    NYLON INSULATED TOGGLE SWITCH
 1    X    1   1  0.00   03.60  00.10   D    B370040003003
 1    6    2   2  0.00   00.30  00.20   D    DA100-PB-B
 1    X    1   1  0.00   00.20  00.15   D    L400080
 1    Y    1   1  0.00   01.50  02.85   D    SW5
 1    a    6   2  0.40   01.35  00.15   D    DA100 PB B
 1    1    2   2  0.00   01.20  00.65   D    DA100 PB B
 1    3    1   1  0.00   03.20  00.20   D    SWITCH ACTION
 1    1    2   2  0.00   03.00  00.20   D    SPST on-None-OFF
 1    3    1   1  0.00   02.70  00.20   D    TERMINALS
 1    1    2   2  0.00   02.50  00.20   D    SOLDER/SPADE
 1    3    1   1  0.00   02.20  00.20   D    RATING
 1    1    2   2  0.00   02.00  00.20   D    @ 10 AMPS, 125VAC
 1    X    1   1  0.00   01.90  00.10   D    B200160003003
 1    X    1   1  0.00   02.40  00.13   D    L194003
 1    X    1   1  0.00   02.90  00.13   D    L194003
 1    0    1   1  0.00   00.00  00.15   D    ALLEGRO LABEL PRINTER
```

Figure 3-4   Sample Label Format

3. Enter an alphanumeric name of up to 16 characters for this label, followed by the return key. The message "New Label Format?" appears, answer Y or N. If yes, the cursor moves to the ROT position. If the cursor does not move 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 degree rotations. Valid responses to the ROT prompt include:

> 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:

- An alphanumeric font type, followed by the return key. Choices are 0 through 8. See Appendix C for examples of each available font type and for the actual printed size of the various fonts using different multiplication factors.

- An alphanumeric CG Triumvirate font type, followed by the return key; the only choice is 9, (see Appendix C for examples). The point size is selected in the bar code height field. Values are 001 through 010.

- A bar code, followed by the return key. Choices are uppercase A through R, except for P (Postnet). For bar codes that include the human-readable interpretation line, or lowercase a through r for bar codes without human-readable lines, see Appendix C for examples of each available bar code.

- X is a special font choice that is not actually a font. The X font selects box and line drawing. Later, in the data/prompt position, the format for lines or boxes must be entered .

- Y is another special font choice that is not actually a font. The Y font selects a graphic image that has already been loaded into the memory module. If this font is selected, enter the name of the graphic image in the data/prompt position. This name must be uppercase characters when printing an image.

If any letter or number is entered in the FNT position other than those specified above, the **'Invalid Font Type'** message will appear.

You will need to re-enter the data. After entering the desired font and pressing the return key, the cursor will move to the XW position.

6. The XW and XH positions are used to magnify widths and heights of fonts, and to change the wide/narrow ratio of bar codes.

- If you wish to magnify the width of a font, valid responses are 1 through 9 and A through O. The default value is 1 for fonts.

- If you wish to magnify the width of a bar code, valid responses are 1 through 9 and A through K. The default is 3 for ratio-based bar codes, 2 for fonts Q & R and 1 for all other bar code fields. If the pixel width is 1, the result will be a 5 mil wide bar. If the pixel width is 2, the result will be a 10 mil wide bar. Pixel sizes by label format are specified in the print Parameters screen.

- Enter the desired XW dimension and press the return key. The cursor will move to the XH position.

7. Enter the desired XH dimension. The default value for fonts is 1. The default value for element bar codes such as UPC or code 128 is 1. For ratio-based bar codes, the default value is 1.

- If you wish to magnify the height of a font, valid responses are 1 through 9 and A through O. The default value is 1 for fonts.

- If you wish to magnify the width of a bar code, valid responses are 1 through 9 and A through K. The default is 3 for ratio-based bar codes, 2 for fonts Q & R and 1 for all other bar code fields. If the pixel width is 1, the result will be a 5 mil narrow bar. If the pixel width is 2, the result will be a 10 mil narrow bar. Pixel sizes by label format are specified in the Print Parameters Screen.

- Enter the desired XH dimension and press the return key. The cursor will move to the bar height (BH) position.

8. In the BH position, a 3-digit number defines the printed bar height for the field or defines a smooth font.

- For UPC/EAN bar codes, the default value is 0.80" (20 mm). For all other bar code fields, the default value is 0.40" (10 mm). For all alphanumeric fonts, the value is set at 0.00" (0 mm). Enter the desired bar height and press the return key. The cursor will move to the Row position.

- When a 9 is in the FNT position it designates a smooth font. The actual point size is determined by a smooth font value in the BH position. The font ranges are listed in Table 3-3 below:

Smooth Font	Valid BH Ranges
Internal CG Triumvirate	001 to 010

Table 3-3   Smooth Font Information

9. The 4-digit Row Field tells the Printer "how far up" on the label to print the data. The default value is 00.00 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.

    For the desired vertical placement of your field, enter a number not more than four digits followed by the return key. If the measurement entered is acceptable, the cursor will move to the COL position. If the measurement selected is too large for the given space or the capability of the Printer, the 'Number Out Of Range' message will appear.

    Data will need to be re-entered. 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 being printed 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.

10. The 4-digit column number tells the Printer 'how far over' from the left edge of the label that data is to be printed. Enter a number no longer than four digits in this field, then press the return key. If the measurement is acceptable, the cursor will move 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 data will need to be re-entered. The cursor will then move to the type position.

11. The type position tells the Printer how the data/prompt position is to be used. There are six options.

- The most common type is 'D' for data, this tells the Printer that fixed data will be entered in this field. In other words, any alpha and/or numeric characters entered in the data/prompt position will be printed on the label exactly as entered on the screen. After pressing the 'D' key, the cursor will move to the data/prompt position. Enter the data to be printed on the label and press the return key.

  Type D is specified when using special font X for lines, boxes and illustrations. It is also specified when using special font Y for graphics. The graphic name must be entered with up to 16 upper case characters.

- Press the 'P' key to signify " that this is a prompt." Any data typed in the data/prompt position will reappear on the print label screen. This allows a label format to be set up ahead of time, but with the ability to change variable information every time that format is printed.

  For example, if you are printing inventory labels, information like the company name, date, and factory location is in the same position on every label. However, the stock number for the part may change approximately every 100 labels. You could set up the stock number field as a prompt by entering in the phrase 'Enter Stock Number' in the data/prompt position. Every time you select that format in the print label screen , the phrase 'Enter Stock Number' appears. You can enter the desired stock number for that label run and the new information will be printed on every label.

