DATAMAX

Class Series

Programmer's Manual

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Part Number: 88-2316-01

Revision C

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Overview

Who Should Use This Manual

This manual is intended for programmers who wish to create their own label production software. Operators without programming experience may prefer to use a label-creation software package. For programming information on models not covered in this document, a copy may be downloaded from our web site at http//www.datamaxcorp.com.

Scope of this Manual

This manual, arranged alphabetically by command, explains in detail Datamax Programming Language (DPL) and its related uses in the writing, loading and storing of programs for the control and production of label formats (designs) using the following Datamax printer models:

- **A-Class**
- **E-Class** (Non-Display)
- **I-Class**
- **M-Class** (Display-Equipped and Non-Display models)
- **W-Class**

Model distinctions, including specific printer configurations (i.e., Display-Equipped or Non-Display Models) and / or equipment types (e.g., I-Class GPIO-1, graphics display, etc.), will be indicated in this text to differentiate command compatibility. The appendices of this manual also contain details that cannot be ignored. The use of any command will require checking for possible exclusionary conditions.

☑ **Notes:** (1) The commands in this manual apply to printer Application (firmware) Version 7.24 or greater (see <STX>KC for more information).

(2) Programming information for the S-Class printer, as well as the Datamax legacy line of printers, can be found in the *DPL Programmer's Manual* (part number 88-2051-01). For backward compatibility purposes, the Class Series of printers will ignore commands no longer processed; Appendix N lists these commands.

(3) References to 'menu settings' refer either to the printer's internal set-up menu, or to the printer's menu driven display system; please consult to the appropriate *Operator's Manual* for details.

This manual contains the following chapters and appendices.

General Conventions

These are some of the conventions followed in this manual:

- On the header of each page, the name of the chapter.
- On the footer of each page, the page number and the title of the manual.
- Names of other manuals referenced are in ***Italics***.
- Notes are added to bring your attention to important considerations, tips or helpful suggestions.
- **Boldface** is also used to bring your attention to important information.
- This manual refers to IBM-PC based keyboard command characters for access to the ASCII character set. Systems based on different formats (e.g., Apple's Macintosh™) should use the appropriate keyboard command to access the desired ASCII character. See Appendix A for the ASCII character set.

Computer Entry and Display Conventions

Command syntax and samples are formatted as follows:

- The Courier font in **boldface** indicates the DPL command syntax, and ***Italics*** are used to indicate the command syntax parameters.
- Regular Courier font indicates sample commands, files and printer responses.
- Square brackets [ ] around something indicates that it is optional.
- <CR> is used to identify the line termination character. Other strings placed between < > in this manual represent the character of the same ASCII name, and are single-byte hexadecimal values (e.g., <STX>, <CR>, and <0x0D> equal 02, 0D, and 0D, respectively).
- Hexadecimal values are often displayed in 'C' programming language conventions (e.g., 0x02 = 02 hex, 0x41 = 41 hex, etc.)

Typical Dataflow Sequence

The typical dataflow sequence is summarized in the following bullets and detailed in the table below. Printer Commands data is transmitted to the printer as shown in the table from left to right, top to bottom.

- Status commands
- Configuration commands
- Download commands
- Label format
- Status commands
- Label reprint commands
- Memory cleanup

Printer Commands	Description	Notes
<SOH>A	"Status" commands: Get Status, Request Memory Module Storage Information…	Optional, bidirectional communication required for these commands.
<STX>WG		
<STX>O220 <STX>n <STX>V0	"Configuration" commands, download image…	See <STX>Kc to reduce configuration commands transferred
<SOH>D <STX>IApImagename<CR>image data...data <CR>	"Download" commands, image, fonts…	RAM (temporary) or Flash (semi-permanent) memory
<STX>L	Begin label	Existing label formats may be recalled. Label header records are not required
D11	Label Header record	
131100000500050Typical text field 01	Label Formatting Data record – Object type, orientation, position, data	
Q0001	Label Quantity	
E	Label Terminate record	
<SOH>A	Status command	Optional, bidirectional communication required for these commands.
<STX>U01new data for field 01	Reprint with New Data Records	Used for fast re-prints
<STX>E0005		
<STX>G		
<STX>xImagename<CR> <STX>zA	Memory cleanup	Typically used for temporary storage

Commands are available for retrieving stored label formats, updating data and adding new data. These techniques are used for increasing throughput. See <STX>G, Label Recall Command ‘r’, and Label Save Command ‘s’.

Typical commands used in the various stages shown above are listed in the tables that follow.

Configuration Commands

The following table lists some commands useful in controlling printer configuration. These commands are generally effective only for the current power-up session; toggling power restores the default configuration. See <STX>Kc for changes to the default power-up configuration. Changing the default power-up configuration and saving objects in printer Flash memory can reduce the data transmitted for each label and therefore improve throughput.

Configuration Command	Name	Function
<STX>A	Set Date and Time	Set Date and Time
<STX>d	Set Double Buffer Mode	Force generation of multiple memory copies of label format; usually not used
<STX>c	Set Continuous Paper Length	Must be 0000 for gap media; not used for reflective media
<STX>e	Set Edge Sensor	Setup for gap or registration hole type stock
<STX>Kf	Set Present Distance	Determines label stop position, head relative. <STX>f edge sensor relative equivalent command, older models
<STX>Kc	Configuration Set	Determines default power-up configuration
<STX>F	Send Form Feed	Sets the stop position of the printed label
<STX>M	Set Maximum Label Length	Length to search for next gap or reflective mark; not used with continuous media
<STX>m	Set to Metric Mode	Subsequent measurements interpreted in metric, most units mm/10. Label equivalent command can be used
<STX>n	Set to Inch Mode	Subsequent measurements interpreted in inches, most units in/100, Label equivalent command can be used
<STX>O	Set Start of Print Position	Effect is not on label immediately following command since media position is at Start of Print between labels; <STX>K default position relative ± 64 in/100 maximum deviation
<STX>S	Set Feed Rate	Blank label movement speed
<STX>V	Software Switch	Enable optional hardware, cutter, present sensor

Download Commands

Download Command	Name	Function
<STX>I	Download Image	Download Image to selected memory module
<STX>i	Download Scalable Font	Download Scalable Font to selected memory module
<ESC>	Download Bitmapped Font	Download Bitmapped Font to selected memory module

Label Header Commands

These commands determine how the label formatting occurs, effect print quality and quantity. They are typically issued immediately following the <STX>L start of the label format. The Format Attribute (A) and the Offset (C, R) commands can be changed at any point between format records to achieve desired effects.

Label Header Command	Name
A	Set Format Attribute
C	Column Offset
D	Set Width and Dot Size
H	Set Heat Setting
M	Set Mirror Mode
P	Set Print Speed
P	Set Backup Speed
Q	Set Quantity
R	Set Row Offset
S	Set Slew Speed

Control Code Command Functions

Introduction

The printer requires a special "attention-getter" character in order to receive a command sequence, informing the printer that it is about to receive a command and the type of command it will be. Control Commands, System-Level Commands, and Font Loading Commands have their own unique attention-getter, followed by a command character that directs printer action.

Attention-Getters

The attention-getters (e.g., "SOH") are standard ASCII control labels that represent a one character control code (i.e., ^A or Ctrl A). Appendix A contains the entire ASCII Control Code Chart.

Attention-Getter For:	ASCII Character	Decimal Value	HEX Value
Immediate Commands	SOH	1	01
System-Level Commands	STX	2	02
Font Loading Commands	ESC	27	1B

Table 2-1: Control Code Listings

Alternate Control Code Modes

For systems unable to transmit certain control codes, Alternate Control Code Modes are available. Configuring the printer to operate in an Alternate Control Code Mode (selected via the Setup Menu, the <STX>Kc command or, where applicable, the <STX>KD command) requires the substitution of Standard Control Characters with Alternate Control Characters in what otherwise is a normal data stream.

Control Character	Standard	Alternate	Alternate 2	Custom	Command Type
SOH	0x01	0x5E	0x5E	User Defined	Control
STX	0x02	0x7E	0x7E	User Defined	System
CR	0x0D	0x0D	0x7C	User Defined	Line Termination
ESC	0x1B	0x1B	0x1B	User Defined	Font Loading
"Count By" [1]	0x5E	0x40	0x40	User Defined	Label Formatting

[1] See Label Formatting Commands, ^ set count by amount.

Table 2-2: Alternate Control Code Listings

☑ **Note:** Throughout this manual <SOH>, <STX>, <CR>, <ESC>, and ^, will be used to indicate the control codes. The actual values will depend on whether standard or alternate control codes are enabled for the particular application.

Alternate Line Terminator Example

Alternate Control Codes provide for substitution of the line terminator, as well as the control characters listed above. For example using Alternate 2, the line terminator <CR> (0x0D) is replaced by | (0x7C). The following is a sample label format data stream for a printer configured for Alternate-2 Control Codes:

```
~L|1911A10001000101234560|X|~UT01ABCDE|~G|
```

Immediate Command Functions

Introduction

When the printer receives an Immediate Command, its current operation will be momentarily interrupted to respond to the command. Immediate Commands may be issued before or after System-Level commands; however, they may not be issued among Label Formatting Commands or during font or image downloading. Immediate Commands consist of:

1. Attention-Getter, 0x01 or 0x5E, see Control Codes.
2. Command Character

SOH # Reset

This command resets the printer. Resetting the printer returns all settings to default and clears both the communications and printing buffers. The command also clears DRAM memory.

Syntax: **<SOH>#**

Printer Response: The printer will reset.
<XON> T (The T may come before the <XON>)

*SOH * Reset*

(Display-Equipped Models only)

This command forces a soft reset of the microprocessor, which resets the printer. Resetting the printer returns all settings to default and clears the communications and print buffers.

Syntax: **<SOH>***

Printer Response: The printer will reset.
<XON> T (The T may come before the <XON>)

SOH A Send ASCII Status String

This command allows the host computer to check the current printer status. The printer returns a string of eight characters, followed by a carriage return. Each character (see below) indicates an associated condition, either true (Y) or false (N). Byte 1 is transmitted first. See <SOH>F.

Syntax: **<SOH>A**

Sample: <SOH>A

Printer Response: abcdefgh<CR>

Where:

Possible Values			Interpretation			Byte Transmit Sequence
a	-	Y/N	Y	=	Interpreter busy (Imaging)	1
b	-	Y/N	Y	=	Paper out or fault	2
c	-	Y/N	Y	=	Ribbon out or fault	3
d	-	Y/N	Y	=	Printing batch	4
e	-	Y/N	Y	=	Busy printing	5
f	-	Y/N	Y	=	Printer paused	6
g	-	Y/N	Y	=	Label presented	7
h	-	N	Always No			8

Table 3-1: ASCII Status Bytes

SOH B Toggle Pause

This command toggles the printer's paused state between on and off. (This is the same function achieved by pressing the PAUSE Key on the printer.)

Syntax: **<SOH>B**

Sample: <SOH>B

Printer Response: This command will illuminate the Paused/Stop Indicator and/or indicate PAUSED on the LCD or graphics display panel, suspend printing, and wait until one of the following occurs:

- The <SOH>B command is sent to the printer.
- The PAUSE Key is pressed.

Upon which the printer will turn the Paused/Stop Indicator 'Off' and/or remove PAUSED from the LCD or graphics display panel, then resume operation from the point of interruption. (If the Receive Buffer is not full, an <XON> character will be transmitted from the printer.)

SOH C Stop/Cancel

This command performs the same function as pressing the STOP/CANCEL Key on the printer. This function clears the current label format from the print buffer, pauses the printer, and illuminates the Paused/Stop Indicator. (The pause condition is terminated as described under <SOH>B.)

Syntax: **<SOH>C**

Sample: <SOH>C

Printer Response: This command will clear the print buffer, pause the printer, illuminate the Paused/Stop Indicator and/or indicate PAUSED on the LCD or graphics display panel, suspend printing, and wait until one of the following occurs:

- The <SOH>B command is sent to the printer.
- The PAUSE Key is pressed.

Upon which the printer will turn the Paused/Stop Indicator 'Off' and/or remove PAUSED from the LCD or graphics display panel. (If the Receive Buffer is not full, an <XON> character will be transmitted from the printer.)

SOH D SOH Shutdown

(Non-Display Models only)

This commands the printer to ignore Immediate Commands (^A). The SOH shutdown command is required before loading images or fonts because some may contain data sequences that could be interpreted as Immediate Commands. After the SOH shutdown command is sent, Immediate Commands can be turned back on by sending a valid SOH command three times, separated by a one second delay between each command, or by manually resetting the printer. **It is good practice to check batch quantities (<SOH>E) to verify that the SOH commands are working.**

Syntax: **<SOH>D**

Sample: <SOH>D

Printer Response: This printer will ignore Immediate Commands (^A) until a valid SOH command is received three times, separated by a one second delay between each command; or, until the printer is manually reset.

SOH E Send Batch Quantity

This command causes the printer to send back a four-digit number indicating the quantity of labels that remain to be printed in the current batch, followed by a carriage return. Communications latency may cause this value to be higher than actual on some printers.

Syntax: **<SOH>E**

Printer response: *nnnn*<CR>

Where: *nnnn* - Is four decimal digits, 0-9999.

SOH F Send Status Byte

This command instructs the printer to send a single status byte where each bit (1 or 0) represents one of the printer's status flags, followed by a carriage return (see below). If an option is unavailable for the printer, the single bit will always be 0. See <SOH>A.

Syntax: **<SOH>F**

Printer response format: X<CR>

Where 'X' is 0 through 0xef with bits as indicated in the 'Condition' column below:

Bit[1]	Value	Condition
8	0	Always zero
7	1 or 0	Label presented
6	1 or 0	Printer paused
5	1 or 0	Busy printing
4	1 or 0	Printing batch
3	1 or 0	Ribbon out or Fault
2	1 or 0	Paper out or Fault
1	1 or 0	Command interpreter busy (Imaging)

[1] Bit one is the least significant bit.

SOH U Update System Database with Current Database

This command saves the current printer configuration to Flash memory. Only those parameters stored in Flash memory are affected. These are all the parameters that can be modified via the Setup Menu. The values of any <STX> System Commands issued prior to <SOH>U and affecting printer configuration items will also be saved. See the <SOH># command, above, for details on what events occur during a reset.

Syntax: **<SOH>U**

Printer response: The printer will reset.
<XON>T (The T may come before the <XON>).

System-Level Command Functions

Introduction

The most commonly used commands are the System-Level Commands. These are used to load and store graphic information, in addition to printer control. System-Level Commands are used to override default parameter values (fixed and selectable) and may be used before or after Immediate Commands but cannot be issued among Label Formatting Commands. System-Level Commands consist of:

1. Attention-Getter, `0x02` or `0x7E`, see Control Codes.
2. Command Character
3. Parameters (if any).

STX A Set Time and Date

This command sets the time and date. The initial setting of the date will be stored in the printer's internal inch counter. This date can be verified by printing a Configuration Label.

Syntax: **<STX>A*wmmddyyyyhhMMjjj***

Where:

`w`	1 digit for day of week; 1 = Monday; 7 = Sunday
`mm`	2 digits for month
`dd`	2 digits for day
`yyyy`	4 digits for year
`hh`	2 digits for hour in 24 hour format
`MM`	2 digits for minutes
`jjj`	3 digits for Julian date (numerical day of the year) / constant; see notes below

Sample: `<STX>A1020319960855034`

Printed response: `Mon. Feb 3, 1996, 8:55AM, 034`

☑ **Notes:** (1) When set to 000, the Julian date is automatically calculated; otherwise, the Julian date will print as that entered number, without daily increments. If factory defaults are restored the actual Julian date will also be restored.

(2) Printers without the Real Time Clock option lose the set time/date when power is removed.

(3) Response format is variable; see the Special Label Formatting Command <STX>T.

STX a Enable Feedback Characters

This command enables the feedback ASCII hex characters to be returned from the printer following specific events after each completed batch of labels when using serial communications. The default value is 'Off'.

Syntax: **<STX>a**

Printer response: Event dependent. (Also, see Appendix D for error codes.)

Where:

Event	Return Characters
Invalid character	0x07 (BEL)
Label printed	0x1E (RS)
End of batch	0x1F (US)

STX B Get Printer Time and Date Information

This command instructs the printer to retrieve its internal time and date information.

Syntax: **<STX>B**

Sample: <STX>B

Printer response format: wmmddyyyyhhMMjjj<CR>

Where:

w	1 digit for day of week; 1 = Monday
mm	2 digits for month
dd	2 digits for day
yyyy	4 digits for year
hh	2 digits for hour in 24 hour format
MM	2 digits for minutes
jjj	3 digits for Julian date / constant*

* See <STX>A for details and restrictions.

Printer response sample: 1020319960855034<CR>

STX c Set Continuous Paper Length

This command sets the label size for applications using continuous media. It disables the top-of-form function performed by the Media Sensor. The sensor, however, continues to monitor paper-out conditions. See <STX>M.

Syntax: **<STX>c*nnnn***

Where: *nnnn* - Specifies the length of the media feed for each label format, in inches/100 or millimeters/10 (see <STX>m).

Sample: <STX>c0100

This sample sets a label length of 100, which equals 1.00 inch (assuming Imperial Mode is selected).

☑ **Note:** This command must be reset to zero for edge or reflective sensing operation.

STX d Set Double Buffer Mode

(Non-Display Models only)

This command, available for backward compatibility, enables double buffer mode. When printing labels with incrementing, decrementing and replacement fields (see note below) the printer will only erase and format those fields, leaving the rest of the label format untouched, and thus increasing throughput. This command is only active if the labels being printed are less than half the maximum size of the print buffer (see <STX>S).

Syntax: **<STX>d**

☑ **Note:** This command is generally not used because fast formatting is the normal operating mode when the number of variable print fields (Label Formatting commands +, -, <, >, u) is less than or equal to 1/3 of the total print field count. In this case the command will force fast formatting even when the proportion of variable print fields is greater than 1/3 the total. The maximum label size is unaffected by this command. The <STX>s command restores normal (fast) formatting.

STX E Set Quantity For Stored Label

This command sets a number of labels for printing using the format currently in the print buffer. (The printer automatically stores the most recent format received in the buffer until the printer is reset or power is removed.) When used in conjunction with the <STX>G command, this will print the labels.

Syntax: **<STX>E*nnnn***

Where: *nnnn* - A four-digit quantity, including leading zeros.

Sample:
```
<STX>E0025
<STX>G
```

Printer response: 25 labels of the current format in memory will be printed.

☑ **Note:** This command may be issued prior to a label format without a specified quantity, Qnnnnn. Also, if a <CR> terminates the command, a five-digit quantity (nnnnn) can be entered.

STX e Select Edge Sensor

This command enables transmissive (see-through) sensing for top-of-form detection of die-cut, and holed (or notched) media. This Media Sensor will detect a minimum gap of 0.1 inches (2.5 mm) between labels (see the *Operator's Manual* for media requirements). Use the <STX>O command to adjust the print position. This is the printer default setting at power-up or reset.

Syntax: **<STX>e**

☑ **Note:** This command is ignored when <STX>cnnnn is issued with a non-zero value for nnnn.

STX F Form Feed

This commands the printer to form feed to the next start of print.

Syntax: **<STX>F**

Printer response: The printer will form feed.

☑ **Note:** Following a reset, if the length of the first label fed is less than the label offset value (defined by the <STX>0 command) the printer will advance past that label until a top-of-form is detected, or until the offset is reached.

STX f Set Form Stop Position (Backfeed Command)

This sets the stop position of the printed label, allowing the label to stop at a point past the start-of-print position. When the next label format is sent, the printer motor reverses direction to retract the media to the start-of-print position. If quantities of more than one label are requested, the printer will operate without backfeeding. A backfeed will then only occur when printing has stopped for a few seconds.

Non-Display models: The printer must be set to 'Host' (via the menu) for this command to have effect.

Display-equipped printers: SOP Emulation may be selected and enabled via the menu – if the SOP Emulation is set to 'Disabled', this command is ignored.

Syntax: **<STX>f*nnn***

Where: *nnn* - Is a three-digit distance from the Media Sensor, in inches/100 or mm/10. This distance is independent of the start-of-print position (<STX>O), yet it must be greater than the start-of-print position to take effect.

Sample: <STX>f230

The sample sets a stop position distance of 230 (2.3 inches from the Media Sensor's eye).

STX G Print Last Label Format

This command prints a previously formatted label and restarts a canceled batch job following the last processed label. This is used when there is a label format in the buffer. The <STX>E command is used to enter the quantity. (If the <STX>E command is not used only one label will print.)

Syntax: **<STX>G**

STX I Input Image Data

This command must precede image downloading from a host computer to the printer. The data that immediately follows the command string will be image data. If any of the 8-bit input formats are to be used, it is necessary to disable the Immediate Command interpreter by executing an <SOH>D command before issuing the <STX>I command. See Appendix O for more information. To print an image, see Generating Label Formats.

A-Class printers: A "ready mode" logo for the graphics display can input using this command. The image must be stored on a Flash Module. The image name must be "LOGOLAB" in the following DPL command. The available display area is 312 pixels wide by 94 pixels high. Images larger than this specified width or height will be clipped on the right and/or bottom edges.

☑ **Note:** The native format for storing downloaded PCX and BMP images is RLE-2. The result is a better compression ratio and therefore the use of less module space for downloaded gray-scale images and for images with very large areas of either black or white.

Syntax: **<STX>I*abfnn…n*<CR>*data***

Where:

a - Memory Module Bank Select (see Appendix K).

b - Data Type (optional), A or omit.

***b* Value:**	**Image Data Value Range:**
A	ASCII Characters 0-9, A-F, (7 bit)
omitted	00-FF, (8 bit)

f - Format Designator

***f* Designator**	**Format Type:**
F	7-bit Datamax image load file
B	.BMP 8-bit format (image flipped), black and white (B&W)
b	.BMP 8-bit format (image as received), B&W
I	.IMG 8-bit format (image flipped), B&W
i	.IMG 8-bit format (image as received), B&W
P	.PCX 8-bit format (image flipped), B&W
p	.PCX 8-bit format (image as received), B&W

nn…n - Up to 16 characters used as an image name.

<CR> - 0x0d terminates the name.

data - Image data

Sample:

```
<SOH>D
<STX>IDpTest <CR>
data...data <CR>
```

The sample instructs the printer to (1) receive an 8-bit PCX image sent by the host in an 8-bit data format, (2) name the image 'Test', and (3) store it in memory module D.

STX i Scalable Font Downloading

The command structure for downloading TrueType (.TTF) scalable fonts (font files may be single-byte or double-byte character systems) is as follows:

Syntax: **<STX>i*mtnnName*<CR>*xx…xdata…***

Where:

- *m* - Memory Module Designator to save this font to; see Appendix K.
- *t* - Type of scalable font being downloaded:
  T = TrueType
- *nn* - Two-digit font reference ID. Valid range is 50-99, 9A-9Z, 9a-9z, (base 62 numbers).
- *Name* - The title, up to 16 characters, for this font.
- <CR> - 0x0d terminates the Name.
- *xx…x* - Eight-digit size of the font data, number of bytes, hexadecimal, padded with leading zeros.
- *data* - The scalable font data.

Sample: `<STX>iDT52Tree Frog<CR>000087C2data...`

This sample downloads a TrueType font to module 'D' and assigns it the Font ID of 52 with the name "Tree Frog". The size of the font data is 0x87C2 bytes long.

STX J Set Pause for Each Label

This command causes the printer to pause after printing each label. It is intended for use with the peel mechanism or tear bar when the Present Sensor option is not installed. After removing the printed label, the PAUSE Key must be pushed in order to print the next label. (The printer must be reset to clear the <STX>J command.)

Syntax: **<STX>J**

STX K Extended-System Commands

This expands the System-Level Commands. See the Extended-System Commands for more information.

STX k Test RS-232 Port

This command instructs the printer to transmit the Y character from the printer's RS-232 port. (Failure to receive Y could indicate an interfacing problem.)

Syntax: **<STX>k**

Printer response: Y

STX L Enter Label Formatting Command Mode

This command switches the printer to the Label Formatting Command Mode. Once in this mode, the printer expects to receive Record Structures and Label Formatting Commands. Immediate, System-Level, and Font Loading commands will be ignored until the label formatting mode is terminated with E, s, or X, (see Label Formatting Commands for additional information).

Syntax: **<STX>L**

STX M Set Maximum Label Length

This command instructs the printer move media this distance in search of the top-of-form (label edge, notch, black mark, etc.) before declaring a paper fault. A paper fault condition can occur if this setting is too close (within 0.1 inch [2.54 mm]) to the physical length of the label. Therefore, it is a good practice to set this command to 2.5 to 3 times the actual label length used. The minimum value should be at least 5" (127 mm).

Syntax: **<STX>M*nnnn***

Where: *nnnn* - Is a four-digit length, 0000-9999, in/100 or mm/10. Maximum setting is 9999 (99.99 inches or 2540 mm). The default setting is 16 inches/ 406.4 mm

Sample: <STX>M0500

The sample sets a maximum travel distance of 5 inches (unless the printer is in metric mode, see <STX>m).

STX m Set Printer To Metric Mode

This command sets the printer to interpret measurements as metric values (e.g., <STX>c0100 will equal 10.0 mm). The default is Imperial (see <STX>n).

Syntax: **<STX>m**

STX n Set Printer to Imperial Mode

This command sets the printer to interpret measurements as inch values (e.g., <STX>c0100 will equal 1.00 inch). The printer defaults to this mode.

Syntax: **<STX>n**

STX O Set Start of Print (SOP) Position

This command sets the point to begin printing relative to the top-of-form (the label's edge as detected by the Media Sensor). The printer will feed from the top-of-form to the value specified in this command to begin printing.

This value operates independently of the <STX>f command.

Non-Display models: The printer must be set to 'Host' (via the menu) for this command to have effect.

Display-equipped models: If SOP Emulation is set to 'Enabled' (via the menu) – this command sets the point where printing starts, emulating the selected legacy printer's distance, as measured between the media sensor and the printhead burn line. In addition, regardless of the SOP Emulation setting the start of print position can be fine-tuned via the menu: Menu Mode / Print Control / Custom Adjustments / Row Adjust.

Syntax: **<STX>Onnnn**

Where: *nnnn* - Is a four-digit offset value in inches/100 or mm/10. The "zero" setting is the default value, and settings below 50 are adjusted back to the default value.

Non-display models: the default setting is 0220 in Imperial Mode (0559 in Metric Mode).

Display-equipped models: the default setting is 'Off' and the printer assumes the natural start of print position.

Sample (non-display models): <STX>O0300

The above sample sets a start of print position of 3.0 inches (unless in Metric Mode, see <STX>m).

Sample (display-equipped models): <STX>O0210

The above sample will begin printing 0.1 inch closer to the leading edge of the label if the 220 (Allegro) SOP Emulation was selected, or 1.0 inch farther away from the leading edge if 110 (ProdPlus) SOP Emulation was selected.

STX o Cycle Cutter

This command will cause the optional cutter mechanism to immediately perform a cut after all previously received commands are executed. The cutter must be installed, enabled and the interlock(s) closed for operation.

Syntax: **<STX>o**

STX P Set Printer to Character (HEX) Dump Mode

This command instructs the printer to assume Character Hex Dump Mode (also known as ASCII dump or monitor mode). Data sent to the printer following this command will be printed in raw ASCII format. To capture this data, labels must be at least four inches (102 mm) long and as wide as the maximum print width. This command has the same effect as turning the printer 'On' while pressing the FEED Key; however, no Configuration/Test Pattern label will be printed. To return to normal operation the printer must be manually reset.

Syntax: **<STX>P**

STX p Controlled Pause

The controlled pause command will cause the printer to pause only after all previously received commands are executed. This is often useful between label batches. (This command will not clear the pause condition, see <SOH>B).

Syntax: **<STX>p**

STX Q Clear All Modules

This command instructs the printer to clear all of the Flash and DRAM modules (see the *Operator's Manual* of the corresponding printer for applicable module options). **All stored data will be destroyed.**

Syntax: **<STX>Q**

STX q Clear Module

This command clears the selected Flash or DRAM module. If a module is corrupted during normal operations (identifiable when the printer responds with a 'No Modules Available' message to a <STX>W command), it must be cleared. **All stored data will be destroyed.**

Syntax: **<STX>q*a***

Where: *a* - Memory module designator, see Appendix K.

Sample: <STX>qA

The sample clears memory module A.

☑ **Notes:** (1) If a module directory intermittently returns the message 'No Modules Available' or if data continuously becomes corrupt with the write protect switch on, the module may be at the end of its service. However, before concluding that a module is defective, cycle the printer's power and test the module.

(2) E-Class models: Some Flash Memory Expansion options must have Write Enable jumpers installed to perform this command.

STX R Ribbon Saver On/Off

(Display-Equipped Models only)

This command enables the operation of the optional Ribbon Saver. It is the only command used to control the Ribbon Saver. Its operation is continuous when enabled. The printer must be set to thermal transfer (ribbon) printing mode then, during operation, the Ribbon Saver engages automatically, lifting when the minimum amount of label white space is exceeded.

Syntax: **<STX>Rx**

Where: x - Y - Enabled (Default = Menu selection.)
N - Disabled

Sample: <STX>RY

The sample will turn the ribbon saver on.

☑ **Note:** This command is ignored on units not equipped with the ribbon saver option.

STX r Select Reflective Sensor

This command enables reflective (black mark) sensing for top-of-form detection of rolled butt-cut, and fan-fold or tag stocks with reflective marks on the underside. This Media Sensor will detect a minimum mark of 0.1 inches (2.54 mm) between labels (see the *Operator's Manual* for media requirements). The end of the black mark determines the top of form. Use the <STX>O command to adjust the print position.

Syntax: **<STX>r**

Default setting: Edge sensing

STX S Set Feed Rate

This command controls the output rate of the media when the FEED Key is pressed.

Syntax: **<STX>S*n***

Where: *n* - Is a letter value (see Appendix L).

STX s Set Single Buffer Mode

(Non-Display Models only)

This command, available for backward compatibility, instructs the printer to use single buffer operation. In single buffer mode, the printer will erase and format all fields. This, in turn, decreases printer throughput when incremental, decremental, or replacement fields are used (see Label Formatting Commands). See <STX>d.

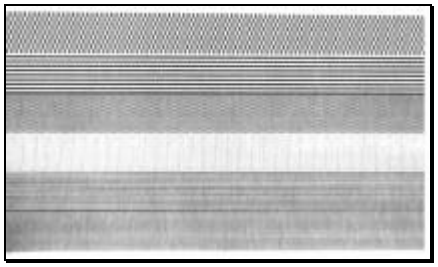
Syntax: **<STX>s**

STX T Print Dot Pattern Test Label

This command instructs the printer to produce a Dot Pattern Label, a label comprised of different patterns that exercise the printhead. This is the same test label printed when powering on the printer while pressing the FEED Key, except that the printer will not produce a Configuration Label or enter the Hex Dump Mode. (On display-equipped models, it can also be generated as a Quick Test Label.) To view the full dot pattern use media at least 2 inches (51 mm) long and as wide as the maximum print width.

Syntax: **<STX>T**

Printer response (dots patterns may vary):



STX t Test DRAM Memory Module

This command tests the DRAM module. The printer returns a one-line message stating the module condition (no message is returned if a module is unavailable).

Syntax: **<STX>t**

results - Test results given as 'Good' or 'Bad'.

Non-display models: The printer must be in Test Mode for the command to function. To enable the Test Mode see the <STX>KD command.

Printer response format: *a*`xxx`K *results*<CR>

Where: *a* - 2 = Slot B

xxx - Module size in Kbytes

Display-equipped models: The printer must have Feedback Characters enabled for this command to function. Feedback Characters can be enabled via the menu (see the *Operator's Manual* for additional information).

Printer response format:
```
Module A: xxxxK  DRAM Tested  results<CR>
Module B: xxxxK  DRAM Tested  results<CR>
Module D: xxxxK  DRAM Tested  results<CR>
```

Where: xxxx - Module size in Kbytes.

STX U Label Format String Replacement Field

This command places new label data into format fields to build a label. Two options are available: Exact Length and Truncated Length.

To easily keep track of fields, place all of the fields to be updated with the command at the beginning of the label format. A maximum of 99 format fields can be updated. Fields are numbered consecutively 01 to 99 in the order received.

Exact Length Replacement Field Functions – The new data string must equal the original string length and contain valid data. When the dynamic data is shorter than the length of the originally defined data field, then field will be padded with blanks (or zero when the Format Record header specifies a numeric bar code).

Syntax: **<STX>U*nnss…s*<CR>**

Where: *nn* - Is the format field number, 2 digits.

ss…s - Is the new string data, followed by a <CR>

Exact Length Sample:

```
<STX>L
1A1100001000100DATA FIELD 1<CR>
161100001100110data field 2<CR>
161100001200120data field 3<CR>
Q0001
E
<STX>U01123<CR>
<STX>U02New data F2<CR>
<STX>E0002
<STX>G
```

The sample produces three labels. The first is formatted with the commands between <STX>L and E. The next two labels print with the replacement data contained in the <STX>U commands (see <STX>E and <STX>G). The barcode is the same length: 3 digits and nine spaces.

Truncated Length Replacement Field Functions – A variant of the <STX>U command includes the truncate option 'T', where dynamic data shorter than the originally defined field length will not be padded, and the original maximum field length is maintained for subsequent replacements.

Syntax: **<STX>UT*nnss…s*<CR>**

Where: *nn* - Is the format field number, 2 digits.

T - Truncate option

ss…s - Is the new string data, followed by a <CR>

Truncated Sample:

```
<STX>L
1A1100001000100data field 1<CR>
161100001100110data field 2<CR>
161100001200120data field 3<CR>
Q0001
E
<STX>UT01123<CR>
<STX>U02New data F2<CR>
<STX>E0002
<STX>G
```

The sample produces three labels. The first is formatted with the commands between <STX>L and E. The next two labels print with the replacement data contained in the <STX>U commands (see <STX>E and <STX>G). The barcode is shortened; it only has three digits (and no spaces).

STX V Software Switch Settings

This command controls the printer options, where the appropriate value allows the option(s) to be 'On' or 'Off.' Each option has a corresponding bit whose value is '1' when enabled. The tables below indicate the bit assignments and corresponding command value needed to enable the desired option(s).

Display-equipped models: printer options are set by entering selections through the menu. The software setting command allows two of these option settings to be modified without returning to the menu.

Syntax: **<STX>V*n***

Where: *n* - Is a single digit ASCII numeric value from 0-F. The value of n is used to override the power-up option settings. Reset or power-up returns the printer to the original settings.

Sample: <STX>V5

The sample corresponds to setting Bits 0 and 2, creating a command value of 5. When applied, this enables the Present Sensor and Cutter options.

Bit Assignment	Printer Option
0	Cutter
1	N/A
2	Present Sensor
3	N/A

Table 4-1: Software Switch Bit Assignment

Use the bit assignment table above to determine the command value **n** in the binary table below (e.g., the command value 5 sets the bits 0 and 2 to '1').

Command Values for Bits Assigned				
n Value	Bit			
	3	2	1	0
0	0	0	0	0
1	0	0	0	1
4	0	1	0	0
5	0	1	0	1

Table 4-2: Software Switch Binary

STX v Request Firmware Version

This command causes the printer to send its version string (this data is the same as that printed on the configuration label). The version may be different from printer to printer.

Syntax: **<STX>v**

Printer Response: `VER: 4308 – 06.06 07/09/2001` <CR>

STX W Request Memory Module Information

This command requests a directory listing for memory module(s). Although a module can store font, graphics and format data together, it can display only one type of information at a time. If the module contains all three types of data, it will be necessary to check the directory three times, using each of the control parameters, F, G, and L, to determine the contents. When no user accessible modules are present, there is no printer response to <STX>WF, <STX>WG, or <STX>WL.

Syntax: **<STX>W*a***

Where: *a* - Data type:

F = Downloaded Font
G = Graphic (Image)
L = Label
f = All fonts (respective of the resident fonts available and any fonts that have been downloaded).

Sample: <STX>Wf

Printer response (using an E-Class printer):

	Meaning:
MODULE: A<CR>	Module ID ‘A’, fonts following reside in this module
103 CG Triumv <CR>	Downloaded font ID and name
MODULE: F<CR>	Module ID ‘F’ (no user access), fonts following reside in this module
000 <CR>	Font internal ID 000, resident bitmapped font DPL ID 0
001 <CR>	Font internal ID 001, resident bitmapped font DPL ID 1
002 <CR>	Font internal ID 002, resident bitmapped font DPL ID 2
003 <CR>	Font internal ID 003, resident bitmapped font DPL ID 3
004 <CR>	Font internal ID 004, resident bitmapped font DPL ID 4
005 <CR>	Font internal ID 005, resident bitmapped font DPL ID 5
006 <CR>	Font internal ID 006, resident bitmapped font DPL ID 6
007 <CR>	Font internal ID 007, resident bitmapped font DPL ID 7
008 <CR>	Font internal ID 008, resident bitmapped font DPL ID 8
012 <CR>	Font internal ID 012, resident bitmapped font DPL ID 9, A06
013 <CR>	Font internal ID 013, resident bitmapped font DPL ID 9, A08
014 <CR>	Font internal ID 014, resident bitmapped font DPL ID 9, A16
015 <CR>	Font internal ID 015, resident bitmapped font DPL ID 9, A12
016 <CR>	Font internal ID 016, resident bitmapped font DPL ID 9, A14
017 <CR>	Font internal ID 017, resident bitmapped font DPL ID 9, A18
018 <CR>	Font internal ID 018, resident bitmapped font DPL ID 9, A24
019 <CR>	Font internal ID 019, resident bitmapped font DPL ID 9, A30
020 <CR>	Font internal ID 020, resident bitmapped font DPL ID 9, A36

STX w Test Flash Memory Module

This command tests the Flash memory module. The time for each test will vary from 20 to 120 seconds, depending upon the size of the module. **All stored data will be destroyed.** If no module is present, there will be no printer response.

Syntax: **<STX>w*a***

Where: *a* - Module designator; see Appendix K.

Printer response format: `Module A: xxxxK` results

Where: `A` - Module tested.

`xxxx` - Module size in kilobytes.

results - Test results given as 'Good' or 'Bad'.

☑ **Note:** E-Class models: Some Flash Memory Expansion options must have Write Enable jumpers installed to perform this command.

STX X Set Default Module

This command, typically used prior to the loading of PCL-4 bit-mapped fonts (see Font Loading Commands), is designed to allow the user to select between modules when downloading information. The default module is one of the following:

1. The first alpha designator of the existing modules if item 2 has not occurred.
2. The module selected by this command.

Syntax: **<STX>X*a***

Where: *a* - Module designator; See Appendix K.

Sample: `<STX>XB`

The sample sets 'B' as the default module.

STX x Delete File from Module

This command removes a specific file from the specified module. The file name is removed from the module directory and thus the file cannot be accessed. The actual storage space occupied by the file is not released. To reclaim deleted file storage space use <STX>z.

Syntax: **<STX>x*mtnn…n*<CR>**

Where:

m - Module designator; see Appendix K.

t - The file type identification code:

- G = Image file
- L = Label format file
- F = Bit-Mapped font file
- S = Smooth scalable font file

nn…n - The file name to delete, up to sixteen alphanumeric characters for graphic or label format files, 3 for bit-mapped font files, and 2 for smooth scalable font files.

STX Y Output Sensor Values

This command causes the printer to respond with the sensor value status. When <STX>Y is received, the printer will respond with the digitally converted values of its internal analog sensors (see below). To repeat the display of values, send the printer a 'SPACE' (20 hexadecimal). Send <ESC> to terminate this function.

Non-display models: The printer must be in Test Mode for the command to function. To enable the Test Mode see the <STX>KD command.

Display-equipped models: The printer must have Feedback Characters enabled for this command to function. Feedback Characters can be enabled via the menu (see the *Operator's Manual* for additional information).

Syntax: **<STX>Y**

Printer response:

```
Thermistor ADC: 0048  Reflective ADC: 0000
Transmissive ADC: 0204  Paperout ADC: 0000  24 Volt ADC:
0217  Contrast ADC: 0093  TOF Adjust ADC: 0170  Ribbon
ADC: 0125  Battery Level: Good     <CR>
```

Where:

`Paperout ADC:` `0225` indicates paper is present;
`0000` indicates paper is not present.

`Battery level:` `Good` indicates the battery has sufficient charge;
`Low` indicates the battery is insufficiently charged.

☑ **Notes:** Equipped sensors vary with printer, model, and options. In addition, some readings require printer-controlled paper movement to indicate a meaningful value.

STX y Select Font Symbol Set

This command selects the scalable font symbol set. The selected symbol set remains active until another symbol set is selected. See the <STX>KS command and Appendices E, I, and H for more information. Option dependant. Not all symbol sets can be used with all fonts.

Syntax: **<STX>y*Sxx***

Where: *S* - Byte-size designation; see Appendix H:
S = Single byte symbol sets.
U = Double byte symbol sets.

xx - Symbol set selection.

Sample: <STX>ySPM

The sample selects the PC-850 multilingual set.

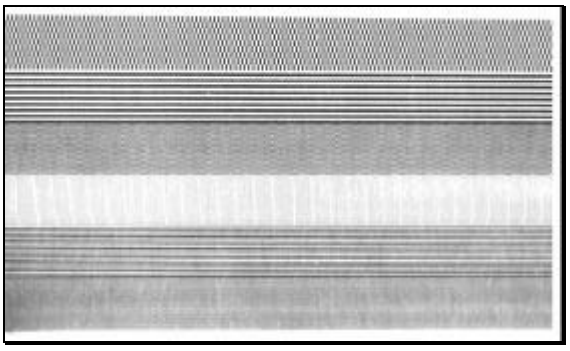
STX Z Print Configuration and Dot Pattern Labels

This command prints Configuration and Dot Pattern Labels. The results are similar to performing the power-up self-test, but the printer does not enter Hex Dump Mode. To capture all printed information, use the labels as wide as the maximum print width and at least 4 inches (102 mm) long.

Syntax: **<STX>Z**

Printer response:

```
 FRI SEPTEMBER 026,  1997 19:29 244    DIRECT THERMAL
 VER: E4304 - 04.06 08/24/01           COMMUNICATIONS NOT DETECTED
  BOOT 83-2329-04A                     9600,8,N
  CODE 83-2325-04F                     EDGE
  FONT 83-2337-01A                     SOP ADJUST________  128
  CPLD 59-2157-01C                     PRESENT ADJUST____  128
SYSTEM RAM CHECKS____ GOOD             TOF LOW___________   0
SYSTEM RAM SIZE___ 2016 KBYTES         TOF DELTA_________  10
SYSTEM RAM AVAIL__ 1264 KBYTES         TOF GAIN__________  10
REG POWER SUPPLY__ NO                  OOS MAXVOLT_______   2


INPUT VALUES                           COUNTER INFORMATION
PAPER_____________ 255                  ABSOLUTE VALUES  9-18-1999
DARKNESS__________ 131                    LENGTH____     773 INCHES
TRAN______________ 255                    TIME______      20 HOURS
REFL______________ 149                  RESETTABLE VALUES 9-22-1999
RIBM______________  87                    LENGTH____     576 INCHES
THR_______________  48                    TIME______      10 HOURS
24V_______________ 223
                                       MEMORY CONFIGURATION
                                       INTERNAL MODULE_____  128
                                       SCALABLE FONTS______   64
                                       LABEL SIZE      0410:02218 IN
```



☑ **Notes:** Printed information will vary according to printer, model, firmware version, and options.

