LDS2

PROGRAMMING MANUAL

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Introduction

This programming guide provides the user with an overview of the LDS2 command structure and label formatting requirements found in the X85 Series printers.

The Label Design Software (LDS2) is the resident printer control language used to create, store and print label scripts, while also controlling the other various printer features.

LDS2 may be used in conjunction with mini-computers, mainframes, personal computers, and most other special purpose computers. The examples provided within this guide use an IBM® compatible personal computer with an available communication port, Windows Notepad, and MCT a terminal emulation program found on our website. The examples included use Windows Notepad and then sent to the printer's active communication port using the MCT program.

This programming manual was written against the feature of code version 01.01.20.

Chapter 3: Special Features

3.1 Reverse Video

The Reverse Video feature is used to automatically generate a box, using the current foreground color, on top of text. This creates text that is the background color, and is done by setting the "AI" (Attribute Index) field to a "2" in the Format Entry command ("^Fn)"). The box can be increased in size by simply overlaying the desired area with a line using the Line Draw feature. The Line Draw format line should be placed before the Reverse Video field to increase the size of the overlaying box.

Auto Reverse Video Example:

```
^A)
^D200) 3.3, 1.9, 0.125, 1.063, 5, 1
^F1) 1.0, 1.0, @normal_14, , , 2
^T1)Reverse Video
^D300)1
^Z)
```


Figure 13   Reverse Video

Line Draw Reverse Video Example:

```
^A)
^D200) 3.3, 1.9, 0.125, 1.063, 5, 1
^F1) 0.25, 0.50,@line, 2.75, 1.00
^F1) 1.0, 1.0, @normal_14, , , 2
^T1)Reverse Video
^D300)1
^Z)
```

Figure 14   Line Draw Reverse Video

3.2 Line Draw

The line draw feature is selected by entering "@line" into the CI parameter of the "^Fn)" Format Entry command. The line draw feature easily creates lines by using the XB and YB coordinates as an insertion point for the line to start. Adjusting the SW and SH parameters determines the width and the height of the line with respect to the rotation or orientation of the FO field.

Line Draw Example:

```
^A)
^D200) 3.3, 1.9, 0.125, 1.063, 5, 1
^F1) 1.0, 1.0,@line, 1.11, 0.01
^F1) 1.0, 1.0,@normal_14
^T1)Line Draw Feature
^D300)1
^Z)
```

This would cause a line to be inserted an inch from the left side and an inch from the bottom. The line would be 0.01" in height and would be 1.11" in width or length. The "^Fn)" field must reference a "^Tn)" field for proper operation. The line draw does not have to reference its own specific Text Entry command (^T) so it could reference an existing Text Entry field in the script file as demonstrated in the above example.

Figure 15   Line Draw Feature

Two Lines Example:

^A)
^D200) 3.3, 1.9, 0.125, 1.063, 5, 1
^F1) 1.0, 1.0, @line, 1.11, 0.01
^F1) 1.55,0.25,@line, 0.01, 0.75
^F1) 1.0, 1.0, @normal_14
^T1)Line Draw Feature
^D300)1
^Z)

Line Draw Feature
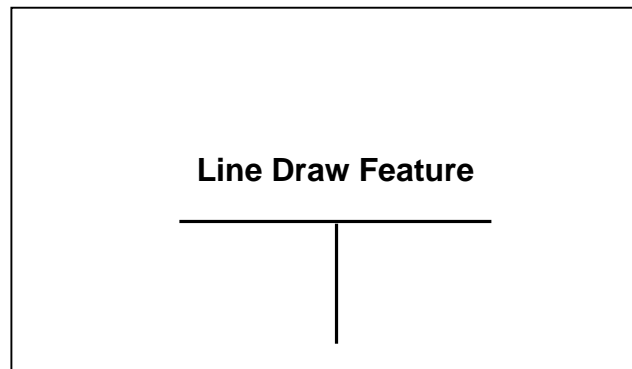
Figure 16   Two Lines

This example shows a line inserted an inch from the left side and an inch from the bottom. This line would be 0.01" in height and would be 1.11" in width or length. A second line is being inserted 1.55" from the left edge and a .25" from the bottom. This line would be 0.75" in height and would be 0.01" in width or length. This demonstrates that the Line Draw feature can be used to draw any amount of lines desired without creating a new "^Tn)" pointer as seen in the example above.
The Line Draw feature can also be used to create boxes. To accomplish this you simply create four lines that connect together to form a box.

Box Creation Example:

^A)
^D200) 3.3, 1.9, 0.125, 1.063, 5, 1
^F1) 0.90, 1.00, @line, 1.35, 0.01
^F1) 0.90, 1.25, @line, 1.35, 0.01
^F1) 0.90, 1.00, @line, 0.01, 0.25
^F1) 2.24, 1.00, @line, 0.01, 0.25
^F1) 1.00, 1.00, @normal_14
^T1)Box Creation
^D300)1
^Z)
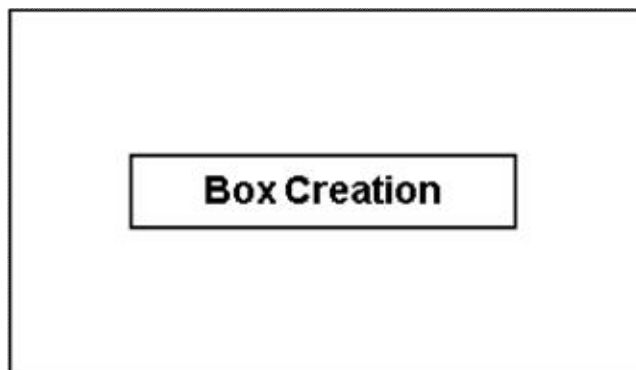
Figure 17   Box Creation

Chapter 4: Bar Codes

The purpose of this chapter is to provide information and the formatting requirements of the different bar codes that are stored in the printer's memory.

4.1 Generating Bar Codes

Bar codes that are stored in the printer are generated by using the CI, SW, SH and the AI (when applicable) parameters of the Format Entry Command ("^Fn)"). The CI parameter is used to select the text equivalent code of the desired bar code while the SW, SH and AI parameters control the size of the printed bar code.

4.1.1   CI Parameter

The CI or Conversion Identifier selects the bar codes that are stored in the printer by entering the text equivalent code of the desired bar code. Refer to Table 1 or the descriptions below, under the "Bar Code Types" section, for the available bar codes and their equivalent codes. The text equivalent codes may be entered in either uppercase, lowercase, or a combination or the two.

4.1.2   SW Parameter

When used in conjunction with bar codes the SW parameter is used to modify the Bar code width by a multiple of the narrowest rendition. This means that a value of "1" will produce the narrowest rendition related to the bar elements while a value of "3" would produce a Bar code that is three times this width. The default value of "1" will be used if a Bar code is selected and this field is left blank.

4.1.3   SH Parameter

When used in conjunction with bar codes the SH parameter selects the actual height, measured in inches, of the desired bar code. This is a required field when used in conjunction with bar codes.

4.1.4   AI Parameter

Some bar code types combine the use of ratios along with the SW and SH parameters to create the different sizes of printed output. The bar codes that use the different ratios are entered in a ratio format and are listed in the descriptions under the "Bar Code Types" section. The ratio is required for the bar codes that utilize the different ratios and if omitted, the bar code will not be printed.

For example: "3:1" would be entered for the AI parameter for a bar code that allows a three to one ratio with respect to the wide and narrow bars.

4.2 Linear Bar Codes

This section provides information regarding the different requirements of the linear bar codes. Unless stated otherwise in the descriptions below, the printer will automatically generate the necessary check digits when required.

4.2.1 Codabar (Rationalized)

Codabar is a variable length linear symbology that used in libraries, blood banks, and in the air parcel business. Codabar is capable of encoding the 16 following characters: 0123456789-$:/. + and the four start/stop characters ABCD. This symbol uses 2:1, 3:1, 4:2, 5:2, and 8:3 ratios, which may be entered in the AI parameter.

CI text equivalent codes: @codabar

4.2.2 Code 128 (Manual Compression)

The Code 128 bar code is a variable length, high density, alphanumeric symbology that used worldwide. This bar code uses three subsets (A, B, and C) which allows for the encoding of the full 128 ASCII character set along with special control codes. This bar code uses manual compression, which provides full control by manually shifting between the available subsets using the special function access codes. The codes (#n) are placed within the data string to access the desired functions listed in the table below.

Code	SUBSET A	SUBSET B	SUBSET C
#0	FNC3	FNC3	N/A
#1	FNC2	FNC2	N/A
#2	SHIFT	SHIFT	N/A
#3	CODE C	CODE C	N/A
#4	CODE B	FNC4	CODE B
#5	FNC4	CODE A	CODE A
#6	FNC1	FNC1	FNC1
#7	START	N/A	N/A
#8	N/A	START	N/A
#9	N/A	N/A	START
##	#	#	N/A

Table 11   Code 128 Special Function Access

When using manual compression the printer defaults to subset B if no start code is defined. The printer will also not attempt to compress the data unless subset C is used. Once in subset C the user must send the appropriate code (#n) to return to either subset A or B.

Data String using Manual Compression

ABC#3012345#5abc

The printer defaults to subset B

The "#3" code, while in subset B, switches to subset C.

The "#5" code, while in subset C, switches to subset A.
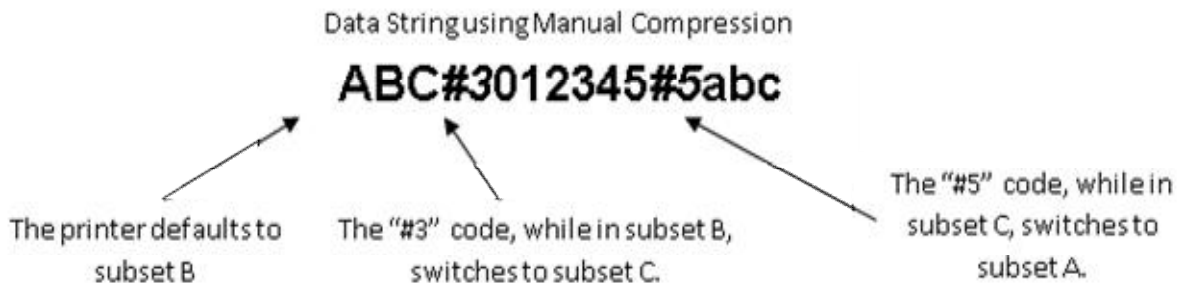
Figure 18   Code 128 Subset Switching

Subset A

This subset contains 106 unique characters, which includes numbers 0 through 9, the English alphabet (uppercase only), punctuation marks, ASCII control codes, and the special function codes listed in table 6.

Subset B

This subset contains 106 unique characters, which includes numbers 0 through 9, the English alphabet (both uppercase and lower case), punctuation marks, and the special function codes listed in table 6. This is the default if a subset is not defined when using manual compression.

Subset C

This subset contains 106 unique characters, which includes matched pair numbers 00 through 99 and the special function codes listed in table 6. Subset C requires that an even amount of digits to be sent because the matched pairs are encoded as a single character. This allows for a greater amount of compression than subsets A and B. If an odd amount of digits and/or non-numeric characters were sent while using subset C, the resulting bar code produced would be invalid.

> CI text equivalent codes: @code128, @c128

4.2.3   Code 128 (Automatic Compression)

The Code 128 bar code is a variable length, high density, alphanumeric symbology that is extensively used worldwide. This bar code uses three subsets (A, B, and C) which allows for the encoding of the full 128 ASCII character set along with special control codes. This bar code uses automatic compression, which means that the printer will automatically choose the most efficient subset and insert the appropriate special function code listed in table 6. It is possible to force a subset change by inserting the appropriate code while in automatic compression but is not recommended. Please note that if a subset is forced while using automatic compression the printer will automatically switch to subset C if 6 or more numeric characters are contained in the data string. Once the even number of characters has been processed, the printer will then switch to subset B. This could create problems if a user sent 6 numeric characters while forcing subset A ("#7123456"), the printer would actually automatically switch to subset C and then back to subset B resulting in an undesired bar code. If specific control of the subsets is a requirement, then the manual compression bar code should be used.

> CI text equivalent codes: @code128auto

4.2.4   Code 39

Code 39 is a variable length, alphanumeric symbology that is very popular and is extensively used in the non-retail, military, manufacturing and medical industries. Code 39 is capable of encoding numerical characters 0 through 9, the English Alphabet (uppercase only), characters -. *$/+% along with the "space" character. The Code 39 is framed with a start/stop character represented by the asterisk ("*") character, which is reserved for this purpose. This symbol uses 2:1, 3:1, 4:2, 5:2, and 8:3 ratios, which may be entered in the AI parameter.

> CI text equivalent codes: @code3of9, @code39, @3of9, @c39

4.2.5   Code 93
Code 93 is a variable length; alphanumeric symbology that is capable of encoding 48 different characters and through the use of control characters can encode the full 128 ASCII character set. The 48 characters include the "space", numerical characters 0 through 9, the English alphabet (uppercase only), characters $%+-. / and five special characters including the start/stop character.

CI text equivalent codes: @code93, @c93

4.2.6   Code I2of5 (Interleaved 2 of 5)
The I2of5 is a variable length, paired, numerical symbology that is typically used in the industrial and distribution industries. The I2of5 is a paired symbology, which means that the data string being sent must always be an even number amount. If the desired data to be sent is an odd amount, simply pad the beginning with "0" to achieve an even amount of digits. This symbol uses 2:1, 3:1, 4:2, 5:2, and 8:3 ratios, which may be entered in the AI parameter.

CI text equivalent codes: @codei2of5, @i2of5, @i25, @2of5, @c25

4.2.7   MSI0 (Modified Plessey)
The MSI Plessey is a variable length, numeric only symbology used for retail shelf labeling. When using the MSI0 bar code, the user provides both check digits.

CI text equivalent codes: @msi0

4.2.8   MSI1 (Modified Plessey)
The MSI Plessey is a variable length, numeric only symbology used for retail shelf labeling. When using the MSI1 bar code, the user provides one check digit and the printer will calculate the second check digit.

CI text equivalent codes: @msi1

4.2.9   MSI2 (Modified Plessey)
The MSI Plessey is a variable length, numeric only symbology used for retail shelf labeling. When using the MSI2 bar code, the printer will calculate both check digits.

CI text equivalent codes: @msi2

4.2.10   Postnet
The Postnet symbol is used to encode digits for postal applications to sort mail. A Postnet symbol is made up of binary digits, represented as full and half bars. Each character is made up of five bars, which together represent a single numeric digit. The 5-digit ZIP code, 9-digit ZIP+4, and 11-digit Delivery Point Code are all supported.

CI text equivalent codes: @postnet

4.3 2D Bar Codes

This section provides information regarding the different requirements of the two-dimensional bar codes. The 2D symbols generally follow their own unique format structure and not the standard Format Entry Command structure. Unless stated otherwise in the descriptions below, the printer will automatically generate the necessary check digits when required.

4.3.1   Data Matrix

Data Matrix is a two-dimensional matrix symbology that is capable of encoding up to 2335 alphanumeric characters, 1556 8-bit byte data characters, or 3116 numeric digits. The ECC 200 version is supported and uses the Reed-Solomon error correction. The requirements for generating a data matrix symbol are the subject data, placement information, CI code, configuration, encoding, module width, and tilde representation. These parameters are set using a Data Matrix unique Format Entry Command that is used in place of the standard Format Entry Command, which is listed below.