- Enter one of the following symbols to signify a consecutive number or alpha character:

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

If any of these symbols are entered in the type position, the printing will either increment or decrement numbers or letters in the label position specified earlier in this field. Information entered in the data/prompt field in the next step will tell the Printer the increment value being use. When viewing the print label screen , it will ask 'Initial Increment?' or 'Initial Decrement?' The number entered at this time will increment or decrement each time a label is printed. The number of labels to be printed with the same number before an increment or decrement occurs can be set with the ALT-P command as described earlier. The default value is 1.

- Press the 'C' key to signify a comment. Any data entered in the data/prompt position will appear on the print label screen as a comment. This function is a useful way to give the operator special instructions, such as how to load a particular type of media for the labels to be printed. Comment fields do not affect the printing of the label.

- Press the 'R' key to request a repeat of the previous field's data.

- Press the 'T' key to print the time and date.

  After entering any one of the above choices, the cursor will move to the data/prompt position.

12. In the data/prompt position, there are six options:

If 'D' was selected in the preceding step, enter the desired data. The Printer automatically computes how many characters there are 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, a 'Not Enough Room For Field Data' error message will appear.

Some of the data will need to be re-entered. Use the DEL key, home key, or arrow keys to change any information. If the Printer does not allow you to enter as many characters as you need, try backing up with the arrow keys and change the font size.

For special font X, enter the required information as explained in the following examples:

LINES: **Lhhhvvv**

L: "L" specifies line drawing
hhh: horizontal width of line
vvv: vertical height of line

LINES: **lhhhhvvvv**

l: "l" specifies line drawing
hhhh: horizontal width of line
vvvv: vertical height of line

> **Note:** Reverse printing is accomplished by printing a very high, or wide solid line. Text placed at the same coordinates (inside the line) is reversed with white letters on a black background.

BOXES: **Bhhhvvvbbbsss**

B: "B" specifies box drawing
hhh: horizontal width of box
vvv: vertical height of box
bbb: thickness of bottom and top box edge
sss: thickness of sides of box

BOXES: **bhhhhvvvvbbbbssss**

b = specifies box drawing
hhhh = horizontal width of box
vvvv = vertical height of box
bbbb = thickness of bottom and top box edges
ssss = thickness of sides of box

For special font Y, enter the name of the graphic image you want to call from the memory module for printing at this field position. You can enter up to 16 uppercase characters.

- Enter the desired prompt information. The field allows up to 44 characters to be entered.

- Enter the desired consecutive number fill character and increment value. This field has the format xnn with the following parameters:

    x: Fill character. It can be any character, including a space. For example, if * is entered, all insignificant characters will be filled with "*".

    nn: Increment value desired. If 01 is entered, it will increment by ones (i.e. 1, 2, 3 etc.). nn can be any value up to 99.

    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 particular run of labels. As a separate function, an increment every "x" number of labels can be set in the print parameters screen (ALT-P).

- For comment fields, enter the data you wish to have appear on the print screen in the data/prompt field.

- For 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.

- For the time and date to be printed on the label, enter the data as shown in the following example:

  Time and date string data is selected by using characters A through Z, and a through f as shown in Table 3-4 in order to retrieve data from the Printer's internal clock.

w	W	W	W	m	m	M	M	M	M	M	M	M	M	M	d
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
d	y	y	y	y	h	h	H	H	n	n	a	a	j	j	j
Q	R	S	T	U	V	W	X	Y	Z	a	b	c	d	e	f

Table 3-4 Time and Date Information Format

w	=	Day number; 1 = Monday
W..	=	Day of the week name
mm	=	2 digit month
M..	=	Month name
dd	=	2 digit day
yyyy	=	4 digit year
hh	=	2 digit hour in 24 hour format
HH	=	2 digit hour in 12 hour format
nn	=	2 digit minutes
aa	=	AM or PM for 12 hour format
jjj	=	3 digit Julian date

In the following example the proper matching characters are sent to the Printer that request the day of week and date to be printed. This command causes the Printer to enter date formatting mode. Spaces and punctuation appear as shown in the example.

Sample: BCD GHI PQ ,   RSTU <CR>
Prints: TUE   DEC   27 , 1993

After entering the desired data, prompt, comment, or consecutive number information, press the return key. The cursor will move to the next line on the screen for another field of information.

- Enter additional fields of information as desired. To print a sample label, press the ALT-X key and the print screen will appear with a quantity of 0001. Press 'Enter' again and a sample label will be printed. The create/modify label screen will return.

  After all fields are completed, press the Esc key from any field in the ROT column. This brings the cursor back to the label name position.

- To print a quantity of the label you defined, press the F1 key. The print label screen appears. See the next section for information on the print label screen .

3.4 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 . The screen should look like this:

```
                    PRINT LABEL
        MODULE NAME:  _____
        LABEL NAME:   _____
        QUANTITY:     _____
```

Figure 3-5 Print Label Screen

3.4.1 Printing a label from the 'Print Label Screen '

1. Enter the label name you want to print and press the return key. The cursor will move to the quantity position. If the Printer does not find the label name you entered, you will receive an error message and will need to re-enter the label name. When in the label name position, you can use the F2 key (LIST) to list all of the names available in the currently installed memory module.

2. Enter a number not more than four digits long to indicate the quantity of labels you wish to print and press the return key. The maximum number of labels per run is 9999.

3. Depending on how the label is set up, the cursor may move to the initial increment or initial decrement position if a consecutive number or letter was specified as a data type. Or, the cursor may move 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 entered, the cursor will move to the sample position.

4. In the sample position, there are two choices:

    a. Print a sample label to check data placement by pressing the Y key for yes. A sample label will print and the cursor will return to the sample position. At this point, you can proceed to step b or you can stop the run by pressing the up arrow key to move the cursor back to the label name position. Press the F1 key to re-edit your format in the create/modify label screen.

    b. If you do not need a sample, press the N key for 'no', or use the return key. The number of labels you requested will be printed. After the print job request is sent to the Printer, the cursor will move back to the label name position. Additional print jobs can now be sent to the Printer or you can return to the create/modify label screen.

3.5   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.

To access the screen in the label name position of the create/modify label screen or print label screen , use ALT-S. The screen will look like this:

```
        SYSTEM MAINTENANCE
1) TEST AND FORMAT MODULE.
2) COPY MODULE.
3) METRIC ? NO.
4) PRINT TEST LABEL.
5) SYSTEM TEST LABEL.
6) EDIT MODULE NAME.
7) RESET PRINTER.
8) EXIT TO RS-232C SYSTEM.
9) PACK MODULE DATA.