STX z Pack Module

This command causes the printer to reclaim all storage space associated with all deleted files on the specified module (see <STX>X and <STX>x).

Syntax: **<STX>z*m***

Where: *m* - The module identification character, see Appendix K.

Extended System-Level Command Functions

Introduction

Extended System-Level Commands expand certain System-Level Commands, providing extra printer control. Extended-System Commands are issued in the same context as System-Level Commands.

STX K Memory Configuration *(Non-Display Models only)*

This command configures the available DRAM (including any installed optional DRAM) as a method for managing printer memory. Memory can be assigned to specific entities or functions in units of 4KB blocks. The allocation(s) set by this command, draw from the same memory pool, affecting maximum print length and label throughput (see note below). The printer executes the memory configuration specified by the command during the next idle period following its receipt, and is stored in Flash memory then reinstated upon a power-up or reset. If the total requested memory allocation exceeds the configurable memory available, contains no fields, or for configurations not specified, the command will be rejected and the printer will assume its previous configuration. Any of the three fields are optional, and are separated by the colon. Brackets indicate optional fields.

Syntax: **<STX>K*ix*[:*jy*][:*kz*]<CR>**

Sample: <STX>KM0020:S0015<CR>

In the sample, memory is allocated 20*4*1024 bytes for module space and 15*4*1024 bytes for the scalable cache.

Where: i, j, k are M, S, or W; x, y, z are four-digit maximum numbers of 4K byte blocks or inches/100 or (mm/10) as described below.

M Represents the start of a sequence (up to five characters) that assigns memory to the Internal Module. If this field does not appear, then the Internal Module is not affected. If no Internal Module exists, it will be created and formatted. Existing Internal Modules will be erased, re-sized and formatted. The number that follows the M is a decimal number (up to four digits) that specifies the size in 4KB blocks of memory to assign to the Internal Module. A value of “0000” will delete the Internal Module (see Appendix J for additional information).

S Represents the start of a sequence (up to five characters) that assigns the amount of internal memory allocated to the smooth scalable font processor. This field is optional; if it does not appear, the current amount of memory assigned to the smooth scalable font processor will remain unchanged. The allocation must be at least 15 (60KB) to print scalable fonts, and at least 30 for double-byte fonts. The number that follows the S is a decimal number (up to four digits) that specifies the size in 4 KB blocks to assign to the smooth scalable font processor. Any value

less than the minimum requirement results in the amount assigned to be zero (0), thereby disabling the printing of smooth scalable fonts. The recommended value is 0025 (100KB).

W Represents the start of a sequence (up to five characters) that sets the printable label width. Setting a width smaller than the natural (maximum) width of the printer effectively extends printable label length. This field is optional; if it does not appear, the current printable label width is left unchanged. The number that follows the W is a decimal number (up to four digits) that specifies the printable label width in either 100^{ths} of an inch or in millimeters, depending on the current units setting of the printer (imperial or metric). If the value specified exceeds the printable width of the printer, the printable label width is set to the maximum. If the value specified is less than the minimum value allowed (200) then the printable label width is set to the minimum allowed value.

☑ **Note:** Label printing requirements may be computed as bytes (label print length * width allocation * printhead resolution / 8). For maximum throughput, the memory allocated should allow for a minimum of three times the computed requirement, or the available label length (as determined by <STX>KQ command) should be three times the label print length.

STX Kb Backfeed Time Delay

(Non-Display Models only)

The backfeed time delay command controls the time a printed label is allowed to remain "presented" before being retracted to the start of print position.

Syntax: **<STX>Kb*nnn*<CR>**

Where: *nnn* - Seconds/10

STX KC Get Configuration

This command returns the configuration of the printer. The form of the returned data is similar to that of a printed Configuration Label. **This command should be parsed by KEYWORDS, not by Character POSITIONS. Each line is terminated by a `CR` (`0x0d`) & `LF` (`0x0a`). Datamax will make every effort to keep Keyword consistent.**

Syntax: **`<STX>KC<CR>`**

Printer response:

```
CONFIGURATION
TUE 02:01PM
01AUG2001
PRINTER KEY:
4308-TB10-010327-
494
APPLICATION
VERSION:
83-2284-06E
06.06 07/09/2001
BOOT LOADER:
83-2269-03D 03.04
10/30/2000
SYSTEM INFORMATION
PRINT BUFFER SIZE:
 280 in.
FLASH SIZE:
 4 MB
RAM TEST:
PASS
OPTIONAL
LANGUAGES:
FRANCAIS
ITALIANO
DEUTSCH
ESPAÑOL
CONFIGURATION
FILE:
NONE
MEDIA SETTINGS
MEDIA TYPE
 THERMAL TRANSFER
SENSOR TYPE
 GAP
LABEL LENGTH
 04.00 in.
MAXIMUM LABEL
LENGTH
•30.00 in.
PAPER OUT DISTANCE
 00.25 in.
LABEL WIDTH
 4.16 in.
SENSOR CALIBRATION
PAPER SENSOR LEVEL
 144
GAP SENSOR LEVEL
 30
EMPTY SENSOR LEVEL
 0
SENSOR GAIN
 10
PRINT CONTROL
HEAT
 10
PRINT SPEED
 6.0in/sec
FEED SPEED
 6.0in/sec
REVERSE SPEED
 4.0in/sec
ROW OFFSET
 00.00 in.
COLUMN OFFSET
 00.00 in.
PRESENT DISTANCE
 0.00 in.
CUSTOM
ADJUSTMENTS:
DARKNESS
 32
ROW ADJUST
 64 DOTS
COLUMN ADJUST
 0 DOTS
PRESENT ADJUST
 64 DOTS
PRINTER OPTIONS
MODULES
A: NOT INSTALLED
B: NOT INSTALLED
D: FORMATTED
F: NOT INSTALLED
G: FORMATTED
X: FORMATTED
Y: 83-2296-01C
Z: NOT INSTALLED
PRESENT SENSOR
NOT INSTALLED
CUTTER
NOT INSTALLED
GPIO PORT:
NOT INSTALLED
SYSTEM SETTINGS
FACTORY SETTING
FILE
NONE
INTERNAL MODULE
 1024 KB
DEFAULT MODULE
 D
SCALEABLE FONT
CACHE
 312 KB
SINGLE BYTE
SYMBOLS
 PC-850
MULTILINGUAL
DOUBLE BYTE
SYMBOLS
 UNICODE
ABSOLUTE COUNTER
3782 in.
27MAR2001
RESETTABLE COUNTER
205 in.
27MAR2001
FORMAT ATTRIBUTES
 XOR
IMAGING MODE
 MULTIPLE LABEL
PAUSE MODE
 DISABLED
SELECT SECURITY
 DISABLED
PEEL MODE
 DISABLED
UNITS OF MEASURE
 IMPERIAL
SOP EMULATION
 DISABLED
BACK AFTER PRINT
 DISABLED
MENU LANGUAGE
 ENGLISH
COMMUNICATIONS
SERIAL PORT A:
BAUD RATE
 9600 BPS
PROTOCOL
 BOTH
PARITY
 NONE
DATA BITS
 8
STOP BITS
 1
SERIAL PORT B:
NOT INSTALLED
PARALLEL PORT A:
PORT DIRECTION
 UNI-DIRECTIONAL
PORT STATUS
 DISABLED
PARALLEL PORT B:
PORT DIRECTION
 BI-DIRECTIONAL
PORT STATUS
 DISABLED
NIC ADAPTER:
DMXNET INACTIVE
HOST SETTINGS:
HOST TIMEOUT
 10 SEC
CONTROL CODES
 STANDARD CODES
FEEDBACK
CHARACTERS
 DISABLED
ESC SEQUENCES
 ENABLED
HEAT COMMAND
 ENABLED
SPEED COMMANDS
 ENABLED
DIAGNOSTICS
HEX DUMP MODE
 DISABLED
PRINT TEST
RATE(min)
 0
SENSOR READINGS
THR TRAN RIBM 24V
132  141  159  178
 PS  HD RANK
000 254  000
RIBBON SENSOR
LIMITS
RIBBON ADC LOW
105
RIBBON ADC HIGH
182
END OF LIST
```

☑ **Note:** Displayed information and its formatted form will vary with printer, model, firmware version, and equipped options.

STX Kc Configuration Set

This command specifies the Power-up Configuration parameter values for the printer and is equivalent to using other system commands followed by the <SOH>U. **This command is intended for easily configuring a custom setup, but NOT for dynamic configuration changes.** Configuration commands are examined for differences relative to the current configuration; the command has no impact when there are no differences. Display-equipped printers will reset upon completion of a command stream containing parameter value changes; non-display models perform this reset only for certain functions, such as memory allocation. In any case, no commands should be sent to the printer until this reset is complete. The following are highlights of this command:

- These parameter values are equivalent to changing the respective menu settings and do not affect the factory default settings of the printer.
- If separated by a semi-colon (;), multiple parameter values may be sent in a single command stream; see sample below.
- All values are stored in Flash memory and remain in effect until new values are received or until factory defaults are restored.
- If system commands are sent that override the Power-up Configuration value(s), the Power-up Configuration value(s) will be restored the next time the printer is powered 'On' or reset.
- These parameters are the same as those found in the Setup Menu (non-display models), or as those found in the Menu System (display-equipped models). The respective functions are documented in the appropriate *Operator's* or *Maintenance Manual*. Not all commands are effective on all Class printers.

> ☑ **Note:** Illegal or out of range parameter values may have unpredictable results. In addition, Media sensing scaling values, TOF Bias, etc. may not be effective on other printers of the same type due to hardware tolerances.

Syntax: **<STX>Kc*aa*$_1$*val*$_1$*[;aa*$_I$*val*$_I$*][;aa*$_n$*val*$_n$*]<CR>**

Where: *aa*$_1$, *aa*$_I$, *aa*$_n$ - Are two letter parameter names.

val$_1$, *val*$_I$, *val*$_n$ - Are parameter values, with ranges appropriate for the associated parameter.

Sample: <STX>KcPA120;CL600;STC<CR>

The sample sets the Present Adjust to 120 dots, the Continuous Label Length to 6 inches, and the Sensor Type to Continuous.

The following table summarizes the different Set Configuration Command parameters. Descriptions of these parameters can be found by referencing the Command Equivalent column of the table. Where no equivalent is given, unique parameter descriptions follow the tables.

Configuration Set Commands						
<STX>Kc Parameter Name	**Parameter Pneumonic**	**Value / Range**	**Units / Interpretation**	**Applicable Printer Type**	**Equivalent Menu Item or Menu Item Number**	**Command Equivalent**
Alignment Length	AL	0 – 999	1/100 in.	Non-Display	19	N/A
Single Byte Symbol Set	AS	2 Byte alpha character	AA – ZZ, printer resident symbol set	Display-Equipped	System Settings	<STX>y, y*Sxx*
				Non-Display	N/A	
Backup After Print	BA	Y, N	Enabled, Disabled	Display-Equipped	System Settings	N/A
Backup Label	BL	0, 3, 4	0 = Disabled, 3 = Active Low, 4 = Active High	I-Class GPIO-1 equipped printers	Printer Options	N/A
British Pound	BP	Y, N	Enabled, Disabled	Display-Equipped	N/A	N/A
Backup (Reverse) Speed	BS or bS	alpha character	Model specific ranges; see Appendix L.	Display-Equipped	Print Control	p*a*
Buzzer Enable	BZ	Y, N	Enabled, Disabled	Graphics Display-Equipped	System Settings	N/A
Column Adjust	CA	0 – 128	Dots, model specific; see Appendix K.	Display-Equipped	Print Control	N/A
Control Codes	CC	S, 1, 2	Standard, Alternate, Alternate-2,	Display-Equipped	Communications	N/A
		S, 1, 2	Standard, Alternate, Alternate-2	Non-Display	9	<STX>KD
Cutter Equipped	CE	A/Y, E, N/D	Enabled, Disabled	Display-Equipped	Printer Options	<STX>V
		A, Y, N		Non-Display	4	
Comm Heat Commands	CH	Y, N	Enabled, Disabled	Display-Equipped	Communications	N/A
		1, 0		Non-Display	N/A	
Continuous Label Length	CL	0 – 9999	1/100 in.	Display-Equipped	Media Settings	<STX>c
				Non-Display	10	
Column Offset	CO	0 – 9999	1/100 in.	Display-Equipped	Print Control	Cnnnn
Comm Speed Commands	CS	Y, N	Enabled, Disabled	Display-Equipped	Communications	N/A
		1, 0		Non-Display	N/A	

Table 5-1: Configuration Set Commands

Configuration Set Commands						
<STX>Kc Parameter Name	**Parameter Pneumonic**	**Value / Range**	**Units / Interpretation**	**Applicable Printer Type**	**Equivalent Menu Item or Menu Item Number**	**Command Equivalent**
Comm TOF Commands	CT	Y, N	Enabled, Disabled	Display-Equipped	Communications	N/A
DPI Emulation	DE	200, 300, 400, 600	Dots per inch	Display-Equipped	System Settings	N/A
Darkness	DK	1 – 64	N/A	Display-Equipped	Print Control	N/A
Default Module	DM	D, G	Module Letter	Display-Equipped	System Settings	<STX>X
Delay Rate (Quick Tests)	DR	0 – 120	Seconds	Display-Equipped	Diagnostics	N/A
Double Byte Symbol Set	DS	2 Byte alpha character	AA – ZZ, printer resident symbol set	Display-Equipped	System Settings	<STX>y, y*Sxx*
Input Mode	EM	0, 1	DPL, Line	Display-Equipped	System Settings	N/A
		0, 1, 2	DPL, Line, ESC/Pause	Non-Display	21	
End Character	EN	D	N/A	Display-Equipped	N/A	N/A
End Of Print	EP	1, 2, 3, 4	1=Low Pulse, 2=High Pulse, 3=Active Low, 4=Active High	Display-equipped	Printer Options (GPIO option)	N/A
Start of Print	EQ	3, 4	3 = Active Low, 4 = Active High	Display-Equipped	Printer Options	N/A
ESC Sequences	ES	Y, N	Enabled, Disabled	Display-Equipped	Communications	N/A
Exact Time	ET	Y, N	Enabled, Disabled	Non-Display	24	N/A
Empty Sensor Level	EV	0 – 255	N/A	Display-Equipped	Media Settings	N/A
Format Attributes	FA	X, O, T	XOR, Opaque, Transparent	Display-Equipped	System Settings	A*n*

Table 5-1: Configuration Set Commands *(continued)*

Configuration Set Commands						
<STX>Kc Parameter Name	**Parameter Pneumonic**	**Value / Range**	**Units / Interpretation**	**Applicable Printer Type**	**Equivalent Menu Item or Menu Item Number**	**Command Equivalent**
Font Emulation	FE	0, 1, 2	0 = No Substitution 1 = Sub CG Times SA0 2 = Sub User S50	Display	N/A	N/A
				Non-Display		
Fault Handling	FH	L, D, R	See Table 5-2.	Display-Equipped	System Settings	N/A
Feedback Mode	FM	Y, N	Enabled, Disabled	Display-Equipped	Communications	<STX>a
GPIO Enable	GE	A, V, N	Applicator, Verifier, Disabled	Display-Equipped	Printer Options	N/A
				Non-Display	25	
Gap / Mark Value	GM	0 – 255	N/A	Display-Equipped	Media Settings	N/A
Gain Reflective Value	GR	0 – 255	N/A	Display-Equipped	Media Settings	N/A
Head Bias	HB	L, R	N/A	A-Class only	System Settings	N/A
Head Cleaning	HC	0 – 9999	Inches (or centimeters) multiplied by 1000	Display-Equipped	Media Settings	N/A
Heat	HE	0 – 30	N/A	Display-Equipped	Print Control	H*nn*
Host Timeout	HT	1 – 60	Seconds	Display-Equipped	Communications	N/A
Ignore Control Codes	IC	Y, N	Enabled, Disabled	Display-Equipped	Communications	N/A
		1, 0		Non-Display	N/A	
Ignore Distances	IE	1, 0	Enabled, Disabled	Non-Display	N/A	N/A
Imaging Mode	IL	M, S	Multiple Label, Single Label	Display-Equipped	System Settings	N/A
Internal Module	IM	100 – max available, see Appendix K	Kbytes	Display-Equipped	System Settings	N/A
		0 – 128	4 Kbytes (0 = disabled)	Non-Display	17	<STX>KM
Label Alignment	LA	Y, N, A	Enabled, Disabled, Automatic See Table 5-3.	Non-Display	18	N/A

Table 5-1: Configuration Set Commands *(continued)*

Configuration Set Commands						
<STX>Kc Parameter Name	**Parameter Pneumonic**	**Value / Range**	**Units / Interpretation**	**Applicable Printer Type**	**Equivalent Menu Item or Menu Item Number**	**Command Equivalent**
Legacy Emulation	LE	N, A, P, L, M	N=None, A=Allegro, P=Prodigy, L=Prodigy Plus, M=Prodigy Max	Display-Equipped	System Settings	N/A
		N, A, P, L		Non-Display	22	N/A
Language Select	LS	String	Language Name	Display-Equipped	System Settings	N/A
Label Width	LW	75 – head width, see Appendix K	1/100 inch	Display-Equipped	Media Settings	N/A
				Non-Display	15	<STX>KW
Module Commands	MC	CZ	1-7 Flash Size / MB	Display-Equipped	N/A	N/A
Maximum Label Length	ML	0 – 9999	1/100 inch	Display-Equipped	Media Settings	<STX>M
Media Type	MT	D, T	Direct, Thermal Transfer	Display-Equipped	Media Settings	N/A
				Non-Display	1	<STX>KD
Mark Value	MV	0 – 255	N/A	Display-Equipped	Media Settings	N/A
Disable Symbol Set Selection	NS	Y, N	Enabled, Disabled	Non-Display	N/A	N/A
Present Adjust	PA	0 – 128	Dots, model specific; see Appendix K.	Display-Equipped	Print Control	N/A
				Non-Display	6	
Print Contrast	PC	0 – 64	N/A	Display-Equipped	Print Control	N/A
				Non-Display	N/A	
Present Distance	PD	0 – 400	1/100 inch	Display-Equipped	Print Control	<STX>Kf
Peel Mode	PE	Y, N	Enabled, Disabled	Display-Equipped	System Settings	N/A
Printer Level	PL	000000 – FFFFFF	Hex Codes	Display-Equipped	System Settings	N/A
Pause Mode	PM	Y, N	Enabled, Disabled	Display-Equipped	System Settings	<STX>J
Paper Out Distance	PO	0 – 9999	1/100 inch	Display-Equipped	Media Settings	N/A

Table 5-1: Configuration Set Commands *(continued)*

Configuration Set Commands						
<STX>Kc Parameter Name	**Parameter Pneumonic**	**Value / Range**	**Units / Interpretation**	**Applicable Printer Type**	**Equivalent Menu Item or Menu Item Number**	**Command Equivalent**
Parallel Direction	PP	xDz	See Table 5-4.	Display-Equipped	Communications	N/A
Present Sensor Enable	PS	A/Y, E, N/D	Enabled, Disabled	Display-Equipped	Printer Options	<STX>V
		A, Y, N		Non-Display	3	<STX>V, <STX>KD
Print Speed	pS	Alpha character	Model specific ranges; see Appendix L.	Display-Equipped	Print Control	P
Tear Position	PT	Y, N	Enabled, Disabled	Non-Display	20	N/A
Paper Value	PV	0 – 255	N/A	Display-Equipped	Media Settings	N/A
Password	PW	A – Z, 0 – 9	Four characters. If security is 'On,' 8 characters	Display-Equipped	System Settings	N/A
Query Configuration	QQ	Q	N/A	All	Configuration Label	N/A
Row Adjust	RA	0 – 128	Dots, model specific; see Appendix K.	Display-Equipped	Print Control	N/A
Reflective TOF Bias	RB	0 – 50	.1 Volt DC	Non-Display	14	N/A
Reflective TOF Delta	RD	0 – 50	.1 Volt DC	Non-Display	13	N/A
Ribbon Saver Enable	RE	A/Y, E, N/D	Enabled, Disabled	Display-Equipped	Printer Options	<STX>R
Row Adjust Finetune	RF	+ / – dots	Resolution specific; see Appendix K.	Display-Equipped	Printer Control	N/A
Reflective TOF Gain	RG	0 – 15	.1 Volt DC	Non-Display	12	N/A
Ribbon Low	RL	1.00 – 2.00	1/100 in.	Display-Equipped	Media Settings	N/A

Table 5-1: Configuration Set Commands *(continued)*

Configuration Set Commands						
<STX>Kc Parameter Name	**Parameter Pneumonic**	**Value / Range**	**Units / Interpretation**	**Applicable Printer Type**	**Equivalent Menu Item or Menu Item Number**	**Command Equivalent**
Reflective No Paper Minimum (Out Of Stock)	RN	0 – 16	.1 Volt DC	Non-Display	11	N/A
Row Offset	RO	0 – 9999	1/100 in.	Display-Equipped	Print Control	R*nnnn*
Ribbon Low Signal	RS	3, 4	3 = Active Low, 4 = Active High	Display-Equipped	Print Options	N/A
Reflective Paper Value	RV	0 – 255	N/A	Display-Equipped	Media Settings	N/A
SOP Adjust	SA	0 – 255	N/A	Non-Display	5	<STX>0
Scalable Cache	SC	100 – 8192	Kbytes	Display-Equipped	System Settings	N/A
		0 – 128	4 Kbytes (0 = disabled)	Non-Display	16	<STX>KS
SOP Emulation	SE	L, A, P, D	L = Prodigy Plus, A = Allegro, P = Prodigy, D = Disable	Display-Equipped	System Settings	N/A
Save As Filename	SF	String	Up to 16 characters	Display-Equipped	System Settings	N/A
Sensor Gain Value	SG	0 – 32	N/A	Display-Equipped	Media Settings	N/A
Scalable Heap	SH	0 – 9999	Kbytes	Display-Equipped	N/A	N/A
Security Lock	SL	Y, N	Enabled, Disabled	Display-Equipped	System Settings	N/A
Stop Location		A, H	Auto, Host	Non-Display	20	N/A
Scanner Configuration	SN	C, H, M, D, B, V	See Table 5-5.	Display-Equipped	Printer Options	N/A
Serial Port	SP	xyz	See Table 5-6.	Display-Equipped	Communications	N/A
				Non-Display	7 and 8	<STX>KD

Table 5-1: Configuration Set Commands *(continued)*

Configuration Set Commands						
<STX>Kc Parameter Name	**Parameter Pneumonic**	**Value / Range**	**Units / Interpretation**	**Applicable Printer Type**	**Equivalent Menu Item or Menu Item Number**	**Command Equivalent**
Slew Speed	SS or sS	alpha character	Model specific ranges; see Appendix L.	Display-Equipped	Print Control	Sa
Sensor Type	ST	G, C, R	Gap (edge), Continuous, Reflective	Display-Equipped	Media Settings	<STX>e, <STX>r,
				Non-Display	2	<STX>KD
TOF Bias	TB	0 – 50	.1 Volt DC	Non-Display	14	N/A
TOF Delta	TD	0 – 50	.1 Volt DC	Non-Display	13	N/A
TOF Gain	TG	0 – 15	.1 Volt DC	Non-Display	12	N/A
No Paper Min (Out Of Stock)	TN	0 – 16	.1 Volt DC	Non-Display	11	N/A
TOF Precedence	TP	Y, N	Enabled, Disabled	Display-Equipped	N/A	N/A
Unit of Measure	UM	M, I	Metric, Imperial	Display-Equipped	System Settings	<STX>m, <STX>n
User Terminator	UT	ON	N/A	Display-Equipped	N/A	N/A
Verifier Equip	VE	A/Y, E, N/D	Enabled, Disabled	Display-Equipped	Printer Options	<STX>KV
Verifier Type	VT	A, B, C, D	Reserved for future use	Display-Equipped	Reserved for future use	N/A

Table 5-1: Configuration Set Commands *(concluded)*

<STX>Kc Parameter Overviews

(AL) Alignment Length – Critical for small labels when 'Label Alignment' is set to 'Yes,' this command allows a length, measured from leading edge to leading edge of two successive labels to be entered. The measured length must be provided to the nearest hundredth of an inch. For very small labels, errors as small as 0.01" can result in noticeable print variations on the labels between the media sensor and the printhead. The number of labels that can be fit between the Media Sensor and the printhead will magnify any error in label alignment length. Errors are more favorable on the low side than on the high side.

(AS) Single Byte Symbol Set – This command allows for a default single-byte symbol set. See <STX>y or ySxx for command details.

(BA) Backup After Print – When the present distance is set with the GPIO enabled, this command determines the timing of the label back up. When enabled, the printer immediately backs up the label after the applicator-issued start of print signal is received, resulting in faster throughput. If disabled, the printer will not initiate repositioning until the next label is ready to print (may help prevent the curling of the label edge).

(BL) Backup Label – This command determines the timing of the label back up when the GPIO 1 option is installed and enabled. When enabled, the interface supports an input signal that allows the printer to back up a label once it has been presented.

(BP) British Pound – This command, when enabled, will automatically switch from the Number symbol (#) found at 0x23 (default PC-850 Multilingual Symbol Set) to the British Pound symbol (£) at 0x9C.

(BS or bS) Backup Speed – This command controls the rate of label movement during backup positioning for start of print, cutting or present distance; see Appendix C for available speed ranges.

(BZ) Buzzer Enable – This command controls the audible signaling device that acknowledges User Interface entries and, if enabled, sounds printer warning and fault conditions.

(CA) Column Adjust – This command fine-tunes the Column Offset setting by shifting both the horizontal start of print position and the Label Width termination point to the right in dots (see Appendix K) to compensate for slight mechanical differences sometimes evident if multiple printers share label formats.

(CC) Control Codes – This command, depending upon printer type, allows a change to the prefix of the software commands interpreted by the printer:

Units / Interpretation	*Definition*
Standard Codes	Hex 01 = SOH command; Hex 02 = STX command; count-by = ^; Hex 1B = ESC; Hex 0x0D = Carriage Return
Alternate Codes	Hex 5E = SOH command; Hex 7E = STX command; count-by = @; Hex 1B = ESC; Hex 0x0D = Carriage Return
Alternate Codes 2	Hex 5E = SOH command; Hex 7E = STX command; count-by = @; Hex 1B = ESC; Hex 0x7C = Carriage Return

(CE) Cutter Equipped – A or Y - automatically senses device presence; if undetected, no error is generated. E - enables the device, its presence must be detected; otherwise a fault is generated. N or D - disables device detection. Note that the value range for non-display printers is Y, N only. See <STX>V for command details.

(CH) Comm Heat Commands – This command causes the printer to disable the DPL Heat command; instead, the Heat value is controlled via the menu setting.

(CL) Continuous Label Length – See <STX>c for command details.

(CO) Column Offset – See Cnnnn for command details.

(CS) Comm Speed Commands – This command causes the printer to disable the DPL speed commands (Print, Feed, Slew, and Reverse); instead, the speed values are controlled via the menu setting.

(CT) Comm TOF Commands – This command causes the printer to disable the DPL TOF (Gap, Continuous, and Reflective) command; instead, the sensor type is controlled via the menu setting.

(DE) DPI Emulation – This command allows printers with higher resolutions to emulate lower print resolutions, as follows:

- 600 DPI can emulate 300 and 203 DPI resolutions
- 400 DPI can emulate a 203 DPI resolution

(DK) Darkness – This command controls the printhead strobe timing to fine-tune the HEAT setting.

(DM) Default Module – See <STX>X for command details.

(DR) Delay Rate – This command sets the number of minutes to delay between multiple batch printings of Quick Test Labels.

(DS) Double Byte Symbol Set – See <STX>y or ySxx for command details.

(EM) Input Mode – This command defines the type of printer language: Standard DPL processing or Line Mode which exacts data terminated by a carriage return to be inserted in a DPL template and printed.

(EN) End Character – This command terminates a <STX>Kc string.

(EP) End of Print – This command defines the programmable signal output that signifies the End of Print (EOP) process:

Units / Interpretation	*Definition*
Active Low	Outputs a logic low (zero) following printing.
Active High	Outputs a logic high (one) following printing.
Low Pulse	Outputs a low pulse (approximately 30 milliseconds long) following printing.
High Pulse	Outputs a high pulse (approximately 30 milliseconds long) following printing.

(EQ) Start of Print – This command defines the programmable signal input that controls the Start of Print (SOP) process:

Units / Interpretation	*Definition*
Active Low	SOP signal must go low for at least 50 milliseconds to initiate printing.
Active High	SOP signal must go high for at least 50 milliseconds to initiate printing.

(ES) ESC Sequences – This command allows data containing invalid ESC control code sequences to be processed (helpful because some systems send a "banner" to the printer). When set to 'Disabled,' ESC sequences are ignored and the data is processed. Bitmapped font downloads are disabled in this mode.

(ET) Exact Time – This command set the printer to wait until the system is idle before the next label's data and time fields are formatted to eliminate any discrepancy between the buffered and printed times.

(EV) Empty Sensor Level – This command sets threshold value for the 'Empty' media sensor parameter.

(FA) Format Attribute – See the An command for details.

(FE) Font Emulation –This command allows font substitution for all Datamax internal fonts, allowing a new default font to be defined without changing the host DPL data streams. Selecting a default font that supports a desired character set could match with third party software to print native characters without modifying the PC drivers. In other words, match the PC font with the Printer Font then no interpretation would be required by driver or printer. Depending on host drivers, the user may have to disable Symbol Set commands and modify the Default Symbol set.

(FH) Fault Handling – When a fault condition (ribbon out, media out, etc.) is detected, this command determines the level of intervention and the disposition of the label being printed at the time the fault occurred.

Value	*Units / Interpretation*	*Definition*	
x, y, z	x – Interaction Level	0 = Standard	Printing stops and a fault message is displayed. After the problem is corrected, the FEED Key must be pressed to clear the fault. The label in process is reprinted.
		1 = Void and Retry	Depending upon the RETRY COUNT, one of the following actions when faulted: • If the Retry Count setting has not been exceeded, 'VOID' is printed on the label in process and reprinting occurs automatically; • If the Retry Count has been exceeded, printing stops and a fault message is displayed. After the problem is corrected, the FEED Key must be pressed to clear the fault. The label in process is reprinted; or, • If the CANCEL Key is pressed the operator now has the option of canceling the reprint: To allow the reprint, press the ESCAPE Key or to cancel the reprint, press the ENTER Key (the operator now has the option of canceling the entire label batch by pressing the ENTER Key again.) ☑ ***Note:*** *VOID will not be printed when insufficient space exists for the height of the text (see VOID DISTANCE, below) or if the fault occurred after the entire label was completed (i.e., when the label reaches its Present Distance at or above the TOF).*
		2 = No Reprint	Printing stops and a fault message is displayed. After the problem is corrected, the FEED Key must be pressed to clear the fault. The label in process is *not* reprinted.
	y - Void Distance	0.10 - 2.00	Sets the distance to backup the faulted label to print 'VOID' on its trailing edge, which also indirectly establishes the font size of the void message.
	z - Retry Count	0 - 3	Establishes the number of times the printer will attempt to reprint a label. If the last label printed in this count has been voided, the printer will stop and display a fault message.

Table 5-2: Configuration Set Commands for Fault Handling

Example: `<STX>KcFH112<CR>`

(The example configures the printer to back up and print a one-inch "VOID" message on a label when a fault is detected; if two successive faults occur during the printing of that label then the FEED Key must be pressed to clear the fault.)

(FM) Feedback Mode – See <STX>a for command details.

(GE) GPIO Enable – This command is used to interface the printer to external controlling devices (see Appendix J):

Units / Interpretation	*Definition*
Applicator	Enables the GPIO for a label applicator.
Verifier	Enables the GPIO for a bar code verifier.
Disabled	Disables the GPIO Port.

(GM) Gap / Mark Value – This command sets threshold value for the media sensor's 'gap / mark' parameter.

(GR) Gain Reflective Value – This command sets the sensitivity of the reflective media sensor.

(HB) Head Bias – This command instructs the printer to switch the dot zero position: as viewed from the printer's front panel (or label output side) – when dot zero occupies the left-most location on the printhead then printing is left justified; when dot zero occupies the right-most location, printing is right justified.

(HC) Head Cleaning – This command controls the printhead cleaning routine. The entered value specifies the inch (or centimeter) count to reach before prompting a printhead cleaning. If the number specified is exceeded three times, the printer will fault until cleaning is initiated.

☑ **Note:** The number specified is multiplied by one thousand. Zero disables this function.

(HE) Heat – See Hnn for command details.

(HT) Host Timeout – This command controls the number of seconds a communications port must be idle before the printer may process data from a different port. The value is also used to "timeout" an image / label format download (i.e., if, at any time, data flow stops before a complete label format is received, the data will be ignored).

(IC) Ignore Control Codes – This command allows the user to remove control codes (< 20 Hex) in the data field. The selected line terminator is processed. When enabled, DPL Control Code (SOH, STX, CR, ESC, and ^) characters are removed from the data string. (Note that some fonts do have printable characters in this range and they will not be printed when enabled.)

(IE) Ignore Distances – This command, when enabled, prevents <STX>O processing that will change the start of print position.

(IL) Imaging Mode – This command instructs the printer whether to pre-image the label format:

Units / Interpretation	*Definition*
Multiple Label	The printer images multiple labels as memory permits, achieving the fastest throughput; however, if time-stamping, the time will reflect the moment the label is imaged rather than when actually printed.
Single Label	The printer images the next label only after the previous label has been successfully printed. Single processing provides time-stamps that are more accurate, but it slows label throughput time.

☑ **Note:** This selection can affect the accuracy of time-stamped labels and label throughput.

(IM) Internal Module – This command sets the number of 1K blocks (or 4K blocks for non-display models, see the <STX>KM command) allocated for the internal RAM 'D' module.

(LA) Label Alignment – This command prevents labels with lengths that are less than the distance between the printhead and the Media Sensor from being wasted at power-up. See the appropriate *Operator's Manual* for detailed information.

Media Type, Operation Mode	**Label Alignment Setting**	**Description**
Continuous stock; 6.5" or greater die-cut, notched and reflective stocks; multiple form lengths	Disabled	At power-up, printing will begin at the current label position without any alignment (unless the RTC option is installed).
6.5" or less die-cut, notched and reflective stocks	Automatic	Use for easy label length changes, and to automatically set the maximum label length. Press and hold the FEED Key four seconds and the printer will automatically measure the label length. Once loaded and aligned subsequent power-ups will result in no wasted labels.
	Enabled	Use for constant label lengths. Specify the Label Alignment Length using the <STX>KcAL command or the Setup Menu. Press and hold the FEED Key four seconds, or toggle printer power, and then the printer will align with the specified length.
6.5" or less die-cut, notched and reflective stocks with the Present Sensor enabled	Automatic	This mode of operation requires a Label Alignment Length or that Label Alignment be set to AUTO. If either of these conditions is not met, the printer will not perform the alignment.

Table 5-3: Label Alignment Settings

☑ **Note:** The Real Time Clock (RTC) option allows the position-state of the label to be stored, thus eliminating the need for an alignment prior to the printing of the first label (assuming the label position has not moved while power was off). If the label stock has been changed then a Forced Alignment (press and hold the FEED Key 4 seconds) is recommended.

(LE) Legacy Emulation – This command enables the <STX>O and <STX>f print positioning commands to allow backward compatibility with label formats that were designed for the Allegro® Prodigy®, and Prodigy Plus® (If the printer is display-equipped, also Prodigy Max® emulation).

(LS) Language Select – This command selects the language in which the menu system messages and configuration label are shown. Only languages that are resident will be available.

(LW) Label Width – This command sets the maximum limit for the printable width. Objects extending beyond this limit will NOT print; see Appendix K. (For non-display models also see the <STX>KW command.)

(MC) Module Commands – This command adjusts the size of Flash module 'Z' on the optional Expansion Card (see Appendix K for module details).

(ML) Maximum Label Length – See <STX>M for command details.

(MT) Media Type – This command selects the printing method: Direct Thermal for use with heat sensitive media or Thermal Transfer for use with media requiring a ribbon to create an image. (For non-display models also see the <STX>KD command.)

(MV) Mark Value – This command sets threshold value for the reflective media sensor's 'mark' parameter.

(NS) Disable Symbol Set Selection – This command prevents the <STX>y and y commands from changing the default single-byte symbol set. When enabled, DPL Symbol Set commands are ignored. (Note that when enabled the only way to change the current symbol set is to use the <STX>KcAS command.)

(PA) Present Adjust – This command fine-tunes the Present Distance setting to compensate for slight mechanical differences sometimes evident if multiple printers share label formats.

(PC) Print Contrast – This command adjusts the relative print edge (gray) component of the print quality, which allows fine-tuning for specific media/ribbon mix.

(PD) Present Distance – This command sets the label stop position past the start of print. When the next label format is received, the printer will automatically backfeed to the start position. If the present distance is set to zero, the printer will operate without reversing. (See *Stop Location*, below).

(PE) Peel Mode – This command, when enabled, specifies that a Feed operation be prevented when the label is presented and not removed, or if the printer is to wait for the GPIO start of print signal.

(PL) Printer Level – This command is used to upgrade the software feature level of the printer.

(PM) Pause Mode – See <STX>J for command details.

(PO) Paper Out Distance – This command sets the length of travel before an out of stock condition is declared.

(PP) Parallel Direction – This command controls the communications settings for the parallel port(s):

Value	Units / Interpretation
xDz	x - A port ID B port ID z - U unidirectional (One-way printer communication) B bidirectional (Enables IEEE 1284 back-channel operation)

Table 5-4: Parallel Communications Configuration Set Commands

(PS) Present Sensor Enable – A or Y - automatically senses device presence; if undetected, no error is generated. E - enables the device, its presence must be detected; otherwise a fault is generated. N or D - disables device detection. See <STX>V for command details. (Note that the value range for non-display printers is Y, N only. Also see the <STX>KD command.)

(pS) Print Speed – See P for command details.

(PT) Tear Position – This command sets the label stopping location at the tear plate on the printer's cover.

(PV) Paper Value – This command sets threshold value for the media sensor's 'paper' parameter.

(PW) Password – This command modifies the numeric password required to access the menu system when security is enabled. If security is enabled, enter the *new* password followed by the *old* password (with no spaces) in this form: XXXXXXXX

(QQ) Configuration Query – This command causes the printer to respond with the current configuration settings. The <STX>Kc response command stream format is sent to the host computer via the serial port containing all parameters controlled by the <STX>Kc command, and may be used for restoring the printer's configuration or for configuring other printers.

(RA) Row Adjust – This command shifts the vertical start of print position in dots (see Appendix K) to fine-tune the Row Offset setting to compensate for slight mechanical differences sometimes evident if multiple printers share label formats.

(RB) Reflective TOF Bias – This command allows the manual entry for the control voltage level to recognize a label "gap" or "mark."

(RD) Reflective TOF Delta – This command allows the manual entry for the control of the low-level voltage difference level to recognize a label "gap" or "mark."

(RE) Ribbon Saver Enable – A or Y - automatically senses device presence; if undetected, no error is generated. E - enables the device, its presence must be detected; otherwise a fault is generated. N or D - disables device detection. See <STX>R for command details.

(RF) Row Adjust Finetune – This command shifts the vertical start of print position in dots (see Appendix K) upward or downward to fine-tune the Row Offset setting to compensate for slight mechanical differences sometimes evident if multiple printers share label formats.

(RG) Reflective TOF Gain – This command allows the manual entry for the control of the voltage to the LED emitter of the Media Sensor.

(RL) Ribbon Low – This command sets the threshold for a low ribbon indication.

(RN) Reflective No Paper Minimum – This command sets the media sensor's reading for the Out Of Stock (OOS) condition.

(RO) Row Offset – See Rnnnn for command details.

(RS) Ribbon Low Signal – This command sets the signal output that signifies the Ribbon Low Diameter condition for the optional GPIO (see Appendix J).

(RV) Reflective Paper Value – This command sets the threshold value for the reflective media sensor's paper parameter.

(SA) SOP Adjust – This command sets the start of print (SOP) location, relative to the top of form. See <STX>O for command details.

(SC) Scalable Cache – This command sets the number of 1K blocks allocated for the scaleable font engine. Available memory dependent upon model; see Appendix K. (For non-display models see the <STX>KS command.)

(SE) SOP Emulation – This command enables the <STX>O and <STX>f print positioning commands to allow backward compatibility with label formats designed for other printers.

(SF) Save As Filename – This command saves the effective configuration of the printer to a file, storing it in Flash memory.

(SG) Sensor Gain Value – This command sets the control of the voltage to the LED emitter of the Media Sensor.

(SH) Scalable Heap – This command sets a working "scratch pad space" in DRAM for scalable font construction.

(SL) Security Lock – This command provides the ability to password protect all printer settings made through the User Interface.

(SL) Stop Location – This command sets the label stopping (and in certain cases the starting) location, as follows:

Setting	Stop Location
Host	Sets stop position according to options installed. If no options are installed the printer sets stop location to the next label's start of print. Host commands will override. The stop location (present distance) may be controlled dynamically by the host using the <STX>f or <STX>Kf commands. This selection has the same effect as <STX>KD Ignore Host Distance bit value 0.
Auto	Automatically sets the stop location. Installed options will be 'auto-sensed' and the appropriate stop position will automatically be set. Host commands are ignored.

(SN) Scanner Configuration – This command configures the optional linear scanner as follows:

Value	Range / Interpretation
C, H, M, D, B, V	C bar code count (number of codes to be read): 00 – 99 (00 = Auto [variable] mode) ☑ ***Note:*** *Do not use Auto Mode with bitmapped codes or codes with certain addendums; see Appendix F.* H min readable height (sets the vertical distance of the code that must have identical reads): 1 - 1/16 2 - 2/16 3 - 3/16 4 - 1/4 5 - 1/2 0 - Disabled (defaults to Redundancy Level 2x) ☑ ***Note:*** *The selected distance should not exceed 50% of the measured bar code height* M mode (enables scanner detection by the printer): A - auto (automatically senses presence); Y is also a valid enabler E - enabled (presence must be detected or a fault is generated) D - disabled (scanner disabled); N is also a valid disabler D direct command ab - reserved for future use B bar codes (specifies the bar code, two digits) followed by 'Y' to enable or 'N' to disable the code 01 - CODE 39 02 - IATA 03 - CODABAR 04 - INTERLEAVED 2 OF 5 05 - INDUSTRIAL 2 OF 5 06 - CODE 93 07 - CODE 128 08 - MSI/PLESSEY 09 - EAN(13/8) 10 - EAN(13/8)+2 11 - EAN(13/8)+5 12 - UPC(A/E) 13 - UPC(A/E)+2 14 - UPC(A/E)+5 ☑ ***Note:*** *To maximize throughput and decoding integrity enable only those symbologies that will be read.* V redundancy level (alternative method to ensure data integrity where the selected level sets a number of consecutive, identical decodes required to pass the bar code; if a different value is read then the count is restarted). ☑ ***Note:*** *Depending upon the print speed, higher levels may cause erroneous failures when scanning multiple or small bar codes.* 0 - Auto Mode 1 - read bar code 1X 2 - read bar code 2X 3 - read bar code 3X 4 - read bar code 4X 5 - read bar code 5X 6 - read bar code 6X 7 - read bar code 8X 8 - read bar code 10X 9 - read bar code 12X A - read bar code 15X B - read bar code 20X C - read bar code 25X D - read bar code 30X E - read bar code 35X F - read bar code 40X G - read bar code 45X

Table 5-5: Scanner Configuration Set Commands

Example: `<STX>KcSNC00H4MAB12YV0<CR>`

(The above sample sets the printer to sense the scanner automatically, to read a variable number of UPC bar codes codes, and to pass only those codes where ¼ inch of the bar code has identical reads.)