Field parameters

^Fn) X, Y, CI Code, Configuration, Encoding, Video_MW, TypeField, Rotation

The "n" identifies the field number

The comma delimiter
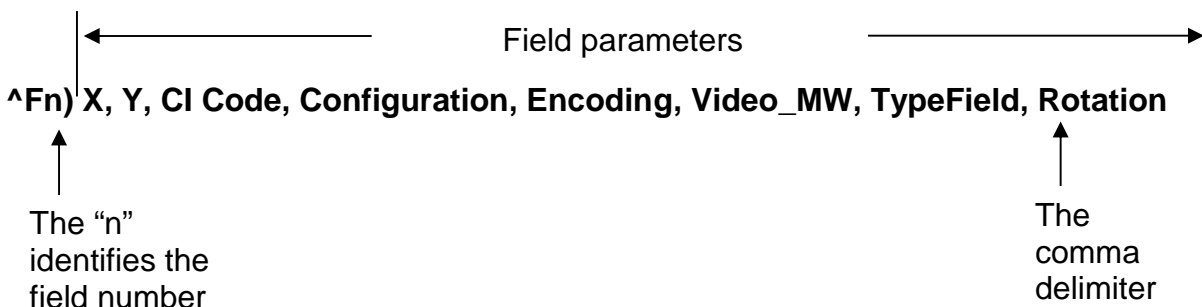
Figure 19   Data Matrix Format Structure

X Parameter
This parameter used to set the X coordinate start position of the Data Matrix symbol.

Y Parameter
This parameter used to set the Y coordinate start position of the Data Matrix symbol.

CI Code
This is the Text Equivalent Code that is used to generate the Data Matrix symbol associated with the Text Entry command line ("^Tn)"). The valid codes are @datamatrix

Configuration
The configuration parameter used to identify the size and capacity of the Data Matrix symbol. The ECC 200 symbols have an even number of rows and an even number of columns. The symbols can be square, with sizes ranging from 10 x 10 to 144 x 144, or rectangular, with sizes 8 x 18 to 16 x 48. The default is set to "auto", which means that the printer will automatically generate the smallest Data Matrix symbol possible for the given data. Refer to Table 7 for additional information regarding the valid choices for the configuration parameter.

Symbol Size	Numeric Capacity	Alphanumeric Capacity	Binary Byte Capacity
Auto	---	---	---
10 x 10	6	3	1
12 x 12	10	6	3
14 x 14	16	10	6
16 x 16	24	16	10
18 x 18	36	25	16
20 x 20	44	31	20
22 x 22	60	43	28
24 x 24	72	52	34
26 x 26	88	64	42
32 x 32	124	91	60
36 x 36	172	127	84
40 x 40	228	169	112
44 x 44	288	214	142
48 x 48	348	259	172
52 x 52	408	304	202
64 x 64	560	418	278
72 x 72	736	550	366
80 x 80	912	682	454
88 x 88	1152	862	574
96 x 96	1392	1042	694
104 x 104	1632	1222	814
120 x 120	2100	1573	1048
132 x 132	2608	1954	1302
144 x 144	3116	2335	1556
8 x 18	10	6	3
8 x 32	20	13	8
12 x 26	32	22	14
12 x 36	44	31	20
16 x 36	64	46	30
16 x 48	98	72	47

Table 12   Data Matrix Configuration Parameters

Encoding
The Encoding parameter used to set the encoding scheme that will be used for the supplied data. The printer default is set to "Auto", which will automatically switch to the most efficient encoding scheme for the data provided. Refer to Table below for the valid choices for the

encoding parameter. Consult the Data Matrix Specification (11/96) ANSI/AIM BC11 for additional information.

Encoding Scheme	Characters	Bits per Character
ASCII	Double digit numeric	4
	ACSII values 0 – 127	8
	Extended ASCII values 128 - 255	16
C40	Primarily Uppercase Alphanumeric	5.33
Text	Primarily Lowercase Alphanumeric	5.33
Base256	All byte values 0 – 255	8
Auto	Automatically switches to the most efficient scheme.	NA

Table 13   Data Matrix Encoding Schemes

ACSII Encoding Scheme
 ASCII encoding is the basic scheme that encodes ASCII data, double density numeric data and symbology control characters. Which means it encodes one alphabetic or two numeric characters per byte. All other encoding schemes are invoked from ASCII and will then return to this scheme through the use of code words, refer to Table 9.

C40 Encoding Scheme
C40 encoding scheme used to encode uppercase alphabetic, numerical and space characters. C40 encodes three alphanumeric data characters into two bytes.

Text Encoding Scheme
Text encoding used to encode lowercase alphabetic and numerical characters. Text encodes three alphanumeric data characters into two bytes.

Base 256 Encoding Scheme
The Base 256 encoding scheme used to encode any 8-bit byte data, including extended channel interpretations (ECI's) and binary data.

Codeword	Data and/or Function
1 - 128	ASCII data (ASCII value +1)
129	Pad Character
130 - 229	2 digit data 00 – 99 (Numeric Value + 130)
230	Latch to C40 Encoding Scheme
231	Latch to Base256 Encoding Scheme
232	FNC1
233	Structured Append
234	Reader Programming
235	Upper Shift (shift to Extended ASCII)
236	05 Macro
237	06 Macro
239	Latch to Text Encoding Scheme
241	ECI Character

Table 14   ASCII Codeword Values

Video_MW
This parameter used to set the Reverse video and the Module width. The commands are separated with the underscore character (_). If the underscore character is not sent, the printer will only set the module width.

Video #   Description
0_   Normal/OR
1_   Reverse
2_   XOR (Default)
4_   Opaque

The MW or Module Width is used to specify the size of the individual squares used in the symbol. Dots are the unit of measurement with 4 being the default.

Type Field
Type Field parameter controls GS1 mode for the data matrix barcode. A value of 1 will enable it and 0 or empty will disable it.

Rotation
This specifies the rotation of the Datamatrix symbol in 90-degree increments. The valid arguments for this parameter would be 0, 90, 180 or 270 with the default being set to 0 (or blank).

Note: DM rotation operates uniquely on the orientation of the barcode, the x and y insertion point is always the lower left hand corner of the resulting image.

Special Character
The printer will always recognize the special character tilde function (~) as a special control character or as a normal "~" character.

Special Character	Description
~X	Used to represent decimal characters 0 to 26 were "X" is the equivalent control code. Example: ~@ = character 0, ~A = character 1, ~B = character 2, etc…
~dNNN	Represents the ASCII encoded by the "NNN" value. For example: "~d065" would represent the ASCII character "A".

Table 15   Data Matrix Special Characters

CI text equivalent codes: @datamatrix

4.3.2   PDF-417
The Portable Data File 417 or PDF-417 is a two-dimensional stacked symbology that is capable of encoding the entire ASCII character set, 2710 digits, and up to 1108 bytes in a single bar code. The requirements for generating a PDF-417 symbol are the subject data, placement information, size configuration, rotation, and Error Correcting Code or ECC. These parameters are set using a PDF-417 unique Format Entry Command used in place of the standard Format Entry Command, listed below.

Field parameters

^Fn) X, Y, CI , #Row, #Columns, Video_ Aspect Ratio, Rotation, ECC%, ECC#

The "n" identifies the field number which always starts at "1".

The comma delimiter
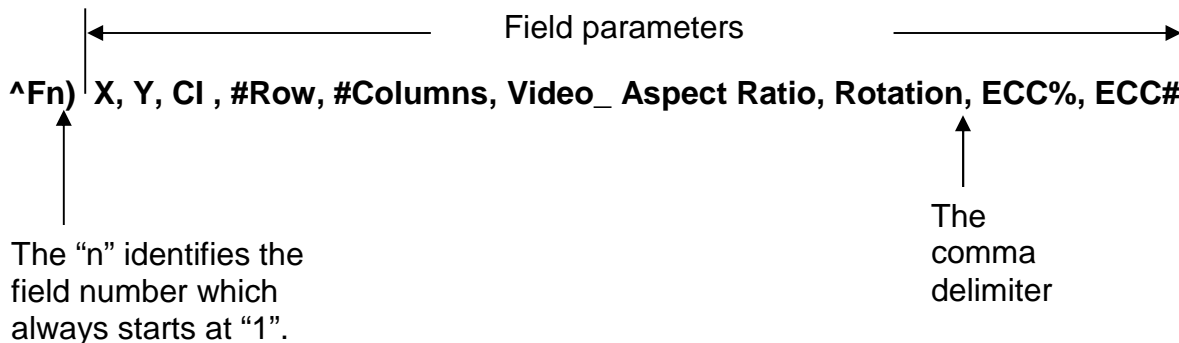
Figure 20   PDF-417 Format Structure

X Parameter
This parameter is used to set the X coordinate start position of the PDF-417 symbol and has a default value of 0.

Y Parameter
This parameter is used to set the Y coordinate start position of the PDF-417 symbol and has a default value of 0.

CI Code
This is the Text Equivalent Code that is used to generate the PDF-417 symbol associated with the Text Entry command line ("^Tn)"). The valid code is @pdf417.

#Row
This parameter is used to adjust the aspect ratio of the PDF-417 symbol. The value is entered in ratio format (height: width) and has a default value of 2:1.

#Columns
This parameter is used to specify the number of columns used for rendering the PDF-417 symbol. The PDF-417 symbol may have 1 to 20 columns with the default setting of 3.

Video_Aspect Ratio
This parameter is used to set the Reverse video and aspect ratio. The separate the two fields with the underscore character (_). If the underscore is omitted, the printer will just process the Aspect Ratio as long as it is in the Height:Width format.

Video # Description
0_ Normal/OR
1_ Reverse
2_ XOR (Default)
4_ Opaque

Aspect Ratio
The aspect ratio is used to change the height and width of the barcode. The format is entered in as Height:Width with a 2:1 ratio being the default.

multiplication of the Y size of the aspect ratio. If the Aspect ratio was 2:1 and the Y multiplier was set to a 2, then the resulting PDF would have 2 bars in the X direction for every 2 bars in the Y direction.

Rotation
This parameter controls the rotation of the rendered PDF-417 symbol in 90-degree increments. The valid arguments for this parameter would be 0, 90, 180 or 270 with the default being set to 0.

ECC%
This parameter has no effect and can be left empty but the

ECC#
The ECC# parameter is used to set the level of error correction of the PDF-417 symbol with a default value set to 0. Refer to Table 11 for the valid ECC# and their equivalent correction codewords.

ECC#	Number of Error Correction Codewords
0	2
1	4
2	8
3	16
4	32
5	64
6	128
7	256
8	512

Table 16   PDF-417 Error Correction Level

4.3.3   Aztec

Aztec is a high density 2 dimensional barcode that can encode up to 3750 characters from the entire 256 byte ASCii character set.   Aztec also has the potential to use less space than other matrix style barcodes because it does not require quiet zones.

@aztec is the CI entry.

Aztec barcodes deviate from the normal structure of this command.

^Fn) XB, YB, @aztec, Configuration, Multiplier, Encoding Mode, Video#_ECC Level, Tilde, Rotation

Examples:
^F1)0.05,.05,@aztec,auto,8,0,1_3,1,0
^T1)TestData1234

^F1)0.05,.05,@aztec,27x27c,5,0,2_,0,0
^T1)TestData123

^F1)0.05,0.05,@aztec,91x91,4,2,1_,0,0
^T1)[01]95012345678903[3102]000400

Configuration
This parameter used to set the size and the number of characters to encode. A value of "auto" will generate an automatically scaled Aztec. The configuration and the size multiplier control the overall size of the barcode.

Configuration	Description
Auto	Auto determines size base on data & ECC%
15x15C	Compact
19x19C	Compact
23x23C	Compact
27x27C	Compact
19x19	Full Size
23x23	Full Size
27x27	Full Size
31x31	Full Size
37x37	Full Size
41x41	Full Size
45x45	Full Size
49x49	Full Size
53x53	Full Size
57x57	Full Size
61x61	Full Size
67x67	Full Size
71x71	Full Size
75x75	Full Size
79x79	Full Size
83x83	Full Size
87x87	Full Size
91x91	Full Size
95x95	Full Size
101x101	Full Size
105x105	Full Size
109x109	Full Size
113x113	Full Size
117x117	Full Size
121x121	Full Size
125x125	Full Size
131x131	Full Size
135x135	Full Size
139x139	Full Size

Configuration	Description
143x143	Full Size
147x147	Full Size
151x151	Full Size

Table 17   Aztec Configuration Values

Multiplier
The sets the size multiplier of barcode. The range up to 16 and defaults to 6 if omitted.

Encoding Mode
Parameter used to specify the encoding mode of the Aztec code.

Encoding Modes	
0	Standard
1	Reserved
2	GS1

Table 18   Aztec Encoding Modes

Video#_ECC%
Command used to specify the Video mode used and to select the ECC % level. The first part of the parameter selects the video effect as listed below while the second portion selects the Error Correction Code percentage. The values for the ECC% are 1 to 4.

Video #	
0	Normal/OR
1	Reverse
2	XOR
4	Opaque

Table 19   Aztec Videos #

ECC%
This parameter is used to set the Error Correction % level. This field is ignored if a configuration parameter is selected.

ECC %	
1	10% + 3 words
2	23% + 3 words
3	36% + 3 words
4	50% + 3 words

Table 20   Aztec ECC%

Tilde
A '1' will use tilde mode and a '0' will not use tilde mode. Tilde mode means the tilde character (~) is interpreted as an escape control character.

The Tilde (~) syntax is ~dNNN with the "NNN" representing the value.

Example: a "~d065" would represent the ASCii character "A".

Rotation
Parameter used to specify the rotation of the Aztec code. The valid values are 0,90,180, and 270 with the default being set to 0.

4.3.4   QR Code
The Quick Response Code or QR Code is a two-dimensional stacked symbology that is capable of encoding the entire ASCII character set and up to around 7089 bytes of data in a single barcode. Only the CI entry and the barcode data is required in the Format Entry Field.

@qrcode is the CI entry.

QR barcodes deviate from the normal structure of this command. Instead, after the CI entry, the version, size, tilde, encoding mode and ECC level are specified:

^Fn) XB, YB, @qrcode, Version, Multipler, Video#_Tilde, Encoding Mode, Rotation_ECC Level

Example
^F4).35,.5,@qrcode,7,4,0_0,1,0_L

Version
This specifies the symbol density of the resulting QR barcode by selecting the Symbol version from the table below.