     ENTER NUMBER:  _____
```

Figure 3-6   System Maintenance Menu

To exit the screen, press the Esc key. All system maintenance screen choices are explained below:

Test and Format Module: Used to format or reformat the memory of a Flash Module. Tests the memory module to see that it properly functions, 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.

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.

Metric: Each time the number 3 is pressed, the screen will toggle between metric 'No' and metric 'Yes'.

Print Test Label: Prints a Printhead Test Label and is used as a relative gauge of Printhead condition and wear.

System Test Label: Lists all current Printer settings and checks both ROM and RAM. Prints a Printhead test label after the system test.

Edit Module Name: This will allow you to change the name of the module.

Reset Printer: This is the same as the <SOH #> Command in the standard printer mode. If switch 7 is on then the internal batch will take over.

Exit To RS-232C System: This is the same as turning Switch 7 'off' and resetting the Printer. You can use the <STX g> command to enter the Internal Batch without using switch 7 in the rear of the Printer.

Pack Module Data: All the label formats are stored in a 256K flash module; therefore, only the entire module can be cleared. For this reason, the data will occasionally need to be packed from time to time when the memory becomes low.

3.6   Quick Reference Listing

The following pages list the valid commands for the Printer's Internal Batch Labeling Software Program.

3.6.1 Create/Modify Label Commands

Command	Valid Inputs
ROT	1,2,3 and 4
FNT	Fonts: 0 through 8, Smooth Font 9 Human Readable Bar codes: Uppercase A through R, Except P (Postnet) non-human readable bar codes, lowercase a through r X = Boxes and Lines Y = Graphics
XW	1 through 9 and A through O
XH	1 through 9 and A through O
BH	0.00 to 9.99
ROW	00.00 to 99.99
COL	00.00 to 04.10
TYPE	D = Data, P = Prompt, C = Comment, R = Repeat, T = Time and Date +,-, <,> = Consecutive Numbering and Alpha

3.6.2 Print Parameters (ALT-P)

Description	Default	Range
Heat Factor	10	0 to 20
Print Speed	C	C
Slew Speed	C	C
Dot Pattern Wide	1	1 or 2
Dot Pattern High	1	1 to 3
Form Edge Offset	220	050 to 999
Form Advance (Back Feed)	220	Form Edge Offset to Form Edge Offset +
Row Offset	000	000 to 999
Column Offset	000	000 to 410
Update Count on	01	01 to 99
Max. Label Width	410	050 to 410
Max. Label Length	1200	0500 to 9999
Cut By Amount	0001	0001 to 9999
Sensor Type	Edge	Edge/Reflective

3.6.3 Special Keys

Key	Function
F1 Esc	Switch
F2	List
F3	Copy
F4	Kill
F5 ALT-S	System Maintenance
F6 ALT-P	Print Parameters Screen
F7 ALT-I	Insert Format Line
F8 ALT-X	Print sample Label
F9 ALT-F	Feed a Label
Esc	End Key
Home	Erase Current Line

♦ Troubleshooting

4.0 Introduction

This chapter provides general guidelines to help maintain the print quality when using media other than the recommended 4 mil stock. It also provides basic ideas to help identify common installation and communication interface problems. If there is any doubt about your ability to perform the procedures outlined in this chapter, contact a qualified service technician or your service representative for instruction before making any adjustments.

4.1 Controlling Print Quality

The Printer provides maximum flexibility by offering both direct-thermal and thermal-transfer printing capabilities. To support these printing options, the Printer has a flexible set of printing controls.

The amount of heat applied to the Printhead and the location of the Printhead to the label media have the most effect on the images that are printed on labels. The Printer provides print quality adjustments, but limits them to prevent the Printer from printing an image that could be damaging to the Printhead. For example, low cost direct-thermal stocks have high reaction temperatures therefore it takes a great deal of heat to make clear images on this type of paper. The Printer has two ways to compensate for this: first set the burn time to a higher value by using the H Label-Formatting Command. This causes more heat to be transferred into the media, and consequently generates a darker image; second, adjust the Printhead position. The Printer has been factory set to maintain good print quality on the majority of media. However, when using media other than the recommended 4 mil thick stock the Printhead position, ribbon, and media tracking may require slight adjustment to maintain its print quality. If poor print quality is apparent, follow the procedures outlined in sections 4.2.1 and 4.2.2.

4.2   Aligning the Printhead

Components used for Printhead alignment are illustrated in Figure 4-1.

4.2.1 Direct-Thermal Stock

For best results when using direct-thermal label stock, turn the head adjustment screws 1/4 turn clockwise to move the Printhead 0.006" (0.15 mm) back on the roller. When the Printhead is aligned with thermal-transfer stock the Printhead is forward on the roller so that the ribbon will separate from the label while the wax ink is still liquid ensuring good print quality. With direct-thermal stock, the Printhead burn line needs to be further back on the roller where there is more contact with the roller. This causes heat to transfer to the paper more efficiently.

4.2.2 Tag Stock or Stiff Media

The Printer is adjusted at the factory using 5 mil thick label stock. If heavier tag stock is used, the Printhead may need to be adjusted forward.

4.2.3 Mechanical Adjustments

The Printhead is precisely positioned on mount plate locating pins that are adjusted at the factory. Once adjusted, the locating pins will ensure correct alignment of all future replacement heads. It should not be necessary to realign each new Printhead; however, an alignment procedure is required if the Printhead Mount Assembly has been removed or disassembled.

The horizontal placement of the Printhead is adjusted by turning the right and left head-adjustment screws that correspond to the right and left sides of the Printhead. Turning the screws 1/2 turn counter-clockwise will move the Printhead 0.012" (0.305 mm) forward. Likewise, a 1/2 turn clockwise will move the Printhead back 0.012" (0.305 mm). Therefore, only a small adjustment of even a 1/4 turn will cause a big difference in print quality.

⚠ **Caution**	Do not turn the head-adjustment screws more than 2 complete turns in either direction. Damage to the Head Mount Assembly will result if the adjustment screws are turned too far.

The alignment procedure and the sequence that should follow is described in section 4.2.1. This procedure should correct poor print quality; however, all adjustments must be performed with label stock that is at least 4" (102 mm) wide. If the final media used is different, then make the specific adjustments needed after the standard adjustments are completed.

4.3   Printhead Alignment Procedure

Depending on the degree of alignment necessary to your Printhead, one or perhaps all of the steps mentioned below may need to be completed.

4.3.1 Label Stock Tracking Adjustment

To ensure that the stock feeds straight use a full roll of 4" (102 mm) or 4.25" (108 mm) wide stock and complete the following steps:

1. Rotate the Media Guide 'down' and install the stock, keep the Media Guide in the down position.

2. Press the feed button to feed the labels until the stock begins to track at a stable position.

3. Rotate the Media Guide to the up position and slide the Media Guide in or out until the inside edge of the stock is gently resting against the inner Media Guide.