(SP) Serial Port – This command configures the serial communication port(s) as follows:

Value	Range / Interpretation	Example
xyz	x - A port ID B port ID y - P protocol (handshaking) z - type: B - both S - software H - hardware N - none y - p parity z - type: N - none O - odd E - even y - D data length z - value: 8 - bits 7 - bits y - S stop bits z - value: 1 - bit 2 - bits	Example: <STX>KcSPAPB;SPApN;SPAD8;SPAS1;SPAB19<CR> (The example configures Serial Port A to use hardware and software handshaking, an eight-bit word, with no parity and one stop bit at 19,200 bits per second.) ☑ **Notes:** E-Class and M-Class printer models – this command is followed by the port ID, always 'A' (i.e., SPA). A-Class printer models – this command is also used to configure the GPIO Auxiliary port (ID always 'B').
xyzz	y - B baud rate zz - value: 12 - 1200 24 - 2400 48 - 4800 96 - 9600 19 - 19200 28 - 28800 38 - 38400	

Table 5-6: Serial Port Configuration Set Commands

Example: <STX>KcSPAD8<CR>

The above sample sets the serial port A to receive eight-bit words (the host computer communications setup is expected to be the same).

(SS or sS) Slew Speed – This command controls the rate of label movement between printing areas; see Appendix L.

(ST) Sensor Type – See <STX>e (edge) or <STX>r (reflective) for command details. (For non-display models also see the <STX>KD command.)

(TB) TOF Bias – This command controls the low-level voltage difference level to recognize a label ‘gap’ or ‘mark’.

(TD) TOF Delta – This command controls the low-level voltage difference level to recognize a label ‘gap’ or ‘mark’.

(TG) TOF Gain – This command controls the voltage to the LED emitter of the Media Sensor.

(TN) No Paper Min – This command sets the media sensor level for the Out Of Stock (OOS) condition.

(TP) TOF Precedence – This command instructs the firmware to stop printing at the first top of form mark it detects. The default, ‘No,’ prints all of the data then slows to the next TOF.

(UM) Units of Measure – See `<STX>m` (metric) or `<STX>n` (imperial) for command details.

(UT) User Terminator – This command allows word wrapping of long character strings of commands to the next line in a file, for the purposes of readability only. In the `<STX>Kc` string, the command `UTON` must fall somewhere before the first line terminator. The last command needs to be `END`, followed by a line terminator (see the `<STX>KcEN` command for details).

(VE) Verifier Equip – A or Y - automatically senses device presence; if undetected, no error is generated. E - enables the device, its presence must be detected; otherwise a fault is generated. N or D - disables device detection. This command enables the GPIO for a bar code verifier (see Appendix J).

(VT) Verifier Type – This command is reserved for future use.

STX KD Database Configuration *(Non-Display Models only)*

This command, stored in Flash memory for future power-ups, controls the printer's environment and operates as a pseudo DIP switch. The <STX>Kc command is recommended for use over <STX>KD.

Syntax: **<STX>KD*wxyz*<CR>**

Where: *w, x, y,* and *z* are binary values with respective bit settings as defined in the following table. (Bit 0 is least significant.)

Sample: <STX>KD@H@@<CR>

The sample configures the printer as follows:

@ Sets the communications to 9600 baud with an 8-bit word and no parity;
H Selects direct thermal printing, standard control characters, and enables the media cutter;
@ Selects gap sensing;
@ Is the default setting (items saved for future expansion).

☑ **Note:** The Ignore Host Distance setting (see below) allows the printer to disregard <STX>O and <STX>f commands; a feature provided for host system software that sends these commands with values that may be inappropriate for the printer and result in incorrect start of print and present distances. Use the <STX>KD command or the Setup Menu to enable this feature.

<STX>KD Parameter	Bit Number	Parameter Function	Parameter Value(s)
w	0 – 2	BAUD Rate / Set Test Mode	0 = 9600, 1 = 600, 2 = 2400, 3 = 19200, 4 = 4800, 5 = 38400, 6 = 1200, 7 = 9600 Test Mode
	3	Word Length and Parity	0 = 8 bits, no parity; 1 = 7 bits, even parity
	4 & 5	Unused	Set to 0
	6	Always 1	Set to 1
	7	Always 0	Set to 0
x	0	Print Method	0 = direct thermal, 1 = thermal transfer
	1	Present Sensor	0 = not equipped, 1 = equipped
	2	Control Character[1]	0 = standard, 1 = alternate characters
	3	Cutter	0 = disabled, 1 = enabled
	4	Ignore Host Distance	0 = disabled, 1 = enabled (See note above)
	5	Alt-2 Control Codes[1]	0 = disabled, 1 = alternate-2 characters
	6	Always 1	Set to 1
	7	Always 0	Set to 0
y	0 & 1	Paper Type (Media Sensor)	0 = gap (edge), 1 = reflective, 2 = continuous
	2	Linerless	0 = not equipped, 1 = equipped
	3 – 5	Unused	Set to 0
	6	Always 1	Set to 1
	7	Always 0	Set to 0
z	0 & 1	Reserved	Set to 0
	2	Reserved	Set to 0
	3 – 5	Unused	Set to 0
	6	Always 1	Set to 1
	7	Always 0	Set to 0

[1] Selects the values of the control characters; see Control Codes.

Table 5-7: <STX>KD Configuration Commands

STX Kd Set File as Factory Default

(Display-Equipped Models only)

This command selects the specified file name as the "factory default" for the printer's configuration. After execution, subsequent "Select Factory Default" commands will configure the printer to the file's configuration. Currently there are three ways to "Select Factory Defaults": 1) by the <STX>KF command; 2) power-up the printer while pressing the PAUSE and CANCEL Keys; or, 3) via the printer's menu system entry System Settings / Set Factory Defaults.

☑ **Note:** Powering 'On' the printer while pressing the PAUSE, FEED and CANCEL Keys will reset the configuration to the factory defaults.

Syntax: **<STX>Kd*Name*<CR>**

Where: *Name* - The name, up to 16 characters, of the configuration file.

<CR> - 0x0d terminates the name.

Sample: <STX>KdPlant1

This command selects the configuration file "Plant1" as the default factory configuration.

STX KE Character Encoding

This command is provided primarily as a means for users of 7-bit communication and to embed control characters and extended ASCII characters in their data streams. Any character in the DPL datastream may be substituted with a delimited two-character ASCII hexadecimal numeric equivalent. The command allows the delimiting character to be selected, and the encoding to be enabled or disabled. When character encoding is enabled, the printer will decode any ASCII hexadecimal numeric pairs following the delimiter as single-byte values. Character encoding is used where control characters cannot be transmitted or where control characters within data may prematurely terminate a label format record. Although the delimiter may be changed at any time (except within a label format definition), there cannot be more than one defined delimiter, and character encoding must be disabled with <STX>KEN prior to re-enabling, regardless of any change in the delimiter.

Syntax: **<STX>KE*ex*<CR>**

Where: *e* - Y – character encoding enabled
N – character encoding disabled

x - Delimiter: one ASCII character (Do not include when e = N)

Sample:
```
<STX>KEN
<STX>KEY\
<STX>L<CR>
1u0000001200120[)>\1E\01\1D\...\04\<CR>
E<CR>
```

The sample disables, and then enables character encoding with the backslash (\) as the delimiter. A UPS MaxiCode will be formatted using a data string interpreted as: `[)>`$^{R}{}_{S}$`01`$^{G}{}_{S}$`...` $^{E}O_{T}$`<CR>`, then formatting is terminated.

Character Encoding Syntax: This syntax requires at least two hexadecimal ASCII digits (0-9, A-F) delimited by the character specified in the <STX>KE command. The number of hexadecimal digits between the delimiter pair must be even; see notes below.

Syntax: `xaa[bbcc…nn]x`

Where:

- `x` - One byte delimiter, 0 to ff_{16}, leading and trailing.
- `aa` - 2 bytes, ASCII, hexadecimal encoded, range each character - 0-9, A-F
- `bb` - 2 bytes, ASCII, hexadecimal encoded, range each character - 0-9, A-F (optional)
- `cc` - 2 bytes, ASCII, hexadecimal encoded, range each character - 0-9, A-F (optional)
- `nn` - 2 bytes, ASCII, hexadecimal encoded, range each byte - 0-9, A-F (optional)

☑ **Notes:** (1) A delimiter pair with no ASCII hexadecimal pairs between (e.g., \\) will be interpreted as one byte whose value is that of the delimiting character, allowing the assigned delimiter to be interpreted as itself rather than as the delimiter.

(2) A delimited string that contains either a non-valid hexadecimal character (e.g., FX) or an odd number of bytes will be treated as an illegal string and, therefore, not correctly decoded.

Character Encoding Examples: In the following partial datastreams it is assumed that character encoding is enabled and that the selected delimiter, a backslash (\), has been transmitted to the printer (i.e., <STX>KEY\). In each example, the printer has not received an unpaired delimiter prior the example.

Partial DPL Sample Data Stream	Interpretation
AB\\CE	5 bytes AB\CE with values 41_{16}, 42_{16}, $5C_{16}$, 43_{16}, 44_{16}
\ABCDEF\	3 bytes with values AB_{16}, CD_{16}, and EF_{16}
1A\1A\1A	5 bytes 1A<SUB>1A with values 31_{16}, 41_{16}, $1A_{16}$, 31_{16}, 41_{16}. <SUB> represents a single-byte ASCII control character with value $1A_{16}$

Alternate Control Codes with Alternate Line Terminator: Character Encoding can also be used with the Alternate Control Character set. Alternate Control Characters are enabled, depending upon the model, via a Setup Menu or the <STX>KD / <STX>Kc commands. See Control Codes.

STX KF Select Factory Defaults

(Display-Equipped Models only)

This command restores the printer's configuration to the "factory default" settings. These factory default values may be either the Datamax default settings or the configuration file previously specified in the <STX>Kd command.

Syntax: **<STX>KF<CR>**

STX Kf Set Present Distance

This command specifies an additional amount to advance the label after printing. This command has the same effect as the <STX>f command, but specifies a distance to advance relative to the start of print (<STX>O command) of the next label.

Syntax: **<STX>Kf*nnnn*<CR>**

Where: *nnnn* - A four-digit present distance in inches/100 or mm/10.

Sample: <STX>Kf0100

The sample represents a one-inch label advance unless in metric mode (see <STX>m).

STX Kp Module Protection

(Display-Equipped Models only)

This command controls memory module protection. When “protected”, a module will ignore format, downloads and delete commands. This command can be useful to add data to Datamax reserved modules, Z (ILPC) and Y (EFIGS). See Appendix K for a listing of the memory modules.

There are two types of modules: RAM (volatile) and Flash (non-volatile).

- RAM - When protected, if the power is cycled or if the printer is reset, the module state resets back to unprotected.

- Flash - When protected, the module can be temporarily unprotected. However, if the power is cycled or if the printer is reset, the module is initialized to ‘protected.’ To clear the protected state forever, the module must be unprotected and then formatted.

Syntax: `<STX>Kp`*`mf`*

Where: *m* - Module ID – Range A to Z (See Appendix K).

Where: *f* - Flag specifying Enable or Disable protection.
0 – disable protection
1 – enable protection

Sample: `<STX>KpY0`

This example disables protection for memory module “Y”. Graphics may now be downloaded to module “Y” and, on subsequent resets, these graphics will be protected.

STX KQ Query Memory Configuration

This command causes the printer to transmit DRAM memory configuration to the host device regarding the total amount installed, the amount available for configuration, and the amount currently assigned to specific functions or entities. The printer's response format is model dependent.

Syntax: **<STX>KQ<CR>**

Non-display model response format:

```
INTERNAL MEMORY<CR>
VER: aa-cdd.ee mm/dd/yy<CR>
INSTALLED: iiii<CR>
AVAILABLE: vvvv<CR>
MODULE: X:xxxx<CR>
SCALABLE: ssss<CR>
LABEL MEM: LLLL<CR>
LABEL SIZE: wwww:gggg:oo<CR>
```

Where:

<CR>	- ASCII Carriage Return (0x0D) record delimiter.
aa-cdd.ee mm/dd/yy	- ASCII string sequence that represents the firmware version number string.
iiii	- The number of 4KB blocks of DRAM memory.
vvvv	- The number of 4KB blocks of DRAM available for configuration.
X:	- ASCII character identifying a DRAM module followed by an ASCII colon (:). If no Internal Module is present, this field and its associated legend will not appear.
xxxx	- The number of 4KB blocks of DRAM allocated as an Internal Module.
ssss	- The number of 4KB blocks of DRAM assigned to the smooth scalable font processor cache.
LLLL	- The number of 4KB blocks of DRAM assigned to label print buffer.
wwww	- Current maximum printable label width (in 100^{ths} of an inch or millimeters).
gggg	- Current printable length (in 100^{ths} of an inch or millimeters), 200 min. / 640 max.
oo	- Current label dimension unit's designation: "IN" for inches or "MM" for millimeters.

Display-equipped model response format:

```
Product:  I4208 – 01.01 05/21/1999
Installed RAM:  8 MB
Label Width:  4.09 IN
Print Buffer Size: 272 IN
Allocation RAM: 6389 KB
Internal Files:  512 KB
Font Cache:   232 KB
```

Where:

`Product`	-	Printer model, type and firmware revision level.
`Installed RAM`	-	Total amount of RAM.
`Label Width`	-	Size in inches/millimeters of the printhead.
`Print Buffer Size`	-	Total number of inches/millimeters of Print Dot Buffers available. (This is not the maximum size of a label, which is limited to 99.99 inches.)
`Allocation RAM`	-	Amount of RAM that can be configured for the Internal Files, Font Cache and the remainder going to the Print Buffer Size.
`Internal Files`	-	Size of the Internal Module used to store downloaded fonts, graphics and label formats.
`Font Cache`	-	Size of the Font Buffer used to temporarily store characters. Increasing this buffer will increase performance if labels have a large variety of font sizes and characters.

STX Kq Query Memory Configuration (new format)

(Display-Equipped Models only)

This command causes the printer to transmit its internal DRAM memory configuration to the host device. The transmitted data provides information regarding the total amount of internal DRAM installed, the amount available for configuration, and the amount currently assigned to specific functions or entities.

Syntax: **<STX>Kq<CR>**

Printer response format:

```
Memory Configuration<CR>
Product:  aaaacdd.ee mm/dd/yy<CR>
Installed RAM:  iiiiMB<CR>
Label Width:  vvvvoo<CR>
Print Buffer Size:  :xxxxoo<CR>
Allocation RAM:  ssssKB<CR>
Internal Files  LLLLKB<CR>
Font Cache  wwww:KB<CR>
```

Where:

`<CR>` - ASCII Carriage Return (0x0D) record delimiter.

`aaaacdd.ee mm/dd/yy` - ASCII string sequence that represents the firmware version number string.

`iiii` - The number of Megabytes of installed internal DRAM memory.

`vvvv` - The length of the Label Width.

`xxxx` - The length of the Print Buffer.

`ssss` - The number of Kilobytes of internal memory assigned to the label Print Buffer

`LLLL` - The number of Kilobytes assigned to the internal memory module.

`wwww` - The number of Kilobytes assigned to the Scalable Cache.

`oo` - Current label dimension unit's designation. "IN" for inches and "MM" for millimeters.

STX KR Reset Memory Configuration

(Non-Display Models only)

This command resets the printer's DRAM configuration to the default settings, see `<STX>KM`.

Syntax: **<STX>KR<CR>**

STX Kr Resettable Counter Reset

This command resets the internal counters. Follow this command with an <SOH>U command to retain the reset or the counters will revert to the previous values after cycling power.

Syntax: **<STX>Kr<CR>**

STX KS Memory Configuration, Scalable Font Cache

(Non-Display Models only)

See the <STX>K command.

STX KV Verifier Enable/Disable

(Display-Equipped Models only)

This command allows the verifier (option, if installed), to be enabled and disabled.

Syntax: **<STX>KV*a*<CR>**

Where: *a* - Y = verifier enable
N = verifier disable

STX KW Memory Configuration, Printable Label Width

(Non-Display Models only)

See the <STX>K command.

STX Kx Delete Configuration File

(Display-Equipped Models only)

This command deletes the specified configuration file.

Syntax: **<STX>Kx*m*Name<CR>**

Where: *m* - Valid Module ID – Range A to Z.

Name - The name, up to 16 characters, of the configuration file.

<CR> - 0x0d terminates the name.

Sample: <STX>KxYPlant1

This command deletes the configuration file *Plant1* located on Module Y. (Remember to prefix this command with the Module (Un)Protect Command <STX>Kp).

Label Formatting Command Functions

Introduction

The <STX>L command switches the printer from the System-Level Processor to the Label Formatting Processor. All commands following the <STX>L are interpreted as label formatting commands, and can be used to override default parameter values. Selectable parameter value defaults may be also reassigned via the Setup Menu, as defined in the corresponding *Operator's Manual*. Label formats that contain no commands overriding printer default values will assume those defaults.

: *Set Cut By Amount*

This command allows a predetermined number of labels to be printed before a cut is initiated. This feature is useful when it is necessary to print an uncut strip of labels. Between 1 and 9999 labels may be printed before a cut is made. The amount must be smaller than the quantity of labels printed.

Syntax: **:*nnnn***

Where: *nnnn* - Is a four digit decimal number indicating the number of labels to be printed before a cut is performed.

Sample:

```
<STX>L<CR>
:0005<CR>
141100001000100SAMPLE LABEL<CR>
Q0021<CR>
E<CR>
```

The sample instructs the printer to make a cut after 5, 10, and 20 labels have been printed. Label 21 will be cut at the start of a subsequent label format (batch) unless a default (cut by amount) greater than one has been entered.

☑ **Note:** The cutter must be enabled and all mechanism interlocks closed for operation.

A *Set Format Attribute*

This command specifies the type of format operation and remains in effect until another format command is specified or another label format has begun (<STX>L). Each label format defaults to attribute 2 (Transparent Mode).

Syntax: **A*n***

Where: *n* - Is attribute mode 1, 2, 3, or 5; see table below. The default is 1, (XOR Mode).

Sample:

```
<STX>L
A3
141100001000100DATAMAX<CR>
141100001100110DATAMAX<CR>
E
```

The sample sets the printer to Opaque Mode and produces one label.

n	Attribute	Description	Example
1	XOR Mode	In this mode, the region where text strings, images or bar codes intersect will not be printed. (An odd number of overlapping objects will print.)	
2	Transparent Mode	This is the default mode; the intersecting regions of text strings, images, and bar codes will print, allowing the user to print fields on top of one another.	
3	Opaque Mode	Interacting text is obliterated by the text formatted last. Each character cell is treated as opaque. This mode is effective only in rotation 1. See Record Structure Types.	
5	Inverse Mode	This mode allows inverse (white on black) printing (e.g., a proportionally sized border and background are printed similar to photographic negative). If text or image fields overlap in this mode, the effect will be similar to the XOR mode.	

Table 6-1: Format Attributes

B Bar Code Magnification

(Display-Equipped Models only)

This command provides a mechanism to specify bar codes greater than 36 dots (0-9,A-Z in the field record). The value is reset to 1 at the start of every label and stays active for the entire label or set to a new value.

Syntax: **B*nn***

Where: *nn* - Is a two digit decimal number indicating the magnification value.

Sample:
```
<STX>L<CR>
D11
B01
1a9305000100030ABCD<CR>
B03
1a3105000700030ABCD<CR>
Q0001
E
```

The sample instructs the printer to print two bar codes, each 9 dots by 3 dots.

C Set Column Offset Amount

This command allows horizontal adjustment of the point where printing begins. The printer is instructed to print label formats *nnnn* units to the right of the position that the format specifies. This feature is useful when a single format is to be printed on labels containing preprinted information.

☑ **Note:** If using preprinted labels where the placement of the preprint data varies from label to label, the printed information may overlap the preprinted data.

Syntax: **C*nnnn***

Where: *nnnn* - Is a four-digit number for the column offset, inches/100 or mm/10. The printer default is 0 for offset.

Sample:
```
<STX>L
C0050
141100001000100DATAMAX<CR>
```

The sample shifts all format data 0.5 inches to the right, unless the printer is in metric mode, (see Label Formatting Command ‘m’).

c *Set Cut By Amount*

This command is the same as the ':' command except only a two-digit value can be entered. This command allows a predetermined number of labels to be printed before a cut is made. 1 to 99 labels may be printed before a cut is made.

Syntax: **c*nn***

Where: *nn* - Is a two-digit number indicating the number of labels to be printed before a cut is made. The printer default is one.

Sample
```
<STX>L<CR>
c07<CR>
141100001000100SAMPLE LABEL<CR>
Q0021<CR>
E
```

The sample instructs the printer to make cuts after labels 7, 14, and 21 have been printed. See Label Formatting Command ':'.

☑ **Note:** The cutter must be enabled and all mechanism interlocks closed for the cut operation.

D *Set Dot Size Width and Height*

This command is used to change the size of a printed dot, hence the print resolution – dots per inch (DPI) of the printhead. By changing the height of a dot, the maximum length of a label can be increased or decreased. For the element sizes see Appendix K.

Syntax: **D*wh***

Where: *w* - Is Dot Width multiplier 1 or 2.

h - Is Dot Height multiplier 1, 2, or 3.

☑ **Note:** D11 is the default value for 300, 400 and 600 DPI printer models, while D22 is the default value for all 203 DPI printer models.

E Terminate Label Formatting Mode and Print Label

This command causes the printer, when the processing Label Formatting commands, to terminate the Label Formatting Mode then generate, print, and feed a label. The label generated will be based on whatever data has been received to that point, even if no printable data has been received. Other termination commands are 'X' and 's'. Commands sent to the printer after the Terminate Label command must be of the Immediate, System-Level, or Font Download type.

Syntax: **E**

Sample:
```
<STX>L<CR>
121100000000000Testing<CR>
E<CR>
```

The sample will print one label.

e Recall Printer Configuration

(Display-Equipped Models only)

This command recalls a previously stored printer configuration. It is highly recommended that only one Recall Printer Configuration command be used per label, and that it be used at the beginning of the label; otherwise, unpredictable results will occur. (Printer configurations may be stored using the Extended System Commands or the printer's menu system.)

Syntax: **e*Name*<CR>**

Where:
- ***Name*** - The name, up to 16 characters, of the configuration file.
- <CR> - 0x0d terminates the name.

Sample:
```
<STX>L<CR>
ePlant1<CR>
1A2210001000000Testing<CR>
E<CR>
```

The sample recalls the stored printer configuration, *Plant1*.

F Advanced Format Attributes

These commends extend the text presentation capabilities for Scalable Fonts. The format attribute allows a set of label format records to select Bolding, Italicizing and Underlining. Additional commands allow the specification of line rotation and font changes within a label field. Reference Section 8.0, Generating Label Formats / Advanced Format Attributes for details.

f *Set Present Speed*

(Non-Display Models only)

This command controls the rate at which the present distance is positioned, allowing the media movement to be slowed during 'presentation' (the distance traveled after printing is completed to the label stop position). This command is used only within the context of a label format. The speed assigned is retained until another label format is received or until power is removed; if a subsequent format does not contain a present speed command then the present speed reverts to the slew speed.

Syntax: **f*a***

Where: *a* - Is a single alpha character representing a speed, limited by the slew speed range; see Appendix L. The default is the slew speed.

Sample:

```
<STX>LD11H30PGSG
fA
191100200830165Fixed Data Field 1
E
<STX>L
191100200830165Fixed Data Field 1
E
```

The sample prints two labels; the first label has present speed of 1 inch per second, while the second reverts to the slew speed of 4 inches per second.

G *Place Data in Global Register*

The 'G' command saves the print data of a print format record in a global register (temporary storage). This data may be retrieved and copied to another record in the same label format using the special Label Formatting Command, <STX>S. Global registers are named in the order received, beginning with register A, ending at register P, and incrementing with each instance of the G command use.

Syntax: **G**

Sample:

```
<STX>L<CR>
121100000000000Testing<CR>
G<CR>
1A2210001000000<STX>SA<CR>
E<CR>
```

The sample stores, retrieves and prints the data in global register A. One label is printed with "Testing" in two locations.

H Enter Heat Setting

This command changes the "on time" of elements of the printhead. The default setting is 10 (except in the case of printers with a menu, where the default setting can be changed through the keypad). An increase or decrease in this value results in a change of heat applied by the printhead to the media, lightening or darkening the print contrast accordingly. This is helpful when using different media types, each requiring a different amount of heat to properly image the media. The host device can send this command value to correct the heat setting per the application.

Syntax: **H*nn***

Where: *nn* - Is a two-digit heat value (00-30)

Sample:
```
<STX>L<CR>
H15<CR>
141100001000100SAMPLE LABEL<CR>
E
```

The sample sets the printer for a heat value of 15 and prints one label.

☑ **Note:** Non-Display Models – the "Darkness Potentiometer," while providing subtle changes, is intended to be used to match print contrast levels following printhead replacements.

J Justification

This command changes the printing justification.

☑ **Note:** Display-Equipped Models – This command is only valid for use with scalable fonts.

Syntax: **J*a***

Where: *a* - Is a single-digit alpha character:
L = left justified (default)
R = right justified
C = center justified

Sample:
```
<STX>L<CR>
1911A1801001000TEST1
JR
1911A1801000100TEST2
JC
1911A1802000200TEST3
E
```

The sample's first text field "TEST1" will be printed at one inch up, one inch over going right. The second text "TEST2" will be printed at one inch up one inch over, going left. (Note the characters will not be reversed.) The third field "TEST3" will be centered on the point two inches up two inches over.

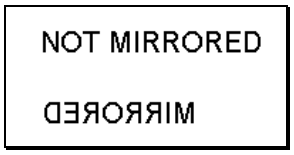
M Select Mirror Mode

This command instructs the printer to "mirror" all subsequent print field records. This command toggles the mirroring mode. Mirrored fields are transposed visually, as if the object is viewed in a mirror.

Syntax: **M**

Sample:
```
<STX>L
161100003200010 NOT MIRRORED<CR>
M<CR>
161100003000400 MIRRORED<CR>
E
```

Printed Result:



m Set Metric Mode

This command sets the printer to measure in metric. When this command is sent, all measurements will be interpreted as metric values, (e.g., a column offset of 0010 will be interpreted as 1.0 mm). All printers default to Imperial (inch) mode.

Syntax: **m**

Sample:
```
<STX>L<CR>
m
141100001000100SAMPLE LABEL<CR>
E
```

The sample prints the text (SAMPLE LABEL) starting at location coordinates 10.0 mm, 10.0 mm.

n Set Inch (Imperial) Mode

This command sets the printer to measure in inches. When this command is sent, all measurements will change to inches. All printers default to Imperial units. Menu selectable.

Syntax: **n**

Sample:
```
<STX>L<CR>
n
141100001000100SAMPLE LABEL<CR>
E
```

The sample prints the text (SAMPLE LABEL) starting at location coordinates 1.0 inch, 1.0 inch.

P *Set Print Speed*

This command sets a print speed for a label or batch of labels.

Syntax: **P*a***

Where: *a* - Is a single character representing a speed; see Appendix L for valid ranges.

Sample:
```
<STX>L
PC
141100001000100LABEL1<CR>
E
<STX>L
141100001000100LABEL2<CR>
E
```

The sample prints two labels, the first at a speed of 2 inches per second (51 mm per second) and the second at the printer default.

p *Set Backfeed Speed*

This command, typically used in conjunction with the Cut or Peel and Present operations, controls the rate at which the labels will reverse to align to the next start of print position. The setting remains in effect until another backfeed speed command is received or until the printer is reset.

Syntax: **p*a***

Where: *a* - Is a single alpha character representing a speed; see Appendix L for valid ranges.

Sample:
```
<STX>L
pF
```

The sample sets the printer to a backup speed of 3.5 IPS.

Q Set Quantity Of Labels To Print

This command sets the number of the label copies to be printed. A one to five digit value is allowed, if the command is delimited by a carriage return <CR>. This permits host applications to generate label quantity commands without the need to pad leading zeros. (A four-digit command value does not need to be <CR> terminated.)

Syntax: **Q*nnnnn***

Where: *nnnnn* - Is a one to five-digit delimited value setting for the number of labels to be printed. The default value is one.

Sample:
```
<STX>L
121100000000000Testing<CR>
Q0020<CR>
E<CR>
```

The sample will print a batch of 20 identical labels.

R Set Row Offset Amount

This command allows vertical adjustment of the point where printing begins. The printer is instructed to print label formats *nnnn* units above the position that the format specifies. This feature is useful when a single format is to be printed on labels containing preprinted information.

☑ **Note:** If using preprinted labels where the placement of the preprint data varies from label to label, the printed information may overlap the preprinted data.

Syntax: **R*nnnn***

Where: *nnnn* - Is a four-digit number (0000-9999) for the row offset, in inches/100 or millimeters/10. The printer default is 0.

Sample:
```
<STX>L
R0037<CR>
141100001000100SAMPLE LABEL<CR>
E
```

The sample prints a label with a row offset amount of .37 inches, unless in metric mode.

r Recall Stored Label Format

This command is used to retrieve label formats stored on a memory module.

Syntax: **rnn...n**

Where: *nn…n* - Is a label name, up to 16 characters in length.

The samples below explain different ways to recall and print a label format. (To view a memory module's directory of label formats use the <STX>W command.)

	String Sent:	Printer Interpretation:
Sample 1:	<STX>L<CR>	Begin label format
	rTEST<CR>	Retrieve format named TEST
	Q0002<CR>	Quantity requested = 2
	E<CR>	Terminate formatting and print
Sample 2:	<STX>L<CR>	Begin label format
	rTEST<CR>	Retrieve format named test
	X<CR>	Terminate formatting
	<STX>G<CR>	Print
Sample 3:	<STX>L<CR>	Begin label format
	D11<CR>	Dot size = 1x1
	PO<CR>	Print speed 0
	SO<CR>	Slew speed 0
	rTEST<CR>	Retrieve format named test
	E<CR>	Terminate formatting and print

S Set Slew Speed

This command controls the rate at which the label is moved through non-printed areas. The setting remains unchanged unless another slew speed command is received or until the printer is reset.

Syntax: **S*a***

Where: *a* - Is a single alpha character representing a speed; see Appendix L for valid ranges.

Sample:

```
<STX>L
SE
141100001000100LABEL1<CR>
E
<STX>L
1411000010001000LABEL2<CR>
E
```

The sample sets the slew speed to 3 inches per second (76 mmps), and prints two labels. The slew speed for the second label is the same as the first.

s Store Label Format In Module

This command stores a label format to a specified module. Supplying the module name will store the label to that module; otherwise, using C will cause the label format to be stored in the selected default module (see <STX>X). In addition, this command terminates the Label Formatting Command.

Syntax: **s*ann…n***

Where:
- *a* - Is the module designator representing a single character module name; see Appendix K.
- *nn…n* - Represents the name of the label (maximum 16 characters).

Sample:

```
<STX>L<CR>
D11<CR>
191100501000000123456789012<CR>
19110050200000001234567<CR>
191100500000000Sample<CR>
1X1100000000000B250250002002<CR>
Q0001<CR>
sATEST<CR>
```

The example stores a format in memory module A and names it ‘TEST’. (To recall a label format from the module use the ‘r’ command.)

T Set Field Data Line Terminator

This command, intended for use with record types that accept binary data (e.g., PDF417), allows special binary control codes (e.g., a carriage return) to be embedded in the printed data by setting an alternate data line terminator. It remains valid only for the next format record, then the terminator defaults back to the carriage return.

Syntax: **T*nn***

Where:
- *nn* - Is an ASCII two-character representation of a HEX code to be used for the end of data terminator.

Sample:

```
<STX>L<CR>
T00<CR>
191100200000000TEST<NULL>
141100001000100TERMIATOR<CR>
Q0001<CR>
E<CR>
```

The sample sets the printer to use a NULL terminator (ASCII NULL: HEX 00) for the data line termination code. The terminator is immediately restored to a carriage return <CR>, as seen in the format record containing the text ‘TERMINATOR’.

U Mark Previous Field as a String Replacement Field

This command controls the way replacement data is formatted. Specifying a field as a string replacement for dynamic fields, and not for static fields, will optimize label throughput. See the <STX>U command.

☑ **Note:** The data string length of any replacement is set by the length of the original string; both must be equal. The data being used when created must be valid for the font type being selected.

Syntax: **U**

Sample:

```
<STX>L
D11
121100001000000123456789012<CR>
U<CR>
12110000200000001234567<CR>
U<CR>
161100000000000Sample<CR>
1X1100000000000B250250002002<CR>
Q0001
E
<STX>U01ABCDEFGHIJKL<CR>
<STX>U028901234<CR>
<STX>G
```

The sample sets up the label format for register loading and prints two labels. The first two of the four format records have been designated as replacement fields. The second label is generated with System-Level field-replacement commands and prints the last label.

X Terminate Label Formatting Mode

This command causes the printer, when in label formatting mode, to immediately switch to the system command mode and generate a label format based on the data received at that point. However, unlike the ‘E’ command, it will not print a label. (Other termination commands are the ‘E’ and ‘s’.)

Syntax: **X**

Sample:

```
<STX>L<CR>
141100001000100SAMPLE<CR>
X<CR>
```

The sample will result in a label format, but no label will be printed.

y *Select Font Symbol Set*

This command, like the <STX>y, selects the scalable font symbol set. The selected symbol set remains active until another symbol set is selected; see the <STX>y command for details.

Syntax: **y*Sxx***

Where: *S* - Byte-size designation; see Appendix H:
S = Single byte symbol sets.
U = Double byte symbol sets.

xx - Symbol set selection.

Sample:
```
<STX>L
ySSW<CR>
```

The sample selects the Swedish symbol set for use in succeeding format records using scalable fonts.

z *Zero (Ø) Conversion to "0"*

This command removes the slash zero in fonts 0 to 8, and in the human readable field (if any) of the bar codes A to Z. The command applies only to format records containing those fonts and bar codes, and is effective only for the label format in which it appears.

☑ **Note:** None of the smooth fonts (i.e., Font 9) use the slash zero. This command will have no effect on scalable fonts.

Syntax: **z**

Sample:
```
<STX>L
z
121100000000000Test0000<CR>
E
```

+ (>) Make Last Field Entered Increment Numeric (Alphanumeric)

This command, useful in printing sequenced labels, causes the printer to automatically increment a field on the labels in a batch. The numeric data in the field will increment by the value assigned after the plus sign (+) each time a label is produced (or the greater than character [>] can be substituted to make the field increment alphabetically). This command is effective only on the label format record that it follows, and is intended to be used with the Q, <STX>E, or <STX>G commands.

Syntax: ***pii**

Where:

*	-	Is + for numeric increment, or > for alphanumeric increment.
p	-	Is the fill character for the left-hand character of the field.
ii	-	Is the amount by which to increment the field.

Sample:

```
<STX>L<CR>
1322000000000012345<CR>
+01<CR>
Q0003<CR>
E<CR>
```

The sample will generate a single field label format that prints the initial label with a value of 12345, and then increments that number by one for the next two labels.

Embedding

Numeric strings for incrementing may also be embedded between alphabetic characters (e.g., when systems require alphanumeric bar codes with alphabetic prefixes or suffixes).

Sample:

```
<STX>L<CR>
1611000001000l0AB0001CD<CR>
+ 100<CR>
Q0003<CR>
E<CR>
```

The sample will print three labels, incrementing 0001 by 1 on each label with AB and CD remaining untouched: AB0001CD, AB0002CD, AB0003CD. Note that the increment value has one leading blank and two trailing zeros, while the blank is a pad character and the trailing zeroes are placeholders that leave CD unchanged.

- (<) Make Last Field Entered Decrement Numeric (Alphanumeric)

This command, useful in printing sequenced labels, causes the printer to automatically decrement a field on the labels in a batch. The numeric data in the field will decrement by the value assigned after the minus (-) sign each time a label is produced (or the less than character [<] can be substituted to make the field decrement alphabetically). This command is effective only on the label format record that it follows, and is intended to be used with the Q, <STX>E or <STX>G commands.

Syntax: ***pii**

Where:

`*` - Is - for numeric decrement, or < for alphanumeric decrement.

`p` - Is the fill character for the leftmost character of the field.

`ii` - Is the amount by which to decrement the field.

Sample:

```
<STX>L<CR>
1322000000000000123AB<CR>
<01<CR>
Q0003<CR>
E<CR>
```

The sample will generate a single field label format that prints the initial label with a value of 123AB, and then decrements that number by one for the next two labels.

Embedding

Numeric strings for decrementing may also be embedded between alphabetic characters (e.g., when systems require alphanumeric bar codes with alphabetic prefixes or suffixes).

Sample:

```
<STX>L<CR>
1611000001000101000CD<CR>
- 100<CR>
Q0003<CR>
E<CR>
```

The sample will print three labels: 1000CD, 999CD, and 998CD. Note that the pad character is a placeholder for digits removed from the left side in the subtraction process. When a fixed pitch font (where all characters have the same width) is used, the justification of the rightmost character is sustained regardless of the number of digits replaced by the pad character on the left side.

^ *Set Count by Amount*

This command allows applications using the increment / decrement field command to print more than one label with the same field value before the field data is updated. All printers default to 1.

> ☑ **Note:** This command can only be issued once per label format. In addition, when alternate Control Codes are enabled, the ^ character must be replaced by the @ character (hexadecimal 0x40). See Control Codes.

Syntax: **^*nn***

Where: ^ - May be 0x55 or 0x40, see Control Codes.

nn - Is a two-digit value that specifies the number of labels to be generated before incrementing (or decrementing) the field value.

Sample:

```
<STX>L<CR>
1322000000000012345<CR>
-01<CR>
^02<CR>
Q0006<CR>
E<CR>
```

The sample prints two labels containing the same field value before decrementing the field. Six labels are printed.

Special Label Formatting Command Functions

Two Special Label Formatting Commands, the <STX>S and the <STX>T, are entered directly into the data field of label format records. Do not confuse them with System-Level Commands because the same control character is used. If alternate control codes are enabled the <STX> becomes '~' (hexadecimal 0x7E); see Control Codes.

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

Table 6-2: Special Label Formatting Commands

STX S Recall Global Data And Place In Field

This command, when in the format record data field, places data from a specified global register into the data field. See the G command.

Syntax: **<STX>S*n***

Where: *n* - Specifies the global register (A – P) that contains the data to place into the data field.

Sample:
```
<STX>L<CR>
121100000000000DMX<CR>
G<CR>
1A2210001000000<STX>SA<CR>
E<CR>
```

The sample places the string "DMX" into the next available global register (A), and then line 4 is effectively replaced by the data from global register A.

STX T Print Time and Date

This command, using string characters and markers, allows time and date data to be selected and retrieved from the printer's internal clock. In addition, the <STX>T may be preceded by data to be printed/encoded, and/or the string may now be terminated by an <STX> command and then followed by more data terminated by a <CR>. The string characters/markers are not printed; instead, the printed label will show a corresponding print value.

☑ **Note:** When using substitution you must ensure the converted string produces valid characters for the selected bar code / font.

Syntax: **<STX>T*string*<CR>**

Where: *string* - Is any set of characters, A - Z and a – h. See the table below.

String Characters	Print Values	String Markers	Print Values
A	Day of the week (Mon = 1, Sun = 7)	VW	Hour in 24 hour format
BCD	Day of the week name	XY	Hour in 12 hour format
EF	Month number	Za	Minutes
GH...O	Month name	gh	Seconds
PQ	Day	bc	AM or PM
RSTU	Year	def	Julian date

Table 6-3: Time and Date String Characters

☑ **Note:** The sample listings below assume a current printer date of December 21, 1998.

Sample 1:
```
<STX>L<CR>
121100001000100<STX>TBCD GHI PQ, TU<CR>
E<CR>
```

Sample 1 will print SUN DEC 21, 98 on a label.

Sample 2:
```
<STX>L<CR>
191100100100010<STX>TEF/PQ<CR>
E<CR>
```

Sample 2 will print 12/21 on a label.

Sample 3:
```
<STX>L<CR>
191100100100010ABC <STX>TEF/PQ<STX> DEF<CR>
E<CR>
```

Sample 3 will print ABC 12/21 DEF on a label. (This illustrates a method of embedding the time string. The string must be terminated by an <STX>.)

Font Loading Command Functions

Introduction

The commands used for font loading are usually generated by font creation software; however, the assigned font ID number command must be sent to the printer before the font file. All Font Loading Commands begin with <ESC> (ASCII control character 27 [decimal]).

The downloaded font will be stored in the default module (refer to the <STX>X command). The commands in the table below are listed in their order of appearance, top to bottom, during font downloading. The <SOH>D command must be sent prior to downloading a font.

Command	Description
*c###D	Assign Font ID Number
)s#Wnn...n	Font Descriptor
*c#E	Character Code
(s#W	Character Download Data

Table 7-1: Font Loading Commands

**c###D Assign Font ID Number*

This command is the first command required for downloading a font to either RAM or Flash Memory modules. ESC represents the ASCII control character 27.

Syntax: **<ESC>*c###D**

Where: *###* - Is the font ID numbers 100-999 (000 – 099 are reserved for resident fonts).

)s###W Font Descriptor

This command (typically first data in a font file) contains all of the information about the font contained in the file. Different font generation software will create different length header information, but the initial 64 bytes will remain consistent with the PCL-4 (HP LaserJet II) format.

Syntax: **<ESC>)s*###Wddd...d***

Where: *###* - Is the number of bytes of font descriptor data from 1 to 3 ASCII decimal digits.

dd...d - Is the descriptor.

**c###E Character Code*

This code is the ASCII decimal value corresponding to the next downloaded character.

Syntax: **<ESC>*c###E**

Where: *###* - Is the ASCII value of the character, three digits maximum, 0 to 999.

(s#W Character Download Data

This command contains all of the information for one downloaded character.

Syntax: **<ESC>(s###W*nn…n***

Where: *###* - Is the number of bytes of bit-mapped data, three digits maximum, from 1 to 999.

nn...n - Is the bit-mapped data.