Symbol Version	Symbol Size	ECC Level	Numeric Capacity	Alphanumeric Capacity	Binary Byte Capacity
1	21x21	L	41	25	17
		M	34	20	14
		Q	27	16	11
		H	17	10	7
2	25x25	L	77	47	32
		M	63	38	26
		Q	48	29	20
		H	34	20	14
3	29x29	L	127	77	53
		M	101	61	42
		Q	77	47	32
		H	58	35	24
4	33x33	L	187	114	78
		M	149	90	62
		Q	111	67	46
		H	82	50	34
5	37x37	L	255	154	106
		M	202	122	84
		Q	144	87	60
		H	106	64	44
6	41x41	L	322	195	134
		M	255	154	106
		Q	178	108	74
		H	139	84	58
7	45x45	L	370	224	154
		M	293	178	122
		Q	207	125	86
		H	154	93	64
8	49x49	L	461	279	192
		M	365	221	152
		Q	259	157	108
		H	202	122	84
9	53x53	L	552	335	230
		M	432	262	180

Symbol Version	Symbol Size	ECC Level	Numeric Capacity	Alphanumeric Capacity	Binary Byte Capacity
		Q	312	189	130
		H	235	143	98
10	57x57	L	652	395	271
		M	513	311	213
		Q	364	221	151
		H	288	174	119
11	61x61	L	772	468	321
		M	604	366	251
		Q	427	259	177
		H	331	200	137
12	65x65	L	883	535	367
		M	691	419	287
		Q	489	296	203
		H	374	227	155
13	69x69	L	1,022	619	425
		M	796	483	331
		Q	580	352	241
		H	427	259	177
14	73x73	L	1,101	667	458
		M	871	528	362
		Q	621	376	258
		H	468	283	194
15	77x77	L	1,250	758	520
		M	991	600	412
		Q	703	426	292
		H	530	321	220
16	81x81	L	1,408	854	586
		M	1,082	656	450
		Q	775	470	322
		H	602	365	250
17	85x85	L	1,548	938	644
		M	1,212	734	504
		Q	876	531	364
		H	674	408	280

Symbol Version	Symbol Size	ECC Level	Numeric Capacity	Alphanumeric Capacity	Binary Byte Capacity
18	89x89	L	1,725	1,046	718
		M	1,346	816	560
		Q	948	574	394
		H	746	452	310
19	93x93	L	1,903	1,153	792
		M	1,500	909	624
		Q	1,063	644	442
		H	813	493	338
20	97x97	L	2,061	1,249	858
		M	1,600	970	666
		Q	1,159	702	482
		H	919	557	382
21	101x101	L	2,232	1,352	929
		M	1,708	1,035	711
		Q	1,224	742	509
		H	969	587	403
22	105x105	L	2,409	1,460	1,003
		M	1,872	1,134	779
		Q	1,358	823	565
		H	1,056	640	439
23	109x109	L	2,620	1,588	1,091
		M	2,059	1,248	857
		Q	1,468	890	611
		H	1,108	672	461
24	113x113	L	2,812	1,704	1,171
		M	2,188	1,326	911
		Q	1,588	963	661
		H	1,228	744	511
25	117x117	L	3,057	1,853	1,273
		M	2,395	1,451	997
		Q	1,718	1,041	715
		H	1,286	779	535
26	121x121	L	3,283	1,990	1,367
		M	2,544	1,542	1,059

Symbol Version	Symbol Size	ECC Level	Numeric Capacity	Alphanumeric Capacity	Binary Byte Capacity
		Q	1,804	1,094	751
		H	1,425	864	593
27	125x125	L	3,517	2,132	1,465
		M	2,701	1,637	1,125
		Q	1,933	1,172	805
		H	1,501	910	625
28	129x129	L	3,669	2,223	1,528
		M	2,857	1,732	1,190
		Q	2,085	1,263	868
		H	1,581	958	658
29	133x133	L	3,909	2,369	1,628
		M	3,035	1,839	1,264
		Q	2,181	1,322	908
		H	1,677	1,016	698
30	137x137	L	4,158	2,520	1,732
		M	3,289	1,994	1,370
		Q	2,358	1,429	982
		H	1,782	1,080	742
31	141x141	L	4,417	2,677	1,840
		M	3,486	2,113	1,452
		Q	2,473	1,499	1,030
		H	1,897	1,150	790
32	145x145	L	4,686	2,840	1,952
		M	3,693	2,238	1,538
		Q	2,670	1,618	1,112
		H	2,022	1,226	842
33	149x149	L	4,965	3,009	2,068
		M	3,909	2,369	1,628
		Q	2,805	1,700	1,168
		H	2,157	1,307	898
34	153x153	L	5,253	3,183	2,188
		M	4,134	2,506	1,722
		Q	2,949	1,787	1,228
		H	2,301	1,394	958

Symbol Version	Symbol Size	ECC Level	Numeric Capacity	Alphanumeric Capacity	Binary Byte Capacity
35	157x157	L	5,529	3,351	2,303
		M	4,343	2,632	1,809
		Q	3,081	1,867	1,283
		H	2,361	1,431	983
36	161x161	L	5,836	3,537	2,431
		M	4,588	2,780	1,911
		Q	3,244	1,966	1,351
		H	2,524	1,530	1,051
37	165x165	L	6,153	3,729	2,563
		M	4,775	2,894	1,989
		Q	3,417	2,071	1,423
		H	2,625	1,591	1,093
38	169x169	L	6,479	3,927	2,699
		M	5,039	3,054	2,099
		Q	3,599	2,181	1,499
		H	2,735	1,658	1,139
39	173x173	L	6,743	4,087	2,809
		M	5,313	3,220	2,213
		Q	3,791	2,298	1,579
		H	2,927	1,774	1,219
40	177x177	L	7,089	4,296	2,953
		M	5,596	3,391	2,331
		Q	3,993	2,420	1,663
		H	3,057	1,852	1,273

Table 21   QR Code Configuration Parameters

Multiplier
This specifies size multiplier of the resulting QR code. The range is 3-16 with the default being 6. If no value is sent, the printer uses the default of 6.

Video#_Tilde
Command used to specify the Video mode used and to enable tilde mode.

Video#:
0 - Normal/ OR
1 - Reverse

2 – XOR
4 – Opaque

Tilde:
A '1' will use tilde mode and a '0' will not use tilde mode. Tilde mode means the tilde
character (~) is interpreted as an escape control character.

Example: a value of 2_1 would select the XOR and enable the Tilde.

Special Character	**Description**
~dNNN	represents the ASCII encoded by the "NNN" value.

For example: "~d065" would represent the ASCII character "A".

Encoding Mode
This specifies encoding mode of the QR code. This is used to set the encoding scheme that
will be used for the supplied data. 0 is for Byte, 1 is for Alpha-numeric and 2 is for Numeric.

NOTE: Rotation and ECC Level parameters share an ^Fn) field position and require the "_"
separator if the non-default rotation is to be used. If the "_" is omitted, the value is assumed
to be the ECC Level.

Examples:
1) To apply a 90-degree rotation with the ECC Level L, enter "90_L"
2) To apply an ECC Level of L enter "L". A default rotation of 0 will be applied.

Rotation_ECC
This parameter specifies the rotation and ECC level of the barcode.

Example: 0_L would select 0 deg rotation and the L ECC level.

Rotation
This specifies the rotation of the QR Code symbol in 90-degree increments. The valid
arguments for this parameter would be 0, 90, 180 or 270 with the default being set to 0. If a
rotation other than 0 is desired, it must be placed in front of the "_" separator.

ECC Level
This specifies the error correction level for the resulting QR code.

ECC Level	Error Correction Capacity	Recovery Capacity
L	Approx. 20% of symbol	Approx. 7%
M	Approx. 37% of symbol	Approx. 15%
Q	Approx. 55% of symbol	Approx. 25%
H	Approx. 65% of symbol	Approx. 30%

Table 22   QR Code Error Correction Level

Chapter 5 : Diagnostics and Troubleshooting

The purpose of this chapter is to provide some information about the diagnostic reporting of the printer used to help identify, diagnose and troubleshoot problems.

5.1 Diagnostic Mode

Diagnostic Mode temporarily powers the printer using factory default parameters while printing out the printer's current configuration on the Status Label. This information is useful to help diagnose and troubleshoot printer configuration issues. The printer will continue using the factory default parameters until printer power is cycled. The printer will then return to the previous configuration that was in use before entering the diagnostic mode.

5.1.1   Entering Diagnostic Mode

To enter the diagnostic mode, press and hold the print button screen in while turning on the printer. Release the button after the status light indicator starts to blink and the printer will power up into diagnostic mode. If the printer is configured with a touch screen display, power the printer on while pressing on the display and wait for the display to go from White to Dark back to White before releasing to enter the diagnostics mode. The printer prints configuration and statistical information followed by the ^D960)1 print head test pattern once it is powered up in the diagnostics mode. On printers configured with displays, the screen calibration will appear afterwards. Please note that the printer power should be cycled to exit the diagnostics mode.

5.1.2   Status Label

The printer prints out a status label that contains statistical and port configuration information. The second portion of the printout is a diagonal test pattern that will show dots that are out or other print issues.

Figure 21   Status Label Printout

Figure 22   Display Calibration

5.1.3   Listing Commands
Commands used to report information regarding the printer setup.

The printer will print the Status label after the printer has performed powered up and enters the diagnostic mode. The status label prints out the reports that are generated by the "^D323)", "^D326)", "^D325)", and "^D324)" commands.

Figure 23   ^D323) - List Enablements Example

```
Settings (D326 or<Ctrl>V)

  Operational

     Print Speed:                        (D635)    6.0 ips

     Detector mode:          (D636)    0 (none)

     Slew Speed:                         (D645)    6.0 ips

     Darkness:                           (D690)    75 (Dark)

     Retraction delay:                   (D641)    0.5 sec.

     Print delay:                        (D640)    0.0 sec.

     Labels printed:         (D655)    42

  Distances

     Label width (LSX):                  (D631)    3.34 inches

     Label height (LSY):                 (D632)    1.5.12 inches

     Reg. mark height (GAP):  (D633)    0.148 inches

     To reg'n mark (DRM):                (D634)    0.0 inches

     X offset (OFX):         (D637)    0.0 inches

     Y offset (OFY):         (D638)    0.0 inches

     Dist. Past Gap (DPG):               (Auto)    1.225 inches

     Activate Gap Det (AGD)   (Auto)    0.0 inches

     Advance/retract:                    (D642)    0.512 inches

     Roll diam. ref. length:             (D646)    10.0 inches

     Black line det to head:             (D648)    2.32 inches

     Gap det to head:                    (D649)    2.34 inches

  Printhead

     Width:                              (D647)    4.094 inches

     Resolution:                         (D647)    203 dpi

   Serial port settings                  (D670)    9600,N,8,1

   Ethernet                                        Active at 10/100
```

Figure 24   ^D326) - List Settings Example

```
Selections (D325 or <Ctrl> U)

  Operational

     Dispense mode:              (D597)   3

     Emulation:                  (D501)   Microcom 426

     Cutter Type:                (D506)   NONE

     PMH Type:                   (D507)   NONE

     Button Mode:                (D541)   1

     Stock-out handling          (D581)   Halt

     Response Mode:              (D550)   Text

     RS-232 connection:          (D570)   Serial port
```

Figure 25   ^D325) - List Selections Example

```
Statistics (D324 or <Ctrl> W)

  Identity

     Model number:          (D501)   Microcom 426

     Language:              (Auto)   LDS2

     Serial number 01234567890

     CPU Serial number:     01234567890

  Accumulated operation

     Labels printed:        (D655)   44

     Inches printed:                 97 inches (246 cm)

     Total inches run:               109 inches (276 cm)

     Power on time:                  2 hours

  Printhead

     Width:                 (D647)   4.094 inches

     Resolution:            (D647)   203 dpi

     Temperature:                    80 Fahrenheit

  Cutter

     Detected at power-up:           false

     Type installed: (D506)  NONE

     Operation enabled:     (D740)   false

     Total cycle count:              0
```

Figure 26   ^D324) - List Statistics Example
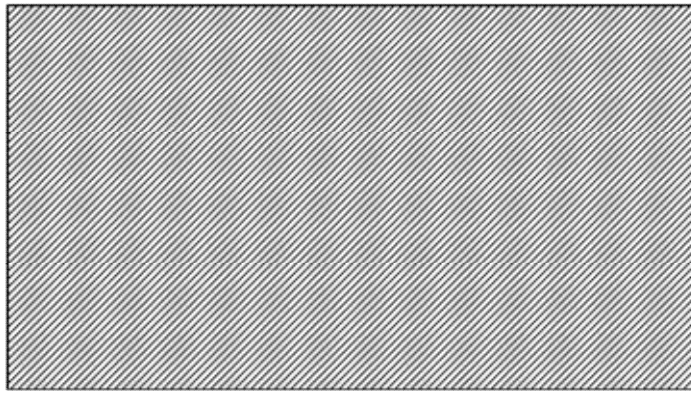
Figure 27   ^D960)1 or ^K Test Pattern

5.2 Enquiry Responses

Enquiry responses provide a method of determining the status of the printer as well as identifying different error conditions. This is possible by sending either the "Ctrl+E" combination, issuing the "^D327)" command, or by enabling any of the auto-reporting commands; Refer to the ^D72x series commands. Fatal error responses triggered from the printer to the host when they occur and halt the printers operation until resolved. Status responses do not halt the printers operation but are simply a status of the printer's current state.

Refer to the table below and the following sections for more information about the various types of responses.

Byte Mode Responses (ASCII Hex)	Text and Verbose Mode Responses	Definition
0x01	>STOCK OUT<	Out of Media
0x02	>STOCK OVERADVANCED<	Excess media past LPD preventing a TOF operation.
0x03	>STOCK JAMMED<	Media is jammed.
0x06	>OK<	ACK message used with the ^D726)1 command.
0x10	>CUTTER JAMMED<	The cutter has jammed.
0x14	>PM<	Preventative Maintenance. Status will show if label countdown is enabled and reaches 0; see also the ^D655 command

Byte Mode Responses (ASCII Hex)	Text and Verbose Mode Responses	Definition
0x1C	>MISSING LABEL<	Generated if more than one die-cut label has been detected.
0x1D	>INCOMPLETE FORM<	A complete script did not print on a >STOCK OUT< condition.
0x21	>INPUT 1<	The Input 1 sensor is active. See also ^D509
0x22	>INPUT 2<	The Input 2 sensor is active. See also ^D511
0x30	>SCRIPT ERROR<	An error with the script has been detected.
0x31	>INVALID PARAMETER<	The printer has detected an invalid parameter.
0x80	>RESTARTED<	The printer has been powered on or the power has been reset.
0x81	>READY<	The printer is in ready to receive data.
0x83	>PAUSED<	The printer has been paused.
0x86	>LABEL/TAG PRESENT<	Media has been presented in a dispense mode.
0x87	>STOCK ADVANCED<	The media has been advanced.
0x8F	>STOCK NOT LOADED<	The printer was powered up with out media installed.
0x90	>RETRACTION DELAY<	The retraction has been delayed.
0x91	>PRINT DELAY<	The printing has been delayed.
0xB0	>FLASH MEMORY LOW<	The Flash memory file space is 95% full.
0xC0	>BUTTON 1 TAPPED<	The print button has been pressed.
0xC1	>BUTTON 1 HELD<	The print button has been held.
0xD0	>TEMPERATURE OUT OF RANGE<	The print head temperature is out of operating range.

Byte Mode Responses (ASCII Hex)	Text and Verbose Mode Responses	Definition
0xD1	>NONEXISTENT COMMAND<	The received command does not exist.
0xD3	>ZIP FILE ERROR<	The received Zipped file has an error.
0xD4	>FILE CONVERSION ERROR<	The file was not converted properly.
0xD5	>UNSUPPORTED FILE TYPE<	The received file is not recognized.
0xD6	>FILE NOT FOUND<	The requested file does not exist or cannot be found.
0xD7	>INADEQUATE ACCESS MODE<	Incorrect password to a higher access level.
0xDA	>INADEQUATE FLASH SPACE<	Cannot save an item to the flash memory due to lack of space.
0xF2	>FILE TOO LARGE<	The sent graphic exceeds the available memory.
0xFF	>POWERED DOWN<	The printer's power has been removed.

Table 23   Enquiry Responses

5.2.1   Fatal Error Responses

Fatal error responses are enquiry responses that halt the printer's current operation and cause the indicator light or LED to flash RED in color. A fatal error condition persists until removal of the condition causing the error and clearing the error. The printer provides different methods of clearing the error including pressing the print button or display or if the Autoload (D723,n,n) is enabled, new media detected by the printers internal registration sensors will cause the printer to clear the error and load the new media.