4.3.2 Ribbon Feed and Tracking Adjustments

Complete the following steps to complete the ribbon feed and tracking adjustment.

Turn the power switch 'on' and use full width paper and ribbon for this adjustment. Install a thermal-transfer ribbon/ media in the Printer and secure the ribbon to the Ribbon Rewind Hub in a counter-clockwise direction (see Chapter 1, Figure 1-7).

1. Press the feed button several times to normalize the feeding of the ribbon and media. Check the ribbon for rippling as it travels from the Ribbon Supply Hub and goes under the Printhead assembly. If rippling or bagging occurs, follow the procedures outlined in steps 2 through 6.

2. To adjust the Ribbon Shield (see Figure 4-1), temporarily move the ribbon and loosen the screws located on the left end of the Head-Support Plate, (do not remove the screws). This end of the shield can be adjusted up or down in order to even out the ribbon tension across the full width of the ribbon.

> **Note:** The mount screws that secure the Ribbon Shield also secure the Head-Support Plate. When loosening these screws, be aware that both the shield and the plate may be affected.

3. Position the shield so that there is no rippling in the ribbon as it travels from the Ribbon Supply Hub. The ribbon should also be adjusted so that tension is even across the entire width of the ribbon.

4. Once the Ribbon Shield is properly positioned, tighten the left screw that supports the Ribbon Shield to the Printhead Mount Assembly. Re-check the ribbon travel to make certain that the ribbon tension is even across the entire width of the ribbon.

5. Feed three or four labels and observe the ribbon as it travels from the Ribbon Supply Hub.

6. Feed the ribbon and paper out the front of the Printer together and check the ribbon for drifting. If the ribbon overlaps one edge of the paper stock, the ribbon and paper are not following the same path. In this case, the paper tracking may need to be re-adjusted. If there is no ribbon overlap, then continue.

4.3.3 Fine Printhead Alignment

Print a few rotated bars and inspect the print quality. With a 1/16" (1.59 mm) hex key, turn the left and right head-adjustment screws counter-clockwise approximately 1/4 −1/2 turn until the desired print quality is achieved. Finally, turn the left head-adjustment screw 1/4 turn counter-clockwise.

4.4   Adjusting Printhead Pressure and Support

The Head-Support Plate supports 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 3.5" (89 mm).

The Printer's Printhead support requires adjustment if media widths of 3.5" (89 mm) or less are used. To make this adjustment, loosen the two mount screws that fasten the Head to the Support Plate, leaving the screw on the left slightly snug. Load the media and engage the Printhead by rotating the Head-Lift Lever to the 'down' position. Turn the adjustment screw clockwise until the support plate moves down and contacts the bearing plate underneath. Finally, tighten the two mount screws to secure the Support Plate.

Note:	The mount screws that secure the Head-Support Plate also secure the Ribbon Shield. When loosening these screws, be aware that both the plate and the shield may move.
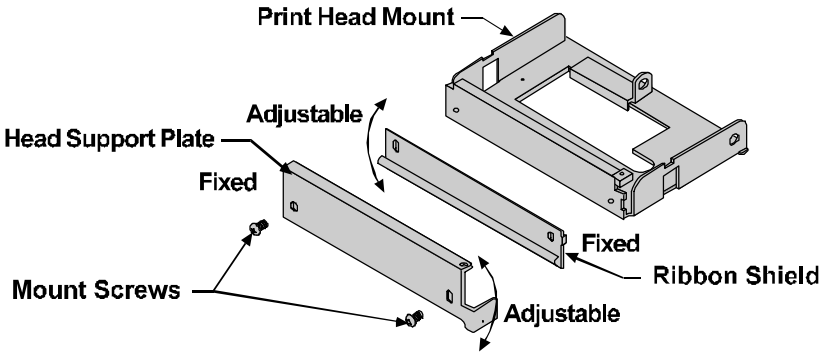
Figure 4-1 Printhead Mount Assembly

4.5   Troubleshooting

Occasionally, situations occur that require some troubleshooting skills. Possible problem situations and potential solutions are listed in this section. While not every situation is addressed, you may find some of these tips helpful. After the corrective action is taken press the feed button to clear the alarm. Contact a qualified service technician for problems that persist or are not covered in this section.

Unacceptable print quality

- The Printhead may be dirty, clean the Printhead, (see Section 5.1).

- Incorrect ribbon/paper combination being used. Be sure to use the correct ribbon type.

The Printer does not print or prints several labels at once

- The labels are incorrectly loaded, see the loading instructions on the inside cover of the Printer, or Section 1.5.1.

- The Media Sensor may be out of adjustment.

- The Media Sensor or Media Sensor Circuitry may be defective, call for service.

Erratic printing

- The Printer is in the test mode. Reset the Printer via software, or simultaneously press the cancel and pause buttons, or turn the Printer 'off' and then 'on' again.

- The Printer is set for 8-data bits but the transmitting device is set for 7- data bits (or vice versa). Check the current data bits setting from the operators panel.

The ribbon does not advance

- The ribbon is installed incorrectly. Make sure that the dull side (side with ink) is facing the paper.

- A bad ribbon/paper combination is resulting in an insufficient amount of friction between paper and ribbon. Ensure that the correct type of ribbon is being used.

Skips every other label

- The label is formatted too close to the top edge of the form. Leave white space equal to 8-dot rows at the top of the label, approx. .02" (.5 mm).

- Check operation of the Top-of-Form Sensor.

Unable to print in rotation 4

- The characters are formatted outside the dimensions of the label. Check that the row/column values provide enough room for the height of the characters or bar code to be printed.

Prints light on the right side of the label

- The Printhead is adjusted for thick media or cardstock.

- The Printhead is not properly aligned, call for service.

Printer fails to turn on

- A fuse may be blown, call for service.

- Faulty AC cord.

- A bad power switch may exist on the Printer, call for service.

- A faulty AC wall outlet.

Label advances 1-2 inches before a fault indication

- The ribbon is installed incorrectly. Make sure that the dull side (side with ink) is facing the paper.

- A bad ribbon/paper combination is resulting in an insufficient amount of friction between paper and ribbon. Ensure that the correct type of ribbon is being used.

Label advances 12 inches before a fault indication

- The Media Sensor may be out of adjustment.

- The Media Sensor, or Media Sensor Circuitry may be defective, call for service.

- A hardware problem may exist, call for service.