8 Generating Label Formats

Introduction

This section explains the use of the different fields in a print format record.

Format Record Commands

Table 8-1 is an example of a label format as seen by the printer, while Figure 8-1 is the label generated by this format. The printer receives the data sequentially, left to right, top to bottom.

String Sent to Printer	Printer Interpretation
<STX>L<CR>	Begin label format
D11<CR>	Set dot size
121100000050005Home Position<CR>	Format text
1911006020002OOROTATION 1<CR>	Format text
2911006020002OOROTATION 2<CR>	Format text
3911006020002OOROTATION 3<CR>	Format text
4911006020002OOROTATION 4<CR>	Format text
1A3104003000260123456<CR>	Format bar code with text
4a6210002500140123456<CR>	Format bar code
1X1100000000000B400400003003<CR>	Format box
1X1100002000000L400001<CR>	Format line
1X1100000000200L001400<CR>	Format line
121100004100010Printhead Location<CR>	Format text
Q0001<CR>	Number of labels
E<CR>	End formatting, begin print

Table 8-1: Sample Label Format

☑ **Note:** This example assumes that the printer is in 'inch' mode (<STX>n).

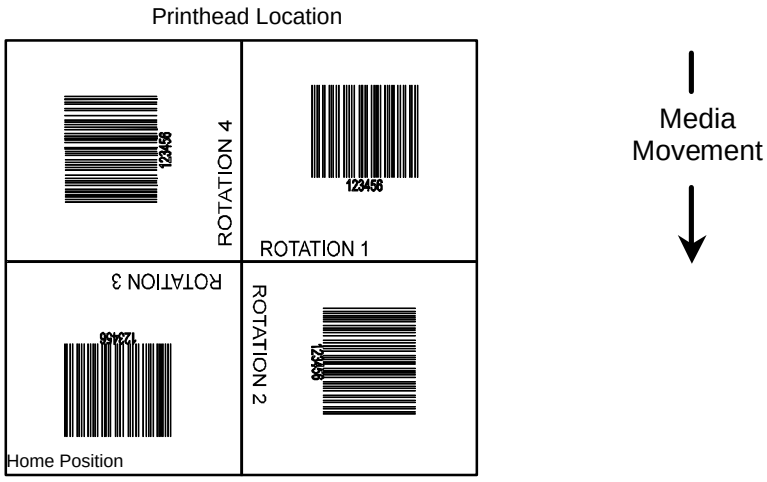


Figure 8-1: Formatted Sample Label

The first line in the sample format (Table 8-1) is the System-Level Command directing the printer to begin label formatting. (Other System-Level Commands may precede the <STX>L for printer setup.) Lines 2, 14, and 15 are Label Formatting Commands. Line 15 is the exit and print command. The remaining lines (3-13) are print format records, explained in this chapter.

A record is a data string that contains the information to be printed on the label(s). Records are the building blocks of label formats. Every record must end with a termination character (usually a carriage return, <CR>). Omitting termination characters will result in the concatenation of records. Omitting the carriage return that precedes the termination character E, which is necessary to complete the label formatting and begin printing, will cause the printer to continue interpreting all subsequent data as label print format records.

Generating Records

Every record is made of three parts: (1) a header that is 15 bytes in length, (2) the data to be printed, and (3) a termination character (e.g., <CR>) marking the end of the field. The header is used to select the appearance of the data when printed by choosing rotation, font type, size, and position options. Every header contains similar information, but this information may be used in different ways by different types of records. The six record types are:

1. Internal Bit-Mapped Font
2. Smooth Font (Simulated)
3. Scalable Font
4. Bar code
5. Images
6. Graphics

The Structure of a Record

The basic structure of the record is described below. For details regarding the various interpretations of the six types see Record Structure Types.

The third line of the label format example in Table 8-1 consists of the following:

```
121100000050005HOME POSITION<CR>
```

This string comprises a complete record, shown below, divided into its three basic component parts.

Header	Data String	Termination Character
121100000050005	HOME POSITION	<CR>

Table 8-2: Record Structure Components

The record conforms to the following fixed field format (spaces added for readability). Identifying lower case letters have been placed below field values for reference in the following sections:

```
 1 2 1 1  000  0005  0005    HOME POSITION            <CR>
 a b c d  eee  ffff  gggg  [hhhh iiii] jj…j  Termination character
```

Location Within Record	Record Type					
	Internal Bit-Mapped Font	**Smooth Font**	**Scalable Font**	**Bar Code**	**Images**	**Graphics**
a	Rotation	Rotation	Rotation	Rotation	Rotation	1
b	Font ID	9	9	Bar Code	Y	X
c	Width Multiplier	Width Multiplier	Width Multiplier	Wide Bar	Width Multiplier	1
d	Height Multiplier	Height Multiplier	Height Multiplier	Narrow Bar	Height Multiplier	1
eee	000	Font Size/ ID	ID	Bar Code Height	000	000
ffff	Row Position	Row Position	Row Position	Row Position	Row Position	Row Position
gggg	Column Position	Column Position	Column Position	Column Position	Column Position	Column Position
hhhh	N/A	N/A	Font Height	N/A	N/A	N/A
iiii	N/A	N/A	Font Width	N/A	N/A	N/A
jj...j	Data String	Data String	Data String	Data String	Image Name	Graphic Specifiers

Table 8-3: Record Type Structure

In Table 8-3, the record structure is shown for each of the record types. The left-most column shows the locations of all characters in the record, and corresponds to the example above the table. Each record structure interprets the characters of the record in its own way, though some of the interpretations of the characters are identical across all record types. For example, the characters ffff are interpreted as Row Position in all record types. While c is a Width Multiplier for Internal Bit-Mapped Font, Smooth Font, Scalable Font, and Image record types, it has other interpretations for Bar Code and Graphics record types.

The Header Fields

Each of the fields in the record header is generally described below. Please reference the detailed descriptions under Record Structure Types for variations. The field name titles of the following paragraphs are preceded with a reference letter from Table 8-3. All characters sent to the printer within the header fields are ASCII, alphanumeric.

a: Rotation

The first field of a header is a single ASCII character that selects the degree of rotation for the data to be printed on a label. Valid rotation values are 1 (0º); 2 (90º); 3 (180º); and 4 (270º) clockwise. Figure 8-1 shows the direction and amount of rotation clockwise, relative to the label feed direction. The bottom left corner of the object is the pivot point.

b: Fonts, Bar Codes, Graphics and Images

The second field (b) determines how the rest of the fields are interpreted, as shown in the table below. Values 0 through 9 select human-readable fonts. 0 through 8 will select standard Datamax fonts; value 9 selects the CG Triumvirate smooth scalable font (internal) or scalable fonts. When 9 is used to select a scalable font, the font size (font I.D. number) is chosen by entering a value in the height field eee.

Values A through z select bar codes**.** Values A through T (uppercase) will print bar codes with human-readable interpretations. Values a through z (lowercase), will print bar codes only.

Value W requires two additional characters to specify the Bar Code/Font ID.

A font field value X selects a drawing object (line, box, circle or polygon), and field value Y is used to print an image stored in a module.

Font Field Value (b)	Interpretation
0-9	Font
A-T	Bar code with human readable text.
a-z	Bar code without human readable text.
Wxx	Bar code/Font expansion
X	Line, box, polygon, circle
Y	Image

Table 8-4: Font Field Interpretations

c: Width Multiplier

Values 1-9 and A-O represent multiplication factors (base 25 numbers). For human-readable fonts, the width multiplier represents the number of times the selected font dot tables are multiplied and has no effect on the character height. For bar codes, this character specifies the wide bar width or ratio. Values 1 through 9 and A through O will give a wide bar width of from 0.0033” (0.085 mm) to 0.792” (2.011 mm) at a resolution dependent upon the printer model. See Appendix F for default values.

d: Height Multiplier

The height multiplier has the same range and function as the width multiplier, but vertical. When used in the context of bar codes, this field is the ratio denominator, or the small bar (module) width. Values 1 through 9 and A through O will give a narrow bar width of one dot (dot size = 1/printhead resolution) to 24 dots. The narrow bar width resolution and range are dependent upon the printhead resolution, see Appendix K. A “dot multiplier” command can also be used to change the printed dot size (see Label Formatting Command ‘D’ and Appendix F).

eee: Bar Code Height (Font Size/Selection)

This field has interpretations dependent upon the value of the font b field, as shown below.

b Font Field Value	eee Field Range	eee Field Interpretation
0-8	000	Not used –Internal bitmapped font
9	000-999, A04-A72, S00-S9z, U00-U9z, u00-u9z	Font height; Font selection
A-T	000-999	Bar code height (with human readable)
a-z	000-999	Bar code height
Wxx	000-999	Bar code height (with human readable)
X,Y	000	Not used

Table 8-5: Bar Code Height Field Interpretations

ffff: Row Position

The lower left corner of a label is considered the "home position" (see Figure 8-1). The row position field is a vertical coordinate that determines how far above the home position the data is to be printed. Field data is interpreted in hundredths of an inch or tenths of millimeters.

gggg: Column Position

This field is a horizontal coordinate that determines how far to the right of "home position" the data will be printed. Appendix G lists the maximum values of the gggg field.

hhhh: Optional Scalable Font Height

The height of a scalable font can be specified in two ways: points or dots. To specify the height in points the first character of the field is a 'P' followed by the number of points, 004 to 999. To specify the size in dots, all four characters must be numeric. This field must be specified for scalable fonts. (See note below Optional Scalable Font Width.)

iiii: Optional Scalable Font Width

The width of a scalable font can be specified in two ways, points or dots. To specify the width in points, the first character of the field is a 'P' followed by the number of points, 004 to 999 points. To specify the size in dots, all four characters must be numeric. This field must be specified for scalable fonts. See note below.

☑ **Note:** To ensure that the data stream is portable to different Datamax printers, specify the font size in points. If the font is specified in dots, it will output differently on printers with different DPI/MMPI resolutions. There are 72.307 points per 1 inch (2.847 mm).

jj…j: Data Field

The final field contains the data that will actually be printed on the label. A string of data can be up to 255 characters in length, (except when using the PDF417 bar code, which may be up to 3000 characters long) ending with a carriage return. Characters placed in the data field will be printed as long as they fall within the physical range of the printhead. Consult Appendix K for a listing by printer.

Record Structure Types

Each of the six record types has its own field structure and is described in the following section. The record types allow quick reference to the field types and their valid data inputs for the field. There are similar, but unique, record structures for each: internal, bit-mapped fonts, internal smooth fonts, downloaded bit-mapped fonts, scalable fonts, bar codes, images, and graphics. The field location identifiers in the tables that follow are the same as those in Table 8-3.

1. Internal Bit-Mapped Fonts

This record type is used for internal bitmapped fonts (see Appendix C, Tables C-1 – C-5).

When a 0 through 8 is entered in field b, then the height field eee is not used. The bitmapped fonts include 8 different fonts (see Appendix C). The character mapping for these fonts is shown in Appendix A, or a subset thereof.

Field	Valid Inputs	Meaning
a	1, 2, 3 and 4	Rotation
b	0 to 8 (see Appendix C).	Font
c	1 to 9 and A to O	Width Multiplier
d	1 to 9 and A to O	Height Multiplier
eee	000	N/A
ffff	0000 to 9999	Row
gggg	0000 to 9999 Dependent upon printer. See Appendix K.	Column
jj…j	Valid ASCII character string up to 255 characters, followed by a termination character.	Data

Table 8-6: Internal Bit-mapped Font Record Structure

2. Smooth Font, Font Modules, and Downloaded Bit-Mapped Fonts

This record type is used for internal smooth fonts (CG Triumvirate – see Table C-6) or a bit-mapped font downloaded to a memory module (see Font Loading Commands).

When a 9 is entered in field b, then the height field eee determines the font. The internal smooth font has up to 13 font sizes (see Appendix C). Values 100 through 999 select individual fonts stored on DRAM, or Flash memory. These include downloaded bit-mapped fonts (see Table 8-5). Use eee values of 096 – 099 for Kanji fonts, if equipped (see Appendix I). The character mapping for these fonts is shown in Appendix A or a subset thereof.

Field	Valid Inputs	Meaning
a	1, 2, 3 and 4	Rotation
b	9	Fixed Value
c	1 to 9 and A to O	Width Multiplier
d	1 to 9 and A to O	Height Multiplier
eee	000 to 999 (000 to 099 Reserved), A04 to A72, x04 – x72*	Font/size
ffff	0000 to 9999	Row
gggg	0000 to 9999 Dependent upon printer. See Appendix K.	Column
jj…j	Valid ASCII character string up to 255 characters followed by a termination character.	Data

* Where x is an upper case letter, see Appendix H.

Table 8-7: Smooth Font Record Structure

3. Scalable Fonts

The Smooth Scalable Font Technology has been licensed from AGFA. Both Intellifont (.CDI) and TrueType (.TTF) Scalable Font file formats are supported. The eee field identifies the scalable font, and data type – normal (binary) or Hex ASCII. Uppercase S or U – binary, lowercase u – Hex ASCII. See Appendix H for additional information. Values S00 to S9z, and U00 to U9z (u00 to u9z), select a scalable font, either internal or downloaded.

S00 and S01 are used for the standard internal (resident) fonts on display-equipped printers, while S01 is used for the standard internal (resident) font on non-display models.

Field	Valid Inputs	Meaning
a	1, 2, 3 and 4	Rotation
b	9	Fixed Value
c	1 to 9 and A to O	Width Multiplier
d	1 to 9 and A to O	Height Multiplier
eee	S00 to Szz, U00-Uzz, u00-uzz	Font data type
ffff	0000 to 9999	Row
gggg	Dependent upon printer. See Appendix K.	Column
hhhh	P004-P999, 0016-4163*	Character height; points, dots
iiii	P004-P999, 0014-4163*	Character width; points, dots
jj…j	Valid ASCII character string up to 255 characters followed by a termination character.	Data

* Character size specifications are printhead resolution dependent as indicated in the following table.

Table 8-8: Scalable Font Record Structure

Printhead Resolution (DPI)	Character size (dots)	
	Width	Height
203	16-2817	16-2817
300	14-4163	16-4163
400	22-5550	22-5550
600	33-8325	33-8325

Table 8-9: Scalable Character Size Ranges

☑ **Note:** A scalable font cache must be allocated to print. Minimum cache size is 15. The double byte fonts require five units of additional cache.

4. Bar Codes

Valid inputs for the bar code field `b` are letters: uppercase letters will print a human-readable text below the bar code; lowercase letters will only print the bar code. For example, entering a '`p`' in the `b` field selects the Postnet bar code. Because the Postnet font does not provide human-readable data, the uppercase P is not valid. Other bar codes without a human-readable counterpart include `u` (MaxiCode) and `z` (PDF417) – for additional model-specific restrictions see Appendix F.

For module-based bar codes, field `d` is the narrow bar width in dots (bar code module size). For consistent results in all rotations for bar codes of this type, field `d` and field `c` must have the same value. For ratio-based bar codes field `c` is the wide bar width in dots (the numerator); field `d` is the narrow bar width in dots (the denominator). See Appendix G for specific bar code information and variations in record format field usage.

The `eee` height field represents the bar code (symbol) height. The eee height field represents the bar code height. The valid range (001 to 999) translates to bar heights ranging from .01 inch (.254 mm) to 9.99 inches (253.7 mm). For bar codes that require additional specified parameters, use the `jj…j` data field as the location for these parameters. See the specific bar code for details in Appendix G.

Field	Valid Inputs	Meaning
`a`	1, 2, 3 and 4	Rotation
`b [bb]`	A to Z and a to z (except P, u, v, z), or `Wna` where `n` is 1 to 9 and `a` is A to S and a to s. No `n` is an implied 1.	Bar Code
`c`	1 to 9 and A to O	Wide Bar
`d`	1 to 9 and A to O	Narrow Bar
`eee`	001 to 999	Symbol height
`ffff`	0000 to 9999	Row
`gggg`	See Appendix K.	Column
`jj…j`	Valid ASCII character string up to 255 characters followed by a termination character.	Data

Table 8-10: Bar Code Record Structure

Placing a 0 (zero) in both `c` and `d` will cause the printer to use the default bar code ratio or module size. Placing a 000 (zero) in the symbol height field causes the printer to use the default bar code height.

5. Images

An image record is used to print an image that is stored in a memory module. Images can be printed only in Rotation 1 (see Input Image Data <STX>I).

Field	Valid Inputs	Meaning
a	1	Fixed Value
b	Y	Image
c	1 to 9 and A to O	Width Multiplier
d	1 to 9 and A to O	Height Multiplier
eee	000	Fixed Value
ffff	0000 to 9999	Row
gggg	See Appendix K.	Column
jj…j	ASCII string, up to 16 characters followed by a termination character.	Image name

Table 8-11: Image Fields

6. Graphics

Using graphics, the printer can produce lines, boxes, polygons, and circles. This function is selected by entering an X in field b. The values entered in the data field determine the sizes and shapes of the objects to be drawn. Forms can be created using shaded boxes, complex logos, or even a simple diagonal line without the need to download a graphics file to the printer. The following sub-sections describe how to generate each kind of graphic.

Lines and Boxes

Lines and boxes are drawn by values that determine column and row starting position, length, width, and wall thickness of the line or box (see Appendix K). Depending on the printer's mode, all measurements are interpreted as inches/100 or millimeters/10 (see <STX>m). The data field jj…j is used to describe the line or box dimensions.

Segment	Valid Inputs	Meaning
a	1	Fixed value
b	X	Line / Box
c	1	Fixed Value
d	1	Fixed Value
eee	000	Fixed Value
ffff	0000 to 9999	Row
gggg	0000-9999, see Appendix K.	Column
jj..j	Lhhhvvv - Line Drawing lhhhhvvvv - Line Drawing Bhhhvvvbbbsss - Box Drawing bhhhhvvvvbbbbssss - Box Drawing	*Line **Line ***Box ****Box

Table 8-12: Line and Box Parameters

*__LINE:__ `Lhhhvvv`

Where:
`L` = "L" and specifies line drawing,
`hhh` = horizontal width of line,
`vvv` = vertical height of line.

**__LINE:__ `lhhhhvvvv`

Where:
`l` = "l" and specifies line drawing,
`hhhh` = horizontal width of line,
`vvvv` = vertical height of line.

***__BOX:__ `Bhhhvvvbbbsss`

Where:
`B` = "B" and specifies box drawing,
`hhh` = horizontal width of box,
`vvv` = vertical height of box,
`bbb` = thickness of bottom and top,
`sss` = thickness of sides.

****__BOX:__ `bhhhhvvvvbbbbssss`

Where:
`b` = "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.

☑ **Note:** Lines are sometimes better understood as filled-in boxes, while boxes are hollow.

Polygons

Polygons are created by defining the positions of the corners, specifying a number of data points that represent the vertices of the object, which can range from a simple line (two points), or a triangle (three points), to any free-form outline. Polygons may be filled with a variety of different patterns. All row/column specifiers are interpreted as inches/100 or millimeters/10 depending on the printer mode, (see `<STX>m`).

Record structure for a polygon (spaces added for readability):

```
1 X 11 ppp rrrr cccc P ppp bbbb rrrr cccc rrrr cccc ... <CR>
```

Where:

`1`	Rotation (must be 1)	`001`	Fixed Value
`X`	Graphic field ID	`0001`	Fixed Value
`1`	Multiplier (must be 1)	`rrrr`	Row of point 2
`1`	Multiplier (must be 1)	`cccc`	Column of point 2
`ppp`	Fill pattern #	`rrrr`	Row of point 3
`rrrr`	Row of point 1	`cccc`	Column of point 3
`cccc`	Column of point 1	`.....`	Additional points
`P`	Polygon ID (Fixed Value)	`<CR>`	Termination character

Table 8-13: Polygon Record Structure

☑ **Note:** The points must be specified in the order to be drawn; the last point specified is automatically connected to the first point to close the polygon. If only two points are specified, a single line will be drawn. See Label Formatting Command A.

Circles

A circle is created by defining by its center point and radius. Circles can be filled with a variety of different patterns. Row, column, and radius are interpreted as inches (100) or millimeters (10) depending on printer mode.

Record structure for a circle (spaces have been added for readability):

```
1 X 11 fff rrrr cccc C ppp bbbb rrrr <CR>
```

Where:

1	Rotation (must be 1)	cccc	Column of the center point
X	Graphic field	C	Circle ID (Fixed Value)
1	Multiplier (must be 1)	001	Fixed Value
1	Multiplier (must be 1)	0001	Fixed Value
fff	Fill pattern #	rrrr	Radius of the circle
rrrr	Row of the center point	<CR>	Termination character

Table 8-14: Circle Record Structure

Fill Patterns for Polygons and Circles:

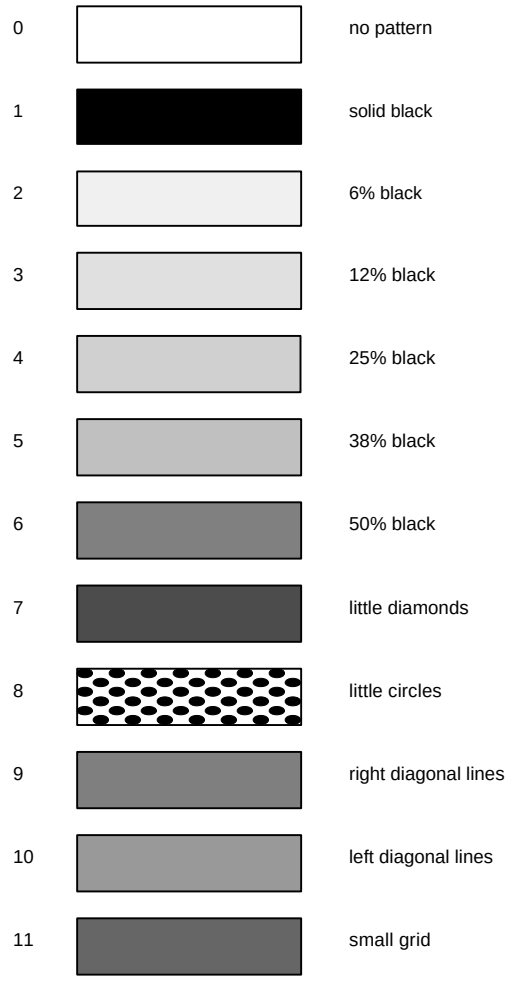


Figure 8-2: Fill Patterns

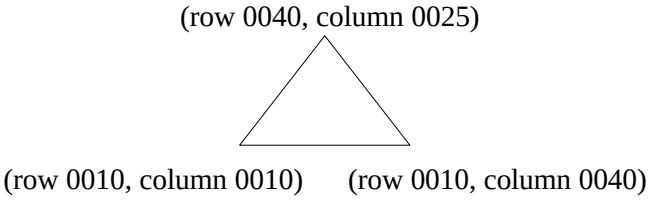
Examples (Spaces have been added for readability)**:**

1. Triangle

The record:

```
1 X 11 000 0010 0010 P 001 0001 0040 0025 0010 0040<CR>
```

Produces a triangle with no fill pattern:

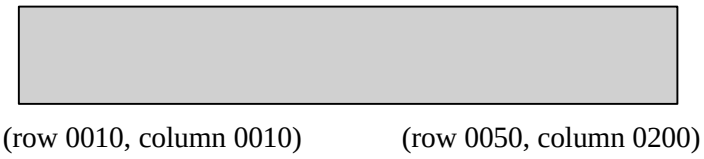


2. Rectangle with Fill

The record:

```
1 X 11 004 0010 0010 P 001 0001 0050 0010 0050 0200 0010 0200<CR>
```

Produces a rectangle filled with pattern 4 (25% black):

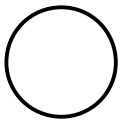


3. Circle

The record:

```
1 X 11 000 0100 0100 C 001 0001 0025<CR>
```

Produces a circle centered at row 0100, column 0100 with a radius of 0025 and no fill pattern:

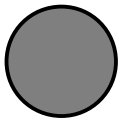


4. Circle with Fill

The record:

```
1 X 11 009 0100 0100 C 001 0001 0025 <CR>
```

Produces a circle centered at row 0100, column 0100 with a radius of 0025 and filled with pattern 9 (right diagonal lines):



Advanced Format Attributes

Two different advanced formatting attributes extend the text presentation capabilities. The first format attribute allows a set of label format records to make a *state change* that modifies the font attributes of any following DPL text records. The second format attribute provides a means of inserting text and font formatting commands directly into the DPL data stream via a *command delimiter structure*. All label formats begin by default with attributes disabled.

☑ **Note:** These commands are only valid for "scalable" fonts, such as Internal Font 9, S00 and S01 or downloaded TrueType scalable fonts. (Non-display models have limited standard font sets and capabilities; see the notes below for applicability of commands and consult the appropriate operators manual for available standard and optional font sets.)

The table below represents the current list of font attributes available to the user. Note that these commands are delimited by the \<*xxx*> sequence (where *xxx* is from the list below).

Command	Units	Purpose	Notes
FB	+/-	Turns on or off emboldment of the font	minus '-' disable, plus '+' enable
FI	+/-	Turns on or off italicize of the font	minus '-' disable, plus '+' enable
FU	+/-	Turns on or off underlining of string.	minus '-' disable, plus '+' enable (display-equipped models only)
FP*n*	Points	Specify the vertical point size of the following text relative to the base line.	Display-equipped models only
FS*n*	Points	Specify the horizontal point size of the following text relative to the base line.	Display-equipped models only
FR[+/-]*r*	Degrees	Specify the rotation of the base line, relative to the original print direction of the record.	If a + or – precedes the numeric value, then the direction is relative to the current print direction.

Table 8-15: Advanced Format Attributes

For example, the first format attribute command can be illustrated as follows. The text below and the resulting label (Figure 1) are examples of a current DPL format:

```
<STX>L
D11
1911S0102600040P018P018Old DPL World
1911S0102000040P018P018Old DPL World
1911S0101400040P018P018Old DPL World
1911S0100800040P018P018Old DPL World
1911S0100200040P018P018Old DPL World
E
```

Figure 1

Now, if the DPL format is modified as follows, the resulting label (Figure 2) is printed:

```
<STX>L
D11
FA+
FB+
1911S0102600040P018P018New DPL World
FU+I+
1911S0102000040P018P018New DPL World
FI-U+B-
1911S0101400040P018P018New DPL World
FU-B+
1911S0100800040P018P018New DPL World
FB+I+U+
1911S0100200040P018P018New DPL World
FB-U-I-
E
```

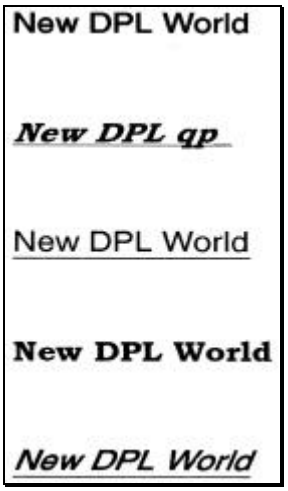


Figure 2

Note that if all format commands after the first FB+ were deleted the entire label would have been printed with bold scalable fonts. This is what is meant by a *state change*. Once invoked, that command is in affect until turned off or the label format is terminated with the “E” “s” or the “X” command.

The second format attribute command is inserted into the text data stream and delimited by the angle brackets “<>“ This structure takes the form of \<*command*>. An example of this command is as follows:

```
<STX>L
D11
A2
FA+
1911S0105000020P018P018DPL allows \<FP36FS36>FONT\<FS10FP10> sizes
\<FS8FP12>in the string
1911S0103500100P018P018\<FR80>D\<FR-5>P\<FR-5>L\<FR-5> \<FR-5>l\<FR-
5>e\<FR->t\<FR-5>s\<FR-5> \<FR-5>y\<FR-5>o\<FR-5>u\<FR-5> \<FR-
5>w\<FR-5>r\<FR-5>i\<FR-5>t\<FR-5>e\<FR-5> \<FR-5>i\<FR-5>n\<FR-5>
\<FR-5>c\<FR-5>i\<FR-5>r\<FR-5>c\<FR-5>l\<FR-5>e\<FR-5>s\<FR-5> \<FR-
5>t\<FR-5>o\<FR-5>o\<FR-5>!
1911S0102400040P018P018\<FR+45>DPL allows \<FB+>Rotations\<FB-FR-90>
in the string
1911S0102000040P018P018DPL allows \<FB+>BOLD\<FB-> in the string
FU+
1911S0101400040P018P012DPL allows \<FI+>ITALICS\<FI-> in the string
FI+U-
1911S0101000040P018P012DPL allows \<FB+I+>COMBINATIONS\<FB-I-> in
the string
FB+I-
1911S0100600040P018P018DPL allows \<FB+>BOLD\<FB-> in the string
FU+I+
1911S0100200040P018P018DPL allows \<FB+>BOLD\<FB-> in the string
FB-U-I-
E
```

Figure 3 is an example of the output from this DPL command stream. The user has the ability to change the point and set size of the font within the DPL command record. In addition, the angle of the baseline may be specified relative to the current orientation of the record. (For example, the command \<FR+45> will rotate the baseline forty five degrees in the positive direction from the default print direction.)

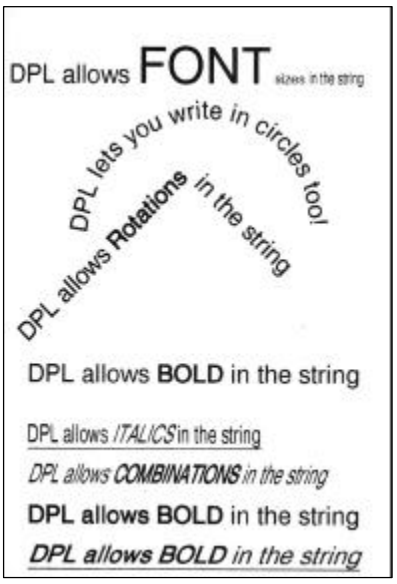


Figure 3

☑ **Note:** Refer to back to Section 8 for more information regarding the DPL record format for a scalable font text string.

Appendix

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

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	º	167	A7	Ã	199	C7	þ	231	E7
ê	136	88	¿	168	A8		200	C8	Þ	232	E8
ë	137	89	®	169	A9		201	C9	Ú	233	E9
è	138	8A		170	AA		202	CA	Û	234	EA
ï	139	8B	1/2	171	AB		203	CB	Ù	235	EB
î	140	8C	1/4	172	AC		204	CC	ý	236	EC
ì	141	8D	¡	173	AD		205	CD	Ý	237	ED
Ä	142	8E		174	AE		206	CE		238	EE
Å	143	8F	¯	175	AF		207	CF		239	EF
É	144	90		176	B0	ð	208	D0		240	F0
æ	145	91		177	B1	Ð	209	D1	±	241	F1
Æ	146	92	²	178	B2	Ê	210	D2		242	F2
ô	147	93	³	179	B3	Ë	211	D3	3/4	243	F3
ö	148	94	´	180	B4	È	212	D4		244	F4
ò	149	95	Á	181	B5		213	D5		245	F5
û	150	96	Â	182	B6	Í	214	D6	÷	246	F6
ù	151	97	À	183	B7	Î	215	D7	¸	247	F7
ÿ	152	98	©	184	B8	Ï	216	D8	º	248	F8
Ö	153	99	¹	185	B9		217	D9	¨	249	F9
Ü	154	9A		186	BA		218	DA	·	250	FA
ø	155	9B	»	187	BB		219	DB		251	FB
£	156	9C		188	BC		220	DC		252	FC
Ø	157	9D	¢	189	BD		221	DD		253	FD
x	158	9E	¥	190	BE	Ì	222	DE		254	FE
f	159	9F		191	BF		223	DF	€	255	FF

☑ **Notes:** (1) For hardware handshake XON/XOFF commands:
XON = Ctrl Q (DC1)
XOFF = Ctrl S (DC3)

(2) The Euro currency character (€) has been added to the table above at 255 (FF) as a Datamax standard for resident bit-mapped fonts 0,1,2,3,4,5,6, and 9 (CG Triumvirate).

Appendix

Sample Programs

'C' Language Program

The following sample 'C' program is included for reference. Figure B-1 shows the output generated by this program.

```
/* DMX SERIES Sample C program */

# include <stdio.h>

main ()
{
        char *pcs = "590";
        char *desc = "10K OHM 1/4 WATT";

        fputs ("DMX Printer Test Program\n", stdout);

        fputs ("\x02L\n", stdaux);                          /* STX L – Enter Label Formatting */
        fputs ("H07\n" stdaux);                             /* Enter Heat Setting of 7*/
        fputs ("D11\n", stdaux);                            /* Set Width and Height Dot Size */

        fprintf (stdaux, "191108010000025%s\n",desc);       /* Select smooth Font */

        fprintf (stdaux, "1a6210000000050%sPCS\n", pcs);    /* Select Bar code type 'a' */
        fputs ("E\n", stdaux);                              /* End Label format mode and print*/
}
```

Figure B-1: Sample Label

ASCII text file

The following ASCII text file will also generate the label shown in Figure B-1.

```
^BL
H07
D11
19110080100002510K OHM 1/4 WATT<CR>
1a62100000000050590PCS<CR>
E<CR>
```

VB Application Generating DPL

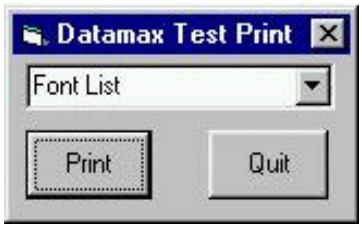
The following sample is a Visual Basic program that displays a database record on the screen. A user can scroll through the records and then print a selected one. Five bar codes are printed along with data fields and headings.

```
'Printer DPL Controls
Dim CharSet As String          '<STX> byte
Const StartLabel = "L"
Const EndLabel = "E"
Const PrintDensity = "D11"

'Printer DPL Data to position dynamic information on label
Const OrderTxt = "191100704150010"        'font 9, 24 pt
Const OrderBC = "1a6205004200120"
Const CustomerTxt = "191100603600010"

Const Item1NO = "191100403250010"
Const Item1BC = "1a6204002870010"
Const Item1Txt = "191100402690010"
Const Item1Qty = "191100603070260"

'DPL Fixed Items on label
Const Itm1 = "1911003034000l0Item #"

Const Qty1 = "191100303400250Quantity"

Const Boxsize = "B065035002002"
Const BoxPos1 = "1X1100003050240"
Const Image1 = "1Y3300004750010SLANT1"

Dim Fixed As String

'Item Variables
Dim Item1 As String
Dim PrintLabel As String
Dim OrderData As String

'Print label by clicking print button with the mouse
Private Sub cmdPrint_Click()
```

```
'Concatenate all the dynamic data fields with the constant
header strings,  terminated with <cr> Chr$(13)
   OrderData = OrderTxt & txtOrderNo.Text & Chr$(13) &
OrderBC & txtOrderNo.Text & Chr$(13) & CustomerTxt &
txtCustomer.Text

   Item1 = Item1NO & txtItem1.Text & Chr$(13) & Item1BC &
txtItem1.Text & Chr$(13) & Item1Txt & txtItem1Desc.Text &
Chr$(13) & Item1Qty & txtItem1Qty.Text

'Concatinate entire label format and send out serial port
   PrintLabel = CharSet & MaxLength & Chr$(13) & CharSet &
StartLabel & Chr$(13) & PrintDensity & Chr$(13) & Image1 &
Chr$(13) & OrderData & Chr$(13) & Item1 & Chr$(13) & Fixed &
Chr$(13) & EndLabel
   Comm1.Output = PrintLabelEnd Sub

'Display the record form on the screen
Private Sub Form_Load()
   Fixed = Itm1 & Chr$(13) & Chr$(13) & Qty1 & Chr$(13) &
Chr$(13) & BoxPos1 & Boxsize & Chr$(13)
   CharSet = Chr$(126)      'Alternate <stx> character ~
   MComm.PortOpen = 1  'Open the serial port
End Sub

'Exit the program by clicking Exit button with the mouse
 Private Sub cmdExit_Click()
   Comm1.PortOpen = 0  'Close down the serial port
   End
End Sub
```

VB Application interfacing via Windows Driver

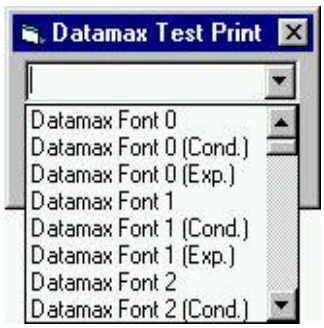
Create a form similar to the one shown here.




```
VERSION 5.00
Begin VB.Form Form1
   Caption         =   “Datamax Test Print”
   ClientHeight    =   1065
   ClientLeft      =   60
   ClientTop       =   345
   ClientWidth     =   2325
   LinkTopic       =   “Form1”
   MaxButton       =   0   ‘False
   MinButton       =   0   ‘False
   ScaleHeight     =   1065
   ScaleWidth      =   2325
   StartUpPosition =   3  ‘Windows Default
   Begin VB.ComboBox cmboFonts
      Height          =   315
      Left            =   90
      TabIndex        =   2
      Text            =   “Font List”
      Top             =   45
      Width           =   2130
   End
   Begin VB.CommandButton cmdExit
      Caption         =   “Quit”
      Height          =   465
      Left            =   1350
      TabIndex        =   1
      Top             =   495
      Width           =   825
   End
   Begin VB.CommandButton cmdPrint
      Caption         =   “Print”
      Height          =   465
      Left            =   90
      TabIndex        =   0
      Top             =   495
      Width           =   870
   End
End
Attribute VB_Name = “Form1”
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
```

```
‘Print label by clicking print button with the mouse
Private Sub cmdPrint_Click()
‘font name as seen in application font list box
‘if not found, driver will inform GDI to generate an
‘image that will be downloaded
    Printer.FontName = cmboFonts.Text

‘1,440 twips equals one inch
    Printer.Height = 6480       ‘4.5 inches in twips
    Printer.Width = 5760        ‘4 inches in twips
    Printer.CurrentX = 1440     ‘1 inch (column position)
    Printer.CurrentY = 2160     ‘2 inches (row position)
    Printer.Print “0123456789”
    Printer.EndDoc
End Sub
Private Sub Form_Load()
Dim X As Printer
Dim I As Integer ‘Used for the font list
‘ search for printer queue name / driver name
    For Each X In Printers
    If X.DeviceName = “Datamax I-4206” Then ‘printer found
‘ Set printer as system default.
        Set Printer = X
            For I = 0 To Printer.FontCount - 1  ‘ Determine number of fonts.
                cmboFonts.AddItem Printer.Fonts(I)    ‘ Put each font into
list box.
            Next I
        Exit For
    End If
    Next
End Sub
‘Exit the program and shut down the serial port
‘by clicking Exit button with the mouse
Private Sub cmdExit_Click()
    End
End Sub
```

When the program is run, the combo box should be populated with the available fonts as shown below.



VB Application to Send RAW Data via a Windows Printer Driver

This is a sample Visual Basic program that checks for any printer driver attached to "LPT1". If one is installed then a DPL file can be printed via the print driver. **Note that this does not have to be a Datamax DPL print driver. DPL is created by the application and sent to LPT1.

To begin, a global variable called SelPrinter must be defined as a string. Then use the following code to create a .frm file.

```
VERSION 5.00
Object = "{F9043C88-F6F2-101A-A3C9-08002B2F49FB}#1.2#0";
"comdlg32.ocx"
Begin VB.Form Form1
   Caption         =   "Form1"
   ClientHeight    =   1290
   ClientLeft      =   165
   ClientTop       =   735
   ClientWidth     =   3750
   LinkTopic       =   "Form1"
   MaxButton       =   0   'False
   MinButton       =   0   'False
   ScaleHeight     =   1290
   ScaleWidth      =   3750
   StartUpPosition =   3  'Windows Default
   Begin MSComDlg.CommonDialog CommonDialog1
      Left            =   1635
      Top             =   765
      _ExtentX        =   847
      _ExtentY        =   847
      _Version        =   393216
   End
   Begin VB.CommandButton cmdClose
      Cancel          =   -1  'True
      Caption         =   "Close"
      Height          =   372
      Left            =   2400
      TabIndex        =   3
      Top             =   735
      Width           =   972
   End
   Begin VB.CommandButton cmdStoreImage
      Caption         =   "Print"
      Default         =   -1  'True
      Height          =   372
      Left            =   240
      TabIndex        =   2
      Top             =   735
      Width           =   972
   End
   Begin VB.TextBox txtFile
      Height          =   288
```

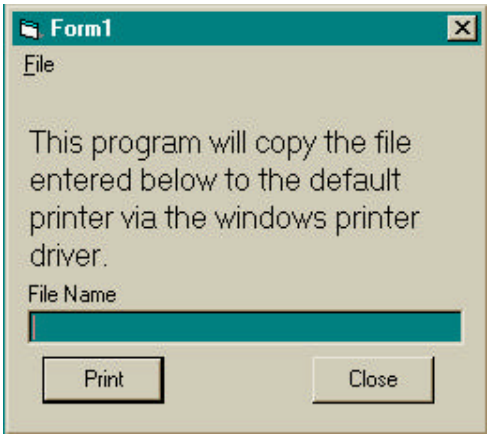
```
      Left            =   120
      TabIndex        =   1
      Top             =   360
      Width           =   3492
   End
   Begin VB.Label Label1
      Caption         =   “File Name”
      Height          =   255
      Left            =   120
      TabIndex        =   0
      Top             =   135
      Width           =   1455
   End
   Begin VB.Menu File
      Caption         =   “&File”
      Begin VB.Menu open
         Caption         =   “&Open”
      End
      Begin VB.Menu exit
         Caption         =   “&Exit”
         Shortcut        =   ^Q
      End
   End
End
Attribute VB_Name = “Form1”
Attribute VB_GlobalNameSpace = False
Attribute VB_Creatable = False
Attribute VB_PredeclaredId = True
Attribute VB_Exposed = False
Option Explicit
‘*********************************
#If Win32 Then
Private Type DOC_INFO_1
    pDocName As String
    pOutputFile As String
    pDatatype As String
End Type

#End If ‘WIN32 Types

‘*********************************
‘**  Function Declarations:

#If Win32 Then
Private Declare Function OpenPrinter& Lib “winspool.drv” Alias
“OpenPrinterA” (ByVal pPrinterName As String, phPrinter As Long, ByVal
pDefault As Long) ‘ Third param changed to long
Private Declare Function StartDocPrinter& Lib “winspool.drv” Alias
“StartDocPrinterA” (ByVal hPrinter As Long, ByVal Level As Long,
pDocInfo As DOC_INFO_1)
```

```
Private Declare Function StartPagePrinter& Lib “winspool.drv” (ByVal
hPrinter As Long)
Private Declare Function WritePrinter& Lib “winspool.drv” (ByVal
hPrinter As Long, pBuf As Any, ByVal cdBuf As Long, pcWritten As Long)
Private Declare Function EndDocPrinter& Lib “winspool.drv” (ByVal
hPrinter As Long)
Private Declare Function EndPagePrinter& Lib “winspool.drv” (ByVal
hPrinter As Long)
Private Declare Function ClosePrinter& Lib “winspool.drv” (ByVal
hPrinter As Long)
#End If ‘WIN32

Dim ch As String * 1, f1 As Integer, loadfile As String
Private Sub cmdOpenFile_Click()
    On Error GoTo ErrHandler
    ‘ Set Filters
    CommonDialog1.Filter = “All Files (*.*)|*.*”
    ‘Specify Default Filter
    CommonDialog1.FilterIndex = 1
    ‘Display Open dialog box
    CommonDialog1.ShowOpen
    loadfile = CommonDialog1.FileName
    Label2.Caption = loadfile
    Exit Sub

ErrHandler:
    Exit Sub
End Sub
Private Sub cmdStoreImage_Click()
Dim hPrinter&
Dim jobid&
Dim res&
Dim written&
Dim printdata$
Dim docinfo As DOC_INFO_1

    loadfile = Form1.txtFile.Text
    If loadfile = “” Then
        MsgBox “You must Open a file to send”, vbExclamation
        Exit Sub
    End If

    ‘ Open file.
    f1 = FreeFile
    Open loadfile For Binary As f1

    ‘ Open printer for printing
    res& = OpenPrinter(SelPrinter, hPrinter, 0)
    If res = 0 Then
        MsgBox “Unable to open the printer”
        Exit Sub
    End If
```

```
    docinfo.pDocName = “MyDoc”
    docinfo.pOutputFile = vbNullString
    docinfo.pDatatype = vbNullString
    jobid = StartDocPrinter(hPrinter, 1, docinfo)
    Call StartPagePrinter(hPrinter)

    Call WritePrinter(hPrinter, ByVal printdata$, Len(printdata$),
written)
    While Not EOF(1)
        Get #f1, , ch
        printdata$ = ch
        Call WritePrinter(hPrinter, ByVal printdata$, Len(printdata$),
written)
    Wend
    Call EndPagePrinter(hPrinter)
    Call EndDocPrinter(hPrinter)
    Call ClosePrinter(hPrinter) ‘ Close when done

    ‘ Close file
    Close #1
    MsgBox “File sent to print spooler.”, vbExclamation
End Sub
Private Sub cmdClose_Click()
    Unload Me
End Sub

Private Sub exit_Click()
    End
End Sub

Private Sub Form_Load()
Dim X As Printer
‘ search for printer queue name / driver name
    For Each X In Printers
        If X.Port = “LPT1:” Then ‘printer found
        ‘ Set printer as system default.
            SelPrinter = X.DeviceName
            Exit For
        End If
    Next
End Sub

Private Sub lpt2_Click()

End Sub

Private Sub open_Click()
    CommonDialog1.ShowOpen
    loadfile = CommonDialog1.FileName
    txtFile.Text = loadfile
End Sub
```

```
Private Sub Printer_Click()
    CommonDialog1.ShowPrinter
End Sub
```

This will create the form pictured below:



☑ **Note:** It may be necessary to remove and reinsert the common dialog control due to Windows® registry issues.