These enquiry responses are sent from the printer to the host, when the appropriate condition occurs, by issuing the "Ctrl+E" (^E) combination or by issuing the queued "^D327)1" command. The printer may be configured to automatically reports errors and status messages by using the ^D72x series commands. The following sections provide further explanations of the various fatal error responses. Refer to the ^D550) command regarding the types of enquiry response sets.

NOTE: The following section titles are the responses that the printer will generate once the associating condition occurs and the printer processes an enquiry command. The first response (between and including the ">" and "<" characters) is generated if text and verbose responses have been enabled using the ^D550) command. The ASCII hex value listed between the parenthesis characters, indicate the enquiry response if byte mode has been enabled.

5.2.1.1   >STOCK OUT< (01)

The ">STOCK OUT<" error response is generated when the printer runs out of stock or media while in text and verbose modes. If the printer is configured for byte responses, the code ASCII 0x01 will be issued from the printer in response to an enquiry command.

5.2.1.2   >STOCK OVERADVANCED< (02)

This error response generated when the printer has an excess amount of media feed out of the printer and a Top-of-Form operation is executed. If the printer is configured for byte responses, the code ASCII 0x02 will be issued from the printer in response to an enquiry command.

5.2.1.3   >STOCK JAMMED< (03)

The ">STOCK JAMMED<" error response indicates that media is jammed and requires correction before the printer can continue printing while in text and verbose modes. A stock jam condition may be detected by two separate methods depending is the printer is configured with a Label Present Detector or LPD. If the printer is configured for byte responses, the code ASCII 0x03 will be issued from the printer in response to an enquiry command.
 When the printer is configured with an LPD and selected by the "^D509)" command, a stock jam is detected by the LPD when the leading edge of the media did not arrive after the motor stepped through the Print head to LPD distance ("^D643) command") plus 0.2 inches. This detection method does not work if media is not detected at the LPD once printing starts and is used in conjunction with the "^D311)" TOF command.

When the printer is configured without an LPD, not selected by the "^D509)" command, or if media is blocking a configured LPD once printing commences, a stock jam condition is detected using the registration mark detectors. The stock jam condition is reported when a registration mark does not arrive after the entire script repeat distance plus 0.2 inches.

5.2.1.4   >CUTTER JAMMED< (10)

The ">CUTTER JAMMED<" error response is generated when the cutter is in a jammed condition and cannot complete a full cycle while in text and verbose modes. If the printer is configured for byte responses, the code ASCII 0x10 will be issued from the printer in response to an enquiry command. For safety, this condition is treated as a fatal issue, which the printer power must be cycled to recover from this error. The status light will be a solid red when this error occurs.

5.2.1.5   >MISSING LABEL< (1C)

The ">MISSING LABEL<" response indicates that the printer has detected only the backing material when using die-cut media indicating a missing label while in text or verbose response modes. If the printer is configured for byte responses, the code ASCII 0x1C is issued from the printer in response to an enquiry command.

5.2.1.6   >INCOMPLETE FORM< (1D)

The ">INCOMPLETE FORM<" response indicates that the printer did not complete the current script while in text or verbose response modes. If the printer is configured for byte responses, the code ASCII 0x1D is issued from the printer in response to an enquiry command. This response appears in conjunction with the >STOCK OUT< error and a printer configured with the "^D581)2" Finish Label command.

5.2.1.7   **>SCRIPT ERROR< (30)**

The ">SCRIPT ERROR<" response is generated when a script contains an error and cannot be processed while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0x30 will be issued from the printer in response to an enquiry command.

5.2.1.8   **>INVALID PARAMETER< (31)**

This error response indicates that a received command contains an invalid parameter or illegal structure while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0x31 will be issued from the printer in response to an enquiry command.

5.3 Basic Status Responses

Basic status responses are enquiry responses that are not immediate. These enquiry responses are sent from the printer to the host, when the appropriate condition occurs, by issuing the "Ctrl+E" (^E) combination or by issuing the "^D327)" command. The following sections provide further explanations of the non-immediate basic status responses. Refer to the ^D550) command regarding the types of enquiry response sets.

NOTE: The following section titles are the responses that the printer will generate once the associating condition occurs. The first response (between and including the ">" and "<" characters) is generated if text and verbose responses have been enabled using the ^D550) command. The ASCII hex value listed between the parenthesis characters, indicate the enquiry response if byte mode has been enabled.

5.3.1   **>OK< (06)**

The ">OK<" response is generated in conjunction with the "^D726)1" command and indicates that a command completed successfully while in text or verbose response modes. If the printer is configured for byte responses, the code ASCII 0x06 is issued from the printer in response to an enquiry command.

5.3.2   **>PM< (14)**

The >PM< message or preventative maintenance is reported if the label countdown is enabled and reaches 0. This is helpful when setting up a cleaning cycle that requires the user to perform some task on the printer before proceeding. Refer to the D655 command for more information regarding the label countdown command.

5.3.3   **>INPUT 1< (21)**

The ">INPUT 1<" response indicates that the INPUT 1 sensor option is tripped while in text or verbose response modes. If the printer is configured for byte responses, the code ASCII 0x21 is issued from the printer in response to an enquiry command. This sensor and response is intended to provide the user with the flexibility for custom configurations.

5.3.4   **>INPUT 2< (22)**

The ">INPUT 2<" response indicates that the INPUT 2 sensor option is tripped while in text or verbose response modes. If the printer is configured for byte responses, the code ASCII 0x22 is issued from the printer in response to an enquiry command. This sensor and response is intended to provide the user with the flexibility for custom configurations.

5.3.5 >RESTARTED< (80)

The ">RESTARTED<" response is issued the first time the printer's status is queried after a power up or reset condition while in verbose and/or semi byte responses. If the printer is configured for byte responses, the code ASCII 0x80 will be issued from the printer in response to an enquiry command.

5.3.6 >READY< (81)

The ">READY<" response indicates that the printer is in the normal operating state and that it is ready to accept data while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0x81 will be issued from the printer in response to an enquiry command.

5.3.7 >PAUSED< (83)

The ">PAUSED<" response indicates that the printer's printing capabilities have been paused while in text and verbose response sets. The printer will continue to receive data while in the >PAUSED< state. The printer may be put into the paused condition by either issuing the "Ctrl+X" combination or by pressing the print button while the printer is printing. Issuing the "Ctrl+X" combination or pressing the print button a second time will cause the printer to resume. If the printer is configured for byte responses, the ASCII code 0x83 will be issued from the printer in response to an enquiry command.

5.3.8 >LABEL/TAG PRESENT< (86)

This response indicates that media is blocking the Label Present Sensor (LPS) and protruding out the front of the printer. If the printer is configured for byte responses, the code ASCII 0x86 will be issued from the printer in response to an enquiry command.

5.3.9 >STOCK ADVANCED< (87)

The ">STOCK ADVANCED<" response indicates that the media has been advanced after printing when a Dispense Mode (^D597) command) is being used while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0x87 will be issued from the printer in response to an enquiry command.

5.3.10 >STOCK NOT LOADED< (8F)

The ">STOCK NOT LOADED<" response indicates that media is not being detected in the printer on power up while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0x8F is issued from the printer in response to an enquiry command. This message persists until media is detected at the registration mark sensors but does not prevent commands from being processed.

5.3.11 >RETRACTION DELAY< (90)

The ">RETRACTION DELAY<" response indicates that the printer has been configured with a delay before retracting, refer to the ^D641) command, while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0x90 will be issued from the printer in response to an enquiry command.

5.3.12 >PRINT DELAY< (91)

The ">PRINT DELAY<" response indicates that the printer has been configured with a delay between labels, refer to the ^D640) command, while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0x91 will be issued from the printer in response to an enquiry command.

5.3.13   >FLASH MEMORY LOW< (B0)

The ">FLASH MEMORY LOW<" response indicates that the user storage area of the flash memory is 95% full while in text and verbose response sets. This message will continue to be received until files are removed from flash memory or until the printer performs garbage collecting and defragmenting. If the printer is configured for byte responses, the code ASCII 0xB0 will be issued from the printer in response to an enquiry command.

5.3.14   >BUTTON 1 TAPPED< (C0)

The ">BUTTON 1 TAPPED<" response occurs when the ^D541) command is configured for the "tapped" response while in text and verbose response sets. This may be used for custom configuration and definition of the print button press or tapped condition. If the printer is configured for byte responses, the code ASCII 0xC0 will be issued from the printer in response to an enquiry command.

5.3.15   >BUTTON 1 HELD< (C1)

The ">BUTTON 1 HELD<" response occurs when the ^D541) command is configured for the "held" response while in text and verbose response sets. This may be used for custom configuration and definition of the print button held condition. If the printer is configured for byte responses, the code ASCII 0xC1 will be issued from the printer in response to an enquiry command.

5.3.16   >TEMPERATURE OUT OF RANGE< (D0)

The ">TEMPERATURE OUT OF RANGE<" response indicates that the printer's print head is not within the proper operating range while in text and verbose response sets. This response will not allow the printer to print until the print head returns to the proper operating range. If the printer is configured for byte responses, the code ASCII 0xD0 will be issued from the printer in response to an enquiry command.

5.3.17   >NONEXISTENT COMMAND< (D1)

The ">NONEXISTENT COMMAND<" response indicates that the printer has received data in the LDS2 command structure that does not exist or is yet to be implemented while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0xD1 will be issued from the printer in response to an enquiry command.

5.3.18   >ZIP FILE ERROR< (D3)

The ">ZIP FILE ERROR<" response indicates that the printer has received a zip file that is either not complete or that the file contains errors while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0xD3 will be issued from the printer in response to an enquiry command.

5.3.19   >FILE CONVERSION ERROR< (D4)

This enquiry response indicates that the printer encountered an error while performing an internal conversion of the received file while in text and verbose modes. If the printer is configured for byte responses, the code ASCII 0xD4 will be issued from the printer in response to an enquiry command.

5.3.20   >UNSUPPORTED FILE TYPE< (D5)

This enquiry response indicates that the printer does not recognize the type of the received file while in text and verbose modes. If the printer is configured for byte responses, the code ASCII 0xD5 will be issued from the printer in response to an enquiry command.

5.3.21 >FILE NOT FOUND< (D6)

The ">FILE NOT FOUND<" response typically indicates that the printer is being instructed to recall and process a file that does not exist in the printer's memory while in text and verbose response sets. If the printer is configured for byte responses, the code ASCII 0xD6 will be issued from the printer in response to an enquiry command.

5.3.22 >INADEQUATE ACCESS MODE< (D7)

This enquiry response is typically issued when the user is attempting to issue a persistent command that is not allowed by the current access mode level or is attempting to enter an access mode that has a higher security level. If the printer is configured for byte responses, the code ASCII 0xD7 will be issued from the printer in response to an enquiry command.

5.3.23 >INADEQUATE FLASH SPACE< (DA)

This enquiry response indicates that the available flash memory is less than the total size of a file being saved to flash memory. If the printer is configured for byte responses, the code ASCII 0xDA will be issued from the printer in response to an enquiry command.

5.3.24 >FILE TOO LARGE< (F2)

This enquiry response indicates that the graphic sent to the printer is larger than the available memory while in text or verbose response sets. If the printer is configured for byte responses, the code ASCII 0xF2 is issued from the printer in response to an enquiry command.

5.3.25 >POWERED DOWN< (FF)

The ">POWERED DOWN<" response indicates that the printer's power has been interrupted while in text and verbose modes. If the printer is configured for byte responses, the code ASCII 0xFF will be issued from the printer in response to an enquiry command. This message also indicates that the printer was successful writing pending updates to flash on a power loss situation.

Chapter 1: Designing Using LDS2

Label formats or scripts are very easy to design using LDS2 by following these basic steps below. LDS2 printers require the use of hardware flow control (CTS/RTS) for proper data management to occur. Do not use Software flow control to manage data sent to an LDS2 printer.

1. Determine the media type, media size, and print speed desired for your application; enter this data into the script header.

2. Determine the type of handling operation desired and use the appropriate LDS2 printer control commands.

3. Define the formatting instructions for the type and placement of data.

4. Enter the text data that corresponds to the formatting instructions.

5. Send the script to the printer.

1.1 Special Control Codes

The printer can accept either the one-character control code ("Ctrl + E") or the two-character caret (^) plus alpha character ("^E"). Control codes are processed immediately while the ^Dxx commands are processed in the order they are issued. It is recognized that some mainframe and mini-computers cannot use the ASCII carat "^" character. The ASCII pipe symbol "|" can be used as a substitute for these instances. Below is a list of special control codes used by LDS2.

^A   **Begin Script**: Marks the beginning of an LDS2 script file entry.

^C   **Clear Halting Error**: When issued five consecutive times with a one second delay between each ^C the printer will clear blocking or halting error conditions returning ^Dxx command responsiveness. If the printer has remaining jobs in the queue, the printer will return to a >PAUSED< state instead of the >READY< state. Please note that if the condition that caused the error still exists, pressing the print button and/or sending further scripts will cause this error to be reported again. Halting error messages are conditions that must be corrected before printing may resume. Refer to section 6.3 for additional information regarding error conditions.

^D   **Standard Command Preface**: Combined with three-digit number issues a command. See Chapter 2 for more information regarding ^D commands.

^E   **Printer Enquiry**: Causes the printer to list its current status to an active communications port.

^K   **Print Test Label**: Causes the printer to print a test pattern consisting of diagonal lines used to test the condition of the dots on the print head.

^L   **Form Feed**: Scrolls one label out of the printer using the previous formats layout.

^M   **Carriage Return**: Represents a Carriage Return (CR) character or 0x0D.

^O   **Top-of-Form (TOF)**: Instructs the printer to perform a TOF operation that uses the Label Present Detector (LPD) in order to retract the media to the proper alignment in regards to the print head.

^P   **Print**: Causes the printer to print. Note: If no label scripts are loaded or stored in the printer's memory, the printer will not print a label until a script is processed.

^R   **Reset Printer**: Instructs the printer to perform a reset through software that duplicates a hard reset. Issuing the ^R causes the reset to occur immediately, bypassing commands sent but not processed. The ^D390)0 command is a queued or serialized version of the ^R and should be used if a reset condition is desired programmatically.

^U   **List Selections**: Causes the printer to list the current configured selections of the printer through an active communications port.

^V   **List Settings**: Causes the printer to list the current configured settings of the printer through an active communications port.

^W   **List Statistics**: Causes the printer to list the current statistics of the printer through an active communications port.

^X   **Toggle Pause**: Pauses the printer if printing, resumes if the printer is currently paused.

^Y   **List Enablements**: Causes the printer to list the current configured enablements of the printer through an active communications port.

^Z   **End Script**: Marks the end of a script file.

^]   **Cancel All Jobs**: Deletes all jobs currently queued and returns the printer to its idle state. Refer to the ^D330 command.

1.2 Script Creation: An Overview

This section intends to show a sample script file used to explain the individual components of the script.

A script consists of printer commands, a script header, field formats, and text data. The script is initiated by sending an "^A)" (Begin Script) and continues until a "^Z)" (End Script) has been received. All commands, unless otherwise noted, are terminated with either another command or another carriage return (ASCII 0x0D) character. The printer ignores the LF (0x0A) character so it may be helpful to terminate each line with a CR+LF to assist in the creation and troubleshooting of script files. Script files may contain up to a maximum of 20,000 total characters and up to 1000 different commands. Each command may contain up to 20 characters for the argument. This provides the flexibility in script creation to handle even the most demanding applications.

The sample label script listed below and will be referred to as the individual components are discussed in the subsequent sections of Chapter 1. Windows Notepad was used to enter the programming instructions and are in the bold typeface. Following these instructions is a brief explanation shown within the parentheses "()".