♦ Maintenance

5.0 Cleaning the Printer

Interior and Exterior

- **Interior** During normal operation dust particles from label stock can build up inside the Printer. To prevent build-up, use a soft bristle brush or vacuum cleaner as needed.

- **Exterior** The exterior surface can be cleaned using a general purpose cleaner and a damp soft cloth or sponge. Do not use abrasive cleansers or solvents.

Drive Roller

Print quality may be affected if the drive roller becomes contaminated with grit, label adhesive, or ink. To clean the Drive Roller complete the following steps:

1. Remove the Tear-Bar Assembly, see Figure 1-4.
2. Turn the Head-Lift Lever to raise the Printhead to the 'up' position.
3. Dampen a clean, soft cloth with Isopropyl Alcohol and wipe off any debris from the Drive Roller.

Note: If the Drive Roller contains excessive build-up that is unable to be removed using Isopropyl Alcohol you can try acetone; however, this should be used sparingly.

5.1 Cleaning the Printhead

The Printhead should be cleaned on an 'as needed' basis. To determine when to clean the Printhead look for characters or bar codes that appear light or faded, or labels that contain spots or light streaks. Once you notice these signs follow the steps below to clean the Printhead.

1. Turn off the power and unplug the Printer.

2. Raise the cover and turn the Head-Lift Lever to the 'up' position.

3. Dampen a cotton swab with isopropyl alcohol and insert into the Printhead as shown below. Gently rub the underside of the Printhead with the moistened swab.
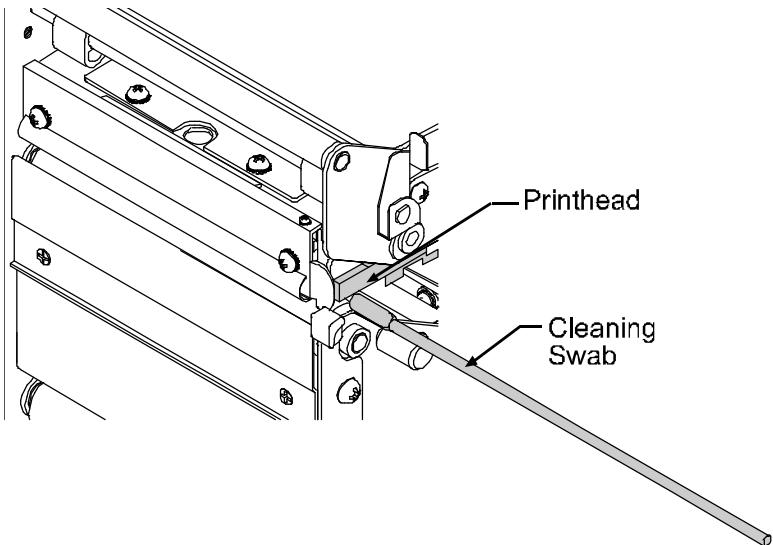
Figure 5-2   Cleaning the Printhead

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	"	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	'	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

(Continued)

ASCII Control Chart — continued

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	°	167	A7	Ã	199	C7	p	231	E7
ê	136	88	¿	168	A8		200	C8	p	232	E8
è	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	´y	236	EC
ì	141	8D	¡	173	AD		205	CD	´Y	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	Ò	208	D0		240	F0
Æ	145	91		177	B1	D	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	°	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
ƒ	159	9F		191	BF		223	DF		255	FF

Appendix B

Switch Settings and Cable Interfacing

Baud	9600	4800	2400	1200	600	300	Test
SW-1	off	off	off	off	on	on	on
SW-2	off	off	on	on	off	off	on
SW-3	off	on	off	on	off	on	on

Table B-1   Baud Rate

SW-4	Data Bits	Parity	Stop Bits
on	7	None	2
off	8	None	1

Table B-2   Word Length

SW-5	Prodigy Compatible
On	Prodigy
Off	Allegro
SW-6	Unused
On	N/A
Off	N/A
SW-7	Internal Batch Software
On	Internal Batch Enabled
Off	Internal Batch Disabled
SW-8	Cutter
On	Cutter Enabled
Off	Cutter Disabled

Table B-3   Options

Printer Cabling and Interfacing:

When the Printer receives data from any host system, it will not properly function with an incorrectly wired cable. Proper wiring diagrams can be found in Appendix E. Table B-1 contains a list of the signals that if correctly wired to the host system will cause the Printer to operate properly.

Signal	Pin
TX	2
RX	3
Busy	20
Ground	7
Jumper	4 to 5
Shield	1

Table B-1   I/O Port Wiring

When the Printer is turned on, it will default to pre-determined interfacing parameters. The default values are in Table B-2.

Parameter	Default Value
Baud	9600
Data Bits	8
Parity	None
Stop Bits	1

Table B-2   Printer Default Communication Parameters

Altering the switch positions of DIP Switch S1 on the back of the Printer will configure the Printer for different applications. Chapter 2, Section 2.4 shows the switch positions and the configurations supported by each setting.

Appendix C

Available Fonts and Barcodes

All character fonts and barcodes available with the Printer are described in this section. Each font and barcode has a name associated with it for use in programming. Human-readable fonts have numeric names while barcode fonts have alpha names. Uppercase alpha names will print barcodes with human readable interpretations. Lowercase alpha names will print barcodes only.

Fonts

Fonts 0 through 8 use the slash zero (Ø) conventions for distinguishing between the zero and the alphabetic O. The slash can be removed with the label formatting command Z. These fonts are non-proportional (monospaced) fonts; all of the characters take up the same amount of space when printed.

The Triumvirate font number 9 is a proportional font; each character will take up a different amount of space when printed. For example, the letter W will be larger than the letter I.

Font	Valid ASCII Characters
0	32-127
1	32-168, 171, 172, 225
2	32-168, 171, 172, 225
3	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225
4	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225
5	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225
6	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225
7	32-126
8	32, 48-57, 60, 62, 67, 69, 78, 83, 84, 88, 90
9	32-126, 128-169, 171-173, 181-184, 189, 190, 198, 199, 208-216, 222, 224-237, 241, 243, 246-250

Table C-1   Valid ASCII Characters

Table C-2 lists the font sizes. The numbers indicate the number of dots.

FONT	HEIGHT	WIDTH	SPACING
Font 0	7	5	1
Font 1	13	7	2
Font 2	18	10	2
Font 3	27	14	2
Font 4	36	18	3
Font 5	52	18	3
Font 6	64	32	4
Font 7	32	15	5
Font 8	28	15	5

Table C-2   Font Sizes

Font 0 96-character alphanumeric, upper and lower case.

Font 1 145-character upper and lower case alphanumeric w/ descenders and ascenders.