Appendix

Available Fonts – Sizes, References, and Samples

All character bit-mapped fonts available on the printers are described in this section. Each font has a name (Font ID) associated with it for use in programming. Use the Font Number (in the left column of Table C-1) in field b of the Format Record header to cause the printer to use the corresponding font.

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). Therefore, all of the characters take up the same amount of space when printed. This is helpful when using variable data in a fixed area. The sizes of these fonts are shown on the following pages.

The CG 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 wider than the letter I.

Font Number	Valid ASCII Characters (decimal)	Use with Record Structure Type
0	32-127, 255	Internal Bit-Mapped Fonts
1	32-168, 171, 172, 225, 255	
2	32-168, 171, 172, 225, 255	
3	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225, 255	
4	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225, 255	
5	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225, 255	
6	32, 35-38, 40-58, 65-90, 128, 142-144, 146, 153, 154, 156, 157, 165, 168, 225, 255	
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, 255	Smooth Font*
9	Dependent upon selected symbol set, see Appendix H.	Scalable Font

*E-Class and M-4206.

Table C-1: Valid Human-Readable Font (Internal) ASCII Characters

Font sizes are dependent upon the printhead resolution of the printer used; Tables C-2 to C-5 contain a listing of the font sizes by resolution with dimensions given in dots.

Font	Height	Width	Spacing	Point Size
Font 0	7	5	1	2.5
Font 1	13	7	2	4.6
Font 2	18	10	2	6.4
Font 3	27	14	2	9.6
Font 4	36	18	3	12.8
Font 5	52	18	3	18.4
Font 6	64	32	4	22.7
Font 7	32	15	5	11.3
Font 8	28	15	5	9.9

Table C-2: Font Sizes @ 203 DPI Resolution

Font	Height	Width	Spacing	Point Size
Font 0	10	7	1	2.4
Font 1	19	10	3	4.6
Font 2	27	15	3	6.5
Font 3	40	21	3	9.6
Font 4	53	27	4	12.7
Font 5	77	27	4	18.5
Font 6	95	47	6	22.8
Font 7	47	22	7	11.3
Font 8	41	22	7	9.8

Table C-3: Font Sizes @ 300 DPI Resolution

Font	Height	Width	Spacing	Point Size
Font 0	14	10	2	2.5
Font 1	26	14	4	4.6
Font 2	36	20	4	6.4
Font 3	54	28	4	9.6
Font 4	72	36	6	12.8
Font 5	104	36	6	18.4
Font 6	128	64	8	22.7
Font 7	64	30	10	11.3
Font 8	56	30	10	9.9

Table C-4: Font Sizes @ 406 DPI Resolution

Font	Height	Width	Spacing	Point Size
Font 0	20	14	2	2.4
Font 1	38	20	6	4.6
Font 2	54	30	6	6.5
Font 3	80	42	6	9.6
Font 4	106	54	8	12.7
Font 5	154	54	8	18.5
Font 6	190	94	12	22.8
Font 7	94	44	14	11.3
Font 8	82	44	14	9.8

Table C-5: Font Sizes @ 600 DPI Resolution

Internal Smooth Font 9 (Smooth Font) Point Size Specifiers

Label format records with font code 9 (in Format Record header field `b`) can specify any of the font sizes in the leftmost column of the table below. The corresponding specification in either column labeled `Ann` or `0nn` is used in the font size/selection (`eee` height) field to select the desired font size. Optional font sets may contain subsets of those described here. For an optional font set that generates these fonts via scalable font technology, the character mapping for this font is the selected scalable symbol set (see Appendix E).

In the sample format below, a 300 DPI printer will use 4-point smooth font to produce a printed label with the words “four point font”. Sample format:

```
<STX>L<CR>
1911A0400100010four point font<CR>
 E<CR>
```

Point Size	Smooth Font 9 Font Size Specification Syntax		
	Ann		0nn
	203 DPI Print Resolution [1]	300, 400, & 600 DPI Print Resolutions [2]	
4	-	A04	-
5	-	A05	000[3]
6	A06	A06	001
8	A08	A08	002
10	A10	A10	003
12	A12	A12	004
14	A14	A14	005
18	A18	A18	006
24	A24	A24	007
30	A30	A30	008
36	A36	A36	009
48	A48	A48	010
72	-	A72	-

[1] All fonts greater than A36 are created from multiples of smaller fonts, 2x or 3x, as available.
[2] All fonts greater than A24 are created from multiples of smaller fonts, 2x or 3x, as available.
[3] Available at 300 DPI and greater print resolutions only.

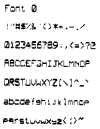
Table C-6: Internal Bit-Mapped (Smooth Font) 9 Size Chart

Internal Bit-Mapped and Smooth Font Samples

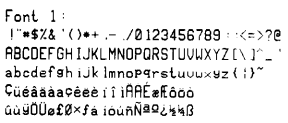
The identifying number is used in the Format Record header field b to cause the printer to use the corresponding font.

> ☑ **Note:** The Euro currency character (€) has been added to Fonts 0 – 6. For the E-Class and M-4206 only, the character is also present in Font 9.

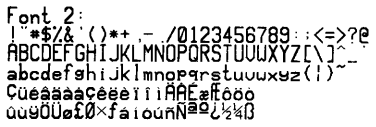
0: Identifies a 96-character alphanumeric font, uppercase and lowercase.



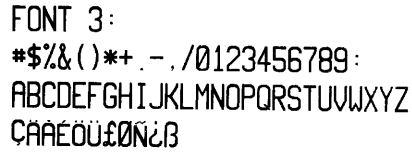
1: Identifies a 145-character uppercase and lowercase alphanumeric font that includes desenders and ascenders.



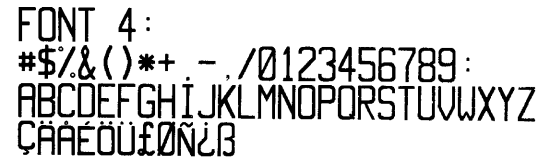
2: Identifies a 138-character alphanumeric upper and lowercase font.



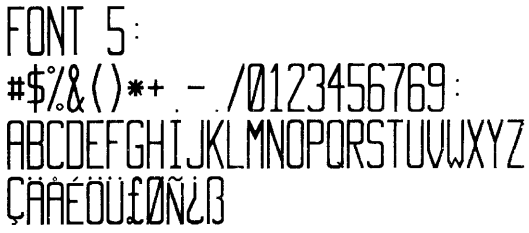
3: Identifies a 62-character alphanumeric uppercase font.



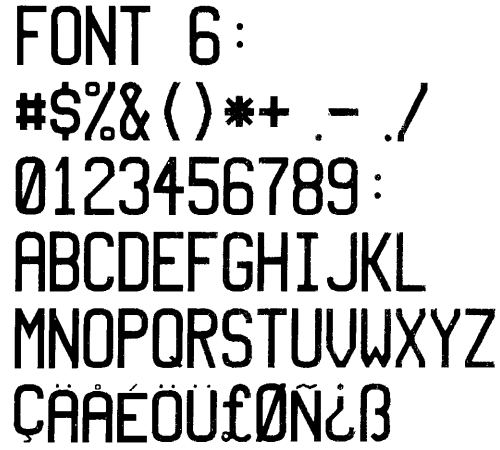
4: Identifies a 62-character alphanumeric uppercase font.



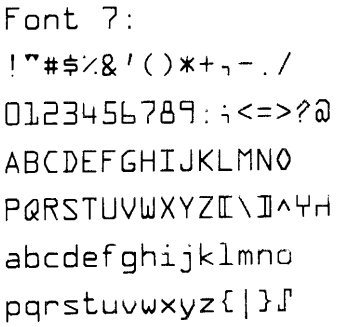
5: Identifies a 62-character alphanumeric upper case font.



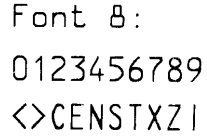
6: Identifies a 62-character alphanumeric uppercase font.



7: Identifies a font that prints OCR-A, size I.



8: Identifies a font that prints OCR-B, size III.



9: Identifies the Internal CG Triumvirate font. Point sizes are selected by the number in the Format Record header eee height field, see Table C-6.

Appendix

Reset Codes

The most common transmitted error codes are:

Uppercase “R”

This code is sent every time the printer is turned ‘On’, signaling a hardware reset.

Uppercase “T”

This code signals a software reset. A software reset is made by sending the command sequence to the printer or by performing a reset using the front panel keys.

Lowercase “v”

There is an input buffer overflow situation, caused when an overflow of data is sent to the printer.

Appendix

Single Byte Symbol Sets

The following tables include some of the sixty-six standard symbol sets. Not all of these symbol sets can be used with every font. Symbol sets containing the Euro currency character are W1, WE, WG, WL, WT, WR, and PM; see Appendix I, and the <STX>y command.

☑ **Note:** The following sets were produced using a Windows®-based PC-compatible with an English (United States) keyboard properties layout. Results may vary if printing this document using a different input locale.

(DN) ISO 60: Danish / Norwegian Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	Æ	Ø	Å	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	æ	ø	å	¯	¦

(DT) DeskTop Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	-
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80																
90																
A0		¶	§	†	‡	©	®	™	℅	¢	–	—	…	fi	fl	
B0	"	"	*µ*	‰	•	●	º	○	þ	₸	•	?	'	¬	¦	=
C0	–	±	×	÷	°	′	″	¼	½	¾	¹	²	³	/		
D0	(	)	«	»	,	„	'	¡	¿	Pt	|	£	¥	¤	*ƒ*	ß
E0	ª	º	æ	Æ	ð	Ð	ij	IJ	t	t	œ	Œ	ø	Ø	þ	Þ
F0	`	'	^	¨	~	?	?	"	°	.	¯	¸	?	'	|	

(E1) ISO 8859/1 Latin 1 Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	-
60	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80																
90																
A0		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¸	¹	»	¼	½	¾	¿
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

(E2) ISO 8859/2 Latin 2 Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	-
60	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80																
90																
A0			?	Ł	¤			§	¨	°	Š			·	Ž	
B0	°			ł	´			·	¸	¹	š			“	ž	
C0		Á	Â		Ä			Ç		É		Ë		Í	Î	
D0	Đ			Ó	Ô		Ö	×	Ø		Ú		Ü	Ý		ß
E0		á	â		ä			ç		é		ë		í	î	
F0				ó	ô		ö	÷			ú		ü	ý		

(E5) ISO 8859/5 Latin 5 Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	-
60	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80																
90																
A0		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
B0	º	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0		Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü			ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0		ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ı		ÿ

(FR) ISO 69: French Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	£	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	à	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	º	ç	§	^	_
60	µ	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	é	ù	è	¨	¦

(GR) ISO 21: German Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	?	(	)	*	+	?	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	§	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	Ä	Ö	Ü	^	_
60	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	ä	ö	ü	ß	¦

(IT) ISO 15: Italian Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	£	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	§	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	º	ç	é	^	_
60	ù	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	à	ò	è	ì	¦

(LG) Legal Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	=	=	¢	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	®	]	©	_
60	°	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	§	¶	†	™	¦

(MC) Macintosh Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80	Ä	Å	Ç	É	Ñ	Ö	Ü	á	à	â	ä	ã	å	ç	é	è
90	ê	ë	í	ì	î	ï	ñ	ó	ò	ô	ö	õ	ú	ù	û	ü
A0	†	°	¢	£	§	•	¶	ß	®	©	™	´	¨	≠	Æ	Ø
B0	∞	±	≤	≥	¥	µ	∂	∑	∏	π	∫	ª	º	Ω	æ	ø
C0	¿	¡	¬	√	ƒ	≈	∆	«	»	…		À	Ã	Õ	Œ	œ
D0	–	—	"	"	'	'	÷	◊	ÿ	Ÿ	/	¤	<	>	fi	fl
E0	‡	·	‚	„	‰	Â	Ê	Á	Ë	È	Í	Î	Ï	Ì	Ó	Ô
F0		Ò	Ú	Û	Ù	ı	^	~	¯	?	?	º	¸	¨	?	?

(PC) PC-8 Code Page 437 Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		☺		♥	♦	♣	♠	•	◘	○			?	?	?	☼
10	▶	◀	↕	!!	¶	§	-	↨	↑	↓	→	←	?	↔	↕	↕
20		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌐
80	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	¢	£	¥	Pt	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	¬	¬	½	¼	¡	«	»
B0	¦	¦	¦	¦	¦	¦	¦	+	+	¦	¦	+	+	+	+	+
C0	+	-	-	+	-	+	¦	¦	+	+	-	-	¦	-	+	-
D0	-	-	-	+	+	+	+	+	+	+	+	¦	_	¦	¦	¯
E0	α	ß	+	π	?	σ	µ	?	?	T	?	δ	n	?	?	n
F0	=	±	≥	≤	(	)	÷	~	?	?	?	v	n	²	¦	

(PD) PC-8 D/N, Code Page 437N Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		☺		♥	♦	♣	♠	•	◘	○			?	?	?	☼
10	▶	◀	↕	!!	¶	§	?	↨	↑	↓	→	←	?	↔	↕	↕
20		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌐
80	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	?	?
A0	á	í	ó	ú	ñ	Ñ	õ	Õ	¿	ã	Ã	¦	?	¡	³	¤
B0	¦	¦	¦	¦	¦	¦	¦	+	+	¦	¦	+	+	+	+	+
C0	+	-	-	+	-	+	¦	¦	+	+	-	-	¦	-	+	-
D0	-	-	-	+	+	+	+	+	+	+	+	¦	_	¦	¦	¯
E0	α	ß	+	π	?	σ	µ	?	?	T	?	δ	n	?	?	n
F0	=	±	≥	≤	(	)	÷	~	?	?	?	v	n	²	¦	

(PE) PC-852 Latin 2 Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		☺		♥	♦	♣	♠	•	◘	○			?	?	?	☼
10	►	◄	↑	!!	¶	§	?	?	↑	↓	→	←	?	↔	↑	↑
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80	Ç	ü	é	â	ä			ç	ł	ë			î		Ä	
90	É			ô	ö					Ö	Ü			L	×	
A0	á	í	ó	ú			Ž	ž							«	»
B0	¦	¦	¦	¦	¦	Á	Â			¦	¦	+	+			?
C0	+	-	-	+	-	+			+	+	-	-	¦	-	+	¤
D0	ð	Đ		Ë			Í	Î		+	+	¦	_			¯
E0	Ó	ß	Ô				Š	š		Ú			ý	Ý		´
F0	?	“	?	?	?	§	÷	¸	°	¨	´				■	

(PI) PI Font Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20			„	,	“	“	‘	‘	〈	〉	™	?	®	©	Ⓜ	
30	¯	?	?	?	↗	↘	↙	↖	∆	▷	∇	◁	«	§	»	¶
40	::	∆					*f*		*ħ*				L	I		
50	P	℘	℞	Σ								𝕃	?	𝕝	‹	›
60	+	+	?	?	+	+	-	? ?	∪	∩	+	+	?	?		
70	+	+	?	?	-	¦	-	¦	?	?	+	+	¦	↑		¦

(PM) PC-850 Multilingual Symbol Set*

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		☺		↑	↑	↑	↑	↑	◘	○		?	?		♫	☼
10	►	◄	↕	!!	¶	§	?	↕	↑	↓	→	←	L	↔	↑	↑
20		!	“	#	$	%	&	‘	(	)	*	+	,	¨	·	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	Ø	×	*f*
A0	á	í	ó	ú	ñ	Ñ	ª	º	¿	®	?	½	¼	¡	«	»
B0	¦	¦	¦	¦	¦	Á	Â	À	©	¦	¦	+	+	¢	¥	+
C0	+	-	-	+	-	+	ã	Ã	+	+	-	-	¦	-	+	¤
D0	ð	Đ	Ê	Ë	È	¡	I	?	Î	+	+	¦	_	?	Ì	¯
E0	Ó	ß	Ô	Ò	õ	Õ	*µ*	þ	Þ	Ù	Û	Ú	ý	Ý	¯	´
F0	-	±	=	¾	¶	§	÷	¸	º	“	.	¹	³	²	?	€

*****Default Symbol Set

(PT) PC-8 TK, Code Page 437T Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		☺		?	↟	↟	↟	↟	?	○		♂	♀		♫	☼
10	▶	◀	↕	!!	¶	§	—	↨	↑	↓	→	←	∟	↔	↟	↟
20		!	″	#	$	%	&	‘	(	)	*	+	,	-	·	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï	î	ì	Ä	Å
90	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	¢	£	¥	Pt	ƒ
A0	á	í	ó	ú	ñ	Ñ	ª	º	¬	¬	½	¼	¡	¡	«	»
B0	¦	¦	¦	¦	¦	¦	¦	+	+	¦	¦	+	+	+	+	+
C0	+	-	-	+	-	+	¦	¦	+	+	-	-	¦	-	+	-
D0	-	-	-	+	+	+	+	+	+	+	+	¦	_	¦	¦	¯
E0	*a*	ß	+	*p*	?	*s*	*µ*	*?*	?	T	?	*d*	**8**	*?*	*?*	**n**
F0	=	±	≥	≤	(	)	÷	~	?	?	?	v	ⁿ	²	¦	

(R8) Roman-8 Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	-
60	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80																
90																
A0		À	Â	È	Ê	Ë	Î	Ï	?	`	^	“	~	Ù	Û	£
B0	-	Ý	ý	º	Ç	ç	Ñ	ñ	¡	¿	¤	£	¥	§	ƒ	¢
C0	â	ê	ô	û	á	é	ó	ú	à	è	ò	ù	ä	ë	ö	ü
D0	Å	î	Ø	Æ	å	Í	ø	æ	Ä	ì	Ö	Ü	É	Ï	ß	Ô
E0	Á	Ã	ã	Ð	ð	Í	Ì	Ó	Ò	Õ	õ	Š	š	Ú	Ÿ	ÿ
F0	Þ	þ	·	*µ*	¶	¾	—	¼	½	ª	º	«	↟	»	±	

(SP) ISO 17: Spanish Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	£	$	%	&	´	(	)	*	+	‚	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	§	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	¡	Ñ	¿	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	º	ñ	ç	~	¦

(SW) ISO 11: Swedish Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	¤	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	É	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	Ä	Ö	Å	Ü	_
60	é	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	ä	ö	å	ü	¦

(TS) PS Text Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80																
90																
A0		¡	¢	£	/	¥	*ƒ*	§	¤	‘	“	«	‹	›	?	?
B0		-	†	‡	·		¶	•	‚	„	“	»	…	‰		¿
C0		`	´	ˆ	~	¯	?	?	¨		°	¸		“	?	?
D0	—															
E0		Æ		ª					Ł	Ø	Œ	º				
F0		æ				|			ł	ø	œ	ß				

(UK) ISO 4: United Kingdom Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	£	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	?	¦

(US) ISO 6: ASCII Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	·	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	-
60	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦

(VI) Ventura International Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80																
90												↵	?	?	¦	?
A0	„	À	Â	È	Ê	Ë	Î	Ï	©	®	™	‹	›	Ú	Û	
B0	‰	“	“	º	Ç	ç	Ñ	ñ	¡	¿	¤	£	¥	§	ƒ	¢
C0	â	ê	ô	û	á	é	ó	ú	à	è	ò	ù	ä	ë	ö	ü
D0	Å	î	Ø	Æ	å	í	ø	æ	Ä	ì	Ö	Ü	É	ï	ß	Ô
E0	Á	Ã	ã			Í	Ì	Ó	Ò	Õ	õ	Š	š	Ú	Ÿ	ÿ
F0	Œ	œ	¶	†	‡	—	–			ª	º	«	•	»		…

(VU) Ventura US Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
80																
90												↵	?	?	¦	?
A0	„								©	®	™					
B0	‰	“	“	º										§		¢
C0																
D0																
E0																
F0			¶	†	‡	—	–						•			…

(W1) Windows 3.1 Latin 1 Symbol Set

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80	€		,	ƒ	„	…	†	‡	ˆ	‰	Š	‹	Œ			
90		‘	‘	“	“	•	–	—	˜	™	š	›	œ			Ÿ
A0		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

(WE) Windows 3.1 Latin 2 Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80	€		‚		„	…	†	‡		‰	Š	‹			Ž	
90		‘	‘	“	“	•	–	—		™	š	›			ž	
A0		?	?	Ł	¤		¦	§	¨	©		«	¬	-	®	
B0	°	±	?	ł	´	µ	¶	·	¸			»		“		
C0		Á	Â		Ä			Ç		É		Ë		Í	Î	
D0	Đ			Ó	Ô		Ö	×			Ú		Ü	Ý		ß
E0		á	â		ä			ç		é		ë		í	î	
F0				ó	ô		ö	÷			ú		ü	ý		

(WO) Windows 3.0 Latin 1 Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	“	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80																
90		`	’													
A0		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

(WT) Windows 3.1 Latin 5 Symbol Set																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20		!	˜	#	$	%	&	‘	(	)	*	+	,	-	.	/
30	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
60	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	¦
80	€		‚	*f*	„	…	†	‡	ˆ	‰	Š	‹	Œ			
90		‘	‘	“	“	•	–	—	˜	™	š	›	œ			Ÿ
A0		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
B0	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0		Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü			ß
E0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0		ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ı		ÿ

Appendix

Bar Code Summary Data

Bar code fonts have alpha names (left column, below). Uppercase alpha names will print bar codes with human-readable interpretations, if supported. Lowercase alpha names will print bar codes only. Place the ID in field b of the Format Record header to cause the printer to encode the data field using the associated bar code symbology, see Appendix G for details. See Table F-2 for default values. The column labeled "Linear Scanner Supported" provides an indication that printers equipped with a Linear Scanner are capable of recognizing the associated barcode symbology.

Bar Code ID	Symbology	Length	Checksum	Valid ASCII Characters, decimal value representation	Linear Scanner Supported
A / a	Code 39	Varies	No	32, 36, 37, 42, 43, 45-57, 65-90	✓
B / b	UPC-A	11	Yes	48-57 Numeric only. Option V used in the 6th & 7th position	✓
C / c	UPC-E	6	Yes	48-57 Numeric only	✓
D / d	Interleaved 2 of 5 (I2 of 5)	Varies	No	48-57 Numeric only	✓
E / e	Code 128	Varies	M-103	32-127	✓
F / f	EAN-13	12	Yes	48-57 Numeric only. Option V used in 7th & 8th position	✓
G / g	EAN-8	7	Yes	48-57 Numeric only	✓
H / h	HBIC	Varies	M-43	32, 36-39, 42, 43, 45-57, 65-90	✓
I / i	Codabar	Varies	No	36, 43, 45-58, 65-68	✓
J / j	Interleaved 2 of 5 w/ a modulo 10 checksum	Varies	M-10	48-57 Numeric only	✓
K / k	Plessey	Up to 14	M-10	48-57 Numeric only. Option + is last character for 2nd M-11 chksum	✓
L / l	Interleaved 2 of 5 w/ modulo 10 checksum & bearer bars	13	M-10	48-57 Numeric only	✓
M / m	2 digit UPC addendum	2	Yes	48-57 Numeric only	[1]
N / n	5 digit UPC addendum	5	Yes	48-57 Numeric only	[1]
O / o	Code 93	Varies	No	35-38, 42-58, 65-90, 97-122	✓
p	Postnet	Varies	Yes	48-57 Numeric only	
Q / q	UCC/EAN 128	19	Yes	48-57 Numeric only	✓
R / r	UCC/EAN 128 K-Mart non-EDI	18	Yes	48-57 Numeric only	✓
S / s	UCC/EAN 128 Random Weight	34 +	Yes	48-57 Numeric only	✓
T / t	Telepen	Varies	Yes	Alphanumeric	
U	UPS MaxiCode	84	Yes	Alphanumeric	

Table F-1: Bar Code Characteristics

Bar Code ID	Symbology	Length	Checksum	Valid ASCII Characters, decimal value representation	Linear Scanner Supported
u	JPS MaxiCode w/ Byte Count	Specified	Yes	Alphanumeric	
v	FIM	1	No	A, B, C, D	
z	PDF417	Varies	Yes	All	
Z	PDF417 w/ Byte Count	Specified	Yes	All	
W1c	DataMatrix	Varies	Yes	All 8-bit values	
W1C	DataMatrix w/ Byte Count	Specified	Yes	All 8-bit values	
W1d	QR Code – Auto format	Varies	Yes	Alphanumeric	
W1D	QR Code – Manual format	Varies	Yes	Single-byte or Kanji double-byte	
W1f	Aztec	Varies	Yes	All 8-bit values	
W1F	Aztec w/ Byte Count	Specified	Yes	All 8-bit values	
W1G / g	USD-8 (Code 11)	Varies	Yes	45, 48-57	
W1I	EAN 128 w/auto subset switching [2]	Varies	Yes	32-127	✓
W1J	Code 128 w/auto subset switching [2]	Varies	Yes	32-127	✓
W1k	RSS (six types) [2]	Varies	Yes	Numeric / Alphanumeric (type dependant)	
W1R	JCC/EAN Code 128 K-MART NON EDI	18	Yes	48-57 Numeric only	
W1t	TCIF Linked Bar Code 3 of 9 (TLC39)	Varies	Yes	Alphanumeric	
W1z	MicroPDF417	Varies	Yes	All 8-bit values	
W1Z	MicroPDF417 w/ Byte Count	Specified	Yes	All 8-bit values	

[1] Readable with the Linear Scanner Option only when using 'Barcode Count' (see the *I-Class Operator's Manual* for details).
[2] Bar codes available only with display-equipped printer models.

Table F-1: Bar Code Characteristics (continued)

Bar Code Default Widths and Heights

Font	203 DPI Resolutions		300 DPI Resolutions		400 DPI Resolutions		600 DPI Resolutions	
	Height (inches)	Ratio/ Module Size	Height (inches)	Ratio/ Module Size	Height (inches)	Ratio/ Module Size	Height (inches)	Ratio/ Module Size
A	.40	6:2	.40	9:4	.40	12:4	.40	18:6
B	.80	3	.80	4	.80	6	.80	9
C	.80	3	.80	4	.80	6	.80	9
D	.40	5:2	.40	9:4	.40	10:4	.40	15:6
E	.40	2	.40	4	.40	4	.40	6
F	.80	3	.80	4	.80	6	.80	9
G	.80	3	.80	4	.80	6	.80	9
H	.40	6:2	.40	9:4	.40	12:4	.40	18:6
I	.40	6:3	.40	9:4	.40	12:6	.40	18:6
J	.40	5:2	.40	9:4	.40	10:4	.40	15:6
K	.40	5:2	.40	9:4	.40	10:4	.40	15:6
L	1.30	5:2	1.30	9:4	1.30	10:4	1.30	15:6
M	.90	3	.90	4	.90	6	.90	9
N	.80	3	.80	4	.80	6	.80	9
O	.40	6:3	.40	8:4	.40	12:6	.40	18:9
p	.08	N/A	.08	N/A	.08	N/A	.08	N/A
Q	1.40	2	1.40	4	1.40	4	1.40	6
R	1.40	2	1.40	4	1.40	4	1.40	6
S	1.40	2	1.40	3	1.40	4	1.40	6
T	.80	1	.80	1	.80	2	.80	3

Table F-2: Bar Code Default Data

Font	203 DPI Resolutions		300 DPI Resolutions		400 DPI Resolutions		600 DPI Resolutions	
	Height (inches)	Ratio/ Module Size	Height (inches)	Ratio/ Module Size	Height (inches)	Ratio/ Module Size	Height (inches)	Ratio/ Module Size
U/u	1.00	N/A	1.00	N/A	1.00	N/A	1.00	N/A
v	.5	1	.5	1	.5	2	.5	3
z	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Z/z	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
W1C/W1c	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
W1D/W1d	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
W1F/W1f	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
W1I	.40	2	.40	4	.40	4	.40	6
W1J	.40	2	.40	4	.40	4	.40	6
W1k	N/A	2	N/A	3	N/A	4	N/A	6
W1G/W1g	.5	5:2	.5	7:3	.5	9:4	.5	14:6
W1R	1.40	2	1.40	4	1.40	4	1.40	6
W1T	.40	6:2	.40	9:4	.40	12:4	.40	18:6
W1Z/W1z	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table F-2: Bar Code Default Data (continued)

☑ **Note:** Some bar codes will be sensitive to Label Command 'D' (set dot width and height size), see Label Formatting Commands for details.

Appendix

Bar Code Details

Unless noted, all bar codes shown here were produced using the ratio/module values of 00 and height fields of 000 to cause the printer to produce symbols using default bar widths and height fields. See Appendix F for the default values.

A: Code 3 of 9

Valid Characters: 0-9, A-Z, - . * $ / + % and the space character.

Variable Length.

Valid bar widths: The expected ratio of wide to narrow bars can range from 2:1 to 3:1.

The following example prints a code 3 of 9 bar code with a wide to narrow bar ratio of 3:1:

```
<STX>L
D11<CR>
1A000000015010001234567890<CR>
121100000000100Barcode A<CR>
E
```

B: UPC-A

Valid Characters: 0-9

Length: 12 digits. If the user provides 11 digits, the printer will compute the checksum. If the user provides the checksum, the printer will check that it matches the expected checksum. If it does not match, the printer will print out all zeros and the expected checksum. See Appendix P.

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width).

The following example prints a UPC-A bar code:

```
<STX>L
D11<CR>
1B000000015010001234567890<CR>
121100000000100Barcode B<CR>
E
```

C: UPC-E

Valid Characters: 0-9

Length: Seven digits. If the user provides six digits, the printer will compute the checksum. If the user provides the checksum, the printer will check that it matches the expected checksum. If it does not match, the printer will print out all zeros and the expected checksum.

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width).

The following example prints a UPC-E bar code:

```
<STX>L
D11<CR>
1C00000001501000123456<CR>
121100000000100Barcode C<CR>
E
```

D: Interleaved 2 of 5 (I 2 of 5)

Valid Characters: 0-9

Variable Length.

Valid bar widths: The expected ratio of wide to narrow bars can range from 2:1 to 3:1.

The following example prints an Interleaved 2 of 5 bar code with a wide to narrow bar ratio of 3:1:

```
<STX>L
D11<CR>
1D0000000150100012345678900<CR>
121100000000100Barcode D<CR>
E
```

E: Code 128

Valid Characters: The entire 128 ASCII character set.

Variable Length

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times the narrow bar width, 3 times the narrow bar width, and 4 times the narrow bar width).

This printer supports the Code 128 subsets A, B, and C. The printer can be selected to start on any code subset and switch to another within the data stream. The default code subset is B, otherwise the first character (A, B, C) of the data field determines the subset. Subset switching is only performed in response to code switch command. These commands are placed in the data to be encoded at appropriate locations, see Table G-1.

Subset A: Includes all of the standard uppercase alphanumeric keyboard characters plus the control and special characters. To select Code 128 Subset A, place an ASCII A (DEC 65, HEX 41) before the data to be encoded.

Subset B: Includes all of the standard uppercase alphanumeric keyboard characters plus the lowercase alphabetic and special characters. To select Code 128 Subset B, place an ASCII B (DEC 66, HEX 42) before the data to be encoded. If no start character is sent for the Code 128 font, Code 128 Subset B will be selected by default.

Subset C: Includes the set of 100 digit pairs from 00 through 99 inclusive, as well as special characters. Code 128 Subset C is used for double density encoding of numeric data. To select Code 128 Subset C, place an ASCII C (DEC 67, HEX 43) before the data to be encoded. Subset C can only encode an even number of numeric characters. When the data to be encoded includes an odd number of numeric characters, the last character causes the printer to automatically generate a 'switch to subset B' and encode the last character appropriately in subset B.

☑ **Note:** It is recommended to use a B as the first character to prevent an A or C from changing the subset.

Special Character Handling: Characters with an ASCII value greater than 95 are considered special characters. To access these values, a two-character reference table is built into the printer, see table below. As an example, to encode FNC2 into a Code 128 Subset A bar code, send the ASCII & (DEC 38, HEX 26) followed by an ASCII B (DEC 66, HEX 41). Code FNC2 will be encoded.

Example: ATEST&B123 Data Encoded: TEST<FNC2>123

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

Table G-1: Special Character Handling

Control Codes: Control character encoding into Code 128 Subset A by sending these control codes:

`	=	NUL
a through z	=	1 - 26
{	=	ESC
|	=	FS
}	=	GS
~	=	RS
ASCII 127	=	US

The following example prints a Code 128 bar code:

```
<STX>L
D11<CR>
1E000000015010001234567890<CR>
121100000000100Barcode E<CR>
```

```
E
```

F: EAN-13

Valid Characters: 0-9

Length: 13 digits. If the user provides 12 digits, the printer will compute the checksum. If the user provides the checksum, the printer will check that it matches the expected checksum. If it does not match, the printer will print all zeros and the expected checksum. See Appendix P.

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width).

The following example prints an EAN-13 bar code:

```
<STX>L
D11<CR>
1F000000015010001234567890l<CR>
121100000000100Barcode F<CR>
E
```

G: EAN-8

Valid Characters: 0-9

Length: 8 digits. If the user provides 7 digits, the printer will compute the checksum. If the user provides the checksum, the printer will check that it matches the expected checksum. If it does not match, the printer will print all zeros and the expected checksum.

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width).

The following example prints an EAN-8 bar code:

```
<STX>L
D11<CR>
1G00000001501000123456<CR>
121100000000100Barcode G<CR>
E
```

H: Health Industry Bar Code (HBIC) (Code 39 bar code with a modulo 43 checksum)

Valid Characters: 0-9, A-Z, -$ /. %

Variable Length.

Valid bar widths: The expected ratio of wide to narrow bars can range from 2:1 to 3:1.

The host must supply leading "+"'s

The following example prints a HBIC bar code with a wide to narrow bar ratio of 3:1:

```
<STX>L
D11<CR>
1H0000000150050+0123456789<CR>
121100000000100Barcode H<CR>
E
```

I: Codabar

Valid Characters: 0-9, A-D, -, ., $, :, /, + (comma is not valid).

Variable Length but requires at least three characters.

Valid bar widths: The expected ratio of wide to narrow bars can range from 2:1 to 3:1.

Valid Codabar symbols require start and stop characters (A–D). These characters should be placed in the data field along with other data to be included in the symbol.

The following example prints a Codabar bar code with a wide to narrow bar ratio of 3:1:

```
<STX>L
D11<CR>
1I63040001501000A1234567890D<CR>
121100000000100Barcode I<CR>
E
```

J: Interleaved 2 of 5 with a modulo 10 checksum.

Valid Characters: 0-9

Variable Length.

Valid bar widths: The expected ratio of wide to narrow bars can range from 2:1 to 3:1.

The following example prints an Interleaved 2 of 5 bar code with a modulo 10 checksum added and with a wide to narrow bar ratio of 3:1:

```
<STX>L
D11<CR>
1J000000015010001234567890<CR>
121100000000100Barcode J<CR>
E
```

K: **Plessey**

Valid Characters: 0-9

Length: 1 to 14 digits

Valid bar widths: The expected ratio of wide to narrow bars can range from 2:1 to 3:1.

If a + character is the last data character, an additional MSI checksum will be added to the bar code in place of the + character.

The following example prints a Plessey bar code with a wide to narrow bar ratio of 3:1:

```
<STX>L
D11<CR>
1K0000000150100012345678900<CR>
121100000000100Barcode K<CR>
E
```

L: Interleaved 2 of 5 with a modulo 10 checksum and shipping bearer bars.

Valid Characters: 0-9

Variable Length: For the bearer bars to be printed, 14 characters are required.

Valid bar widths: The expected ratio of wide to narrow bars can range from 2:1 to 3:1.

The following example prints an Interleaved 2 of 5 bar code with a modulo 10 checksum with a wide to narrow bar ratio of 3:1 and bearer bars:

```
<STX>L
D11<CR>
1L00000001501000123456789012<CR>
121100000000100Barcode L<CR>
E
```

M: 2-digit UPC addendum

Valid Characters: 0-9

Length: 2 digits.

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width). Human readable characters for this bar code symbology are printed above the symbol.

The following example prints a 2 digit UPC bar code addendum:

```
<STX>L
D11<CR>
1M0000000015010042<CR>
121100000000100Barcode M<CR>
E
```

N: 5-digit UPC addendum

Valid Characters: 0-9

Length: 5 digits.

Valid bar widths: The width multiplier is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width). Human readable characters for this bar code symbology are printed above the symbol.

The following example prints a 5 digit UPC bar code addendum:

```
<STX>L
D11<CR>
1N000000015010001234<CR>
121100000000100Barcode N<CR>
E
```

O: Code 93

Valid Characters: 0-9, A-Z, -.$/+% and the space character.

Variable Length.

Valid bar widths: The width multiplier is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width).

The following example prints a Code 93 bar code:

```
<STX>L
D11<CR>
1O00000000150100Datamax42<CR>
121100000000100Barcode O<CR>
E
```

p: Postnet

Valid Characters: 0-9

Length: 5, 9 or 11 digits

Valid bar widths: The width and height multiplier values of 00 will produce a valid Postnet symbol.

Usage: The bar code height field is ignored since the symbol height is United States Postal Service specific. This bar code is to display the zip code on a letter or package for the US Postal Service.

The following example prints a Postnet bar code:

```
<STX>L
D11<CR>
1p000000015010032569<CR>
121100000000100Barcode p<CR>
E
```

Q: UCC/EAN Code 128

Valid Characters: 0-9

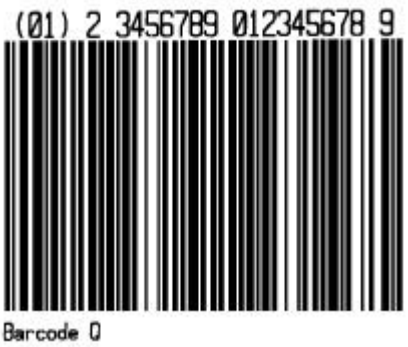
Length: 19 digits.

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width). Human readable characters for this bar code symbology are printed above the symbol.

The printer spreads a weighted module 103 check sum.

The following example prints a UCC/EAN Code 128 bar code:

```
<STX>L
D11<CR>
1Q00000001501000123456789012345678<CR>
121100000000100Barcode Q<CR>
E
```



R: UCC/EAN Code128 K-MART NON EDI

Valid Characters: 0-9

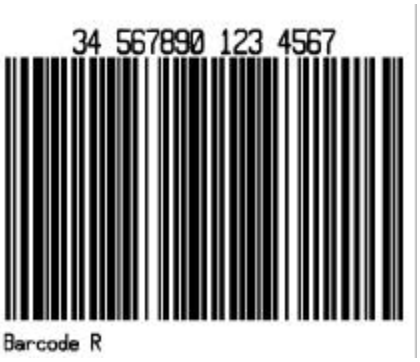
Length: 18 digits

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width). Human readable characters for this bar code symbology are printed above the symbol. (See W1R for an alternate.)

This bar code is set up according to K-MART specifications.

The following example prints a KMART bar code.

```
<STX>L
D11<CR>
1R0000000150100012345678901234567<CR>
121100000000100Barcode R<CR>
E
```



S: UCC/EAN Code 128 Random Weight

Valid Characters: 0-9

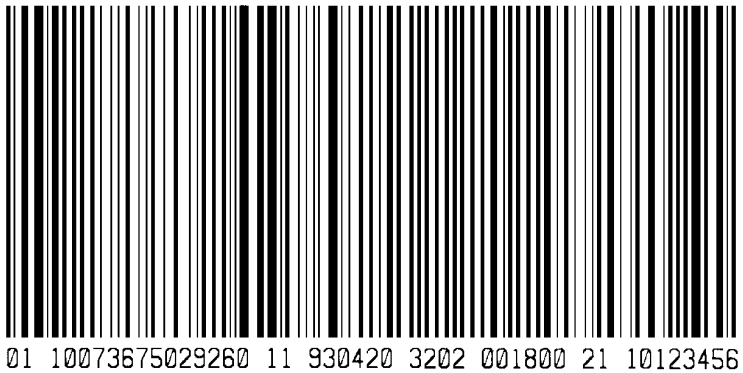
Length: At least 34 digits.

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width).

This bar code is commonly used by the food and grocery industry.