^A)Sample Script
      (^A indicates the beginning of the script file followed by an optional script title)

^D200)3.3, 1.9, 0.125, 1.063, 5 , 1 , 0, 0, 0
      (Script header used to define the label format or script file. Units entered using inches as the unit of measure in this example.)

^F1)0.15, 1.50, @normal_14
      (Field #1 formatting instructions containing text using a normal 14 point font)

^F2)0.30, 0.50, @code128auto, 3, 0.70
      (Field #2 formatting instructions containing a Code128 bar code using automatic compression)

^F3)0.60, 0.13, @normal_10
      (Field #3 formatting instructions containing text using a normal 10 point font)

^T1)MICROCOM CORPORATION
      (Text data for field #1)

^T2)12345678901234567
      (Text data for field #2)

^T3)12345 678 90123 45 6 7 8901234
      (Text data for field #3)

^D300)1
      (Instructs the printer to print one copy once the ^Z instruction is received)

^Z)   (Marks the end of the script file)

Field #1 –
The ^F1) and ^T1) commands
are formatting this field.

MICROCOM CORPORATION

Field #2 –
The ^F2) and
^T2) commands
are used to
format this bar
code.

Field #3 –
The ^F3) and
^T3) commands
are used to
format this field.

12345 678 90123 45 6 7 8901234
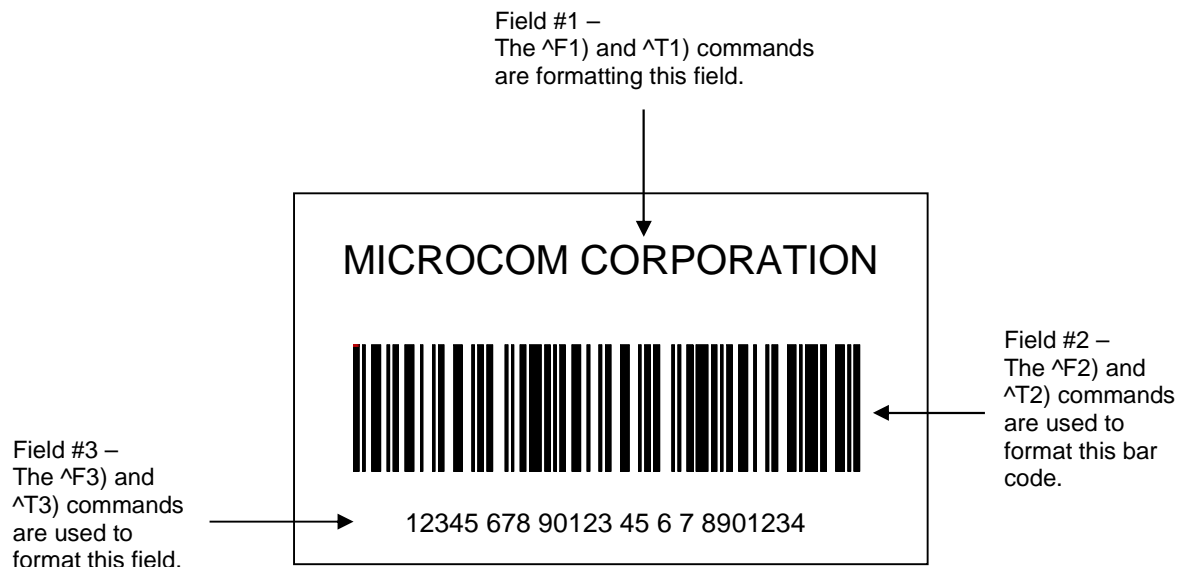
Figure 1   Sample Script Format

1.3 Begin Script - ^A)filename

This command used to mark the beginning of a script file. The script is saved into the printer's non-volatile flash memory if a title or filename is placed after the command. The filename may contain to a maximum of 20 characters in length and include any character from ASCII 0x20 and 0x41 to 0x7A (alphabetical characters plus [\]_'and SP (space character)) with the exception of the caret (^) character. Script filenames can not use a leading zero ("0") or 0x30 characters. A script that contains a "filename" will only save the script and will not process and print. The "^D350)filename" would be issued to recall and process the saved script. If the script does not contain a "filename", the script is processed normally and will be volatile in nature.

For Example: The previous example script's first line is "^A)Sample Script" which would save this script into the printer's flash memory (non-volatile) as "Sample Script".

1.4 Script Header

The script header consists of the "^D200)" command followed by nine parameters that control the media layout as well as printer operation. The parameters must be separated by a delimiter, comma by default, and are entered using the current unit of measure selected by the "^D564)" command. The origin or the starting coordinate is always the lower left corner as the media exits the printer. Issue this command from within a script file.

The script header temporarily overrides the individual header parameters when issued from within a script file. The parameters may be defaulted to the current persistent value by not entering a value between the delimiters. Each of the header parameters has an "^D6xx)" command equivalent that when set outside a script file remains persistent.

For Example: "^D200)LSX,LSY,,DRM", would cause the "GAP" parameter to be defaulted to the current "^D633)" value that was set outside a script file.

The persistent commands are helpful in setting the printer up for a basic configuration and then override them within the script. A script header should contain values for each parameter if access to the persistent command listings is not available.

^D200)LSX, LSY, GAP, DRM, SPD, DET, OFX, OFY, AGD

Print Direction

MICROCOM CORPORATION

12345 678 90123 45 6 7 8901234

LSY – Y Direction
(Virtually unlimited)

This is the origin

LSX – X Direction
(Print head limitation)
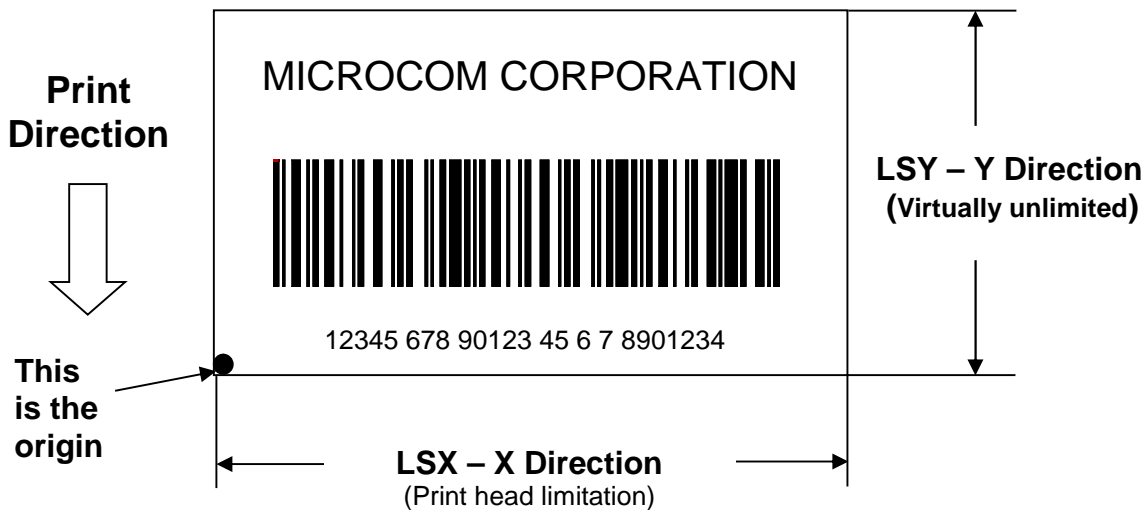
Figure 2   **Script Parameters**

1.4.1   LSX (Label Width)   **LSX**, LSY, GAP, DRM, SPD, DET, OFX, OFY, AGD
Specifies the width or "X" direction of the label in the unit of measure selected by the "^D564)" command. The maximum LSX is the width of the print head installed in the printer. This parameter is always required for proper script operation. See also ^D631)n command.

1.4.2   LSY (Label Height)   LSX, **LSY**, GAP, DRM, SPD, DET, OFX, OFY, AGD
Specifies the height or "Y" direction of the label in the unit of measure selected by the "^D564)" command. The maximum LSY height is 24". This parameter is always required for proper script operation. See also ^D632)n command.

1.4.3   GAP (Gap Size)   LSX, LSY, **GAP**, DRM, SPD, DET, OFX, OFY, AGD
The GAP is the height of the registration mark on each label and/or tag. This would be the backing material found between die-cut labels, blowhole sense mark, and/or the blackline height.   The value is entered using the current unit of measure selected by the "^D564)" command. See also ^D633)n command.

1.4.4   DRM (Distance to Registration Mark)   LSX, LSY, GAP, **DRM**, SPD, DET, OFX, OFY, AGD
This parameter used when the registration mark is not located at the edge of the media. The "DRM" is the distance from the leading edge of the media to the beginning of the registration mark. The DRM is entered using the current selected unit of measure selected by the "^D564)" command. See also ^D634)n command.
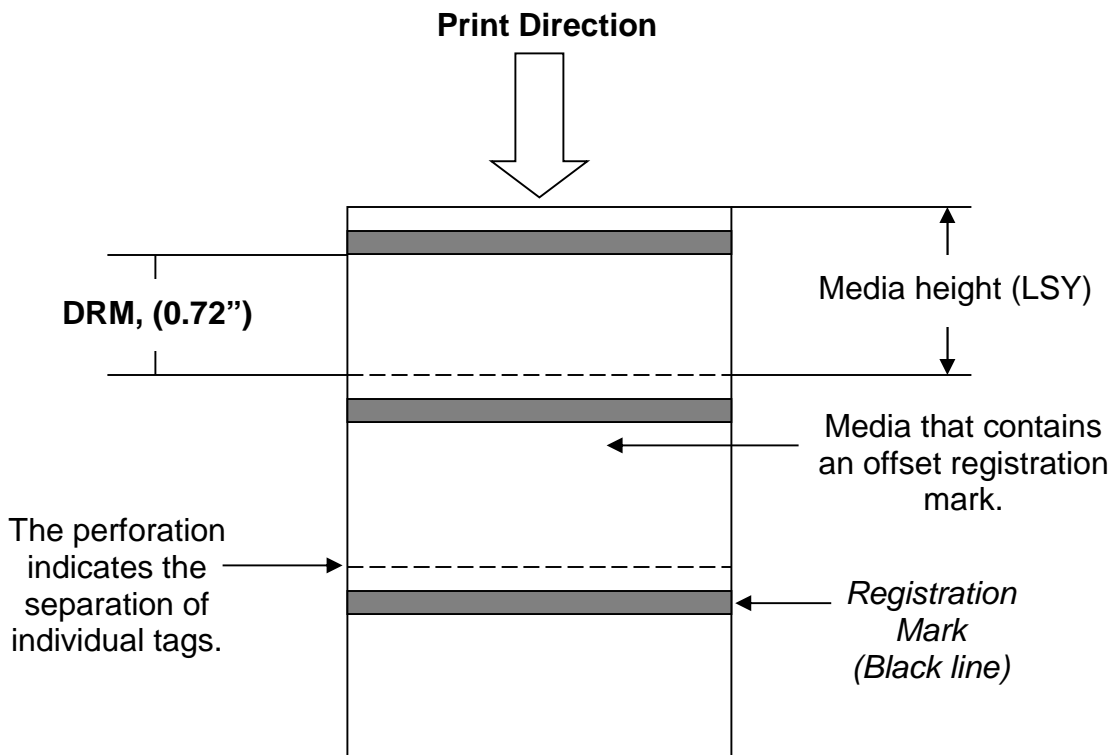
Figure 3   Distance-to-Registration Mark (DRM)

1.4.5   SPD (Print Speed)   LSX, LSY, GAP, DRM, **SPD**, DET, OFX, OFY, AGD
This is the speed of the printer while printing, which is defined in either "inches/second (ips)" or "centimeters/second (cms) as selected by the "^D564)" command. The print speed can be adjusted anywhere from 1 ips (2.54 cms) to 6 ips (15.24 cms). See also ^D635)n command.

1.4.6 DET (Detection Method)   _{LSX, LSY, GAP, DRM, SPD,} **DET**, _{OFX, OFY, AGD}

This parameter selects the type of method the printer uses for detecting registration marks on different media types. A selection of a "0" disables registration detection and is used in conjunction with media that does not contain a registration mark like continuous media. The detectors are only used to detect Stock Out conditions when a selection of "0" is selected. A selection of a "1" uses the reflective detection method and is used when detecting registration marks located on the bottom side of the media. A selection of a "2" uses the transmissive detection method which requires both the upper and the lower gap detectors to be installed on the printer. This method can be used with any type of media but is not recommended when only detecting registration marks located on the bottom side of the media. A selection of a "3" also uses the transmissive detection method and is used in conjunction with media containing a blowhole. The blowhole and die-cut selections differ on how they detect an out of stock condition. See also ^D636)n command.

0	None	(gap sensors are disabled)
1	Blackline	(lower gap sensor is enabled)
2	Die-cut	(upper and lower gap sensors are enabled)
3	Blowhole	(upper and lower gap sensors are enabled)

1.4.7 OFX (Offset X Direction)   _{LSX, LSY, GAP, DRM, SPD, DET,} **OFX**, _{OFY, AGD}

This parameter moves or offsets all fields in the "X" direction without altering the field's insertion points. The value is entered using the current unit of measure selected by the "^D564)" command. See also ^D637)n command.

1.4.8 OFY (Offset Y Direction)   _{LSX, LSY, GAP, DRM, SPD, DET, OFX,} **OFY**, _{AGD}

This parameter moves or offsets all fields in the "Y" direction without altering the field's insertion points. The value is entered using the current unit of measure selected by the "^D564)" command. See also ^D638)n command.

1.4.9 AGD (Activate Gap Detector)   _{LSX, LSY, GAP, DRM, SPD, DET, OFX, OFY,} **AGD**

This parameter disables the registration sensor from detecting for the distance entered. This is helpful when preventing false triggers on preprint and other areas that detect like a registration mark. The value is entered using the current unit of measure selected by the "^D564)" command. See also ^D650)n command.

1.5 Format Entry Command - ^Fn)

The Format Entry command used to define the characteristics, placement and representation of the corresponding text data of the individual fields. This command starts with the "^Fn)" structure which is then followed by thirteen different parameters that define and control the desired field. The "n" is an identifier that represents the field number being formatted and corresponds to the equivalent "^Tn)" line. As with the ^Dxxx commands, multiple parameters must be separated by the comma (",") delimiter. Issue the format entry from within a script file. Unlike the "^Dxx)" commands and the script header, the Format Entry Command typically does contain default values as there are no equivalent commands for the individual parameters. The default values are discussed under the individual parameter descriptions.

Field parameters

^Fn) XB, YB, CI, SW, SH, AI, DN, FO, FJ, FW, CS, FC, CC

The "n" identifies the field   The comma delimiter
number which always
starts at "1" and not "0".
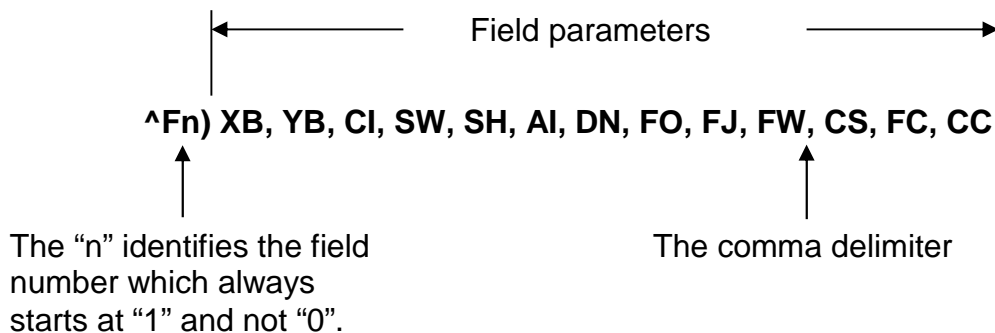
Figure 4   Format Entry Command

1.5.1   XB (X Coordinate)   XB, YB, CI, SW, SH, AI, DN, FO, FJ, FW, CS, FC, CC
This parameter used to set the X coordinate of the field. The X coordinate measured from the left edge of the media, as viewed from the front of the printer. The value is entered using the current unit of measure selected by the "^D564)" command and may contain any number of digits desired. A leading zero before the decimal point is not required but should be used to make trouble shooting scripts easier (i.e., .75 should be entered as 0.75). This parameter does not contain a default value and is required.