Font 2 138-character alphanumeric, upper and lower case.

Font 3 62-character alphanumeric, uppercase.

Font 4 62-character alphanumeric, uppercase.

Font 5 62-character alphanumeric, uppercase.

FONT 4:
#$%&()*+ - ./0123456789:
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ÇÃÅÉÖÜ£ØÑ¿ß

FONT 5:
#$%&()*+ - ./0123456789:
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ÇÃÅÉÖÜ£ØÑ¿ß

Font 6 62-character alphanumeric, uppercase.

FONT 6:
#$%&()*+ - ./
0123456789:
ABCDEFGHIJKL
MNOPQRSTUVWXYZ
ÇÃÅÉÖÜ£ØÑ¿ß

Font 7 OCR-A, size I.

Font 8 OCR-B, size III.

```
Font 7:
!"#$%&'()*+,-./
0123456789:;<=>?@
ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`
abcdefghijklmno
pqrstuvwxyz{|}~
```

```
Font 8:
0123456789
<>CENSTXZI
```

Font 9 Internal Triumvirate font.
Point sizes are selected by the number in the barcode height.
Larger point sizes can be obtained by increasing the height and width
multipliers (see the Programmer's Manual for more information).

6 pt ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz0123456789
8 pt ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
10 pt ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklm
12 pt ABCDEFGHIJKLMNOPQRSTUVWXYZabc
14 pt ABCDEFGHIJKLMNOPQRSTUVWX
18 pt ABCDEFGHIJKLMNOPQR
24 pt ABCDEFGHIJKLM
30 pt ABCDEFGHIJ
36 pt ABCDEFG
48 pt ABCD

Barcodes

Font	Length	Cksum	Valid ASCII Characters	Bar widths
A	Varies	No	32, 36, 37, 42, 43, 45-57, 65-90	2:1 - 3:1
B	11	Yes	48-57 Numeric only Option V used in the 6th & 7th position	2:1 - 4:1
C	6	Yes	48-57 Numeric only	2:1 - 4:1
D	Varies	No	48-57 Numeric only	2:1 - 3:1
E	Varies	M-103	32-127	2:1 - 4:1
F	12	Yes	48-57 Numeric only Option V used in the 7th & 8th position	2:1 - 4:1
G	7	Yes	48-57 Numeric only	2:1 - 4:1
H	Varies	M-43	32, 36-39, 42, 43, 45-57, 65-90	2:1 - 3:1
I	Varies	No	36, 43, 45-58, 65-68	2:1 - 3:1
J	Varies	M-10	48-57 Numeric only	2:1 - 3:1
K	Up to 14	M-10	48-57 Numeric only Option + is Last Character for Second M-11 Checksum	2:1 - 3:1
L	13	M-10	48-57 Numeric only	2:1 - 3:1
M	2	Yes	48-57 Numeric only	2:1 - 4:1
N	5	Yes	48-57 Numeric only	2:1 - 4:1
O	Varies	No	0 - 127 ASCII characters	2:1 - 4:1
p	Varies	Yes	48-57 Numeric only	Same as fonts
Q	19	Yes	48-57 Numeric only	2:1 - 4:1
R	18	Yes	48-57 Numeric only	2:1 - 4:1

Table C-3   Barcode Characteristics

Uppercase barcode identifiers (I.D's) have corresponding lowercase I.D's that when selected suppress printing of associated human-readable text.

Barcode A Code 3 of 9

Barcode B UPC-A

Barcode C UPC-E

Barcode D Interleaved 2 of 5

Barcode E Code 128

Barcode F EAN-13

Barcode G EAN-8

Barcode H Health Industry Barcode (HBIC)

Barcode I Codabar

01234567890

Barcode J Interleaved 2 of 5 w/module 10 checksum

012345678905

Barcode K Plessey

01234567890

Barcode L Interleaved 2 of 5 w/module 10 checksum and shipping bearer bars

0 12 34567 89012 8

Barcode M 2 Digit UPC addendum
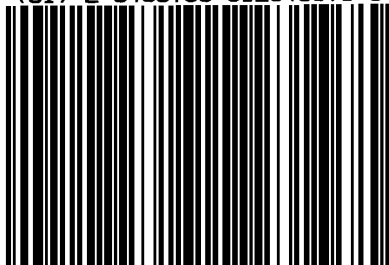
42

Barcode N 5 Digit UPC addendum

01234

Barcode O Code 93

Barcode p Postnet

Barcode Q UCC/EAN Code 128

Barcode R UCC/EAN Code 128
KMART NON EDI

(01) 2 3456789 012345678 9

34 567890 123 4567
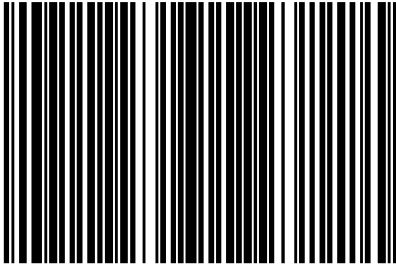
Appendix D

Error Codes

The most common error codes transmitted by the Printer are described below.

Lower case "c" Printer received a data byte from the host that contains a framing error (corrupted) due to noise.

Lower case "e" Memory module won't clear. Retry after a <STX> W command.

Lower case "v" Input buffer overflow.

Upper case "I" This means that an invalid command sequence was sent to the Printer. The Printer did not understand the command sequence and terminated the command interpreter.

Upper case "R" This code will be sent every time the Printer is turned on, this means there was a hardware reset.

Upper case "T" This means that the Printer has had a watchdog time-out condition. This is how a software reset occurs. A software reset is made by sending the command sequence to the Printer or by doing a front panel reset.

BELL HEX "07" This is usually returned on a corrupt image download, or if you try to load an image that is already installed in the module.

Appendix E

Cable Listings

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

Table E-1   Printer Interface Cables

Pin	Description
1	CHASSIS
2	TXD (RS-232C)
3	RXD (RS-232C)
4	RTS (4.7k ohm to +5VDC)
5	CTS (input)
7	LOGIC GROUND
14	+5 VDC (100 mA maximum)
20	BUSY (output)

Straight Cable (MXM)

```
HOST                                    PRINTER
        1 •————————SHIELD————————• 1
  TXD 2 •——————————————————————• 3 RXD
  RXD 3 •——————————————————————• 2 TXD
        7 •————————GROUND————————• 7
  RTS 4 •——┐                    ┌——• 4 RTS
  CTS 5 •——┘                    └——• 5 CTS

      DB25P                    DB25P
```
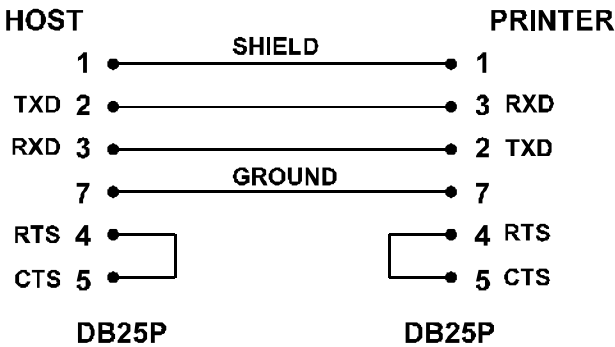
Figure E-1   Null Modem Cable (MXM)

> **Note:**   Cable is used for typical connection to other DCE
> equipment with Xon/Xoff flow control.