The following example prints a UCC/EAN Code 128 Random Weight bar code:

```
<STX>L
D11<CR>
1S0000000150050011007367502926011930420320200180021101234567<CR>
121100000000100Barcode S<CR>
E
```



Barcode S

T: Telepen

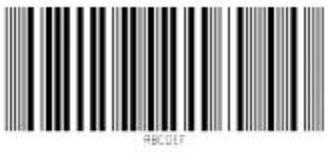
Valid Characters: All 128 ASCII characters.

Variable Length

Valid bar widths: The fourth character of the record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, and 4 times the narrow bar width).

The following example prints a Telepen bar code:

```
<STX>L
D11<CR>
1T0000000150100ABCDEF<CR>
121100000000100Barcode T<CR>
E
```



Barcode T

u: UPS MaxiCode (Modes 2&3)

The printer supports MaxiCode as defined in the AIM Technical Specification. The following examples illustrate various label format record message syntaxes for encoding data as MaxiCode. In the following examples, special formatting is used to denote special ASCII characters as shown:

Symbol	Hexadecimal Value
$^{R}_{S}$	1E
$^{G}_{S}$	1D
$^{E}O_{T}$	04

Printer message syntax allows for $^{E}O_{T}$ to be substituted with <CR> or the use of both $^{E}O_{T}$ and <CR>.

UPS Modes 2 & 3 Explicit

The data stream can force Mode 2 or 3 encoding by placing #2 or #3, respectively, before the data, as shown in the example below. If this is not specified, the printer chooses the best mode.

1u0000001200120**#3**[)>$^{R}_{S}$01$^{G}_{S}$96**123456**$^{G}_{S}$068$^{G}_{S}$001$^{G}_{S}$1Z12345675$^{G}_{S}$UPSN$^{G}_{S}$12345E$^{G}_{S}$0
89$^{G}_{S}$$^{G}_{S}$1/1$^{G}_{S}10.1^{G}_{S}Y^{G}_{S}$$^{G}_{S}$$^{G}_{S}UT^{R}_{S}$$^{E}O_{T}$

This example will print encoding the MaxiCode symbol in Mode 3.

```
<STX>L
D11<CR>
```
1u0000001200120**#3**[)>$^{R}_{S}$01$^{G}_{S}$96**123456**$^{G}_{S}$068$^{G}_{S}$001$^{G}_{S}$1Z12345675$^{G}_{S}$UPSN$^{G}_{S}$12345E$^{G}_{S}$0
89$^{G}_{S}$$^{G}_{S}$1/1$^{G}_{S}10.1^{G}_{S}Y^{G}_{S}$$^{G}_{S}$$^{G}_{S}UT^{R}_{S}$$^{E}O_{T}$
```
121100000000100Barcode u<CR>
E
```

Where:

#3	Forces Mode 3 encoding	
[)>$^{R}_{S}$01$^{G}_{S}$96	Message Header	
123456	Maximum 9 alphanumeric ASCII, postal code	Primary Message
068	Country Code	
001	Class	
$^{G}_{S}$1Z1...		Secondary Message
...T$^{R}_{S}$E$^{E}_{S}$O$_{T}$		

UPS 3.0 Examples

In the UPS 3.0 protocol examples that follow, Primary Message control characters $^{G}_{S}$ will not be encoded in the MaxiCode symbol. All characters, the Secondary Message, with the exception of the leading $^{G}_{S}$, in are encoded.

An example of the UPS 3.0 zip + 4 with Message data format and message header:

1u0000001200120[)>$^{R}_{S}$01$^{G}_{S}$96**84170**6672$^{G}_{S}$**840**$^{G}_{S}$**001**$^{G}_{S}$1Z12345675$^{G}_{S}$UPSN$^{G}_{S}$12345E$^{G}_{S}$089$^{G}_{S}$$^{G}_{S}$1/1$^{G}_{S}10.1^{G}_{S}Y^{G}_{S}$$^{G}_{S}$$^{G}_{S}UT^{R}_{S}E^{E}_{S}O_{T}$

Where:

[)>$^{R}_{S}$01$^{G}_{S}$96	Message Header	
841706672	Maximum 9 alphanumeric ASCII, postal code	Primary Message
840	Country Code	
001	Class	
$^{G}_{S}$1Z1...		Secondary Message
...T$^{R}_{S}$E$^{E}_{S}$O$_{T}$		

An example of the UPS 3.0 international postal "V6C3E2" with Message data format and message header:

1u0000001200120[)>$^{R}_{S}$01$^{G}_{S}$96**V6C3E2**$^{G}_{S}$**068**$^{G}_{S}$**001**$^{G}_{S}$1Z12345675$^{G}_{S}$UPSN$^{G}_{S}$12345E$^{G}_{S}$089$^{G}_{S}$$^{G}_{S}$1/1$^{G}_{S}10.1^{G}_{S}Y^{G}_{S}$$^{G}_{S}$$^{G}_{S}UT^{R}_{S}E^{E}_{S}O_{T}$

Where:

[)>$^{R}_{S}$01$^{G}_{S}$96	Message Header	
V6C3E2	Maximum 6 alphanumeric ASCII, international zip code	Primary Message
068	Country Code	
001	Class	
$^{G}_{S}$1Z1...		Secondary Message
...T$^{R}_{S}$E$^{E}_{S}$O$_{T}$		

An example of the UPS 3.0 international zip "V6C3E2" without Message data format and message header:

1u0000001200120**V6C3E2**$^{G}_{S}$**068**$^{G}_{S}$**001**$^{G}_{S}$1Z12345675$^{G}_{S}$UPSN$^{G}_{S}$12345E$^{G}_{S}$089$^{G}_{S}$$^{G}_{S}$1/1$^{G}_{S}10.1^{G}_{S}Y^{G}_{S}$$^{G}_{S}$$^{G}_{S}UT^{R}_{S}E^{E}_{S}O_{T}$

Where:

V6C3E2	Maximum 6 alphanumeric ASCII, international zip code	Primary Message
068	Country Code	
001	Class	
[GS]1Z1...		Secondary Message
...T[RS][ES]O[T]		

An example of the UPS 3.0 zip + 4 "32707-3270" without Message data format and message header:

1u0000001200120**32707**3270[GS]**068**[GS]**001**[GS]1Z12345675[GS]UPSN[GS]12345E[GS]089[GS][GS]1/1[GS]10.1[GS]Y[GS][GS][GS]UT[RS][ES]O[T]

Where:

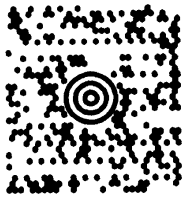
32707	5 digit ASCII, Zip code	Primary Message
3270	4 digit ASCII, +4 Zip code (not required)	
068	Country Code	
001	Class	
[GS]1Z1...		Secondary Message
...T[RS][ES]O[T]		

U: UPS MaxiCode (Modes 2&3) with Byte Count Specifier

Specified Length – The upper case U identifies a UPS MaxiCode bar code with a 4-digit string length specifier. This allows values 0x00 through 0xFF to be included within the data strings without conflicting with the DPL format record terminators. The four-digit decimal data byte count immediately follows the 4-digit column position field. This value includes all of the data following the byte count field, but does not include itself.

```
<STX>L
D11<CR>
1U00000010001000051327895555840666this package<0x0D>is going to
Datamax<CR>
121100000000100Barcode U<CR>
E
```

From the example above, the bar code's data stream, 1U00000010001000**0051**327895555840666this package<0x0D>is going to Datamax, now includes a Byte Count Specifier (the portion in bold), where 0051 equals the four-digit decimal data byte count and includes all bytes that follow until the end of the bar code data. Field termination is set by the byte count. <STX>, <CR>, and <0x0D> all represent single byte values of hexadecimal 02, 0D, and 0D, respectively. The UPS MaxiCode bar code produced encodes "327895555840666this package<CR>is going to Datamax", and prints a line of text: Barcode U.



Barcode U

v: FIM

Valid Characters: A, B, C, or D

Length: 1 character

Valid bar widths: The width and height multiplier works the same as for fonts on this bar code.

This bar code is used to display the Facing Identification Mark (FIM) that is carried on certain types of letter mail for the U S Postal Service:

FIM A: Courtesy reply mail with Postnet.

FIM B: Business reply, penalty or franked mail without Postnet.

FIM C: Business reply, penalty or franked mail with Postnet.

FIM D: OCR readable mail without Postnet (typically for envelopes with a courtesy reply window).

The following example prints an FIM A bar code:

```
<STX>L
D11<CR>
1v00000000150100A<CR>
121100000000100Barcode v<CR>
E
```

z : PDF-417

Valid Characters: All ASCII characters.

Variable Length – This two dimensional bar code holds large amounts of data in a small area, while providing a high level of redundancy and error checking, if specified.

```
<STX>L
D11<CR>
1z00000000150100F1000000PDF417<CR>
121100000000100Barcode z<CR>
E
```

The example above prints a normal, security level one, PDF-417 bar code with a 1:2 aspect ratio and best-fit rows and columns. The (bolded) bar code's data stream 1z0000000150100F1000000PDF417**<CR>** decodes as follows:

Example Data	Explanation
F	1-character specifying a normal or truncated bar code (T to truncate, F for normal).
1	1-digit security level ranging from 0 to 8.
00	2-digit aspect ratio specified as a fraction, with the first digit being the numerator and the second digit the denominator. Use “00” for the default ratio of 1:2. Valid range is from “00” to “99.”
00	2-digit number specifying the number of rows requested. Use “00” to let the printer find the best fit. Valid range is from “03” to “90”. Row values less than 3 are set to 3, while row values greater than 90 are set to 90.
00	2-digit number specifying the number of columns requested. Use “00” to let the printer find the best fit. Valid range is from “01” to “30”. Column values greater than 30 are set to 30.
PDF417	The data stream to be encoded.
<CR>	Terminates the data stream.

☑ **Note:** Format Record header fields c and d should both be zero.

Z: PDF-417 with Byte Count Specifier

Specified Length – The upper case Z identifies a PDF-417 bar code with a string 4-digit length specifier. This allows values 0x00 through 0xFF to be used within the data strings without conflicting with the DPL format record terminators. The four-digit decimal data byte count immediately follows the 4-digit column position field. This value includes all of the data following the byte count field, but does not include itself.

```
<STX>L
D11<CR>
1Z000000015010000015F1000000pdf<0x0D>417<CR>
121100000000100Barcode Z<CR>
E
```

Barcode Z

From the example above, the bar code’s data stream,
1Z000000015010**0015**F1000000pdf<CR>417, now includes a Byte Count Specifier (the portion in bold), where 0015 equals the four-digit decimal data byte count and includes all bytes that follow until the end of the bar code data. Field termination is set by the byte count. <STX>, <CR>, and <0x0D> all represent single byte values of hexadecimal 02, 0D, and 0D, respectively. The PDF-417 bar code produced encodes “pdf<CR>417”, and prints a line of text: Barcode Z.

W1c: DataMatrix

Valid Characters: Any 8-bit byte data

Variable Length

DataMatrix is a two-dimensional matrix symbology, which is comprised of square modules arranged within a perimeter finder pattern. There are two basic types: ECC 000-140 and ECC 200.

ECC 000 - 140 symbols:

These square symbols can be any odd sizes from 9x9 to 49x49, which may be specified in fields iii, and jjj. If an ECC 000-140 symbol is specified with even numbers of rows or columns, the next largest odd value will be used. Input values greater than 49 or less than 9 will cause the symbol to be automatically sized for the input character stream. The record format is shown here, expanded with spaces.

```
a W b[b] c d eee ffff gggg hhh i jjj kkk ll...l
```

Where:

Field	Valid Inputs	Meaning
a	1,2,3, and 4	Rotation
W	W	Fixed value, extended bar code set
b[b]	1c, 1c	Selects DataMatrix the Bar code - the two differing values have no other significance.
c	1 to 9 and A to O	Module size horizontal multiplier
d	1 to 9 and A to O	Module size vertical multiplier
eee	000 to 999	No Effect; Must be numeric
ffff	0000 to 9999	Label position, row
gggg	0000 to 9999	Label position, column
hhh	000, 050, 080, 100 140	A 3-digit convolutional error correction level. If any number other than one of these options is entered then the nearest lesser value from the valid entries is used. Example: Selecting an ECC value of 099 will cause the actual ECC value of 080 to be used.
i	0 - 6	1 digit format identification: 0 - Automatically choose the encodation scheme based on the characters to be encoded. 1 - Numeric data. 2 - Upper-case alphabetic. 3 - Upper-case alphanumeric and punctuation characters (period, comma, hyphen, and slash). 4 - Upper-case alphanumeric. 5 - ASCII, the full 128 ASCII character set. 6 - Any 8-bit byte. If a format identifier is selected which will not encode the input character stream then the bar code symbol will not be printed. It is recommended to use the auto-encodation format identification since it will select the best possible encodation scheme for the input stream.

Table G-2: DataMatrix ECC 000 – 140 Record Structure

ECC 200 symbols:

There are 24 square symbol sizes available, with both row and column dimensions, which may be specified in fields iii, and jjj, measured in modules as indicated in the following list - 10, 12, 14, 16, 18, 20, 22, 24, 26, 32, 36, 40, 44, 48, 52, 64, 72, 80, 88, 96, 104, 120, 132, and 144. If an ECC 200 symbol is specified with odd numbers of rows or columns, the next largest even value will be used. Input values greater than 144 or less than 10 will cause the symbol to be automatically sized for the input character stream. The record format is shown here, expanded with spaces.

```
a W b[b] c d eee ffff gggg hhh i jjj kkk ll...l
```

Where:

Field	Valid Inputs	Meaning
a	1,2,3, and 4	Rotation
W	W	Fixed value, extended bar code set
b[b]	c, 1c	Selects DataMatrix the Bar code - the two differing values have no other significance.
c	1 to 9 and A to O	module size horizontal multiplier
d	1 to 9 and A to O	module size vertical multiplier
eee	000 to 999	No Effect; Must be numeric
ffff	0000 to 9999	label position, row
gggg	0000 to 9999	label position, column
hhh	200	ECC 200 uses Reed-Solomon error correction.
i	0	Fixed value, not used
jjj	10, 12, 14, 16, 18, 20, 22, 24, 26, 32, 36, 40, 44, 48, 52, 64, 72, 80, 88, 96, 104, 120, 132, 144	A 3 digit even number (or 000) of rows requested. 000 causes rows to be automatically determined. The symbol will be sized to a square if the rows and columns do not match by taking the larger of the two values.
kkk	10, 12, 14, 16, 18, 20, 22, 24, 26, 32, 36, 40, 44, 48, 52, 64, 72, 80, 88, 96, 104, 120, 132, 144	A 3 digit even number (or 000) of columns requested. 000 causes columns to be automatically determined. The symbol will be sized to a square if the rows and columns do not match by taking the larger of the two values.
ll...l	8-bit data	Data to be encoded in the symbol

Table G-3: DataMatrix ECC 200 Record Structure

Example:

```
<STX>L
D11<CR>
1W1c4400001000100200000000DATAMAX<CR>
121100000000100Barcode W1c<CR>
E
```

Barcode W1c

W1C: DataMatrix with Byte Count Specifier

Specified Length – The upper case C identifies a DataMatrix bar code with a string 4-digit length specifier. This allows values 0x00 through 0xFF to be included within the data strings without conflicting with the DPL format record terminators. The four-digit decimal data byte count immediately follows the four-digit column position field. This value includes all of the data following the byte count field, but does not include itself.

```
<STX>L
D11<CR>
1W1C44000010001000029200000000Datamax<0x0D>prints best<CR>
121100000000100Barcode W1C<CR>
E
```

From the example above, the bar code's data stream, `1W1C44000010001000**29**2000000000 Datamax<0x0D>prints best`, includes a Byte Count Specifier (the portion in bold), where 0029 equals the four-digit decimal data byte count and includes all bytes that follow until the end of the bar code data. Field termination is set by the byte count. `<STX>`, `<CR>`, and `<0x0D>` all represent single byte values of hexadecimal 02, 0D, and 0D, respectively. The DataMatrix bar code produced encodes "Datamax<CR>prints best", and prints a line of text: Barcode W1C.

Barcode W1C

W1d / W1D: QR Code

Valid Characters: Numeric Data, Alphanumeric Data, 8-bit byte data, and Kanji characters

Variable Length: The two-dimensional bar code (as documented in AIM, Version 7.0).

Syntax: `a W1 b c d eee ffff gggg hh…h`

Where:

Field	Valid Inputs	Meaning
a	1,2,3 and 4	Rotation
W1	W1	Fixed value, extended bar code set
b	D and d	Selects the QR bar code formatting mode, where: D = Manual formatting. Allows the data string (hh…h) to be entered with a comma (,) as a field separator; fields are optional per QR Code specifications, and the first field indicates Model 1 or Model 2 QR Code (Model 2 is the default). d = Automatic formatting. Allows the data string (hh…h) to be data only.
c	1 to 9 and A to O	Module size horizontal multiplier Each cell in the bar code is square, therefore 'c' and 'd' must be equal. Depending on the conversion mode (<STX>n or <STX>m), each unit indicates a cell dimension of .01 inch or .1 mm.
d	1 to 9 and A to O	Module size vertical multiplier. (See explanation for 'c', above.)
eee	000 to 999	No effect; must be numeric
ffff	0000 to 9999	Label position, row
gggg	0000 to 9999	Label position, column (see Appendix J)
hh…h	Valid ASCII character string, followed by (a) termination character(s).	QR Code data string (see Generation Structure, below).

Generation Structure

The data input structure (hh…h) is as follows:

Auto Format (W1d)

With bar code identifier 'd', the data begins after the last character of the column position field, and does not include any command characters. The data string is terminated with a termination character, usually a 0x0d hex that occurs twice in succession. The bar code symbol will have the following characteristics:

1. Model 2
2. Error Correction Code Level = 'M' (Standard Reliability Level)
3. Mask Selection = Automatic
4. Data Input Mode = Automatic [1]

Example:

```
<STX>L
D11<CR>
1W1d4400000100010This is the data portion<CR><CR> [3]
121100000000100Barcode W1D<CR>
E
```

(Two termination characters required.)

Manual Formatting (W1D)

With bar code identifier 'D', minor changes allow flexibility for data entry. (Spaces have been added for readability.)

`[q,] [e [m] i,]  cdata cdata cdata…cdata term` [2]

Where:

Field	Valid Inputs	Meaning
q	1, 2	QR Code Model number, optional. Model 2 is the default.
e	H, Q, M, L	Error Correction Level (Reed-Solomon) – Four levels allowing recovery of the symbol codewords: H = Ultra Reliability Level (30%) Q = High Reliability Level (25%) M = Standard Reliability Level (15%) L = High Density Level (7%)
m	0 – 8, none	Mask Number, optional: None = Automatic Selection 0-7 = Mask 0 to Mask 7 8 = No Mask
I	A, a, M, m	Data Input Mode: A = Automatic setting, ASCII [1] a = Automatic, hex-ASCII [1] M = Manual Setting, ASCII[2] m = manual, hex-ASCII[2]
cdata	N, A, B, K immediately followed by data	Character Mode: N = Numeric, N data A = Alphanumeric, A data B = Binary , Bnnnn data (where nnnn = data byte-count, 4 decimal digits; byte-count /2 for hex-ASCII K = Kanji, K data
term	<CR>, <CR><CR> [3]	The data string is terminated with a termination character, generally a 0x0d hex, but can be changed by the operator. If the Data Input Mode is Automatic, the data string is terminated with two successive termination characters.

[1] When Data Input Mode = Automatic – Kanji data cannot be used; Manual data input is required.

[2] When using manual formatting commas are required between format fields and data types.

[3] <CR> represents the line termination character as defined by the current control code set or after use of `Txx`, line field terminator label format command.

If HEX/ASCII mode is selected in manual Data Input Mode, only the data for Kanji or Binary data types will be converted, therefore the other data types and all command characters must be entered in ASCII format. If HEX/ASCII is selected in automatic Data Input Mode, all of the data must be entered in HEX/ASCII format.

Data Append Mode String Format, Manual Formatting – Bar Code W1D

```
D aa tt pp I
```

Where:

Field	Valid Inputs	Meaning
D	D	Data Append Mode String Format indicator
aa	00, 99	QR Code Number in Append Series, 2 decimal digits
tt		Total number of QR Codes in series, 2 decimal digits
pp		Value of Parity, 2 digits, 8 LSBs of data parity
e	H, Q, M, L	As above
m	0 – 8, none	As above
i	A, a, M, m	As above
cdata	N, A, B, K immediately followed by data	As above
term	<CR>, <CR><CR>	As above

Characteristics

Models:

Model 1 (original version), bar code versions 1 through 14

A. ECC Levels ‘H’, ‘M’, ‘Q’, and ‘L’
B. Mask Selection Automatic or 0 through 8
C. Data Input Modes Automatic and Manual
D. Data Append Mode

Model 2 (enhanced version), bar code versions 1 through 40

A. ECC Levels ‘H’, ‘M’, ‘Q’, and ‘L’
B. Mask Selection Automatic or 0 through 8
C. Data Input Modes Automatic and Manual
D. Data Append Mode

Representation of data:

Dark Cell = Binary 1
Light Cell = Binary 0

Symbol Size (not including quiet zone, 4 cells on each of the 4 sides):

Model 1: 21 X 21 cells to 73 X 73 cells (Versions 1 to 14, increase in steps of 4 cells per side)

Model 2: 21 X 21 cells to 177 X 177 cells (Versions 1 to 40, increase in steps of 4 cells per side)

Data Characters per symbol (maximum for symbol size):

Numeric Data
Model 1; Version 14; ECC = L: 1,167 characters
Model 2; Version 40; ECC = L: 7,089 characters

Alphanumeric Data
Model 1; Version 14; ECC = L: 707 characters
Model 2; Version 40; ECC = L: 4,296 characters

Binary Data
Model 1; Version 14; ECC = L: 486 characters
Model 2; Version 40; ECC = L: 2,953 characters

Kanji Data
Model 1; Version 14; ECC = L: 299 characters
Model 2; Version 40; ECC = L: 1,817 characters

Code Type: Matrix

Orientation Independence: Yes

Example

```
<STX>L
D11<CR>
1W1D44000001000102HM,AThis is the data portion also
with binary,B0003<0xfe><0xca><0x83><0x0D>
121100000000100Barcode W1D<CR>
E
```

Barcode W1D

Where:

QR Code bar code, Cell Size = 0.1 inch square, positioned at X =. 1” and Y = .1”, ECC=H, Mask = Automatic, Data Input Mode = Manual.

Other examples:

DPL field record, QR Code bar code, Cell Size = 0.04 inch square, positioned at X = .1” and Y = .1”, ECC = H, Mask = 3, Data Input Mode = Manual:

```
1W1D4400000100010H3M,AThis is the data portion also with
binary,B0003<0xfe><0xca><0x83><0x0D>
```

DPL field record, QR Code bar code, Cell Size = 0.08 inch square, positioned at X = .1” and Y = .1”, ECC = L, Mask = Automatic, Data Input Mode = Manual - Kanji:

```
1W1D88000001000102,LM,K<0x81><0x40><0x81><0x41><0x81><0x42><0x0
D>
```

DPL field record, QR Code bar code, Cell Size = 0.04 inch square, positioned at X = .1” and Y = .1”, ECC = L, Mask = Automatic, Data Input Mode = Manual - Kanji (in Hex/ASCII format):

```
1W1D4400000100010L8m,K814081418142<0x0D>
```

DPL field record, QR Code bar code, Cell Size = 0.01 inch square, positioned at X = .1” and Y = .1”, ECC = M, Mask = Automatic, Data Input Mode = Automatic:

```
1W1d1100000100010Pallet 35FGA, Box 55367, Datamax Corp,
Orlando, Florida 32707<0x0D><0x0D>
```

W1f / W1F: Aztec

Valid Characters: All ASCII characters, depending upon the selected options.

Variable Length (W1f): This two dimensional bar code holds a large amount of data in a small area and can provide a high level of error checking.

Specified Length (W1F): With a string four-digit length specifier, values 0x00 through 0xFF to be included within the data strings without conflicting with the DPL format record terminators.

Syntax: `a W1 b c d eee ffff gggg [hhhh] i jjj kk…k`

Where:

Field	Valid Inputs	Meaning
`a`	1,2,3, and 4	Rotation
`W1`	W1	Fixed value, extended bar code set
`b`	f and F	Lowercase selects the Aztec bar code, variable length Uppercase selects the Aztec bar code with a Byte Count Specifier
`c`	0 to 9 and A to O	Module size horizontal multiplier, 0 = default size. The c/d module size parameters should be equal to produce a square symbol. When the label command (Dwh) is used to generate larger text, then c and d may be used to compensate and ensure a square symbol.
`d`	0 to 9 and A to O	Module size vertical multiplier, 0 = default size (See explanation for 'c', above.)
`eee`	000	No Effect
`ffff`	0000 to 9999	Label position, row
`gggg`	0000 to 9999	Label position, column
`[hhhh]`	0000 to 9999	Optional string length specifier. Field termination is set by this byte count. This decimal value includes all of the data following this byte count field, but does not include itself.
`i`	0, 1	Extended Channel Interpretation (ECI) mode; 0 = Disabled, 1 = Enabled
`jjj`	000 to 300	Error Correction (EC) / Amount (see table below), where: 000 – Default EC, approximately 23% 001 – 099 EC fixed value, expressed as a percent. 101 – 104 Compact core, 1 to 4 layers respectively. 201 – 232 Full size core, 1 to 32 layers respectively. 300 – Rune format, encodes three ASCII decimal digits 0-256; scanner decode output is decimal number 0-256
`kk…k`	8-bit data, followed by a termination character	Data to be encoded.

The error correction or size selection determines the symbol size and other characteristics of the symbol, as shown in the following table. Attempting to encode more data that has been made available will result in no symbol printed.

Error Correction (EC) / Size Implications					
jjj	**Symbol Size**[1]	**Symbol Format**	**Maximum**[2] **Binary Data Bytes**	**Maximum**[2] **Alphabetic Characters**	**Maximum**[2] **Numeric Characters**
000	variable	data dependant	1914	3067	3832
001 to 099	variable	data and EC dependant	1914	3067	3832
101	15	compact	6	12	13
102	19	compact	19	33	40
102	19	compact	19	33	40
103	23	compact	33	57	70
104	27	compact	53	89	110
201	19	full size	8	15	18
202	23	full size	24	40	49
203	27	full size	40	68	84
204	31	full size	62	104	128
205	37	full size	87	144	178
206	41	full size	114	187	232
207	45	full size	145	236	294
208	49	full size	179	291	362
209	53	full size	214	348	433
210	57	full size	256	414	516
211	61	full size	298	482	601
212	67	full size	343	554	691
213	71	full size	394	636	793
214	75	full size	446	718	896
215	79	full size	502	808	1008
216	83	full size	559	900	1123
217	87	full size	621	998	1246
218	91	full size	687	1104	1378
219	95	full size	753	1210	1511
220	101	full size	824	1324	1653
221	105	full size	898	1442	1801
222	109	full size	976	1566	1956
223	113	full size	1056	1694	2116
224	117	full size	1138	1826	2281
225	121	full size	1224	1963	2452
226	125	full size	1314	2107	2632
227	131	full size	1407	2256	2818
228	135	full size	1501	2407	3007
229	139	full size	1600	2565	3205
230	143	full size	1702	2728	3409
231	147	full size	1806	2894	3616
232	151	full size	1914	3067	3832
300	11	Rune	1	1	1

[1] Measured in module size x, assuming default module size (cd=00).

[2] Maximum sizes are approximate and data dependant, and may be less than indicated.

Table G-4: Aztec Characteristics Index

Error Correction

Size 001 to 099: This value specifies the percent of symbol code words to be used for error correction. Actual error correction word percentage will vary depending on data. The default value, approximately 23%, is recommended. Any other value may be selected to meet the user's needs. Some minimum-security codeword may be generated depending on the data sent for encoding,

particularly when the volume of that data is small. It the data capacity is exceeded no symbol is printed.

Size 101 to 104: Values 101 through 104 result in 1 through 4 layers (two modules thick) respectively, around the center finder pattern. Data volume constraints apply as indicated in the table above. Symbols will be of the compact form. All available codeword will be used for error correction. It the data capacity is exceeded no symbol is printed.

Size 201 to 232: Values 201 through 232 result in 1 through 32 layers (two modules thick) respectively, around the center finder pattern. Data volume constraints apply as indicated in the table above. Symbols will be of the full-size form. All available codewords will be used for error correction. It the data capacity is exceeded no symbol is printed.

Size 300: Value 300 informs the printer that the data, which follows will be used to encode one RUNE symbol. The data consists of one to three ASCII digits with value range of 0 to 256. The data may include leading zeros. Data streams longer than three digits or data that includes non-numeric characters may have unpredictable results.

Extended Channel Interpretation Mode: A value of 1 provides for extended channel codewords to be inserted into the bar code symbol, using escape sequences in the datastream. This mode also provides for effective Code 128 and UCC/EAN 128 emulations, when used in with appropriately configured bar code readers. The valid values for escape sequences are of the form <ESC>n, where:

<ESC> – 1 byte with value $27_{10} = 1B_{16}$
n – 1 ASCII digit, range 0 through 6

These escape sequences are encoded as FLG(n) character pairs described in the International Symbology Specification – Aztec Code, AIM, 1997-11-05, and the meanings of the values for n are the same in both.

<ESC>0 – Is encoded as FLG(0), and interpreted as FNC1 or <$^{G}_{S}$> depending on its location in the data stream. The printer does not validate <ESC>0 locations in the data stream.

When <ESC>0 is the leading data in the stream, it is interpreted as a FNC1 as used in the Code 128 symbology, and specifically for UCC/EAN 128 applications. For appropriately configured scanners this will be interpreted/transmitted as a]C1 symbology identifier preamble. The printer does not validate UCC/EAN 128 data syntax.

When <ESC>0 follows a single alphabetic or two numeric characters respectively, then it also interpreted as a FNC1. For appropriately configured scanners this would be interpreted/transmitted as a]C2 symbology identifier preamble, and the alpha or numeric characters preceding the FNC1 are Application Indicators assigned by AIM International. The printer does not check AI validity.

When <ESC>0 is anywhere else in the data stream, a <$^{G}_{S}$> replaces it in the bar code symbol, as with UCC/EAN 128 field separators.

<ESC>n – Is encoded as FLG(n), and is interpreted as signaling Extended Channel Interpretation. When the value of n is from 1 to 6, it signals that the following n digits comprise an extended channel identifier for use with ECI compliant bar code scanners. An erroneous bar code symbol may result from failing to follow <ESC>n with n digits. Any <ESC>0 following <ESC>n and not within the n digits will be encoded as FLG(0). In the context of a FLG(n), any backslash '\' (92_{10}) will be interpreted by the scanner as two backslashes '\\'.

Example 1: The variable length example encodes "AZTEC" with no ECI input, and 23% error correction, and prints the bar code. A line of text is also printed.

```
<STX>L
D11<CR>
1W1f00000001501000000AZTEC<CR>
1211000000000100Barcode W1f<CR>
E
```

Barcode W1f

Example 2: The specified length example includes a byte count field for all bytes that follow until the end of the bar code data. The byte count is 17. The symbology encodes "AZTEC<CR>barcode", and prints the bar code. Notice that a <CR> does not terminate the bar code format record. A line of text is also printed.

```
<STX>L
D11<CR>
1W1F000000015010000170000AZTEC<0x0D>barcode
1211000000000100Barcode W1F<CR>
E
```

Barcode W1F

Functions Not Supported

- Structured Append
- Reader Initialization Symbol Generation
- Module shaving

W1g / W1G: USD-8 (Code 11)

Valid Characters: 0-9,-

Bar Code Data String Length: Variable, typical max 41 characters

Non-Human Readable: W1g
Human Readable: W1G

USD-8 (Code 11) is a bar code which encodes the ten digits and the dash (-) character. An additional character serves as the start and stop indicator. Each character has three bars and two spaces for a total of five elements. Of these five elements, two are of medium width and three are narrow, except for the “0”, “9”, and “-“ characters, which have only one wide element and four narrow elements.

The narrow bar size is specified in DPL by the narrow bar parameter, the medium is specified in DPL by the wide bar parameter and the wide bar is fixed at 2 times the medium bar minus the narrow bar.

DPL calculates two checksum characters, C and K, and automatically places them prior to the stop character. The following example prints a Code11 bar code:

```
<STX>L
D11
1W1G0000001500150012345678 9-<CR>
121100000000100Barcode W1G<CR>
E
```

Barcode W1G

W1I: EAN128 with Auto Subset Switching

Valid characters: The entire 128 ASCII character set.

Variable length, minimum 4 characters

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times the narrow bar width, 3 times the narrow bar width, and 4 times the narrow bar width).

This printer supports the Code 128 subsets A, B, and C. If the data begins with at least four numeric characters the default start code is subset C. If there is a non-numeric in the first four characters then the default start code is subset B. The next character after start is always FNC1. Subset switching between B and C is performed based on rules as below:

1. If in subset C and there are an odd number of numeric digits, subset B will be set prior to the last digit.
2. If four or more numeric digits appear consecutively while in subset B, the character code C will be set prior to the digits.
3. When in subset C and a non-numeric occurs subset B will be inserted prior to the character.

Note that there is no auto-switching from or to Subset A. Standard switches are still used (see table below).

Subset A: Includes all of the standard uppercase alphanumeric keyboard characters plus the control and special characters.

Subset B: Includes all of the standard uppercase alphanumeric keyboard characters plus the lowercase alphabetic and special characters.

Subset C: Includes the set of 100 digit pairs from 00 through 99 inclusive, as well as special characters. EAN128 Subset C is used for double density encoding of numeric data.

Special Character Handling: Characters with an ASCII value greater than 95 are considered special characters. To access these values, a two-character reference table is built into the printer, see table below. As an example, to encode FNC2 into an EAN128 Subset A bar code, send the ASCII & (DEC 38, HEX 26) followed by an ASCII B (DEC 66, HEX 41). Code FNC2 will be encoded.

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

Table G-8: Special Character Handling

Control Codes: Control character encoding into Code 128 Subset A by sending these control codes:

`	=	NUL
a through z	=	1 - 26
{	=	ESC
|	=	FS
}	=	GS
~	=	RS
ASCII 127	=	US

The following example prints an EAN128 bar code:

```
<STX>L
D11<CR>
1W1I0000000250025123456&G10Z2133021AK<CR>
121100000000100Barcode W1I<CR>
E
```

Barcode W1I

When scanned this bar code will decode as:

```
[C][FNC1]1234[B]5[F1]10Z[C]213302[B]1AK(81)
```

W1J: Code 128 with Auto Subset Switching

Valid characters: The entire 128 ASCII character set.

Variable length

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times the narrow bar width, 3 times the narrow bar width, and 4 times the narrow bar width).

This printer supports the Code 128 subsets A, B, and C. If the data begins with at least four numeric characters the default start code is subset C. If there is a non-numeric in the first four characters or there are less than four then the default start code is subset B. Subset switching between B and C is performed based on rules as below:

1. If in subset C and there are an odd number of numeric digits, subset B will be set prior to the last digit.

2. If four or more numeric digits appear consecutively while in subset B, the character code C will be set prior to the digits. If there is an odd number of numerics and already in B the first numeric will be placed in B with the others in C.

3. When in subset C and a non-numeric occurs subset B will be inserted prior to the character.

Note there is no auto switching from or to subset A. Standard switches are still used. See table below.

Subset A: Includes all of the standard uppercase alphanumeric keyboard characters plus the control and special characters.

Subset B: Includes all of the standard uppercase alphanumeric keyboard characters plus the lowercase alphabetic and special characters.

Subset C: Includes the set of 100 digit pairs from 00 through 99 inclusive, as well as special characters. Code128 Subset C is used for double density encoding of numeric data.

Special Character Handling: Characters with an ASCII value greater than 95 are considered special characters. To access these values, a two-character reference table is built into the printer, see table below. As an example, to encode FNC2 into a Code128 Subset A bar code, send the ASCII & (DEC 38, HEX 26) followed by an ASCII B (DEC 66, HEX 41). Code FNC2 will be encoded.

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

Table G-9: Special Character Handling

Control Codes: Control character encoding into Code 128 Subset A by sending these control codes:

`	=	NUL
a through z	=	1 - 26
{	=	ESC
|	=	FS
}	=	GS
~	=	RS
ASCII 127	=	US

The following example prints a Code128 Auto bar code:

```
<STX>L
D11<CR>
1W1J0000000250025123456&G10Z2133021AK<CR>
121100000000100Barcode W1J<CR>
E
```

Barcode W1J

When scanned this bar code will decode as:

```
[C]1234[B]5[F1]10Z2 [C]133021[B]AK(95)
```

W1k: Reduced Space Symbology (RSS)

Valid Characters: Type dependant

Bar Code Data String Length: Type dependant

RSS is a continuous, linear bar code symbology used for identification in EAN.UCC systems. There are six different types:

RSS Type	Overview*
RSS-14 RSS-14 Truncated RSS-14 Stacked RSS-14 Stacked Omni-Directional	• Encodes a full 14-digit EAN.UCC item identification within a linear symbol that can be scanned omni-directionally. • The encodable character set is 0 through 9. • The maximum numeric data capacity is the application identifier plus 14-digit numeric item identification. • Error detection is mod 79 checksum.
RSS Limited	• Encodes a 14-digit EAN.UCC item identification with indicator digits of zero or one within a linear symbol. • The encodable character set is 0 through 9. • The maximum numeric data capacity for is the application identifier plus 14-digit numeric item identification. • Data must begin with indicator 0 or 1. Any higher number results in discarded data. • Error detection is mod 89 checksum.
RSS Expanded	• Encodes EAN.UCC item identification plus supplementary AI element strings. • The encodable character is a subset of ISO 646, consisting of upper and lower case letters, digits and 20 selected punctuation characters, plus the special function character FNC1, (#). • The maximum numeric data capacity is 74 numeric or 41 alphanumeric. • Error detection is mod 211 checksum.

*Additional data can be encoded in a two-dimensional composite as per specification. (See AIM Spec ITS/99-001 “International Symbology Specification - Reduced Space Symbology” for more details.)

Syntax for RSS-14, RSS-14 Truncated, RSS-14 Stacked, RSS-14 Stacked Omni-Directional and RSS Limited (spaces shown for readability):

```
a W1 k c d eee ffff gggg h  i j m n…n | p…p
```

Where:

Field	Valid Inputs	Meaning
a	1,2,3, and 4	Rotation
W1	W1	Fixed value, extended bar code set
k	k	Selects RSS bar code
c	0 to 9 and A to O	Wide bar ratio, default = 2
d	0 to 9 and A to O	Narrow bar ratio, default = 2
eee	000	No effect
ffff	0000 to 9999	Label position, row
gggg	0000 to 9999	Label position, column
h	R, T, S, D, L	RSS Type: R = RSS-14, T = RSS Truncated, S = RSS Stacked, D = RSS Omni-Directional, L = RSS Limited
i	1-9	Pixel Multiplier
j	0 to (i-1)	X pixels to undercut
m	0 to (i-1)	Y pixels to undercut
n…n	0 to 9	Numeric linear data, length 13 [1]
|	| (optional)	Vertical bar separates primary linear data and secondary 2-D data
p…p	2-D data (optional)	Additional 2-D data [2]

[1] The application identifier is not encoded in the symbol nor is the last check digit; the user should enter in a 13-digit value. The decoding system will display the application identifier and calculate the check digit.

[2] The separator row height for two-dimensional composite is fixed at one times the pixel multiplier.

Table G-5: RSS-14, RSS-14 Truncated, RSS-14 Stacked, RSS-14 Stacked Omni-Directional and RSS Limited Record Structures

Examples:

The following example prints an RSS-14 bar code.


```
<STX>L
D11
1W1k0000001500150R1002001234567890
121100000000100Barcode W1k<CR>
E
```

The following example prints an RSS-14 bar code with 2-D data.


```
<STX>L
D11
1W1k0000001500150R1002001234567890|123456-99/99/99
121100000000100Barcode W1k<CR>
E
```

The following example prints an RSS-14 Truncated bar code.


```
<STX>L
D11
1W1k0000001500150T1002001234567890
121100000000100Barcode W1k<CR>
E
```

The following example prints an RSS-14 Stacked bar code.


```
<STX>L
D11
1W1k0000001500150S1002001234567890
121100000000100Barcode W1k<CR>
E
```

The following example prints an RSS-14 Stacked Omni-Directional bar code.


```
<STX>L
D11
1W1k0000001500150D1002001234567890
121100000000100Barcode W1k<CR>
E
```

The following example prints an RSS-14 Limited bar code.


```
<STX>L
D11
1W1k0000001500150L1001501234567890
121100000000100Barcode W1k<CR>
E
```

Syntax for the RSS Expanded bar code (spaces shown for readability):

```
a W1 k c d eee ffff gggg h  i j m nn p…p | q…q
```

Where:

Field	Valid Inputs	Meaning
a	1,2,3, and 4	Rotation
W1	W1	Fixed value, extended bar code set
k	k	Selects RSS bar code
c	0 to 9 and A to O	Wide bar ratio, default = 2
d	0 to 9 and A to O	Narrow bar ratio, default = 2
eee	000	No effect
ffff	0000 to 9999	Label position, row
gggg	0000 to 9999	Label position, column
h	E	RSS Type: E= RSS Expanded
i	1-9	Pixel Multiplier
j	0 to (i-1)	X pixels to undercut
m	0 to (i-1)	Y pixels to undercut
nn	2-22, even only[2]	Segments per row
p…p	0 to 9	Subset of ISO646, including alphanumerics
|	| (optional)	Vertical bar separates primary linear data and secondary 2-D data
q…q	2-D data (optional)	Additional 2-D data [1]

[1] The separator row height for two-dimensional composite is fixed at one times the pixel multiplier.
[2] When using additional 2-D composite data, the sequence width must be at least 4.

Table G-6: RSS-14 Expanded Record Structure

Example:

The following example prints an RSS-14 Expanded bar code.

```
<STX>L
D11
1W1k0000001500150E100022001234567890
121100000000100Barcode W1k<CR>
E
```

Barcode W1k

W1R: UCC/EAN Code 128 K-MART NON EDI

Valid Characters: 0-9

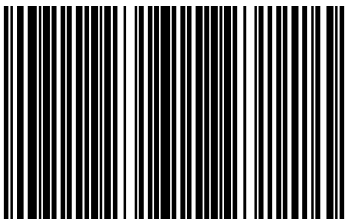
Length: 18 digits

Valid bar widths: The fourth character of record is the width of the narrow bar in dots. All other bars are a ratio of the narrow bar (2 times, 3 times, or 4 times the narrow bar width). Human readable characters for this bar code symbology are printed above the symbol.

This bar code produces the same symbology as bar code ID “R”, except that the human readable field has been modified to print on the bottom of the bar code (see below).

The following example prints a KMART bar code:

```
<STX>L
D11<CR>
1W1R0000000150100012345678901234567<CR>
121100000000100Barcode W1R<CR>
E
```



W1t: TCIF Linked Bar Code 3 of 9 (TLC39)

Valid Characters: All ASCII characters.

Variable Length: Encodes a 25-character alphanumeric serial number in MicroPDF417 symbol.