1.5.2   YB (Y Coordinate)   XB, YB, CI, SW, SH, AI, DN, FO, FJ, FW, CS, FC, CC
This parameter used to set the Y coordinate of the field. The Y coordinate measured from the bottom edge of the media, as viewed from the front of the printer. The value is entered using the current unit of measure selected by the "^D564)" command and may contain any number of digits desired. A leading zero before the decimal point is not required but should be used to make trouble shooting scripts easier (i.e., .75 should be entered as 0.75). This parameter does not contain a default value and is required.

1.5.3   CI (Conversion Identifier)   XB, YB, CI, SW, SH, AI, DN, FO, FJ, FW, CS, FC, CC
The Conversion Identifier (CI) determines how the associated text field will be rendered. This parameter can be used to select from the available fonts, graphics, line draw feature, and/or bar codes that will be used to render the associated Text Entry command line ("^Tn)"). Objects that are stored in the printer's flash memory are selected using the system character ("@") and the appropriate text identifier. This parameter can also be used to select other user stored files by entering the name of the saved file into the CI parameter. The entered values for the CI parameter are not case sensitive because the printer will internally translate as lower case.

Resident Bitmapped Fonts
Listed in the table below are the resident fonts stored in the printer. To access the resident fonts, enter the appropriate Font Name into the CI parameter. The printer may store up to nineteen bitmapped fonts and custom font sets are available upon request.

CI - Font Name	Font Sample
@normal_06	6 Point – 01234567890ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxwy
@bold_06	**6 Point – 01234567890ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxwy**
@normal_08	8 Point – 01234567890ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxwy
@bold_08	**8 Point – 01234567890ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxwy**
@normal_10	10 Point – 01234567890ABCDEFGHIJKLMNOPQRSTUVWXYZab

CI - Font Name	Font Sample
@bold_10	**10 Point – 01234567890ABCDEFGHIJKLMNOPQRSTUVWXYZa**
@normal_12	12 Point – 01234567890ABCDEFGHIJKLMNOPQRSTUVWXYZab
@bold_12	**12 Point – 01234567890ABCDEFGHIJKLMNOPQRSTUVWXYZa**
@normal_14	14 Point – 01234567890ABCDEFGHIJKLMNOPQRSTU
@bold_14	**14 Point – 01234567890ABCDEFGHIJKLMNOPQRST**
@normal_16	16 Point – 01234567890ABCDEFGHIJKL
@bold_16	**16 Point – 01234567890ABCDEFGHIJKL**
@normal_20	20 Point – 01234567890ABCDEFGHIJ
@bold_20	**20 Point – 01234567890ABCDEFGHI**
@normal_24	24 Point – 0123456ABCDEGabc
@bold_24	**24 Point – 012345ABCabcdefgh**
@ocra_12	12 Point - 0123456789ABCDEFGHIJKLMNOPQRUSTUWXYZabc
@ocrb_08	8 Point – 1234567890ABCDEFGHIJKLMNOPQRSTUVWXZYabcdefghijklmnopqr
@ocrb_12	12 Point – 1234567890ABCDEFGHIJKLMNOPQRSTUV

Table 1   Resident Bitmapped Fonts

Font File Type Example:
If a normal 8 point font is desired then "@normal_08" should be entered for the CI parameter in order for the proper font to be printed. Fonts are accessed by entering the system character "@", font name followed by the underscore character and then the point size into the CI parameter.

Line Draw
The line draw feature selected by entering "@line" into the CI parameter. The line draw feature easily creates lines by using the XB and YB coordinates as an insertion point for the line to start and then adjusting the SW and SH parameters to define the width and the height of the line.

Line Draw Example:
^A)
^D200)3.3, 1.9, 0.125, 1.063, 5, 1
^F1)1.0, 1.0,@line, 1.11, 0.01
^F1)1.0, 1.0,@normal_14
^T1)Line Draw Feature
^D300)1
^Z)

This script inserts a line an inch from the left side and an inch from the bottom. The line would be 1.11" in width or length (X direction) and would be 0.01" in height (Y direction). The "^Fn)" field must reference a "^Tn)" field for proper operation. The line draw does not have to reference its own specific Text Entry command ("^Tn)") and may reference an existing Text Entry field in the script file as demonstrated in the above example. Refer to Chapter 4 for additional information regarding the line draw feature.

Bar Codes
The bar codes or symbologies are stored in the printer and can be selected by entering the system character "@" followed by the text equivalent code of the desired symbology in the CI parameter, refer to Table 2 for the available bar codes.

The bar codes that provide optional check digits are accessed by entering "cs" immediately following the bar code text equivalent code. This is helpful to meet the individual bar code specifications.

For example: If the user wanted to generate a human readable MSI1 that included the check digits, "msi1cs_hr" would then be entered while "msi1_hr" would not include the check digits in human readable form.

See Chapter 5 for more detailed information pertaining to bar codes and their individual formatting requirements.

CI - Barcode Name	Bar code Type
@codabar	Codabar
@code128	Code 128 using manual compression
@code128auto	Code 128 using automatic compression
@code39	Code 3 of 9
@code93	Code 93
@codei2of5	Code I2 of 5
@msi0	Modified Plessey, User provides both check digits
@msi1	Modified Plessey, User provides one check digit
@msi2	Modified Plessey, User provides no check digits
@postnet	POSTNET
@uccean128	UCC/EAN 128
@data	Data Matrix 2D Bar code
@pdf417	PDF417 2D Bar code
@aztec	Aztec 2D Bar code
@qrcode	QR Code Bar code

Table 2   Bar Code Index

Graphics
The printer is capable of processing monochrome 1-bit bitmaps. If color 1-bit bitmaps are used, it is recommended that the user use Burkes dithering method at the print resolution of the printer. The bitmap graphic does not need a separate converter to convert to the printer's recognized graphic structure as the printer will do this internally. The actual ".bmp" may be saved to the printer's non-volatile flash memory using the "^D340)" command or into volatile RAM using the "^D345)" command. User definable graphic images are accessed and printed by entering the file name of the appropriate stored graphic, that was used to save the graphic using the "^D340)" command, into the CI parameter.

Graphics may also be sent to the printer in "zipped" (.zip file extensions) form without specifying the file size. The file size would be provided by the zipped files header and should not be included in the command line. This also reduces the transfer time of sending the graphic to the printer; improving throughput.

Graphic File Type Example:
If a BMP graphic saved as "my graphic" then "my graphic" should be entered for the CI parameter in order for the graphic to be printed.

1.5.4   1.5.4   SW   (Size Width)   XB, YB, CI, **SW**, SH, AI, DN, FO, FJ, FW, CS, FC, CC
This parameter is used to adjust the width multiple of fonts, bar codes and/or lines.

Bitmapped Fonts
For bitmapped fonts, the SW can be used to adjust the width multiple of the font chosen using the CI parameter. The parameter entered in as an integer and has a valid range of 1 to 256. The SW default for bitmapped fonts is set a one.

Bar Codes
The SW has a different effect when used in conjunction with bar codes. When a 0 or 180 degree bar code is selected using the CI parameter, the SW is used to modify the bar code width by a multiple of the narrowest rendition. This means that a value of "1" will produce the narrowest rendition related to the bar elements while a value of "3" would produce a Bar code that is three times this width. The default value of "1" will be used if a bar code is selected and this field is left blank. For 90 or 270 degree bar codes, the SW field would specify the actual width or height using the current selected unit of measure. The default SW height, 90 and 270 degree rotations, is set a value of 0.5 inches or 12.7mm depending on the current unit of measure ("^D564)" command) setting with the default for 0 and 180 degree rotation being set to a 1.

Line Draw
The SW determines the width of a line when the CI field has selected the line draw feature. This is a required field when used in conjunction with the line draw feature.

1.5.5   SH (Size Height)   XB, YB, CI, SW, **SH**, AI, DN, FO, FJ, FW, CS, FC, CC
This parameter is used to adjust the height multiple of fonts, bar codes and/or lines.

Bitmapped Fonts
For bitmapped fonts, the SH can be used to adjust the height of the font chosen using the CI parameter. The parameter entered in as an integer and has a valid range of 1 to 256. The SH default for bitmapped fonts is set a 1.

Bar Codes
The SH has a different effect when used in conjunction with bar codes. When a 90 or 270 degree bar code is selected using the CI parameter, the SH is used to modify the bar code width by a multiple of the narrowest rendition. This means that a value of "1" will produce the narrowest

rendition related to the bar elements while a value of "3" would produce a bar code that is three times this width. The default value of "1" will be used if a bar code is selected and this field is left blank. For 0 or 180 degree bar codes, the SH field would specify the actual height of the bar code using the current selected unit of measure. The default SH height, 0 and 180 degree rotations, is set a value of 0.5 inches or 12.7mm depending on the current unit of measure ("^D564" command) setting with the default for 90 and 270 degree rotation being set to a 1.

Line Draw

The SH determines the height of a line when the CI field has selected the line draw feature. This is a required field when used in conjunction with the line draw feature.

1.5.6   AI (Attribute Index)   XB, YB, CI, SW, SH, **AI**, DN, FO, FJ, FW, CS, FC, CC

The attribute index controls the type of effect placed on text and/or bar codes. The default is a setting of "0" for text fields and a default value of "2" for barcodes.

The OR value causes new black dots to be placed regardless of whether those dots are intended to be black or not. This means that the resulting field will always be black.

The Reverse setting places a black rectangle that is two dots larger than the field and then will anything that would normally be black will show up as white.

The XOR selection causes fields to appear black but if two black fields overlap, then the field will appear as white.

The Opaque setting causes new images to overwrite the existing images by printing a white box that is two dots larger that the contents of the field and then print black.

Attribute Index Value	Conversion / Effect
0	OR (Text Default)
1	Reverse Video
2	XOR (Barcode Default)
4	Opaque
2:1	Wide to Narrow Bar Ratio
3:1	Wide to Narrow Bar Ratio
5:2	Wide to Narrow Bar Ratio
8:3	Wide to Narrow Bar Ratio

Table 3   Attribute Index

The AI parameter field used to add barcode ratios for barcodes that use the wide to narrow bar or overall size ratios. These barcodes include the Codabar, Code 39, Code I2of5, and PDF417. The ratios first select a video attribute and then the ratio separated by an underscore (_) character. Example: If you wanted a Reverse Video Barcode with a 3:1 ratio, 1_3:1 would be entered for the AI parameter.

1.5.7   DN (Direction)   XB, YB, CI, SW, SH, AI, **DN**, FO, FJ, FW, CS, FC, CC

This parameter used to select the direction of the text. The only valid parameter for direction is rightwards text. A selection of rightwards text would cause the characters to be printed left to right.

           1   Rightwards Direction   (default)

1.5.8   FO (Field Orientation)   XB, YB, CI, SW, SH, AI, DN, **FO**, FJ, FW, CS, FC, CC

Enter the values as degrees for this parameter. The normal orientation (0°) is right side up as viewed from the front of the printer. The valid arguments are 0, 90, 180 and 270. The rotation is measured counter-clockwise.

           0   0 degree   (default)
           90   90 degree
           180   180 degree
           270   270 degree

1.5.9   FJ (Field Justification)   XB, YB, CI, SW, SH, AI, DN, FO, **FJ**, FW, CS, FC, CC

The field justification or FJ controls the alignment, kerning, and the proportionality of text and/or bar codes with respect to the type of composition used. Alignment is done side-to-side (left, right, centered, or full justified to span the entire LSY distance) and vertically (on or below baseline, which is an imaginary line extending from the starting coordinates along the direction of the text), relative to the default (0 degree) orientation of text and/or bar codes and the insertion point of the field. This means that whatever the direction and orientation may be; left will always be the left edge of the characters when the media exits the printer.

Kerning is when one character in a proportional font can be slid under another character to achieve a more appealing result. Kerning is enabled and used by default unless a value for the FJ parameter is entered. If a value is entered then kerning would have to be selected by adding "100" to the justification value.

Proportionality refers to whether the characters are all different widths or all the same. A proportional font has characters that are mostly different widths. A mono-spaced font has characters that are all the same width, except generally for punctuation.

When selecting the alignment value, text and/or bar codes will be aligned from the XB and YB insertion point. The justified function, to be aligned, can be specified by using a combination of the insertion point and the FW (Field Width) parameter so that the text is spaced to run this entire distance.

The desired alignment value can be determined from the table below:

	Composition		Horizontal Alignment			
	Horizontal	*Vertical*	*Left*	*Center*	*Right*	*Justified*
Vertical Alignment	Above Baseline	Top	11	12	13	14
	Below Baseline	Bottom	31	32	33	34

Add 100 for kerning and add 200 for mono-spacing to the FJ value to produce effects.

Table 4   Field Justifications

For Example: A typical European language uses left horizontal and normal vertical alignment, which would be a value of "11" for the "FJ" parameter. If using kerning, the proper value would then be "111" and for mono spacing, it would be "211".

1.5.10   FW (Field Width)
XB, YB, CI, SW, SH, AI, DN, FO, FJ, **FW**, CS, FC, CC

The field width parameter sets the width of a text field, using the current unit of measure, along the direction of composition. This is used to limit the physical width of the cell where the appropriate data is to be placed. If the desired data is longer than the field width setting, then characters outside the cell width setting will not be printed.

1.5.11   CS (Character Spacing)
XB, YB, CI, SW, SH, AI, DN, FO, FJ, FW, **CS**, FC, CC

This parameter adjusts the spacing between each character or the inter-character spacing. The change made relative to a default, where omitting this parameter or entering a "0" causes the default to be used. The specified spacing value is in units of typesetting points, where 1 point = 1/72". Positive point values increase the default spacing while negative values reduce the default spacing. The point values are accurate to a single digit following the decimal place (1.4 for example).

1.5.12   FC (First Character)
XB, YB, CI, SW, SH, AI, DN, FO, FJ, FW, CS, **FC**, CC

The FC parameter used to select the first character to be used as data within the text string data. This parameter is helpful in allowing several fields to use sections of the same text string minimizing the amount of data transmitted. If the value specified for the FC parameter is equal to or greater than the included data, the entire data string will be printed. For Example, for the text string 0123456789, a FC value of 5 would start the data on the fifth character and the resulting data would be 456789. This parameter used in conjunction with the CC (Character Count) parameter listed below.

1.5.13   CC (Character Count)
XB, YB, CI, SW, SH, AI, DN, FO, FJ, FW, CS, FC, **CC**

This parameter used to determine the number of characters that will be used as data within a text string. If the number of characters in the selected text string is more than the quantity specified by the CC, then the remainder of the text string is ignored. If this parameter is left blank then the entire text string will be used as the data. Using the same example described in section 1.4.12, a CC value of 2 in conjunction with a FC value of 5, would result in a value of 45 to be used as the data.