Straight Cable (MM)

```
HOST                                    PRINTER
        1 •————————SHIELD————————• 1
  TXD 2 •——————————————————————• 2 TXD
  RXD 3 •——————————————————————• 3 RXD
        7 •————————GROUND————————• 7
  RTS 4 •——┐                    ┌——• 4 RTS
  CTS 5 •——┘                    └——• 5 CTS

      DB25P                    DB25P
```
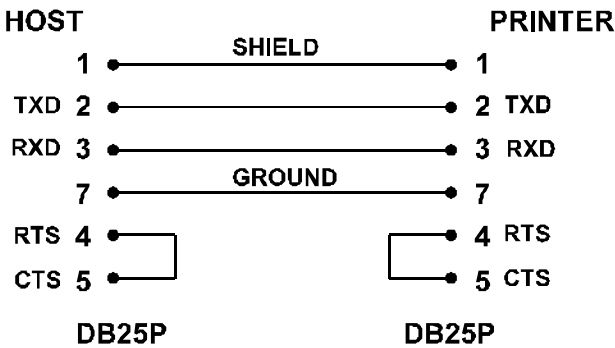
Figure E-2   Straight Cable (MM)

> **Note:**   Cable is used for typical connection to other DCE
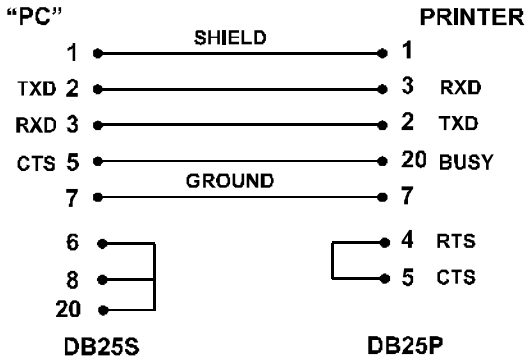> equipment with Xon/Xoff flow control.

PC (DB25P) to Allegro

Figure E-3   PC (DB25P) to Printer

Note: Cable is used for connection to a PC compatible with DB25P communication ports. Flow control is either Xon/Xoff or CTS/DTR.
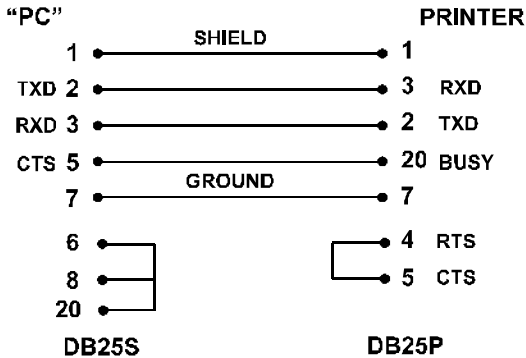
PC (DB9P) to Allegro

Figure E-4   PC (DB9P) to Printer

Note: Cable is used for connection to a PC compatible with DB9P communication ports. Flow control is either Xon/Xoff or CTS/DTR.

- **Parallel to Serial Adapter (Part Number: 899516)**

   If the Printer is being set up for parallel to serial communications a special parallel to serial interface adapter is needed, (figure E-5). The Parallel to Serial Interface Adapter is designed specifically for use with your Label Printers. The adapter is a one-way communication self-powered device. No external power source is required.

   The adapter has a sophisticated microprocessor built into the head assembly that converts standard Centronics parallel to RS-232C serial communication. This cable is useful when using the Printer with a PC that has only a parallel Printer port available.

   PC Parallel Port End

   Printer Port End RS-232
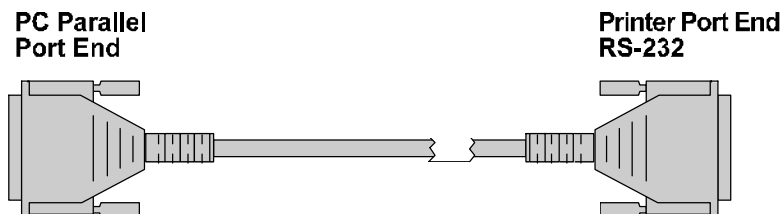
   Figure E-5   Centronics Parallel Interface Converter

   Cable is used for connection to a PC compatible with DB25M parallel communication ports. Flow control is CTS/DTR only. Part Number: 899516.

Appendix F

Printer Specifications

Printing

|	
Type:	Direct thermal or thermal transfer
Resolution:	203 dots per inch (8 dots/mm)
Print Speed:	2.0" (51 mm) per second
Barcode modules:	5 mil to 110 mil "X" dimension in picket or ladder orientation
Maximum Print Width:	4.1" (104mm)
Maximum Print Length:	8.25" (210mm) with standard RAM; up to 20.25" (514mm) with optional 512K memory module
White Space Slew Rate:	2.0" (51mm) per second
Maximum Fields Per Label:	200; 5K data per label maximum
Minimum Dot Size:	0.005" (0.125mm) square
Optional Dot Sizes:	0.010" (0.250mm) vertical; 0.015" (0.381mm) vertical; 0.010" (0.250mm) horizontal
Label Backfeed:	For use with optional Cutter or Peel and Present.

Fonts

Resident Fonts: Nine alphanumeric fonts from 0.035"H (0.89mm) to 0.64"H (16mm) and OCR-A, OCR-B; CG Triumvirate smooth font (10 point sizes) from Agfa in both portrait and landscape orientations

Optional Fonts: Proportional and monospaced available

Font Expansion, Rotation: All fonts expandable vertically and horizontally up to 8x; fonts and graphics can be printed in four directions: 0°, 90°, 180° and 270°

Character Density: 33.83 CPI in font 0 at 1x; 0.70 CPI in font 6 at 8x

Barcodes: Code 39, Interleaved 2 of 5, Code 128 (subsets A, B, and C), Codabar, LOGMARS, UPC-A, UPC-E, UPC 2& 5 digit addendum's, EAN-8, EAN-13, EAN 2 & 5 digit addendum's, UPC random weight, Code 93, MSI Plessey, Universal Shipping Container Symbology, UCC/EAN Code 128, Postnet

Barcode Density: 12.69 CPI using Code 39 with a 0.005" narrow bar at a 3:1 ratio; 6.34 CPI using Code 39 with a 0.010" narrow bar at a 3:1 ratio

Media

Width: 0.75" (19 mm) to 4.65" (118 mm); 4.25" (108mm) maximum recommended.