Specified Length: Encodes a six-digit sequence in a standard 3 of 9 bar code (code 39) followed by a link flag character in code 3 of 9.

Syntax: `a W1 t c d eee ffff gggg hhhhhh ; ii…i`

Where:

Field	Valid Inputs	Meaning
a	1,2,3, and 4	Rotation
W1	W1	Fixed value, extended bar code set
t	t	Selects TLC39 bar code
c	0 to 9 and A to O	Wide bar of Code 39, ratio of wide to narrow must be between 2:1 and 3:1
d	0 to 9 and A to O	Narrow bar of Code 39
eee	001 to 999	Height of Code 39
ffff	0000 to 9999	Label position, row
gggg	0000 to 9999	Label position, column
hhhhhh	ECI Data	Six digit ECI number
;	Fixed	Parses data. (If the seventh character is not a semi colon then only a six-digit code 39 will print.)
i…i	S/N Data	Up to 25 alphanumeric serial number characters to be encoded in the MicroPDF417 symbol. This symbol is fixed at four columns. The number of rows is determined by the amount of data, as follows:

Number of Alphanumeric Characters	Number of Rows
1-14	4
15-22	6
23-25	8

The link flag is the character “T” in code 39 without a start/stop indicator. The location of this flag is based on the ECI code location, length and height. The location of the MicroPDF417 symbol is based on the location of ECI bar code. The symbol’s module width and height are fixed at the default. The following example prints a TLC39 bar code:

```
<STX>L
D11
1Wt00000015001501234567890;ABCD1234567890123456
1911A0801300170A1B2C3DAAA
121100000000100Barcode W1t<CR>
E
```

Barcode W1t

W1z: MicroPDF417

Valid Characters: All ASCII characters, depending on the selected options.

Variable Length

Syntax: `a W z c d eee ffff gggg h i j k 0 m…m`

Where:

Field	Valid Inputs	Meaning
`a`	1,2,3, and 4	Rotation
`W1`	W1	Fixed value, extended bar code set
`z`	z	Selects the MicroPDF417 bar code
`c`	0 to 9 and A to O	Module size horizontal multiplier, 0 – default size
`d`	0 to 9 and A to O	Module size vertical multiplier, 0 – default size
`eee`	000	No Effect
`ffff`	0000 to 9999	Label position, row
`gggg`	0000 to 9999	Label position, column
`h`	1 to 4	Number columns
`i`	0 to 9 and A	Row / Error Correction index
`j`	0, 1	Byte Compaction Mode (1), best compression for binary data
`k`	0, 1	Macro Character Substitution Disable (1)
`0`	0	Fixed ASCII digit 0. Reserved for future use.
`m…m`	8-bit data	Data to be encoded

This is a 2 dimensional bar code capable of holding large amounts of data in a small area. It provides a high level of redundancy and error checking. Please reference the following specifications for details: International Symbol Specification – MicroPDF417, AIM International Technical Specification, version 1.0 1998-06-18; International Symbol Specification Code 128, AIM International Technical Specification, version 1.0 1999-11-4; UCC/EAN-128 Application Identifier Standard, Uniform Code Council, Inc, January 1993, revised July 1995; Application Standard for Shipping Container Codes, Uniform Code Council, 1996. The following example prints a MicroPDF417 bar code, default module size (cd = 00), with 1 column, 24 rows, error correction of 33%, no byte compaction, macro character substitution enabled.

```
<STX>L
D11<CR>
1W1z00000001501001400PDF417<CR>
121100000000100Barcode W1z<CR>
E
```

Barcode W1z

The number of columns (h) and the row / error correction index (i) combine to form a row/column/error correction selection index (hi) which determines other characteristics of the symbol as shown in the following table.

Row/Column/Error Correction Selection Index (h, i) Implications								
hi	**Columns**	**Rows**	**Maximum Errors Corrected**[1]	**Symbol Width**[2]	**Symbol Height**[3]	**Maximum Binary Data Bytes**[4]	**Maximum Alphabetic Characters**[5]	**Maximum Numeric Characters**[5]
10	1	11	4	40	24	3	6	8
11	1	14	4	40	30	7	12	17
12	1	17	4	40	36	10	18	26
13	1	20	5	40	42	13	22	32
14	1	24	5	40	50	18	30	44
15	1	28	5	40	58	22	38	55
20	2	8	5	57	18	8	14	20
21	2	11	6	57	24	14	24	35
22	2	14	6	57	30	21	36	52
23	2	17	7	57	36	27	46	67
24	2	20	8	57	42	33	56	82
25	2	23	10	57	48	38	67	93
26	2	26	12	57	54	43	72	105
30	3	6	9	84	14	6	10	14
31	3	8	11	84	18	10	18	26
32	3	10	13	84	22	15	26	38
33	3	12	15	84	26	20	34	49
34	3	15	18	84	32	27	46	67
35	3	20	23	84	42	39	66	96
36	3	26	29	84	54	54	90	132
37	3	32	35	84	66	68	114	167
38	3	38	41	84	78	82	138	202
39	3	44	47	84	90	97	162	237
40	4	4	5	101	10	8	14	20
41	4	6	9	101	14	13	22	32
42	4	8	11	101	18	20	34	49
43	4	10	13	101	22	27	46	67
44	4	12	15	101	26	34	58	85
45	4	15	18	101	32	45	76	111
46	4	20	23	101	42	63	106	155
47	4	26	29	101	54	85	142	208
48	4	32	35	101	66	106	178	261
49	4	38	41	101	78	128	214	313
4A	4	44	47	101	90	150	250	366

[1] Can be any combination of 1∗erasures + 2∗substitutions (e.g. 13 maximum number of errors corrected might include 7 erasures and 3 substitutions).

[2] Includes 1 module width of quiet zone on either side.

[3] Assumes the module height is 2∗module width, and includes one module width quiet zones on top and bottom.

[4] Assumes Binary Compaction.

[5] Assumes Text Compaction.

Table G-7: MicroPDF417 Characteristics Index

☑ **Note:** In the table above, row/column/error correction selection index (hi) values increasingly large do not necessarily result in the ability to encode more data.

Byte Compaction Mode (j = 1)

A value of 1 forces Byte Compaction. The compaction ratio is six 8-bit bytes of data compressed into a 5-symbol codeword. See the table above for the maximum data allowed for any row/column/error correction selection index (hi).

Macro Character Substitution Disable (k=1)

By default Macro Character Substitution is enabled (k=0). When enabled, Byte Compaction has priority over Macro Character Substitution. When Macro Character Substitution is enabled, the data stream header and trailer are compacted when they conform to the following forms:

[)>$^{R}_{S}$05$^{G}_{S}$ *data* $^{R}_{S}$ ^{E}o$_{T}$

or

[)>$^{R}_{S}$06$^{G}_{S}$ *data* $^{R}_{S}$ ^{E}o$_{T}$

where:

data may not contain adjacent bytes with values $^{R}_{S}$ or $^{G}_{S}$

($^{R}_{S}$ = 30_{10} , $1E_{16}$ and $^{G}_{S}$ = 29_{10}, $1D_{16}$ and ^{E}o$_{T}$ = 4_{10} ,4_{16})

Functions Not Supported

- General Purpose Extended Channel Interpretations, including Code-128 emulations
- Structured Append
- Reader Initialization Symbol Generation
- Module shaving

W1Z: Micro PDF417 with Byte Count Specifier

Specified Length – The upper case Z identifies a Micro PDF417 bar code with a 4-digit string length specifier. This allows values 0x00 through 0xFF to be included within the data strings without conflicting with the DPL format record terminators. The four-digit decimal data byte count immediately follows the four-digit column position field. This value includes all of the data following the byte count field, but does not include itself.

```
<STX>L
D11<CR>
1W1Z000000015010000121400 0pdf<0x0D>417
121100000000100Barcode W1Z<CR>
E
```

Barcode W1Z

From the example, the bar code's data stream,
1W1Z000000015010**0012**14000PDF<0x0D>417, includes a Byte Count Specifier (the portion in bold), where 0012 equals the four-digit decimal data byte count and includes all bytes that follow until the end of the bar code data. Field termination is set by the byte count. <STX>, <CR>, and <0x0D> all represent single byte values of hexadecimal 02, 0D, and 0D, respectively. The Micro PDF417 bar code produced encodes "pdf<CR>417", and prints a line of text: Barcode W1Z.

Appendix

Font Mapping - Single and Double Byte Characters

Label format records with font code 9 in the b field of the Format Record header can specify any of the following bit-mapped or scalable fonts with the associated specification in the font size/selection (eee height) field, as shown in the tables on the following pages.

Example: `1911u4000100010A0215134<CR>`

The example above will produce a printed string consisting of the two Kanji characters referenced by the two HEX ASCII pairs A0, 21, and 51, 34, on appropriately equipped printers.

Example: `1911U4001000100P012P012<0x38><0x77><0x00>`

The above example will produce a printed string consisting of the one 12 point Kanji character referenced by the byte pair with hex values 38 and 77 on appropriately equipped printers.

☑ **Note:** Double byte hex representation character strings terminate with two null bytes and a <CR>, i.e., `0x 00 00 0D`. The Hex-ASCII representation is terminated with <CR>.

The alphanumeric portion (nn) of the scalable font specifiers, Snn, Unn, unn, numbering system is a base 62 numbering system, 0, 1, 2…8, 9, A, B, C...X, Y, Z, a, b, c...x, y, z. For scalable fonts the S designation signifies single byte characters and U designates double byte. The lower case U counterpart signifies that print data in the label format record is in a hex-ASCII format. Fonts that have been downloaded with designators of the form nn, where nn are alphanumeric, as seen in the font size specifier (eee height) column below, may be referenced in label format records by their upper or lower case specifiers as available. However, fonts created for double-byte access cannot be accessed using Snn as the font designator, and vice versa, single-byte fonts cannot be accessed using Unn or unn.

☑ **Note:** Downloading scalable fonts require specifying the font ID, a two character alphanumeric. The S, or U, u used in referencing the font within label format records is not used in the download specification. Attempting to utilize a scalable font with an inappropriate byte-size designation (e.g. S on double byte or U, u on single byte) will have unpredictable results.

Font 9, Font Specifications (eee Height) and Associated Characteristics			
Font Name	**Character Mapping**	**Font Size Specifier (eee Height)**	**Point Size**
Font 9 Bit-Mapped Resident Fonts (E-Class and M-4206, only)			
CG Triumvirate[1]	Single Byte	000 - 010	5, 6, 8, 10, 12, 14, 18, 24, 30, 36, 48, respectively
CG Triumvirate[1]	Single Byte	A04, A05, A06, A08, A10, A12, A14, A18, A24, A30, A36, A48, A72	4, 5, 6, 8, 10, 12, 14, 18, 24, 30, 36, 48, 72, respectively
Font 9 Bit-Mapped Downloaded Fonts			
User downloaded bit-mapped typeface	Single Byte	100 - 999	user defined
Font 9 Scalable Resident Fonts Specifications (not available for E-Class and M-4206)			
CG Triumvirate Bold Condensed Scalable[1]	Single Byte	S00	scalable
CG Triumvirate[1] Scalable	Single Byte	S01	scalable
Font 9 Scalable Resident Fonts Specifications (optional)			
CG Times Scalable	Single Byte	SA0	scalable
CG Times Italic Scalable	Single Byte	SA1	scalable
CG Times Bold Scalable	Single Byte	SA2	scalable
CG Times Bold Italic Scalable	Single Byte	SA3	scalable
Gothic B Kanji Scalable	Double Byte (Binary)	U40	scalable
Gothic B Kanji Scalable	Double Byte (Hex ASCII)	u40	scalable
GB Simplified Chinese Scalable	Double Byte (Binary)	UC0	scalable
GB Simplified Chinese Scalable	Double Byte (Hex ASCII)	uC0	scalable
Korean Hangul Scalable	Double Byte (Binary)	UH0	scalable
Korean Hangul Scalable	Double Byte (Hex ASCII)	uH0	scalable
Font 9 Scalable Downloaded Fonts			
User downloaded Scalable typeface	Single Byte (Binary)	S50 - S5z... S90 - S9z	scalable
User downloaded Scalable typeface	Double Byte (Binary)	U50...,U5z...,...U90..., U9z	scalable
User downloaded Scalable typeface	Double Byte (Hex ASCII)	u50...,u5z...,...u90..., u9z	scalable

[1] Standard internal fonts

Table H-1: Font 9 Specifications

Appendix

Symbol Sets and Character Maps

Symbol Set Selection

Scalable fonts are mapped through a symbol set sometimes referred to as a 'code page'. This mapping allows the host application to select a variety of characters to match the application. For example in the code page (CP), character code 0xE4 causes character Φ to be printed. In CP E7, the character code 0xE4 causes δ to be printed. Each of the CPs allows the host application to "emulate" a character set for their application. Datamax printers that support scalable fonts contain either a standard or an enhanced group of CPs as defined below. The CP (symbol set) is selected using a DPL Command, <STX>ySxx, where xx is the two letter CP Identifier.

☑ **Note:** Not all fonts have an entire compliment of character codes for a given code page (symbol set).

Single Byte Code Pages					
Code Page Identifier		Font Format			Description
Datamax	HP (PCL)	Intellifont [1]	MicroType [2]	TrueType	
AR	8V	√	√	√ [3]	Arabic-8
CP	3R	√	√	√ [3]	PC Cyrillic
D1	11L	√			ITC Zapf Dingbats/100
D2	12L	√			ITC Zapf Dingbats/200
D3	13L	√			ITC Zapf Dingbats/300
DN	0D	√	√	√	ISO 60 Danish / Norwegian
DS	10L	√			PS ITC Zapf Dingbats
DT	7J	√	√	√	DeskTop
E1	0N	√	√	√	ISO 8859/1 Latin 1
E2	2N	√	√	√	ISO 8859/2 Latin 2
E5	5N	√	√	√	ISO 8859/9 Latin 5
E6	6N	√	√	√	ISO 8859/10 Latin 6
E7	12N	√		√	ISO 8859/7 Latin/Greek
E9[3]	9N		√ [4]	√ [4]	ISO 8859/15 Latin 9
EG	12N	√	√	√ [3]	ISO 8859/7 Latin/Greek
EH	7H	√	√	√ [3]	ISO 8859/8 Latin/Hebrew
ER	10N	√	√	√ [3]	ISO 8859/5 Latin/Cyrillic
FR	1F	√	√	√	ISO 69: French
G8	8G	√	√	√ [3]	Greek-8
GK	12G	√	√	√ [3]	PC-8 Greek
GR	1G	√	√	√	ISO 21: German
H0	0H	√	√	√ [3]	Hebrew-7
H8	8H	√	√	√ [3]	Hebrew-8
IT	0I	√	√	√	ISO 15: Italian
LS[3]	14L	√	√	√	HP4000 ITC Zapf Dingbats
LG	1U	√	√	√	Legal
M8	8M	√	√	√	Math-8
MC	12J	√	√ [4]	√ [4]	Macintosh

Single Byte Code Pages					
Code Page Identifier		Font Format			Description
Datamax	HP (PCL)	Intellifont [1]	MicroType [2]	TrueType	
MS	5M	√	√ [4]	√ [4]	PS Math
P9[3]	13U		√ [4]	√ [4]	PC-858 Multilingual
PB	6J	√	√	√	Microsoft Publishing
PC	10U	√	√	√	PC-8, Code Page 437
PD	11U	√	√	√	PC-8 D/N, Code Page 437N
PE	17U	√	√	√	PC-852 Latin 2
PG	10G	√	√	√ [3]	PC-851 Latin/Greek
PH	15H	√	√	√ [3]	PC-862 Latin/Hebrew
PI	15U	√	√	√	Pi Font
PM	12U	√	√ [4]	√ [4]	PC-850 Multilingual
PR	10V	√	√	√	PC-864 Latin/Arabic
PT	9T	√	√	√	PC-8 TK, Code Page 437T
PU	9J	√	√	√	PC-1004
PV	26U	√	√	√	PC-775 Baltic
PX	12U	√			PTXT3000
PY	3Y			√ [3]	Non-UGL, Generic Pi Font
R8	8U	√	√	√	Roman-8
R9[3]	4U		√ [4]	√ [4]	Roman-9
SP	2S	√	√	√	ISO 17: Spanish
SW	0S	√	√	√	ISO 11: Swedish
SY	19M		√	√	Symbol
TK	8T	√			Turkish-8
TS	10J	√	√	√	PS Text
UK	1E	√	√	√	ISO 4: United Kingdom
US	0U	√	√	√	ISO 6: ASCII
VI	13J	√	√	√	Ventura International
VM	6M	√	√	√ [3]	Ventura Math
VU	14J	√	√	√	Ventura US
W1[4]	19U	√	√	√	Windows 3.1 Latin 1
WA	9V	√	√	√ [3]	Windows Latin/Arabic
WD	579L	√	√	√	Wingdings
WE[4]	9E	√	√	√	Windows 3.1 Latin 2
WG[4]	9G	√	√	√ [3]	Windows Latin/Greek
WL[4]	19L	√	√	√	Windows 3.1 Baltic (Latv, Lith)
WN	9U	√			Windows
WO	9U	√	√ [4]	√ [4]	Windows 3.0 Latin 1
WR[4]	9R	√	√	√ [3]	Windows Latin/Cyrillic
WT[4]	5T	√	√	√	Windows 3.1 Latin 5

[1] Supported in the E-Class and M-4206 models.
[2] Supported in the A-Class, I-Class, W-Class, M-4208 and M-4306 models.
[3] Not supported in the E-Class models.
[4] Contains the Euro currency symbol (€).

Table I-1: Single Byte Code Pages

Double-Byte Symbols, Chinese, Kanji and Korean

Character Map Selection

Double byte scalable fonts are mapped through a 'character map'. This mapping allows the host application to select a variety of characters to match the application. Each of the code pages allows the host application to emulate a character set for the application.

Double Byte Character Map		
Character Map ID	**TrueType Font**	**Description**
B5	√	BIG 5 (Taiwan) Encoded
EU	√	EUC (Extended UNIX Code)
GB	√	Government Bureau Industry Standard; Chinese (PRC) ; default
JS	√	JIS (Japanese Industry Standard); default
SJ	√	Shift JIS
UC	√	Unicode (including Korean)

Table I-2: Double Byte Character Map

The double-byte symbol set is selected using <STX>yUxx command. The single-byte symbol set is selected using the same command, <STX>ySxx. Each affects an independent database selection and has no impact on the other.

Appendix

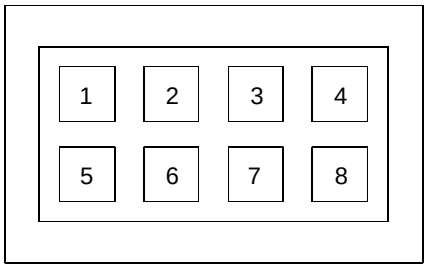
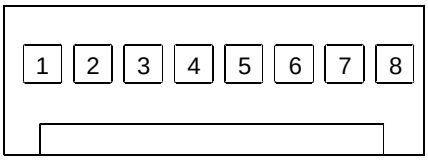
The General Purpose Input Output (GPIO) Port

If GPIO equipped, printers can easily be programmed to interface with most applicator devices. There are three different configurations of the GPIO Card. The GPIO functions are enabled and configured using the menu system of the printer, or via <STX>Kc Commands. These parameters are stored in non-volatile memory and saved for subsequent power-ups.

Printing with GPIO: When the GPIO is enabled, the printer will not print a label unless the Start of Print signal is active. When a label is ready to print and the printer is waiting for the Start of Print signal the printer will display "WAITING FOR SIGNAL".

GPIO Configuration (M-Class)

The connection to the GPIO signals is accessed via the option port connector on the front of the printer or the J6 connector on the Main PCB (51-2355-01). The printer requires firmware version 5.07 or greater. The option port connector is an 8-pin Molex Microfit 3.0 P/N 44300-800. The J6 connector is an AMP connector P/N 640456-8. Each of the GPIO pin functions is detailed below:

Options Port Connector	Main PCB Connector J6
	

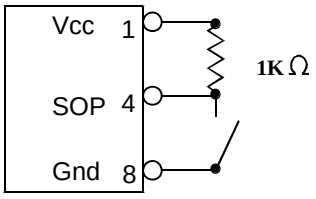
M-Class GPIO Port Connections and Functions				
Pin #	**Signal Name**	**Signal State**	**Signal Direction**[1]	**Signal Description**
1	Vcc	+5 VDC	Output	Printer +5 VDC
2	Printer Fault	Low	Output	Goes low if the printer detects any fault. Applicable only if cutter not equipped. To activate set the GPIO Option to "YES" and Cutter Equipped to "NO" [2] .
3	Spare	Reserved	Input	N/A
4	Start of Print (SOP)	Low Level	Input	For applicators, it is recommended to only set the SOP signal to ACTIVE LOW. When ready to print a label, the applicator should set this signal low for at least 50ms or until the EOP signal goes not active. (See sample circuit next page.) To activate set the PRESENT SENSOR Option to "YES" [2]. ☑ **Note:** If a label is ready to print, the printer will blink the STOP LED, signifying "WAITING FOR SIGNAL," until it receives the applicator's Start of Print signal.
5	End of Print (EOP)	Low Level	Output	Goes low when printed label reaches the presented position. Minimum signal time 20msecs. To activate set GPIO Option to "YES" [2].
6	Signal Ground	Ground	N/A	N/A
7	+24V	1.6 Amp (fused)	Input	N/A
8	Signal Ground	Ground	N/A	N/A

[1] Signal direction given relative to the printer.

[2] Selection for this option can be set via the Printer Set Configuration Command <STX>Kc or the Printer Setup Function. The Printer Set Configuration Parameter Mnemonics are "PS" for Present Sensor (N, Y, A [Auto]); "CE" for Cutter Equipped (N, Y, A [Auto]) and "GE" for GPIO (N, Y or A [Applicator]). The Printer Setup selections are as follows: Item #3, PRESENT SENSOR; Item #4, CUTTER EQUIPPED; and Item #25, GPIO.

M-Class Start of Print Control

Connections for an external Start of Print control can be made (1) directly to Pin 4 using a TTL-level input or (2) with an interface circuit similar to the one shown here (for additional interfacing data, see the table above).



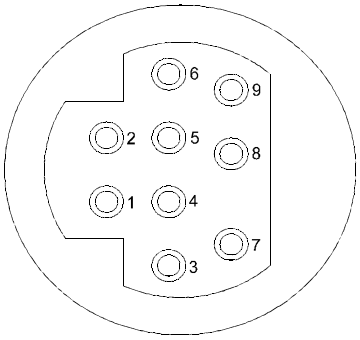
GPIO-1 Configuration (I-Class & W-Class)

The GPIO-1 interface connector is a 9-pin Mini-DIN female type (e.g., Kycon KMDG-9S-BS) requiring a 9-pin Mini-DIN plug (e.g., Kycon KMDA-9P). Each GPIO-1 pin function is detailed in the table below:

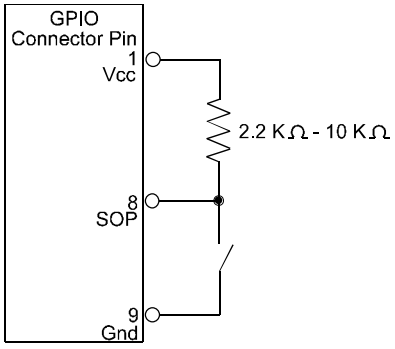
I&W-Class GPIO-1 Pin Functions				
Pin #	**Signal Name**	**Signal State**	**Signal Direction***	**Signal Description**
1	Vcc	+5 VDC	Output	Printer +5 VDC
2	Ribbon Fault	Low	Output	Goes low when the printer detects ribbon out.
3	Paper Fault	Low	Output	Goes low when the printer detects media out.
4	Printer Fault	Low	Output	Goes low when any printer fault is detected.
5	Ribbon Low	Programmable	Output	Will signal Applicator when the ribbon supply is low.
6	End of Print	Programmable	Output	Will signal Applicator when print is done. Can be monitored to initiate next Start of Print sequence.
7	Backup Label	Programmable	Input	When active, will back up the label once it has been presented. (i.e., must have a present distance greater than zero)
8	Start of Print Signal	Programmable	Input	When active, will begin print.
9	Signal Ground	Ground	N/A	N/A

*Signal direction is given relative to the printer.

GPIO-1 Pin Configuration (as viewed from the rear of the printer)**:**

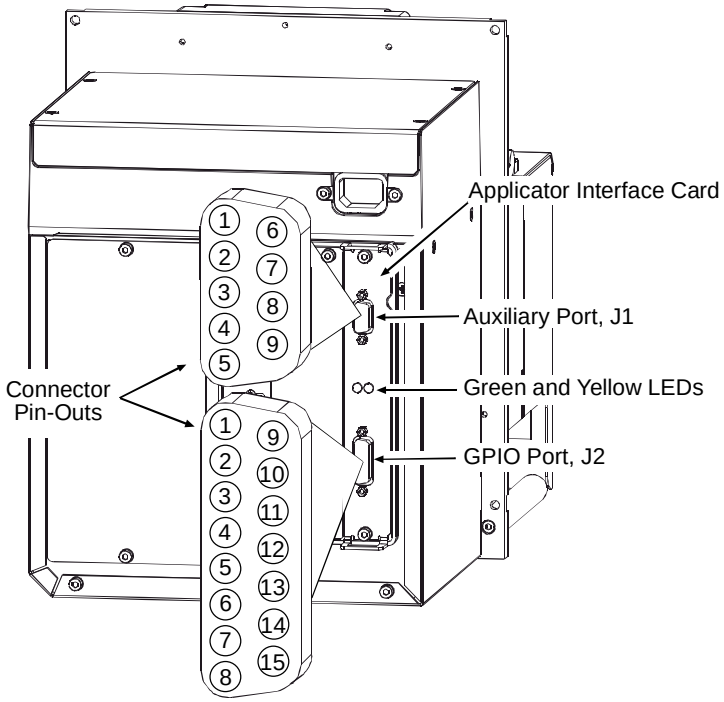


I&W-Class GPIO-1 Start of Print Control
Connections for an external Start of Print/Backup Label control can be made (1) directly to Pin 8 / 7 using a TTL-level input or (2) with an interface circuit similar to the one shown right. For additional interfacing requirements, see the table above.

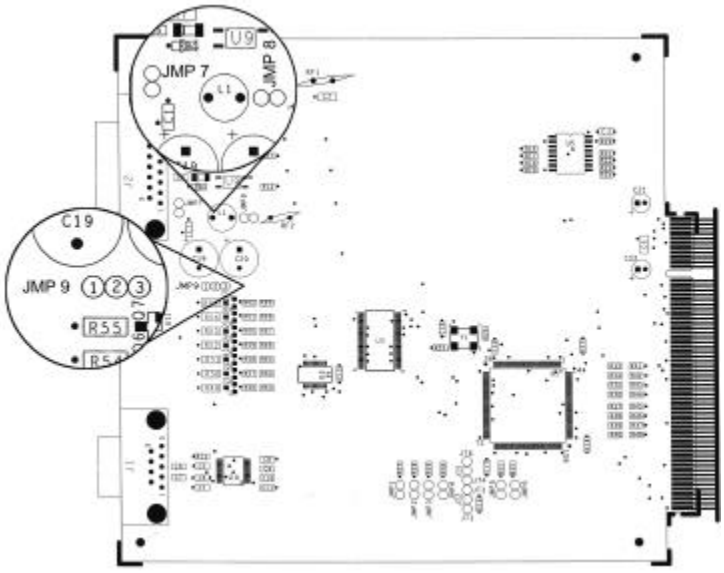


GPIO-2 Configuration (A-Class)

The A-Class GPIO-2 (Applicator Interface Card) has two LEDs, an Auxiliary (Serial B) Port, and a GPIO Port.



GPIO-2 Interface Card Location and Port Pin-outs



GPIO-2 Interface Card Jumper Locations

The **Auxiliary Port (J1)** is an RS-232 interface. Serial data transfer settings, such as baud rate, word length and parity, can be made using <STX>KcSP commands. These settings must match the device that you are connecting. Jumpers JMP 1 – JMP 4 should be in installed.

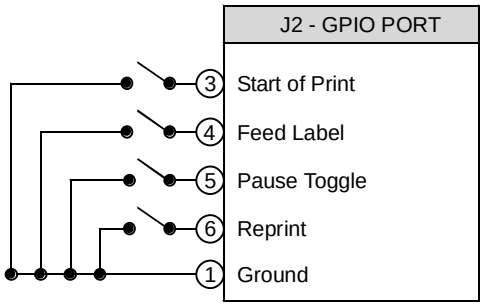
GPIO-2 Auxiliary Data Port	
Pin Number	**Signal**
1	+5 VDC (0.5 Amp)
2	RX
3	TX
4	DTR
5	Ground
6	N/C
7	RTS
8	CTS
9	N/C

The **GPIO Port** allows convenient printer to applicator integration. Functions can be configured using the menu system or via <STX>Kc commands. All configuration settings are saved in non-volatile memory. Jumper settings are critical:

- Jumper settings allow the printer to power the applicator interface circuitry, or the applicator interface circuitry can be powered externally.
- Jumper settings allow + 5 or +24 VDC output signal levels to be used.

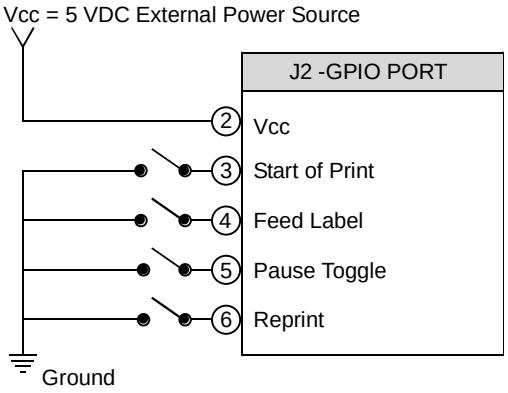
The **Applicator Start of Print Circuit** will depend upon the applicator system's requirements:

- ***For applicator interface circuitry*** that will use the printer's +5 VDC, follow the schematic shown right.



- ***For applicator interface circuitry*** that will supply an external +5 VDC and ground, follow the schematic shown right.

  For this configuration, JMP 7 and JMP 8 must be removed



The table below details the GPIO Port pin-outs, functions, and configurable settings:

WARNING Failure to configure the GPIO Port's jumpers for the device(s) you are connecting may result in damage to the printer and/or the applicator.

GPIO Port (J2) Pin Functions and Associated Jumper Selections					
Pin #	**Signal Name**	**Signal Direction**	**Active Setting**	**Jumper Placement**	**Function / Description**
1	Ground (Configurable)	Ground	Ground	JMP 8 'On'	Printer chassis ground is used
		Open	Open	JMP 8 'Off'	Ground return must be supplied
2	+5 VDC (Configurable)	Output	+5 VDC	JMP 7 'On'	Printer +5 VDC is used (.5 amp max.)
		Open	Open	JMP 7 'Off'	+5 VDC must be supplied
3	Start Of Print [5]	Input	Programmable [1]	N/A	N/A
4	Feed Label [4]	Input	Low		
5	Pause Toggle	Input	Low		
6	Reprint [3]	Input	Low		
7	+24 VDC (1.0 amp max.)	Output	+24 VDC		
8	Ground	Ground	Ground		
9	Ribbon Low	Output	Programmable [1]	JMP 9: Pins 1 & 2 = +5 VDC *– OR –* Pins 2 & 3 = +24 VDC	**⚠ See WARNING message, above.** When the output is inactive, then all output pins will be pulled up to the voltage determined by this jumper setting.
10	Service Required [2]	Output	Low		
11	End Of Print	Output	Programmable [1]		
12	Media Out	Output	Low		
13	Ribbon Out	Output	Low		
14	Data Ready (DRDY)	Output	Low		
15	Spare	Output	N/A	N/A	N/A

[1] For details see Section 4.2.4 of the *A-Class Operator's Manual*.
[2] Evoked by occurrences listed under 'Fault Messages' in Section 6.2 of the *A-Class Operator's Manual*.
[3] Reprints the last label exactly, with no increment or time stamp changes; use it for error conditions. Always keeping this signal LOW will result in non-stop printing.
[4] Advances media until the signal goes HIGH and, if not in continuous mode, the media will be positioned at the next available media TOF.
[5] If active with no current print job, `"WAITING FOR DATA"` is displayed. Specifying a quantity of 9999 while always keeping this signal 'ON' will cause non-stop label printing, except in single label mode (see Imaging Mode, Section 4.2.5 of the *A-Class Operator's Manual*), which will cause the printer to stop between labels.

The Green and Yellow **Indicators** offer a visual check of printer/applicator activity:

GPIO-2 Interface Indicators	
• Yellow LED	Flash at power-up and when the card's outputs change state.
• Green LED	Flash at power-up and when the card's inputs change state.

Appendix

Print Resolutions, Module Identifiers, Maximum Field, Column, & Character Values

☑ **Note:** Throughout the tables below, the following standards are used:
X = Supported Command
ND = Non-Display

Module ID (Memory Bank)	Description	Printer Model					
		A	E	I	M (ND)	M	W
A	DRAM (512 KB - default size)		X		X		
B	Flash (256 KB available to user) [1]		X[3]		X		
C	Default, as assigned by <STX>X	X	X	X	X	X	X
D	DRAM (512 KB - default size) configurable.				X	X	
	Internal DRAM (default 1MB) configurable.	X		X		X	X
G [2]	512 KB Flash Main PCB, configurable.	X		X		X	X
H	1.5 MB Flash, configurable.	X					
	5.5 MB Optional Expanded Flash Main Logic Card, configurable.						
Y	64 KB Flash – Menu / EFIGS – protected	X		X		X	X
	128 KB Flash – 64 KB Menu / EFIGS protected / 64 KB Flash, configurable.	X					
F	4 MB Flash – Option, configurable.			X			X
Z	4 MB Flash – Option ILPC – protected			X			X

[1] The availability/size of the Internal Flash Module is dependent upon the installed font option (expandable with the Flash Memory Expansion Option) and available Flash memory; reference the Configuration Label, or following the <STX>KC command the "INTERNAL FLASH MODULE PRESENT" message. The Flash memory has a limited number of writes (approximately 100,000) and is intended for permanent (or semi-permanent) storage of downloaded images, fonts and label formats.
[2] Not available for the I-4206 and I-4208.
[3] Not standard.

Table K-1: Printer Module Identifiers

Printer (All models, or as noted)	Maximum Format Fields [3]	Total Characters for all Fields
A-Class	700	32768
E-Class	450	16,000
I-Class (I-4206 and I-4208)	500	32768
I-Class (I-4210, I-4212, I-4308, I-4406, and I-4604)	700	32768
M-Class (M-4206)	450	16,000
M-Class (M-4208 and M-4306)	700	32768
W-Class	700	32768

[3] When the product of the number of fields and characters in each field exceeds the available printer memory (the limiting factor), portions of the label may not print.

Table K-2: Maximum Label Format Fields & Characters

Printer Model	Print Resolution		Dot Dimensions (Nominal)		Maximum Print Width		Maximum "gggg" Value	
	DPI	DPMM	Inches	Millimeters	Dots	Millimeters	Inch	Metric
A-4212	203	8.0	.0043 x .0052	.11 x .13	832	104.1	0410	1041
A-4310	300	11.8	.0027 x .0043	.07 x .11	1248	105.7	0416	1057
E-4203	203	8.0	.0043 x .0052	.11 x .13	832	104.1	0410	1041
E-4204	203	8.0	.0043 x .0052	.11 x .13	832	104.1	0410	1041
E-4304	300	11.8	.0028 x .0056	.07 x .14	1248	105.7	0416	1057
I-4206	203	8.0	.0043 x .0052	.11 x .13	832	104.1	0410	1041
I-4208	203	8.0	.0043 x .0052	.11 x .13	832	104.1	0410	1041
I-4210	203	8.0	.0043 x .0052	.11 x .13	832	104.1	0410	1041
I-4212	203	8.0	.0043 x .0052	.11 x .13	832	104.1	0410	1041
I-4308	300	11.8	.0027 x .0043	.07 x .11	1248	105.7	0416	1046
I-4406	406	16.0	.0013 x .0018	.05 x .07	1664	104.1	0410	1041
I-4604	600	23.6	0008 x .0015	.03 x .06	2496	105.7	0416	1057
M-4206	203	8.0	.0043 x .0052	.11 x .13	864	108.0	0425	1080
M-4208	203	8.0	.0043 x .0052	.11 x .13	864	108.0	0425	1080
M-4306	300	11.8	.0027 x .0043	.07 x .11	1248	105.7	0416	1057
W-6208	203	8.0	0043 x .0052	.109 x .132	1344	168.1	0662	1681
W-6308	300	11.8	.00027 x .0043	.069 x .108	1920	162.6	0640	1626
W-8306	300	11.8	.00027 x .0043	.069 x .108	2560	216.7	0853	2167

Table K-3: Print Widths, Resolutions, and Record Column Field Values

Printer Resolution (DPI)	Row Adjust Finetune <STX>KcRF Parameter Range (+/– dots)
203	-100 – 100 dots
300	-150 – 150 dots
400	-200 – 200 dots
600	-300 – 300 dots

Table K-4: Row Adjust Range per Print Resolution

Appendix

Speed Ranges

Printer Speed Command*	Speed Value:	
	Inches per Second	Millimeters per Second
A	1.0	25
B	1.5	38
C	2.0	51
D	2.5	63
E	3.0	76
F	3.5	89
G	4.0	102
H	4.5	114
I	5.0	127
J	5.5	140
K	6.0	152
L	6.5	165
M	7.0	178
N	7.5	191
O	8.0	203
P	8.5	216
Q	9.0	227
R	9.5	241
S	10.0	254
T	10.5	267
U	11.0	279
V	11.5	292
W	12.0	305
X	13.0	330
Y	14.0	356
Z	15.0	381
a	16.0	406
b	17.0	432
c	18.0	457
d	19.0	483
e	20.0	508

*Applicable speed values are printer dependent. See Table L-2, below.

Table L-1: Speed Command Values

Printer	Print		Slew		Backup	
	Range	Default	Range	Default	Range	Default
A-4212	C – W	O	C – f	O	C – G	G
A-4310	C – S	K	C – d	K	C – G	G
E-4203[1]	A – G	G	A – G	G	A – E	C
E-4204	A – G	G	A – G	G	A – E	C
E-4304	A – G	G	A – G	G	A – E	C
I-4206	C – K	K	C – K	K	C – G	G
I-4208	C – O	O	C – O	O	C – G	G
I-4308	C – O	K	C – O	K	C – G	G
I-4210	C – S	K	C – S	K	C – G	G
I-4212	C – W	O	C – W	O	C – G	G
I-4406	C – K	I	C – K	K	C – G	G
I-4604	C – G	E	C – G	G	C – G	G
M-4206	C – K	G	C – K	G	C – G	C
M-4208	C – O	O	C – O	O	C – G	G
M-4306	C – K	G	C – K	G	C – G	C
W-6208	C – O	K	C – S	K	C – G	G
W-6308	C – O	K	C – S	K	C – G	G
W-8306	C – K	K	C – O	K	C – G	G

[1] Maximum speed is limited to 'E' unless the optional regulated power supply is attached.