1.6 Text Entry Command - ^Tn)

The Text Entry command used to define the actual data rendered using the output identified by the CI parameter. This command starts with the "^Tn)" structure and then is followed by the subject text or data. The "n" is an identifier that represents the subject text lines and will use the formatting that has been placed in the corresponding "n" of the format entry command ("Fn)").

 For features like graphics and/or line draw, this command is simply a placeholder for the equivalent "^Fn)" command, so any text may be entered. When printing graphics, text containing the graphic name or simply the word graphic should be entered and can be helpful for debugging purposes. The same would be true when using the line draw feature by entering the word "line" in the "^Tn)", this also assists in debugging easier.

Note: To print either the caret ("^") or the pipe ("|") characters simply enter them twice (example - "^^").

This text is what will
print out on the media.

^Tn)Your subject text is typed here.

Identifies the subject text
line number and
corresponds with the
same format line number.

Subject data is entered
immediately after the command
with no space between the
command and the text.

Figure 5   Text Entry Command

Chapter 2: Printer Commands

The script management commands may be issued inside a script file while the ^Dxx printer control commands may be issued from inside or outside a script file. Commands will be persistent and non-volatile if issued from outside a script file and temporary if issued from inside a script. Commands that issued from inside a script file will override the persistent setting during the processing of the script file and then return to the value of the previous persistent command. The commands require a ")" between the command and the first parameter or argument. Separate multiple parameters with a comma delimiter. The printer control commands follow the standard command preface ("^Dxxx") structure and are divided into eight sub-categories. These categories are identified by the "hundreds" digit as listed below. The commands are also executed in the order that they are issued with the only exceptions being the ^D391, ^D566, ^D565, and ^D564 commands. Commands will return the status and/or setting if entering the ^Dxx command without an argument. Entering a question mark ("?") after the ^Dxx command causes the printer to report the commands current setting as well as the verbose description and help text associated with that particular command.

^Dxxx Series Number	Series Number Command Definition
2xx	Formatting Commands
3xx	Operation Commands
4xx	Volatile Selection and Setting Commands
5xx	Configurable Selection Commands
6xx	Configurable Setting Commands
7xx	Configurable Enablement Commands
8xx	*Reserved for future use.*
9xx	Self Test and Factory Commands

Table 5   ^Dxxx Series Commands

2.1 Script Management Commands

The script management commands deal specifically with scripts and control how scripts are processed and executed. These commands are only valid when sent inside a script file. Refer to the previous chapter for detailed description on working with script files and their formatting requirements. Certain commands are processed before other commands with disregard to their placement. These commands include the ^D391, ^D566, ^D565, ^D564, and then the ^D200 command. The commands are processed in this order, if present, and after processed the remaining commands are executed in the order, they are issued.

2.1.1 Begin Script - ^A)filename

This command is used to mark the beginning of a script file. The script may be saved into the printer's non-volatile flash memory if a title or filename is placed after the command. The filename may contain to a maximum of 20 characters in length and include any character from ASCII 0x20 and 0x41 to 0x7A (alphabetical characters plus [\]_'and SP (space character)) with the exception of the caret (^) character. Script filenames can not use a leading zero ("0") or 0x30 characters. A script that contains a "filename" will only save the script and will not process and print. The "^D350)filename" would be issued to recall and process the saved script. If the script does not contain a "filename", the script is processed normally and will be volatile in nature.

2.1.2 Begin Temporary Script - ^AT)filename

This command is used to mark the beginning of a temporary or transient script file. The script may be saved into the printer's volatile RAM if a title or filename is placed after the ^AT) command. The filename may contain to a maximum of 20 characters in length and include any character from ASCII 0x20 and 0x41 to 0x7A (alphabetical characters plus [\]_'and SP (space character)) with the exception of the caret (^) character. Script filenames can not use a leading zero ("0") or 0x30 characters. Scripts saved in RAM report "*volatile*" in the comments column to distinguish between volatile and non-volatile scripts. A script that contains a "filename" will only save the script and will not process and print. The "^D350)filename" would be issued to recall and process the saved script. If the script does not contain a "filename", the script is processed normally and will be volatile in nature. Temporary scripts are not saved and are lost once a reset or power cycle occurs.

2.1.3 Format Entry Command - ^Fn)XB,YB,CI,SW,SH,AI,DN,FO,FJ,FW,CS,FC,CC

The Format Entry command used to define the characteristics, placement and representation of the corresponding text data of the individual fields. This command starts with the "^Fn)" structure which is then followed by thirteen different parameters that define and control the desired field. The "n" is an identifier that represents the field number being formatted and corresponds to the equivalent "^Tn)" line. As with the ^Dxxx commands, multiple parameters must be separated by the comma (",") delimiter. The format entry command may be issued from outside a script but is typically created within a script file. Unlike the "^Dxx)" commands and the script header, the Format Entry Command typically does contain default values as there are no equivalent commands for the individual parameters. The default values discussed under the individual parameter descriptions. Refer to section 1.5 for the individual parameters detailed descriptions.

2.1.4 Text Entry Command - ^Tn)text data

The Text Entry command used to define the actual data rendered using the output identified by the CI parameter. This command starts with the "^Tn)" structure and then is followed by the subject text or data. The "n" is an identifier that represents the subject text lines and will use the formatting that has been placed in the corresponding "n" of the format entry command ("Fn)").

 For features like graphics and/or line draw, this command is simply a placeholder for the equivalent "^Fn)" command, so any text may be entered. When printing graphics, text containing the graphic name or simply the word graphic should be entered and can be helpful for debugging purposes.   The same would be true when using the line draw feature by entering the word "line" in the "^Tn)", this also assists in debugging easier.

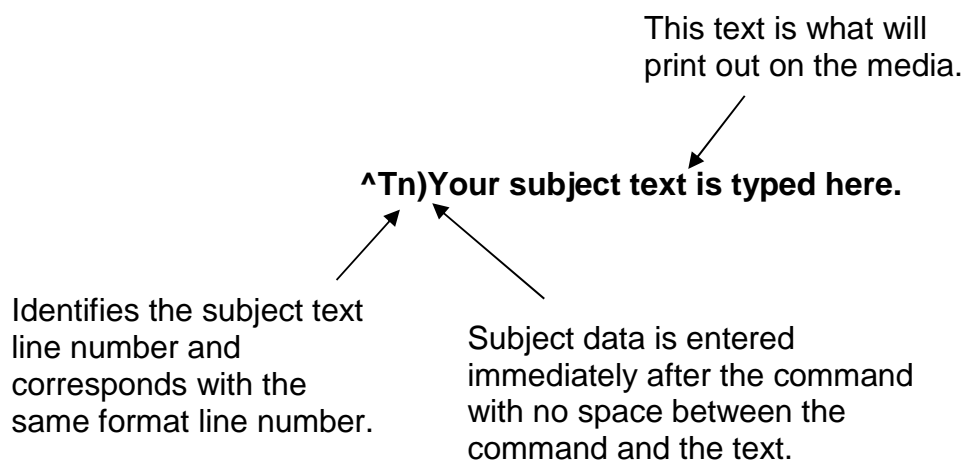Note: To print either the caret ("^") or the pipe ("|") characters simply enter them twice (example - "^^").

2.2 2xx Series Commands

The 2xx series commands control the formatting commands. Commands will return the current status and/or setting if the ^Dxx command is entered without an argument. Entering a question mark ("?") after the ^Dxx command causes the printer to report the commands current setting as well as the verbose description and help text associated with that particular command.

2.2.1   ^D200) LSX, LSY, GAP, DRM, SPD, DET, OFX, OFY, AGD (Script Header)

This command followed by nine parameters that control the media layout as well as printer operation. The beginning parameter (LSX) must be separated from the ^D command with a ")" character and each following parameter must be separated by the delimiter, which is the comma (",") by default. It is recommended that since the header is used to identify a certain media configuration that all header parameters are included in a script file. Refer to section 1.4 for additional information.

2.2.2   ^D202)n   (Text Replacement Header)

This command may be used in place of the script header ("^D200)") after a script containing ^Fn) formatting instructions has been processed. Parameter "n" is used to specify a script that has been saved into the printer memory that will be used as the current script. The "^D202)" command causes new text data to replace the corresponding text from the previously processed script sent to the printer or by entering value for "n" a script saved in memory. This provides a streamlined method for entering new data into an existing script without having to send the header and formatting instructions again, thus improving throughput. The data that needs to be replaced is sent after the "^D202)" command using the corresponding ^Tn) command in the current script. To erase or clear a format line, you would send the desired ^Tn) line and omit new data. To conserve text data from the previous script, do not reference the line after the "^D202)" command.

For Example:
```
^AT)test                                <-- saves a volatile file called "test"
^D200)3,1,0.125,0,3,2,0,0               <-- label header
^F1)1.50,0.75,@normal_10,1,1,0,1,0,12   <-- field #1 definition
^F2)1.50,0.50,@normal_10,1,1,0,1,0,12   <-- field #2 definition
^F3)1.50,0.25,@normal_10,1,1,0,1,0,12   <-- field #3 definition
^T1)Text                                <-- field #1 data
^T2)Replacement                         <-- field #2 data
^T3)Example                             <-- field #3 data
^D300)1                                 <-- print "1" copy command when recalled
^Z)                                     <-- end script
```

^D202 Print Example #1

```
              Text
          Replacement
            Example
```

The "^D202 Print Example #1" illustrates what the sample script listed above would generate if recalled using the "^D350) command ("^D350)test").

^D202 Print Example #2

```
^A)                <-- start script
^D202)test         <-- recalls file "test"
^T3)Print Sample   <-- replace ^T3 data
^D300)1            <-- print 1 copy
^Z)                <-- end script
```

<div style="border:1px solid black; text-align:center">
Text
Replacement
Print Sample
</div>

The "^D202 Print Example #2" illustrates recalling the script from Example #1 ("test") and then replacing the data in text field #3 ("^T3") from "Example" to "Print Sample".

^D202 Print Example #3

```
^A)                <-- start script
^D597)1            <-- advance after print
^D202)test         <-- recalls file "test"
^T1)               <-- replace/delete ^T1 data
^T3)Print Sample   <-- replace ^T3 data
^D300)2            <-- print 2 copies
^Z)                <-- end script
```

<div style="border:1px solid black; text-align:center">
Replacement
Print Sample
</div>

The "^D202 Print Example #3" illustrates adding a ^D command, recalling the script from Example #1 ("test"), replacing text field #1 with blank space, replacing the data in text field #3 ("^T3") from "Example" to "Print Sample", and increasing how many copies are printed ("^D300)2").

2.2.3   ^D203)LSX,LSY,GAP,DRM,SPD,DET,OFX,OFY,AGD,BT_FS (optional) (Direct Image Script Header)

This command replaces the need of the D200 script header and allows users to print a graphic without needing to save it to the printer first. The user can embed image data in the form of a raw binary, compressed binary, BMP, PNG, PDF, JPG, or zipped BMP/PNG/PDF/JPG. The ^F and ^T fields are ignored when printing a full-page graphic image.

Header parameters in order: lsx,lsy,gap,dtm,spd,det,ofx,ofy,agd,binary tag_file size (optional).

LSX – Label Width, see also ^D631 command
LSY – Label Height, see also ^D632 command
GAP – Gap size (registration mark size), see also ^D633 command
DRM – Distance to Mark, see also ^D634 command
SPD – Print Speed, see also ^D635 command
DET – Detector Type, see also ^D636 command
OFX – X Offset, see also ^D637 command
OFY – Y Offset, see also ^D638 command
AGD – Advance Gap Detection, see also ^D650 command
BT_FS (optional) – BinaryTag and File Size optional parameters:

BT – BinaryTag is an optional parameter that shares with the File Size parameter used to indicate the file type sent for direct image printing. If the image is a Raw Binary image, a "b" is used. If the image is a Compressed Binary Image file, a "c" is used. Omit the BT parameter if the image is a BMP, PNG, JPG, or PDF image and use only the FS parameter.

FS - The FS or File Size is an option parameter used when sending binary images or unzipped BMP, PNG, JPG, or PDF files where the size is equal to the number of bytes in the image file. If no size is included, the printer assumes that the data is a PKZIP file.

The values contained in the D203 header supersede the persistent ^D command settings. After the script containing the ^D203 header is processed, the printer reverts to the persistent values set by the D commands outside of a script.

The ^D300 or ^P print commands are supported by the direct image print command. It is also possible to reprint the direct image job by sending another print request or even print multiple copies.

Full page direct image printing must be the width of the printhead (832 for 203dpi and 1280 for 300dpi 4" printers).

Examples:
Raw Binary Image File
 ^A)
^D203) 4,3,0.125,0,6,2,0,0,0,b_63336
63,336 Bytes of Raw Binary Image Data
^D300)1
^Z)

Compressed Binary Image File
^A)
^D597)3
^D203)4,3,0.125,0,6,2,0,0,0,c_4514
4,514 Bytes of Raw Binary Image Data
^D300)5
^Z)

BMP Image File
^A)
^D564)1
^D203) 4,3,0.125,0,6,2,0,0,0,45078
45,078 Bytes of BMP Image Data
^F1)0.5,0.5,@normal_10
^T1)This text will print
^D300)100
^Z)

PNG Image File
^A)
^D564)1
^D203) 4,3,0.125,0,6,2,0,0,0,45078

45,078 Bytes of PNG Image Data
^D300)100
^Z)

PDF File
^A)
^D564)1
^D203) 4,3,0.125,0,6,2,0,0,0,45078
45,078 Bytes of PDF File Data
^F1)0.5,0.5,@normal_10
^T1)This text will print
^D300)100
^Z)

PNG Image File
^A)
^D564)1
^D203) 4,3,0.125,0,6,2,0,0,0,45078
45,078 Bytes of PNG Image Data
^D300)100
^Z)

JPG Image File
^A)
^D564)1
^D203) 4,3,0.125,0,6,2,0,0,0,45078
45,078 Bytes of JPG Image Data
^D300)1
^Z)

Zipped BMP/PDF File
^A)
^D203) 4,3,0.125,0,6,2,0,0,0
Zipped BMP/PNG/PDF Image Data
^F1)0.5,0.5,@normal_10
^T1)This text will print
^D740)1
^D300)15
^Z)

Zipped PNG/JPG File
^A)
^D203) 4,3,0.125,0,6,2,0,0,0
Zipped BMP/PNG/PDF Image Data
^D740)1
^D300)15
^Z)

2.3 3xx Series Commands

The 3xx series commands control basic operation and list commands. Commands will return the current status and/or setting if the ^Dxx command is entered without an argument. The ^D3xx series commands are also required to be sent each and every time because persistent or values set outside a script file are not retained. Entering a question mark ("?") after the ^Dxx command causes the printer to report the commands current setting as well as the verbose description and help text associated with that particular command.

2.3.1   ^D300)n   (Print Command)
This command will print a label or a batch of labels where "n" controls how many labels of the identical script are printed. When this command is used within a script file, it should be placed at the end of the ^D commands. The "^D300)" command is equivalent to the ^P (ASCII 0x10) control code.

2.3.2   ^D305)1   (Infinity Print Command)
Issuing this command will initiate infinity printing. The printer will continue to print until the machine turns off. This command may be sent from outside or from inside a script file.

2.3.3   ^D311)1   (Top-OF-Form)
This command uses the Label Present Sensor to detect the edge of the media and retracts the leading edge of the media the start position which is just behind the TOF sensor. The "^D311)" command is equivalent to the ^O (ASCII 0x0F) control code.

2.3.4   ^D312)n   (Form Feed)
This command causes the printer to feed or scroll a form size that is based upon the previous script's configuration where "n" controls how many copies are issued. The form determined by the last label size that was processed. This command can be used inside and/or outside a script file. The "^D312)" command is equivalent to the ^L (ASCII 0x0C) control code.