Length: 0.50" (13 mm) to 99.99" (2539 mm).

Thickness: 0.0025" (0.0635mm) to 0.0100" (0.254mm)

Type: Roll-fed, die-cut continuous or fan-fold labels, tags or tickets; most direct thermal or thermal transfer materials.

Supply Roll: 6" (152 mm) maximum diameter on 1.5" (38 mm) to 3" (76 mm) cores.

Optional Front Rewind: 6" (152 mm) maximum O.D. capacity (full supply roll).

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 Ribbons: Standard widths are 25 mm, 38 mm, 51 mm, 64 mm, 76 mm, 89 mm, 110 mm; 1182' (360 m) length.

Media Sensing: Moveable "see-through" for die-cut labels and reflective for tags with black striping.

Note: The reflective sensor mark must be carbon based. The sensor is infrared and will reflect off of a plain black mark.

Label/Tag Media Specifications:
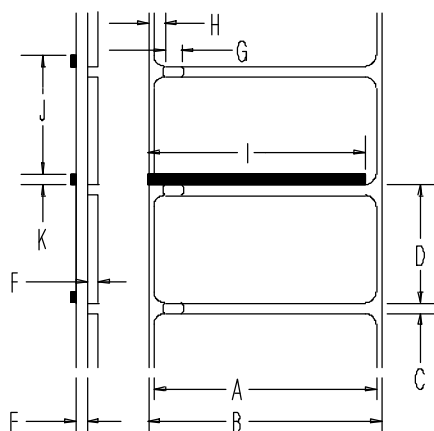
Figure F-1   Media Specifications

	Description	**MAX***	**MIN***
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	0.005	0.0023
F	Label thickness	0.005	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
I	Reflective sensor mark width	4.00	1.000
J	Distance between reflective mark	99.99	0.500
K	Reflective sensor mark length	99.99	0.100

* Units of measure are in inches

Table F-1   Media Dimensions

Lists of Approved Media

For a current list approved standard Media for use in Thermal and Thermal-Transfer Printers, please contact your customer support representative.

Lights and Switches

Lights*:*   Power, Paper/Ribbon, Pause

Switches: Power, Pause, Feed, Stop/Cancel, Thermal/Thermal Transfer, Baud Rate Selection and Function Switch Bank Variable Head Temperature Control

Communications Interfacing

IEEE RS-232C +RS-422:   300, 600, 1200, 2400, 4800, or 9600 baud.
Character Set: ANSI ASCII character set

Word Length: Selectable 7-bit or 8-bit data format

Handshaking: Xon/Xoff (in receive mode only) and CTS/DTR

Input Buffer: Approximately 7000 bytes. Xoff is transmitted and DTR goes low when 750 bytes are available in the buffer. Xon is transmitted and DTR goes high when 750 bytes are left in the buffer. Characters are transmitted with no parity from the Printer.

Electrical

Power Source: 115, 220/240 VAC, 50/60 Hz

Circuit Protection: 115 VAC: 1 amp time delay fuse; 230: 2 time delay fuses T 0.5 amp

Grounding: Unit must be connected to a properly-grounded receptacle

Environmental

Operating Temperature: 40°F to 90°F (4°C to 32°C)

Storage Temperature: 32°F to 120°F (0°C to 49°C)

Humidity: 10% to 95% non-condensing

Ventilation: Free air movement

Dust: Non-conducting, non-corrosive

Electromagnetic Radiation: Moderate RF fields can be tolerated

Physical

Dimensions: 8.8"H x 16.6"W x 14.5"D (224mmH x 421mmW x 368 mmD)

Weight: 23 lbs. (10.4 kg)

Options

Front Rewind:	6" (152mm) maximum O.D. capacity (full supply roll) 8" (203mm) maximum O.D. capacity (full supply roll)

Cutter with Tray: Maximum thickness of 0.010" (.254mm)

Font Memory Cartridges: (pre-loaded from the manufacturer)

256K Flash EEPROM
Memory Module :   Used for permanent storage of custom fonts, graphics and formats.

256K and 512K RAM
Memory modules: Used for temporary storage of fonts, formats and graphics; 512K Module also extends label length to 20.25" (514mm).

Parallel Adapter: Converts Centronics Parallel type data to RS-232C

PC-Batch Software: Stand-alone label creation software package for IBM-PC or compatible.

Appendix G

Datamax Barcode Products
Limited Warranty Statement

Allegro™

Printer

Datamax warrants to Purchaser that under normal use and service, the Allegro Printer, 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 one year, (365 days), or 1,000,000 linear inches of use, whichever comes first, for the Allegro thermal printhead. This one year (365 days) warranty is valid only if a Datamax - approved thermal or thermal transfer label media is used, as defined in 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: 4724 Parkway Commerce Blvd., Orlando, Florida, 32808. A Return Material Authorization (RMA) number must be issued before the product can be returned. To open an RMA please call the Datamax Customer Service Department at (407) 523-5550. Please include your RMA number on the outside of the box and on the shipping document. Include a contact name, action desired, a detailed description of the problem(s), and examples when possible with the defective unit. 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 warranty. In the event of a defect covered by its warranty, Datamax will return the repaired or replaced product to the 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

Datamax makes no warranty as to the design, capability, capacity or suitability of any of its hardware, supplies, or software.

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.

Limitation of Liability

In no event shall Datamax be liable to the purchaser for any indirect, special or consequential damages or lost profits arising out of or relating to Datamax's products, or the performance or a breach thereof, even if Datamax has been advised of the possibility thereof. Datamax's liability, if any, to the purchaser or to the customer of the purchaser hereunder shall in no event exceed the total amounts paid to Datamax hereunder by the purchaser for a defective product.

In no event shall Datamax be liable to the purchaser for any damages resulting from or related to any failure or delay of Datamax in the delivery or installation of the computer hardware, supplies or software or in the performance of any services.

Some states do not permit the exclusion of incidental or consequential damages, and in those states the foregoing limitations may not apply. The warranties here give you specific legal rights, and you may have other legal rights which vary from state to state.