Table L-2: Speed Ranges and Defaults by Model

Appendix

Commands by Function

Commands by Function	
Function	**Command**
Backup speed	pa
Batch quantity request	<SOH>E
Cancel	<SOH>C
Character bit-mapped data	<ESC>(snnnWdata
Character code	<ESC>*cnnnE
Character dump mode	<STX>P
Column offset amount	Cnnnn
Configuration label and dot pattern print	<STX>Z
Configuration Set (See Table 5-1 for listing)	<STX>Kc
Continuous paper length	<STX>cnnnn
Count by	^nn
Cut	<STX>o
Cut by	:nnnn
Cut by	cnn
Decrement alphanumerically	<fii
Decrement numerically	- fii
DIP switch, host controlled settings	<STX>Vn
Dot size height and width	Dwh
Edge sensor enable	<STX>e
Feed rate	<STX>Sa
Feedback characters enable	<STX>a
Field data line terminator	Tnn
File delete from module	<STX>xmfname
Firmware version request	<STX>v
Font descriptor	<ESC>)snnnW
Font ID number	<ESC>*cnnnD
Form feed	<STX>F
Set Present Distance	<STX>Kfnnnn
Format attribute	An
Graphics image download	<STX>Iabfname$^{c}_{r}$
Heat setting	Hnn
Inches	<STX>n
Increment alphanumerically	>fii
Increment numerically	+fii
Label format field replacement	<STX>Unnstring
Label formatting start	<STX>L
Label length maximum	<STX>Mnnnn

Table M-1: Commands (A-L)

Commands by Function	
Function	**Command**
Memory query	<STX>KQ
Memory query (new format)	<STX>Kq
Metric	<STX>m
Metric	m
Mirror	M
Module clear	<STX>qm
Module, compress	<STX>zm
Module, directory request	<STX>Wa
Module, set default	<STX>Xm
Module, FLASH memory Test	<STX>w
Module, RAM memory Test	<STX>t
Modules, clear all	<STX>Q
Pause for each label	<STX>J
Pause toggle	<SOH>B
Pause, controlled	<STX>p
Place data in global register	G
Print last label format	<STX>G
Print speed	Pa
Print time and date	<STX>Tstring
Printhead dot pattern test label	<STX>T
Quantity labels printed	<STX>Ennnn
Quantity of labels	Qnnnn
Recall global data and place in field	<STX>Sa
Recall stored label	rname
Reflective sensor select	<STX>r
Replacement field tag	U
Reset	<SOH>#
Resettable counters reset	<STX>Kr
Ribbon saver	<STX>Rx
Row offset amount	Rnnnn
RS-232 port test	<STX>k
Scalable font download	<STX>imtaabbb...b$^{c}_{r}$xxxxxxxxfff...f
Sensor values request	<STX>Y
Slew rate	Sa
Status ASCII string request	<SOH>A
Status byte request	<SOH>F
Store label in module & terminate formatting	smname
Symbol set select	<STX>ySaa
Symbol set select	ySaa
Terminate formatting - print label format	E
Terminate label formatting, do not print label	X
Time and date request	<STX>B
Time and date set	<STX>AwMMddyearhhmmjjj
Update system database with current database	<SOH>U
Zero (Ø) conversion to "0"	z

Table M-1: Commands (M-Z)

Appendix

Class Series DPL Constraint Cross-Reference

☑ **Note:** Throughout the tables below, the following standards are used:
X = Supported Command
ND = Non-Display

Immediate Command	Description	Class Printer Model					
		A	E	I	M – ND	M	W
#	Reset	X	X	X	X	X	X
*	Reset	X		X		X	X
A	Send ASCII Status String	X	X	X	X	X	X
B	Toggle Pause	X	X	X	X	X	X
C	Stop/Cancel	X	X	X	X	X	X
D	SOH Shutdown		X		X		
E	Send Batch Quantity	X	X	X	X	X	X
F	Send Status Byte	X	X	X	X	X	X
U	Update System Database with Current Database	X	X	X	X	X	X

Table N-1: Immediate Command <SOH> Constraints

System Level Command	Description	Class Printer Model					
		A	E	I	M – ND	M	W
A	Set Time and Date	X	X	X	X	X	X
a	Enable Feedback Characters	X	X	X	X	X	X
B	Get Printer Time and Date Info	X	X	X	X	X	X
b	Set Cutter signal time						
C	Copy Module						
c	Set Continuous Paper Length	X	X	X	X	X	X
D	Memory Dump						
d	Set Printer to Double Buffer Mode		X		X		
E	Set Quantity for Stored Label	X	X	X	X	X	X
e	Select Edge Sensor	X	X	X	X	X	X
F	Form Feed	X	X	X	X	X	X
f	Set Form Stop Position	X	X	X	X	X	X
G	Print Last Label Format	X	X	X	X	X	X
g	Internal Batch Software Mode						
H	Set Cutter Signal Time						
I	Input Graphics Data	X	X	X	X	X	X
i	Download Scalable Font	X	X	X	X	X	X
J	Set Pause	X	X	X	X	X	X
k	Test RS-232 Port	X	X	X	X	X	X
L	Enter Label Formatting Mode	X	X	X	X	X	X

Table N-2: System Level Command <STX> Constraints

System Level Command	Description	Class Printer Model					
		A	E	I	M – ND	M	W
M	Set Maximum Label Length	X	X	X	X	X	X
m	Set Printer to Metric	X	X	X	X	X	X
N	Enter Internal Batch						
n	Set Printer to Inches	X	X	X	X	X	X
O	Set Start of Print Position	X	X	X	X	X	X
o	Cycle Cutter	X	X	X	X	X	X
P	Enter Character Dump Mode	X	X	X	X	X	X
p	Controlled Pause	X	X	X	X	X	X
Q	Clear All Modules	X	X	X	X	X	X
q	Clear Module	X	X	X	X	X	X
R	Ribbon Saver	X					X
r	Select Reflective Sensor	X	X	X	X	X	X
S	Set Feed Rate	X	X	X	X	X	X
s	Set Printer to Single Buffer Mode		X		X		
T	Printhead Dot Pattern Test Label	X	X	X	X	X	X
t	Test DRAM Memory Module	X	X	X	X	X	X
U	Label Format Field Replacement	X	X	X	X	X	X
V	Software Switch Settings	X	X	X	X	X	X
v	Firmware Version Information	X	X	X	X	X	X
W	Request Module Information	X	X	X	X	X	X
w	Test FLASH Memory Module	X	X	X	X	X	X
X	Set Default Module	X	X	X	X	X	X
x	Delete Module File	X	X	X	X	X	X
Y	Output Sensor Values	X	X	X	X	X	X
y	Select Font Symbol Set	X	X	X	X	X	X
Z	Print Configuration and Dot Pattern	X	X	X	X	X	X
z	Pack Module	X	X	X	X	X	X

Table N-2: System Level Command <STX> Constraints (continued)

Extended-System Command	Description	Class Printer Model					
		A	E	I	M – ND	M	W
Kb	Backfeed Time Delay		X		X		
KC	Get Configuration	X	X	X	X	X	X
Kc	Set Configuration	X	X	X	X	X	X
KD	Database Configuration		X		X		
Kd	Set File as Factory Defaults	X		X		X	X
KE	Character Encoding	X	X	X	X	X	X
KF	Select Factory Defaults	X	X	X	X	X	X
Kf	Set Present Distance	X	X	X	X	X	X
KI	GPIO Input						
KM	Memory Configuration, Internal Module		X		X		
KO	GPIO Output						
KQ	Query Memory Configuration	X	X	X	X	X	X
Kq	Query Memory Configuration (new format)	X	X	X	X	X	X
KP	Module Protection	X		X		X	X
KR	Reset Memory Configuration		X		X		
Kr	Reset Internal Counters	X	X	X	X	X	X
KS	Memory Configuration, Scalable Font Cache		X		X		
KV	Verifier Enable/Disable	X		X		X	X
KW	Memory Configuration, Printable Label Width		X		X		
Kx	Delete Configuration File	X		X		X	X

Table N-3: Extended-System Command Constraints

Label Formatting Command	Description	Class Printer Model					
		A	E	I	M – ND	M	W
:	Set Cut by Amount	X	X	X	X	X	X
+ (>)	Make Last Field Entered Increment Numeric (Alphanumeric)	X	X	X	X	X	X
- (<)	Make Last Field Entered Decrement Numeric (Alphanumeric)	X	X	X	X	X	X
^	Set Cut by Amount	X	X	X	X	X	X
A	Set Format Attribute	X	X	X	X	X	X
B	Bar Code Magnification	X		X		X	X
C	Set Column Offset Amount	X	X	X	X	X	X
c	Set Cut by Amount	X	X	X	X	X	X
D	Set Dot Size Width and Height	X	X	X	X	X	X
E	Terminate Label Formatting Mode and Print Label	X	X	X	X	X	X
e	Recall Printer Configuration	X		X		X	X
F	Advanced Font Attributes	X	X	X	X	X	X
f	Set Present Speed		X		X		
G	Place Data in Global Register	X	X	X	X	X	X
H	Enter Heat Setting	X	X	X	X	X	X
J	Justification	X	X	X	X	X	X
M	Select Mirror Mode	X	X	X	X	X	X
m	Set Metric Mode	X	X	X	X	X	X
n	Set Inch Mode	X	X	X	X	X	X
P	Set Print Speed	X	X	X	X	X	X
p	Set Backfeed Speed	X	X	X	X	X	X
Q	Set Quantity of Labels to Print	X	X	X	X	X	X
R	Set Row Offset Amount	X	X	X	X	X	X
r	Recall Stored Label Format	X	X	X	X	X	X
S	Set Slew Speed	X	X	X	X	X	X
s	Store Label Format in Module	X	X	X	X	X	X
T	Set Field Data Line Terminator	X	X	X	X	X	X
U	Mark Previous Field as a String Replacement Field	X	X	X	X	X	X
W	Wait Mode						
X	Terminate Label Formatting Mode	X	X	X	X	X	X
y	Select Font Symbol Set	X	X	X	X	X	X
Z	Zip Mode						
z	Zero (Ø) Conversion to “O”	X	X	X	X	X	X
<STX>S	Recall Global Data	X	X	X	X	X	X
<STX>T	Print Time and Date	X	X	X	X	X	X

Table N-4: Label Command Constraints

Internal Font	Description	Class Printer Model					
		A	E	I	M – ND	M	W
9	(Ann) Smooth Internal CG Triumvirate Bitmap Font: Referencing the Font 9 to Smooth CG Triumvirate Fonts are automatically converted to the CG Triumvirate Scalable Font, when installed. The printed scalable font is slightly smaller than previous printers, measuring less than 1/16 inch over three inches of print.	X [2]	X [1]	X [2]	X [1]	X [2]	X [2]
9	(S00) CG Triumvirate Bold Condensed Scalable Font. (Standard)	X		X		X	X
9	(S01) CG Triumvirate Scalable Font. (Standard)	X		X		X	X

[1] Bitmapped Fonts may or may not be used depending on installed fonts.
[2] Scaleable Fonts are always used.

Table N-5: Internal Font Constraints

Appendix

Image Loading

The printer will accept four types of image files: .BMP, .IMG, .PCX and a special Datamax 7-bit ASCII file (as defined in this section). Using the Datamax 7-bit ASCII format will require at least twice as much data transmission time as the other formats, (see <STX>I). The Datamax ASCII image file format is made up of a set of records with identical formats, each representing a dot row of the image; a terminator follows the last of these records.

Dot-row record
•
•
•
•
Dot-row record
Terminator

Each dot-row record has the following format:

Syntax: **80*nn*dd...*d*<CR>**

Where: *nn* - Is the number of character pairs in dd...d, represented in ASCII hex.

dd...d - Is dot data, character pairs, ASCII hex, 00-FF.

Duplicate records may be encoded using a repeat data record, following the data record that needs duplicating. The repeat data record format is:

Syntax: **0000FF*nn*<CR>**

Where: *nn* - Is the number of duplicates, ASCII hex, 00-FF.

The terminator, last record, at the image download is: FFFF<CR>

```
^BqA(CR)
^BIAAFLOGO(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFC00000007FFC0003FFFFC001FC0001FC0003FFFFC0018000FFC001FF8000C0003FFFFE000000FFFFE0001FFFFF0000(CR)
8030FFC00000000FFC0003FFFFC001FC0001FC0003FFFFC0018000FFC001FF800040001FFFFE0000007FFFC0001FFFFF0000(CR)
8030FFC000000003FC0001FFFFC001FC0001FC0001FFFFC0018000FFC001FF800040001FFFFE0000003FFFC0001FFFFF0000(CR)
8030FFC000000000FC0001FFFFC001FE0001FE0001FFFFC00180007FC000FF800060001FFFFE0000003FFFC0003FFFFF0000(CR)
8030FFE0000000007E0001FFFFC001FE0001FE0001FFFFC00180007FC000FFC00060000FFFFE0000001FFFC0003FFFFF0000(CR)
8030FFE0000000003E0000FFFFC001FE0000FE0000FFFFC00180007FC0007FC00020000FFFFE0000001FFF80003FFFFF0000(CR)
8030FFE0000000001E0000FFFFC001FE0000FF0000FFFFC001C0007FC0007FC00030000FFFFE0010000FFF80003FFFFF0000(CR)
8030FFE0000000000F0000FFFFC001FE0000FF0000FFFFC001C0007FC0007FC00030000FFFFE00180007FF80007FFFFF0000(CR)
8030FFE000000000700007FFFC001FF0000FF80007FFFC001C0007FC0003FC000380007FFFE00180007FF80007FFFFF0000(CR)
8030FFF000000000380007FFFC001FF0000FF80007FFFC001C0003FC0003FE000380007FFFE001C0003FF80007FFFFF0000(CR)
8030FFF000000000380007FFFC001FF0000FF80007FFFC001C0003FC0003FE000380007FFFE001E0003FF80007FFFFF0000(CR)
8030FFF000000000180003FFFC001FF00007FC0003FFFC001C0003FC0001FE0001C0003FFFE001E0001FF0000FFFFFF0000(CR)
8030FFF00000000001C0003FFFC001FF00007FC0003FFFC001E0003FC0001FE0001C0003FFFE001F0000FF0000FFFFFF0000(CR)
8030FFF00007C00000C0003FFFC001FF00007FE0003FFFC001E0003FC0000FF0001E0003FFFE001F0000FF0000FFFFFF0000(CR)
8030FFF80007F80000E0001FFFC001FF80007FE0001FFFC001E0003FC0000FF0001E0001FFFE001F80007F0000FFFFFF0000(CR)
8030FFF80007FC0000E00000000001FF80007FE00000000001E0001FC0000FF0001E00000000001FC0007F0000FFFFFF0000(CR)
8030FFF80007FE0000600000000001FF80003FF00000000001E0001FC00007F0000F00000000001FC0003F0001FFFFFF0000(CR)
8030FFF80003FF0000700000000001FF80003FF00000000001F0001FC00007F0000F00000000001FE0001E0001FFFFFF0000(CR)
8030FFF80003FF0000700000000001FF80003FF00000000001F0001FC00007F8000F00000000001FE0001E0001FFFFFF0000(CR)
8030FFFC0001FFC0003C0000000001FFE0001FFE000000001F8000FC00000FC0007E0000000001FFE00000003FFFFFF0000(CR)
8030FFFE0001FFC0001E0000000001FFE0001FFE000000001F8000FC00000FC0007E0000000001FFF00000003FFFFFF0000(CR)
8030FFFE0001FFC0001E0000000001FFE0001FFE000000001F8000FC00000FC0007F0000000001FFF00000007FFFFFF0000(CR)
8030FFFE0000FFC0001F0000000001FFE0000FFF000000001F8000FC000007C0003F0000000001FFF80000007FFFFFF0000(CR)
8030FFFE0000FFC0001F0000000001FFE0000FFF000000001FC0007C000007E0003F0000000001FFF80000007FFFFFF0000(CR)
8030FFFE0000FFE0001F0001FFC001FFE0000FFF8001FFC001FC0007C000003E0003F8000FFE001FFFC0000007FFFFFF0000(CR)
8030FFFE0000FFE0000F8001FFC001FFF0000FFF8000FFC001FC0007C000003E0003F8000FFE001FFFE000000FFFFFFF0000(CR)
8030FFFF0000FFE0000F8000FFC001FFF0000FFF8000FFC001FC0007C000003E0003F8000FFE001FFFE000000FFFFFFF0000(CR)
8030FFFF0000FFE0000F8000FFC001FFF00007FFC000FFC001FC0007C000001F0001FC000FFE001FFFF000000FFFFFFF0000(CR)
8030FFFF00007FE0000FC000FFC001FFF00007FFC0007FC001FE0007C002001F0001FC0007FE001FFFF000000FFFFFFF0000(CR)
8030FFFF00007FF0000FC0007FC001FFF00007FFE0007FC001FE0003C002001F0001FE0007FE001FFFF800000FFFFFFF0000(CR)
8030FFFF00007FF0000FE0007FC001FFF80007FFE0007FC001FE0003C003000F0001FE0007FE001FFFFC00001FFFFFFF0000(CR)
8030FFFF80007FF00007E0007FC001FFF80007FFE0003FC001FE0003C003000F0001FE0003FE001FFFFC00001FFFFFFF0000(CR)
8030FFFF80007FF00007E0003FC001FFF80003FFF0003FC001FE0003C00300078001FF0003FE001FFFFE00001FFFFFFF0000(CR)
8030FFFF80003FF00007F0003FC001FFF80003FFF0003FC001FE0003C00380078000FF0003FE001FFFFE00001FFFFFFF0000(CR)
8030FFFF80003FF80007F0003FC001FFF80003FFF0001FC001FF0003C00380078000FF8001FE001FFFFE00001FFFFFFF0000(CR)
8030FFFF80003FF80007F0001FC001FFF80003FFF8001FC001FF0001C003C0038000FF8001FE001FFFFE00001FFFFFFF0000(CR)
8030FFFFFFC0000000007FFC000001F80000000000FC000001FFF0000003FFE0000007FFC000001FFFC0003F80007FFF0000(CR)
8030FFFFFFE000000000FFFC000001F80000000000FE000001FFF8000003FFE0000007FFE000001FFFC0003FC0003FFF0000(CR)
8030FFFFFFF000000000FFFE000001F80000000000FE000001FFF8000003FFF0000007FFE000001FFFC0003FC0003FFF0000(CR)
8030FFFFFFFC00000000FFFE000001FC0000000000FE000001FFF8000003FFF0000007FFE000001FFFC0003FE0001FFF0000(CR)
8030FFFFFFFE00000000FFFE000001FC00000000007F000001FFF8000003FFF0000007FFF000001FFFC0003FE0001FFF0000(CR)
8030FFFFFFFF00000001FFFF000001FC00000000007F000001FFF8000003FFF8000007FFF000001FFF80003FF0000FFF0000(CR)
8030FFFFFFFFC0000001FFFF000001FC00000000007F000001FFF8000003FFF8000003FFF800001FFF80007FF0000FFF0000(CR)
8030FFFFFFFFE0000003FFFF800001FC00000000007F800001FFFC000003FFF8000003FFF800001FFF80007FF80007FF0000(CR)
8030FFFFFFFFF0000007FFFF800001FC00000000007F800001FFFC000003FFFC000003FFF800001FFF80007FF80007FF0000(CR)
8030FFFFFFFFF800000FFFFF800001FE00000000003FC00001FFFC000003FFFC000003FFFC00001FFF00007FFC0003FF0000(CR)
8030FFFFFFFFFE00001FFFFFC00001FE00000000003FC00001FFFC000003FFFE000003FFFC00001FFF00007FFC0003FF0000(CR)
8030FFFFFFFFFF00007FFFFFC00001FE00000000003FC00001FFFC000003FFFE000003FFFE00001FFF00007FFE0001FF0000(CR)
8030FFFFFFFFFF8003FFFFFFC00001FE00000000003FE00001FFFC000003FFFF000003FFFE00001FFF00007FFE0001FF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
8030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0000(CR)
FFFF(CR)
^BL(CR)
1Y1100000000000LOGO(CR)
E(CR)
```

Figure O-1: Sample Datamax 7-bit ASCII File Image

DATAMAX

BAR CODE PRODUCTS CORPORATION

Figure O-2: Sample Label

Appendix

UPC-A and EAN-13: Variable Price/Weight Bar Codes

The EAN/UPC standard allows for an additional checksum to be generated in the middle of the bar code based on the data. This is used when the price or weight of an item is embedded into the bar code data (commonly used in the food industry).

For the printer to generate this checksum, a 'V' must be placed in the data stream in the position the checksum is requested. If the 'V' is placed in the 6th position for UPC-A or the 7th position for EAN-13, a checksum will be generated using the next five digits in the data stream. If the 'V' is placed in the 7th position for UPC-A or the 8th position for EAN-13, a checksum will be generated using the next four digits in the data stream. The checksum is generated per the EAN/UPC bar code standard.

Examples:

1B110000200020012345V01199

Prints the UPC-A bar code with the variable price checksum in the sixth position.

1B110000200020012345V0150

Prints the UPC-A bar code with the variable price checksum in the seventh position.

1F110000200020012345V01199

Prints the EAN-13 bar code with the variable price checksum in the seventh position.

1F110000200020012345V0150

Prints the EAN-13 bar code with the variable price checksum in the eighth position.

Appendix

International Language Print Capability (ILPC) Programming Examples

ILPC, offered as a field upgrade or a factory installable option, allows the printing of non-English character sets, available with European language support (CG TIMES), KANJI language support (GOTHIC B and GOTHIC E [available on the E-Class and non-display M-Class printer models]), Chinese language support (SIMPLIFIED GB) and Korean Hangul. All of the features are embedded in the printer resident firmware and accessible through DPL thus eliminating excessive download time of bitmapped characters. Using scalable technology licensed from AGFA, this firmware allows users to print smooth characters in sizes from 4pt (1.4 mm) to 999pt (350 mm) in over 40 languages. Consult Appendix I for code page selections. Specific details regarding which characters are supported in each option can be obtained through Datamax Technical Support.

ILPC - CG® TIMES Option

The CG Times Option is a single-byte scalable font consisting of four typefaces in 38 Western European languages. This option contains over 900 unique characters in each of the four typefaces from the CG Times typeface family, Normal, Italic, Bold, and Bold Italic. Single-byte scalable fonts are selected using a print format record (see Generating Label Formats and Appendix H for details).

Scalable CG® TIMES Font Code ('eee' field):

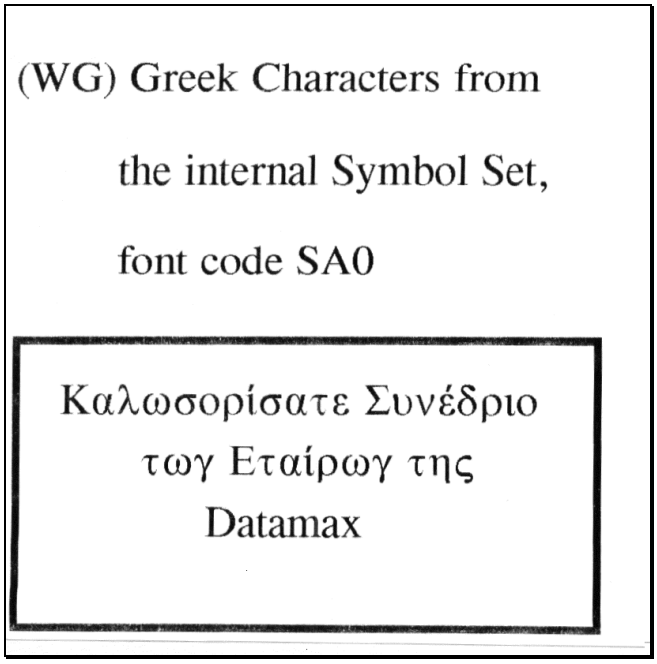
SA0 - CG TIMES
SA1 - *CG TIMES ITALIC*
SA2 - **CG TIMES BOLD**
SA3 - ***CG TIMES BOLD ITALIC***

Sample Greek DPL file and resulting label:

```
<02>L<CR>
D11<CR>
ySWG<CR>
1911SA003600020P020P020(WG) Greek Characters from<CR>
1911SA003000085P020P020the internal Symbol Set,<CR>
1911SA002400085P020P020font code SA0<CR>
1911SA001500050P020P020<ca><e1><eb><f9><f3><ef><f1><df><f3><e1><f4><e5><20><d3><f5><ed>
<dd><e4><f1><e9><ef><20><CR>
1911SA001100100P020P020<f4><f9><e3><20><c5><f4><e1><df><f1><f9><e3><20><f4><e7><f2><CR>
1911SA000700140P020P020Datamax<CR>
1X1100000100020B365190005005<CR>
Q0002<CR>
E<CR>
```

☑ **Note:** The notation "<xx>" in this DPL file should be interpreted by the reader as representing the hexadecimal value of the character sent to the printer.

Sample label created using the preceding data:



ILPC-KANJI Option

The Kanji Option is a double byte scalable font supporting Kanji Gothic B (or Gothic E on E-Class and non-display M-Class printers). In the double byte format, the printer recalls one character printed from every two 8-bit bytes sent from the host. Double byte scalable fonts are selected using a print format record (see Generating Label Formats and Appendix H for details).

Scalable Double-Byte Font Map - KANJI					
eee (Font Code)	**Scalable Font Type**	**Font Name**	**Binary Addressing**	**Hex ASCII Addressing**	**Code Pages**
U40	Scalable Resident	HG-Gothic-B Kanji Scalable	√		EUC, JIS, SJIS, UC
u40	Scalable Resident	HG-Gothic-B Kanji Scalable		√	EUC, JIS, SJIS, UC
UK1	Scalable Resident	HG-Gothic-E Kanji Scalable	√		EUC, JIS, SJIS
uK1	Scalable Resident	HG-Gothic-E Kanji Scalable		√	EUC, JIS, SJIS
u50 - u5z… u90 - u9z	Scalable Non-Resident (download)	User defined		√	
U50 - U5z... U90 - U9z	Scalable Non-Resident (download)	User defined	√		

☑ **Note:** Not all fonts contain an entire compliment of character codes for a given character map. Gothic E is available only on E-Class and non-display M-Class printers.

Sample Kanji Gothic B DPL file (binary addressing) and the resulting label:

```
<02>L<CR>
D11<CR>
ySPM<CR>
1911S0003100010P020P015Scalable Kanji Gothic B Available<CR>
1B1100000200170012345678900<CR>
yUJS<CR>
1X1100001900010b0392011000020002<CR>
1122000028000030JIS CHARACTER'S IN ALL 4 ROTATION'S<CR>
1122000026000030Rotation 1<CR>
1911U4002650150P012P012<4D><3F><21><21><21><21><4D><4F><21><21><21><21><4D><5F><21><21>
<21><21><4D><6F><00><00><CR>
1122000024000030Rotation 2<CR>
2911U4002600150P012P012<4D><3F><00><00><CR>
2911U4002600205P012P012<4D><4F><00><00><CR>
2911U4002600250P012P012<4D><5F><00><00><CR>
2911U4002600300P012P012<4D><6F><00><00><CR>
1122000022000030Rotation 3<CR>
3911U4002330315P012P012<4D><6F><21><21><21><21><4D><5F><21><21><21><21><4D><4F><21><21>
<21><21><4D><3F><00><00><CR>
1122000020000030Rotation 4<CR>
4911U4001950165P012P012<4D><3F><00><00><CR>
4911U4001950215P012P012<4D><4F><00><00><CR>
4911U4001950265P012P012<4D><5F><00><00><CR>
4911U4001950315P012P012<4D><6F><00><00><CR>
1X1100001100010b0392007500020002<CR>
1122000016500030SCALING JIS CHARACTER'S<CR>
1911U4001200020P010P020<21><6F><00><00><CR>
1911U4001200050P020P020<21><6F><00><00><CR>
1911U4001200080P030P020<21><6F><00><00><CR>
1911U4001200110P040P020<21><6F><00><00><CR>
1911U4001200145P040P030<21><6F><00><00><CR>
1911U4001200190P040P040<21><6F><00><00><CR>
1911U4001200250P040P050<21><6F><00><00><CR>
1911U4001200320P040P060<21><6F><00><00><CR>
1122000000500010NORMAL   INVERSE<CR>
112200000050245 NORMAL   MIRROR<CR>
1911U4000250010P040P040<21><6F><00><00><CR>
1911U4000250245P040P040<4B><30><00><00><CR>
A5<CR>
1911U4000250090P040P040<21><6F><00><00><CR>
A1<CR>
M<CR>
1911U4000250390P040P040<4B><30><00><00><CR>
M<CR>
E<CR>
```

☑ **Note:** The notation "<xx>" in this DPL file should be interpreted by the reader as representing the hexadecimal value of the byte sent to the printer.

Sample Kanji Gothic E DPL file (Hex-ASCII addressing) and resulting label:

```
<02>L<CR>
D11<CR>
ySPM<CR>
1911S0003100010P020P015Scalable Kanji Gothic E Available<CR>
1B11000002001700123456789O<CR>
yUJS<CR>
1X1100001900010b0392011000020002<CR>
112200002800030JIS CHARACTER'S IN ALL 4 ROTATION'S<CR>
112200002600030Rotation 1<CR>
1911uK102650150P012P0124D3F212121214D4F212121214D5F212121214D6F<CR>
112200002400030Rotation 2<CR>
2911uK102600150P012P0124D3F<CR>
2911uK102600205P012P0124D4F<CR>
2911uK102600250P012P0124D5F<CR>
2911uK102600300P012P0124D6F<CR>
112200002200030Rotation 3<CR>
3911uK102330315P012P0124D6F212121214D5F212121214D4F212121214D3F<CR>
112200002000030Rotation 4<CR>
4911uK101950165P012P0124D3F<CR>
4911uK101950215P012P0124D4F<CR>
4911uK101950265P012P0124D5F<CR>
4911uK101950315P012P0124D6F<CR>
1X1100001100010b0392007500020002<CR>
112200001650030SCALING JIS CHARACTER'S<CR>
1911uK101200020P010P020216F<CR>
1911uK101200050P020P020216F<CR>
1911uK101200080P030P020216F<CR>
1911uK101200110P040P020216F<CR>
1911uK101200145P040P030216F<CR>
1911uK101200190P040P040216F<CR>
1911uK101200250P040P050216F<CR>
1911uK101200320P040P060216F<CR>
112200000050010NORMAL   INVERSE<CR>
112200000050245 NORMAL   MIRROR<CR>
1911uK100250010P040P040216F<CR>
1911uK100250245P040P0404B30<CR>
A5<CR>
1911uK100250090P040P040216F<CR>
A1<CR>
M<CR>
1911uK100250390P040P0404B30<CR>
M<CR>
E<CR>
```

ILPC-CHINESE Option

The Chinese Option is a double byte scalable font supporting Simplified GB Chinese. In the double byte format the printer recalls one character printed from every two 8-bit bytes sent from the host. Double byte scalable fonts are selected using a print format record (see Generating Label Formats and Appendix H for details).

DPL Big 5 Encoding Support: With the ILPC Chinese option, the printer firmware supports font files that are encoded for the GB Character Map and the Big 5 Character Map. The resident Asian font in the printer is encoded in the GB Character Map. To utilize the Big 5 Character Map, the user must download a font file that is Big 5 encoded. The font file downloaded must be of a size compatible with the internal module size available or of a size compatible with an external (plug in) module where applicable. Printing characters from the Big 5 encoded font file is accomplished by:

1. Setting the character mapping with a System Command or Label Format Command (<STX>yUB5 or yUB5, respectively).
2. Setting the 'b' field = '9' and 'eee' field = 'Unn', where 'nn' is equal to the Font ID number selected for the Big 5 encoded font file downloaded.
3. Selecting string data corresponding to the Big 5 Character Map.

Scalable Double-Byte Font Map - CHINESE					
eee (Font Code)	**Scalable Font Type**	**Font Name**	**Binary Addressing**	**Hex ASCII Addressing**	**Code Pages**
UC0	Scalable Resident	Simplified GB Chinese	√		GB
uc0	Scalable Resident	Simplified GB Chinese		√	GB
U50 - U5z... U90 - U9z	Scalable Non-Resident (download)	Big 5	√		B5
u50 - u5z… u90 - u9z	Scalable Non-Resident (download)	Big 5		√	B5
U50 - U5z... U90 - U9z	Scalable Non-Resident (download)	User defined	√		_
u50 - u5z… u90 - u9z	Scalable Non-Resident (download)	User defined		√	_

Sample Simplified GB Chinese DPL file (binary addressing) and resulting label:

```
<02>L<CR>
D11<CR>
ySPM<CR>
1911S0003100010P020P015Scalable Chinese Available in GB Character Set<CR>
1B11000002001700123456789O<CR>
yUGB<CR>
1X1100001900010b0392011000020002<CR>
112200002800030GB CHARACTER'S IN ALL 4 ROTATION'S<CR>
112200002600030Rotation 1<CR>
1911UC002650150P012P012<BD><D0>A1><A1><A1><A1><BD><D1><A1><A1><A1><A1><BD><D2><A1><A1>
<A1><A1><BD><D3><00><00><CR>
112200002400030Rotation 2<CR>
```

```
2911UC002600150P012P012<BD><D0><00><00><CR>
2911UC002600205P012P012<BD><D1><00><00><CR>
2911UC002600250P012P012<BD><D2><00><00><CR>
2911UC002600300P012P012<BD><D3><00><00><CR>
112200002200030Rotation 3<CR>
3911UC002330315P012P012<BD><D3><A1><A1><A1><A1><BD><D2><A1><A1><A1><A1><BD><D1><A1><A1>
<A1><A1><BD><D0><00><00><CR>
112200002000030Rotation 4<CR>
4911UC001950165P012P012<BD><D0><00><00><CR>
4911UC001950215P012P012<BD><D1><00><00><CR>
4911UC001950265P012P012<BD><D2><00><00><CR>
4911UC001950315P012P012<BD><D3><00><00><CR>
1X1100001100010b0392007500020002<CR>
112200001650030SCALING GB CHARACTER'S<CR>
1911UC001200020P010P020<BA><D0><00><00><CR>
1911UC001200050P020P020<BA><D0><00><00><CR>
1911UC001200080P030P020<BA><D0><00><00><CR>
1911UC001200110P040P020<BA><D0><00><00><CR>
1911UC001200145P040P030<BA><D0><00><00><CR>
1911UC001200190P040P040<BA><D0><00><00><CR>
1911UC001200250P040P050<BA><D0><00><00><CR>
1911UC001200320P040P060<BA><D0><00><00><CR>
112200000050010NORMAL   INVERSE<CR>
112200000050245 NORMAL    MIRROR<CR>
1911UC000250010P040P040<BD><E0><00><00><CR>
1911UC000250245P040P040<BD><E1><00><00><CR>
A5<CR>
1911UC000250090P040P040<BD><E0><00><00><CR>
A1<CR>
M<CR>
1911UC000250390P040P040<BD><E1><00><00><CR>
M<CR>
E<CR>
```

☑ **Note:** The notation "<xx>" in this DPL file should be interpreted by the reader as representing the hexadecimal value of the byte sent to the printer.

ILPC-KOREAN Option

The Korean Option is a double-byte scalable font supporting Korean Hangul. In the double-byte format, the printer recalls one character printed from every two 8-bit bytes sent from the host. Double-byte scalable fonts are selected using a print format record (see Generating Label Formats and Appendix H for details).

Scalable Double-Byte Font Map - KOREAN					
eee (Font Code)	**Scalable Font Type**	**Font Name**	**Binary Addressing**	**Hex ASCII Addressing**	**Code Pages**
UH0	Scalable Resident	Korean Hangul	√		UC
uh0	Scalable Resident	Korean Hangul		√	UC
u50 - u5z… u90 - u9z	Scalable Non-Resident (download)	User defined		√	
U50 - U5z... U90 - U9z	Scalable Non-Resident (download)	User defined	√		

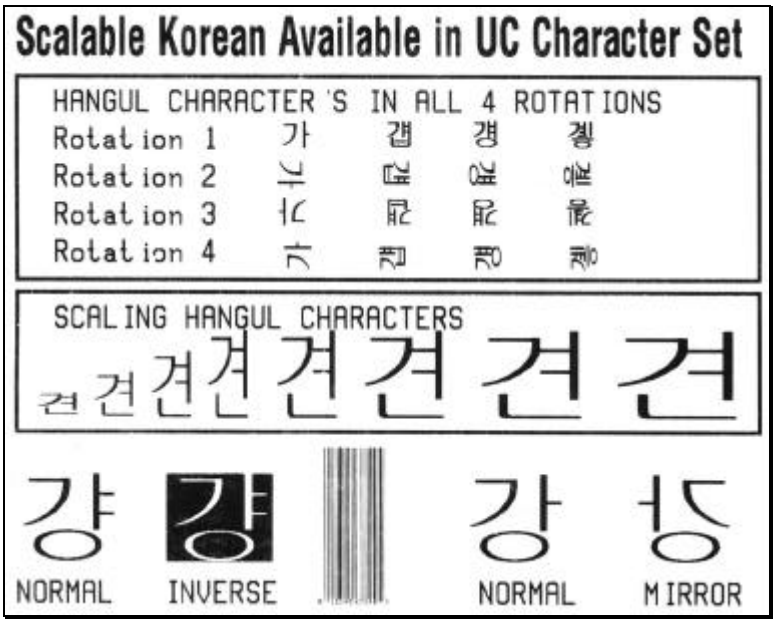
☑ **Note:** Not all fonts contain an entire compliment of character codes for a given character map.

Sample Korean Hangul DPL file (binary addressing) and the resulting label:

```
<02>L<CR>
D11<CR>
ySPM<CR>
1911S0003100010P020P015Scalable Korean Available in UC Character Set<CR>
yUUC<CR>
1B11000002001700l234567890<CR>
1X1100001900010b0392011000020002<CR>
112200002800030HANGUL CHARACTER'S IN ALL 4 ROTATIONS<CR>
112200002600030Rotation 1<CR>
1911UH002620150P012P012<AC><00><00><00><CR>
1911UH002620205P012P012<AC><65><00><00><CR>
1911UH002620250P012P012<AC><69><00><00><CR>
1911UH002620300P012P012<AC><DF><00><00><CR>
112200002400030Rotation 2<CR>
2911UH002550150P012P012<AC><00><00><00><CR>
2911UH002550205P012P012<AC><65><00><00><CR>
2911UH002550250P012P012<AC><69><00><00><CR>
2911UH002550300P012P012<AC><DF><00><00><CR>
112200002200030Rotation 3<CR>
3911UH002330165P012P012<AC><00><00><00><CR>
3911UH002330220P012P012<AC><65><00><00><CR>
3911UH002330265P012P012<AC><69><00><00><CR>
3911UH002330315P012P012<AC><DF><00><00><CR>
112200002000030Rotation 4<CR>
4911UH001950165P012P012<AC><00><00><00><CR>
4911UH001950215P012P012<AC><65><00><00><CR>
4911UH001950265P012P012<AC><69><00><00><CR>
4911UH001950315P012P012<AC><DF><00><00><CR>
1X1100001100010b0392007500020002<CR>
112200001650030SCALING HANGUL CHARACTERS<CR>
1911UH001200020P010P020<AC><AC><00><00><CR>
1911UH001200050P020P020<AC><AC><00><00><CR>
1911UH001200080P030P020<AC><AC><00><00><CR>
```

```
1911UH001200110P040P020<AC><AC><00><00><CR>
1911UH001200145P040P030<AC><AC><00><00><CR>
1911UH001200190P040P040<AC><AC><00><00><CR>
1911UH001200250P040P050<AC><AC><00><00><CR>
1911UH001200320P040P060<AC><AC><00><00><CR>
112200000200010NORMAL    INVERSE<CR>
112200000200245 NORMAL     MIRROR<CR>
1911UH000450010P040P040<AC><4D><00><00><CR>
1911UH000450245P040P040<AC><15><00><00><CR>
A5<CR>
1911UH000450090P040P040<AC><4D><00><00><CR>
A1<CR>
M<CR>
1911UH000450390P040P040<AC><15><00><00><CR>
M<CR>
E<CR>
```

☑ **Note:** The notation "<xx>" in this DPL file should be interpreted by the reader as representing the hexadecimal value of the byte sent to the printer.



Appendix

Plug and Play IDs

```
MFG:Datamax;
CMD:DPL;
MDL:I4208;
CLS:PRINTER;
DES:Datamax 4208 Label Printer Version 06.06 07/09/2001
```

Where:

CMD = Fixed string “DPL”

MDL = Model (valid MDLs are A4212, A4310, A4408, A4606, A6212, A6310, E4203, E4204, E4304, M4206, M4208, M4306, I4206, I4208, I4308, I4210, I4212, I4406, I4604, W6308, W6208 & W8306)

CLS = Fixed string “PRINTER”

DES = Description (subject to change with the application [firmware] revision and printer model)

Appendix

Bar Code Symbology Information Sources

AIM International, Inc.
11860 Sunrise Valley Drive, Suite 101
Reston, VA 22091 USA
Tel: 703-391-7621 Fax: 703-391-7624

AIM JAPAN
Aios Gotanda Bldg. 6F
1-10-7 Higashigotanda
Shinagawa-ku Tokyo 141 Japan
Tel: 03-3440-9085 Fax: 03-3440-9086

AIM EUROPE
The Old Vicarage
Haley Hill, Halifax HX3 6DR
West Yorkshire, England
Tel: 44-1422-359161 Fax: 44-1422-3556904

AIM UK
The Old Vicarage
Haley Hill, Halifax HX3 6DR
United Kingdom
Tel: 44-1422-359161 Fax: 44-1422-355604

AIM USA
634 Alpha Drive
Pittsburgh, PA 15238-2802 USA
Tel: 412-963-8588 Fax: 412-963-8753

American National Standards Institute (ANSI)
11 West 42nd Street
New York, New York 10036 USA
Tel: 212-642-4900 Fax: 212-398-0023

Automotive Industry Action Group
26200 Lahser Road
Suite 200
Southfield, MI 48034 USA
Tel: 313-358-3570 Fax: 313-358-3253

Computing Technology Industry Association
450 E. 22 Street Suite 230
Lombard, IL 60148-6158 USA
Tel: 630 268-1818 Fax: 630 278-1384

Health Industry Business Communications Council
PO Box 53528
Phoenix, AZ 85018 USA
Tel 602-318-1091

International Article Numbering Association
(EAN)
Rue Royal 29
B-1000 Bruxelles
Belgium
Tel: 32-22-187674 Fax: 32-22-187585

Uniform Code Council, Inc. (UCC)
8163 Old Yankee Rd. Suite J
Dayton, OH 45458 USA
Tel: 513-435-3870 Fax: 513-435-4749

U.S. Government Printing Office
732 North Capitol Street NW
Washington, DC 20401 USA
Tel: 202-512-1991 Fax: 202-512-1293

Glossary

alphanumeric Consisting of alphabetic, numeric, punctuation and other symbols.

backing material The silicon-coated paper carrier material to which labels with adhesive backing are affixed. Also referred to as “liner”.

bar code A representation of alphanumeric information in a pattern of machine-readable marks. The basic categories are divided into one-dimensional (UPC, Code 39, Postnet, etc.) and two-dimensional bar codes (Data Matrix, MaxiCode, PDF417, etc.).

boot loader The resident program that loads the application from Flash memory, decompresses it into the DRAM, and starts operations.

burn line The row of thermal elements in the printhead that create the images on the media.

calibration The process through which Media Sensor readings are entered into the printer for correct sensor function (for example, detection of a given media type) and top of form positioning.

character set The entire complement of alphanumeric symbols contained in a given font.

checksum An alphanumeric error detection method used in many bar code symbologies for informational security.

continuous media An uninterrupted roll or box of label or tag stock media that contains no gap, slit, notch, or black mark to separate individual labels or tags.

cutter A mechanical device with a rotary or guillotine type blade used to cut labels or tags following printing.

defaults The functional setting values returned following a factory reset of the printer.

diagnostics Programs used to locate and diagnose hardware problems.

die-cut media Media that has been cut into a pattern using a press, where the excess paper is removed leaving individual labels, with gaps between them, attached to a backing material.

direct thermal The printing method that uses a heat sensitive media and only the heat of the thermal printhead to create an image on the label.

direct thermal media Media coated with special chemicals that react and darken with the application of heat.

DPI (dots per inch) A measurement of print resolution, rated in the number of thermal elements contained in one inch of the printhead. Also referred to as “resolution.”

DPL (Datamax Programming Language) programming commands used specifically for control of and label production in Datamax printers.

fan-fold Media that is folded and stacked.

feed speed The rate at which the media moves under the printhead in non-printed areas and between labels.

Flash memory Non-volatile memory (does not require printer power to maintain data) that can be erased and reprogrammed, used to hold the printer's operating program.

font A set of alphanumeric characters that share a particular typeface.

gap A space between die-cut or notched labels used to sense the top-of-form.

IPS (inches per second) Imperial measurement of printer speeds.

label A paper or synthetic printing material, typically with a pressure sensitive adhesive backing.

label length The distance from the top of the label to the bottom of the label as it exits the printer.

label repeat The distance from the top of one label to the top of the next label.

label tracking Excessive lateral (side to side) movement of the media as it travels under the printhead.

label width The left to right measurement of the label as it exits the printer.

media Generalized term for all types of printing stocks, including: roll fed, continuous, butt-cut, die-cut, reflective, and fanfold.

media hub Device in the printer used to support roll media.

media sensor An electronic device equipped with photosensors to detect media and the top-of-form on die-cut, notched or reflective media.

MMPS (millimeters per second) Metric measurement of printer speeds.

notched stock Media, typically tag stock, with holes or notches in the material that is used to signal the top-of-form. The printer must be set to 'gap' to use this media type.

perforation Small cuts extending through the backing and/or label material to facilitate their separation. Also referred to as "perf".

preprinted media Label stock that contains borders, text, or graphics, floodcoating, etc.

present sensor An electronic sensor that provides a signal to the printer firmware that a label is present, typically located beyond the printhead, where the labels exits the printer.

print speed The rate at which the media moves under the printhead during the printing process.

reflective media Media imprinted with carbon-based black marks on the underside of the material, which is used to signal the top-of-form when the ‘reflective’ Media Sensor is enabled.

registration Repeatable top to bottom alignment of printed labels.

reverse speed The backward rate of media motion into the printer during tear-off, peel and present and cutting operations for positioning the label at the start of print position.

ribbon An extruded polyester tape with several layers of material, one of which is ink-like, used to produce an image on the label. Also referred to as “foil”.

roll media A form of media that is wound upon a cardboard core.

start of print The position on the label where the printing actually begins.

tag stock A heavy paper or synthetic printing material, typically featuring a notch or black mark for top of form and no adhesive backing.

thermal transfer The printing method that creates an image by transferring ink from a ribbon onto the media using the heat from the thermal printhead.

TOF (top-of-form) The start of a new label as indicated by a label gap, notch, mark or programming.