2.3.5   ^D313)n1,n2   (Advance Media)
This command used to advance the media by a programmable distance (n1) at a programmable speed (n2). The distance and speed parameters are specified in the current selectable units ("^D564)" and "^D565)") commands. A negative distance for the n1 parameter causes the printer to retract the specified amount at the speed entered with the n2 parameter.

2.3.6   ^D323)n   (List Enablements)
The "^D323)" command will list the printers current configurable enablements along with each of the individual enablement specific ^D7xx command.   This command should only be issued from outside a script file and not issued in a script file. The valid parameters for "n" are listed below. If the ^D command is issued without a parameter, the default will be used. The "^D323)" command is equivalent to the ^Y (ASCII 0x19) immediate control code.

    1   through active port (default)
    2   print out

2.3.7   ^D324)n   (List Statistics)

This command used to report the printer's status such as the firmware version, communication parameters, memory information, and basic usage statistics.   The "^D324)" command is equivalent to the ^W (ASCII 0x17) control code.

> 1   through active port (default)
> 2   print out

2.3.8   ^D325)n   (List Selections)

The "^D325)" command will list the printers current configured selections along with each of the individual selection specific ^D5xx command. Issue this outside a script file. The valid parameters for "n" are listed below. If the ^D command is issued without a parameter, the default will be used. The "^D325)" command is equivalent to the ^U (ASCII 0x15) control code.

> 1   through active port (default)
> 2   print out

2.3.9   ^D326)n   (List Settings)

The "^D326)" command lists the printers current settings along with each of the individual setting specific ^D6xx) commands. This command should only be issued outside a script file. The valid parameters for "n" are listed below. If the ^D command is issued without a parameter, the default will be used. The "^D326)" command is equivalent to the ^V (ASCII 0x16) control code.

> 1   through active port (default)
> 2   print out

2.3.10   ^D327)1   (List Status)

The "^D327)1" command will report the printers current status through the active port. When the indicator light on the front panel changes from green to amber or red, this command will provide information of the current status (i.e., >STOCK OUT<, >READY<, >PAUSED<...). The actual response the printer sends depends on the printer response set configuration, refer to the "^D550)" command for additional information. This command may be issued inside or outside a script file. The "^D327)1" command is the queued or serialized equivalent to the ^E (ASCII 0x05) immediate control code. Refer to Chapter 6 for the available status messages.

2.3.11   ^D339)size   (Load Firmware)

Command used to update the printer's firmware. The code firmware should be in Zipped form when sending to the printer. The "size" parameter is optional and should match the size of the zip file being sent. If the update is successful, the printer will reboot at the completion of the update.

2.3.12   ^D340)filename   (Load/Save File)

The "^D340)" command causes the printer to take the ensuing data transfer as a binary file upload from the host. The file will then be permanently stored in the printer's flash memory until erased. The printer will currently accept the following file types: 1-bit (monochrome) BMP graphics, scalable fonts (.ttf), and compressed .zip files. The ^D340) command has three parts, which are name, file size, and comment. Both the name and file size are required while the comment is optional.

The filename and/or comment may contain to a maximum of 20 characters in length and include any character from ASCII 0x20 and 0x41 to 0x7A (alphabetical characters plus [\]_'and SP (space character)) with the exception of the caret (^) character. Script filenames can not contain a leading zero ("0") or 0x30 characters.

Command Syntax: ^D340)filename, file size, comment (optional)

Example 1:   "^D340)swiss721_10,3092"
Example 1 would save a font file titled "swiss721_10" into the printer's flash memory. The printer will automatically detect the file type of the ensuing data and save it as such.

Example 2:   "^D340) graphic, 2862, my graphic"

Example 2 would save a BMP file titled "graphic" and a comment "my graphic" into the printer's flash memory. The printer will automatically detect the file type of the ensuing data and save it as such.

2.3.13   ^D341)type   (List Catalog)
This command used to list the files stored in the printer's flash memory. The list reports the files name (user file CI), any associated comments, file type, and the file size of all file types. This command should only be issued from outside a script file and not entered from a script file. Issuing this command with the "?" as the argument also causes the listing to be generated. The ^D341) command may contain a search string type to limit a search for specific file types. The valid parameters for "type" listed below.

1	List all file types
2	List only graphic file types
4	List only bitmapped font file types
5	List only script file types

2.3.14   ^D342)filename   (Delete File)
This command is used to delete a stored font, graphic, or script. The filename must match a saved file name and/or contain the wild card character (*) for the stored file to be properly deleted. This would include any space characters that were entered when saving the file. The "^D341)" command is useful in determining the exact filename and the valid wild card structure is listed below.

*x   - deletes filenames that end with character string x.
x*   - deletes filenames that begin with character string x.
x*y   - deletes filenames that begin with character string x and end with string y.
x   - deletes filenames where character string x is found anywhere in the filename.

2.3.15   ^D343)filename   (List Script)
This command lists the contents of the specified script that has been saved in the printer's flash memory to the active port.

2.3.16   ^D345)filename   (Load Volatile File)
The "^D345)" command causes the printer to take the ensuing data transfer as a binary file upload from the host without saving to the printer's flash memory. The file is volatile in nature and will lost when power is cycled. The printer will currently accept the following file

types: 1-bit (monochrome) BMP graphics, MCF (Microcom Corporation Converted Font), and user created script files. The file transfer can be sent in uncompressed or PKZIP compatible compressed formats. A ^E (0x05) character may be sent to the printer during the download without any negative effects towards the file size. The "^D345)" command has two parts, which are the file name and file size.

The filename may contain to a maximum of 20 characters in length and include any character from ASCII 0x20 and 0x41 to 0x7A (alphabetical characters plus [\]_'and SP (space character)) with the exception of the caret (^) character. Script filenames can not use a leading zero ("0") or 0x30 characters.

 When saving MCF files, the chosen name should include the "_" (underscore character) followed by the point size; see the examples below.
Command Syntax: ^D345)filename, file size

Example 1:   "^D340) graphic, 2862"

Example 1 would save a BMP file titled "graphic" into the printer's volatile RAM memory. The printer will automatically detect the file type of the ensuing data and save it as such.

2.3.17   ^D350)filename   (Execute Script)
This command recalls and processes a script that has been saved in the printer's flash memory or volatile scripts that are currently in RAM.

2.3.18   ^D360)1   (List Memory Available)
This command lists the current RAM and Flash memory available. The available RAM is listed and then the available Flash memory is reported. The memory types are separated by the comma (",") delimiter.

2.3.19   ^D365)?   (List Status Response List)
This command generates a list of the status responses and sends it to the active port. The list contains the byte, text, and verbose equivalent responses. Refer to the "^D550)" command regarding the byte, text, and verbose response sets. Issue this command outside a script file. Listed below are the available status responses.

Byte Mode Responses (ASCII)	Text / Verbose Mode Response Equivalent
0x01	>STOCK OUT<
0x02	>STOCK OVERADVANCED<
0x03	>STOCK JAMMED<
0x06	>OK<
0x10	>CUTTER JAMMED<
0X14	>PM<
0x1C	>MISSING LABELS<
0x1D	>INCOMPLETE FORM<

Byte Mode Responses (ASCII)	Text / Verbose Mode Response Equivalent
0x20	>CATCH TRAY FULL<
0x21	>INPUT 1<
0x22	>INPUT 2<
0x30	>SCRIPT ERROR<
0x31	>INVALID PARAMETER<
0x80	>RESTARTED<
0x81	>READY<
0x83	>PAUSED<
0x86	>LABEL/TAG PRESENT<
0x87	>STOCK ADVANCED<
0x8F	>STOCK NOT LOADED<
0x90	>RETRACTION DELAY<
0x91	>PRINT DELAY<
0xB0	>FLASH MEMORY LOW<
0xC0	>BUTTON 1 TAPPED<
0xC1	>BUTTON 1 HELD<
0xD0	>TEMPERATURE OUT OF RANGE<
0XD1	>NONEXISTENT COMMAND<
0xD3	>ZIP FILE ERROR<
0xD4	>FILE CONVERSION ERROR<
0xD5	>UNSUPPORTED FILE TYPE<
0xD6	>FILE NOT FOUND<
0xD7	>INADEQUATE ACCESS MODE<
0xDA	>INADEQUATE FLASH SPACE<
0XF2	>FILE TOO LARGE<
0xFF	>POWERED DOWN<

Table 6   ^D365) Status Response List

2.3.20   ^D390)1   (Reset Printer)

This command instructs the printer to perform a reset through software, which duplicates a hard reset. This command may be issued from either inside or outside a script file. Caution should be used if issued from inside a script before sending data after a reset due to the power up time. It is a good idea to issue an Enquiry command ("^D327)1" or ^E) before

sending data after a reset to verify that the printer has returned to a >READY< status. The "^D390)1" command is the queued equivalent to the immediate ^R (ASCII 0x12) control code.

2.3.21   ^D391)1   (Restore Configuration Defaults)
This command used to restore configuration defaults to a known state. This command may be sent from inside or outside a script. If this command is sent inside a script file, the printer will transiently restore factory defaults, with the exception of Model Type ("^D501)") and Serial Port parameters ("^D670)"), before executing any other command regardless of the placement within the script file. This command should be sent to the printer outside a script file as a part of a Flash memory update. Failure to issue the "^D391)1" command after a Flash code update may cause the printer to become unstable.

2.3.22   ^D392)1   (Restore Property Defaults)
This command used to restore the printer's property command defaults to a known state. This command may be sent from inside or outside a script. If this command is sent inside a script file, the printer will transiently restore factory defaults. This command should be sent to the printer outside a script file as a part of a Flash memory update. Failure to issue the "^D392)1" command after a Flash code update may cause the printer to become unstable. A reset (^D390) and/or power cycle is required for this command to complete.

2.4 5xx Series Commands
The 5xx series commands control the printer's configurable selections and may be issued from outside and/or inside a script file. Commands will return the current status and/or setting if the ^Dxx command is entered without an argument. Entering a question mark ("?") after the ^Dxx command causes the printer to report the commands current setting as well as the verbose description and help text associated with that particular command.

2.4.1   ^D501)n   (Select Emulation Mode)
Command used to select the printers emulation or language mode. Once set to a new mode, only commands that are valid for that mode are accepted. This command requires special access level control and it either set at the factory or by the printer display.

           1   LDS1 Image Mode
           2   LDS2
           3   FGL

2.4.2   ^D506)n   (Select Cutter Type)
This command used to select the type of cutter installed on the printer. The valid parameters for "n" listed below. The printer requires a reset and/or a power cycle must occur after setting this command. To adjust the dispense distance for the available cutters, refer to the "^D642)" command.

           0   None
           1   Guillotine Cutter
           2   Rotary Cutter
           3   Microcom Rotary Cutter

2.4.3   ^D508)n   (Select Label Present Detector Type)

The "^D508)" command selects from among the available label present detector (LPD) types. If selections 1 through 3 are used the printer will report either the >LABEL\TAG PRESENT< or 0x86 when media blocks the sensor depending on the configured response set or "^D550)" command. When selections 1 through 3 are used and media does not block the LPD either the >LABEL\TAG NOT PRESENT< or 0x8D when media blocks the sensor depending on the configured response set or "^D550)" command. A selection, 1 through 3, is also required when using the Dispense mode or "^D597)" or the dispense mode command with automatically retract ignoring the LPD signal. The valid parameters for "n" are listed below.

> 0   None
> 1   Reflective
> 2   Transmissive type 1

2.4.4   ^D509)n   (Select INPUT1 Response Polarity and Action)

The "^D509)" command selects whether the printer issues an >INPUT 1< or 0x21 message, depending on the "^D550)" command setting, when the optional INPUT 1 sensor's signal is active (LOW), or when it is inactive (HIGH), and whether it sets an error of just sends a message through the printer's active port.

> 0 - None
> 1 - Output message >INPUT 1< when BLOCKED
> 2 - Output message >INPUT 1< when UNBLOCKED
> 3 - Error when BLOCKED
> 4 - Error when UNBLOCKED

2.4.5   ^D511)n   (Select INPUT2 Response Polarity and Action)

The "^D511)" command selects whether the printer issues an >INPUT 2< or 0x22 message, depending on the "^D550)" command setting, when the optional INPUT 2 sensor's signal is active (LOW), or when it is inactive (HIGH), and whether it sets an error of just sends a message through the printer's active port.

> 0 - None
> 1 - Output message >INPUT 2< when BLOCKED
> 2 - Output message >INPUT 2< when UNBLOCKED
> 3 - Error when BLOCKED
> 4 - Error when UNBLOCKED

2.4.6   ^D541)n   (Select Button 1 Response)

This command is used to select the operation and response of Button 1 which is typically referred to as the print button. When set to a value of "1", the printer will reprint the previously printed script with a short button press and if the button is held, the printer will

continuously feed media until the button is released. When set to a value of "2", the printer will form feed with a short or brief button press and continuous feed if held. A setting of "3" causes the short button press to send the ">BUTTON 1 TAPPED<" response to the active port while holding the button in continuously feeds media until the button is released. A setting of "4" causes the short button press to send the ">BUTTON 1 TAPPED<" response to the active port while holding the button in sends the ">BUTTON 1 HELD<" response through the active port. A setting of "5" causes the short button press to initiate a TOF (Top-Of-Form) or ^D311 command while holding the button in continuously feeds media until the button is released.

1	Short press = reprint; button held = continuous feed (default)
2	Short press = form feed; button held = continuous feed
3	Short press = ">BUTTON 1 TAPPED<" response; button held = continuous feed
4	Short press = ">BUTTON 1 TAPPED<"; button held = ">BUTTON 1 HELD<"
5	Short press = Initiates a TOF (^D311); button held = continuous feed

2.4.7   ^D550)n   (Select Printer Response Set)

This command used to select among the available response sets the printer offers. The response sets determine how the printer will react to commands, functions, and enquiry responses. Issuing a ^Dxx command without a parameter will report the commands current setting regardless of the selected response set. Descriptive text is reported by issuing the question mark character ("?") after a ^Dxx command and is available in all response sets.

Example: Issuing the "^D550)? <CR>" command sequence would cause the printer to report text that describes the commands current setting as well as the commands operation and valid settings.

Refer to the following sample dialog:

^D550 n -- Selects response mode
*   1 - TEXT -- Text responses (default)*
*   2 - BYTE -- Byte-encoded responses*
*   9 - VERBOSE -- Text responses with command help text*
*   and confirmations of settings*
Current setting is: 1.
Use a selection index to change the setting.

Text: If text responses are selected, the printer responds with simple text responses to enquiries and error conditions. Commands that are issued without an argument will return that commands current setting without descriptive text while in the text mode response set. The printer is capable of multiple line responses so the final response is terminated with a "CR LF" or "0x0D 0x0A" sequence to assist in programming. The only response that is automatically generated is the >POWERED DOWN< response and occurs when power is removed from the printer.

Byte: When the byte response set is selected, the printer returns all responses in binary form. Commands that are issued without an argument will return that commands current setting without descriptive text while in the byte mode response set. The printer is capable

of multiple line responses so the final response is terminated with the ^Z or 0x1A character to assist in programming. The only response that is automatically generated is the >POWERED DOWN< or 0xFF response and occurs when power is removed from the printer.

Verbose: If verbose responses are selected, the printer will include elaborate text help about commands when that command is issued without an argument, a summary of any action that has just resulted from a command, and listings of printer parameters, where the listed values are each identified by descriptive text. This mode is very helpful when learning how to use the printer for the first time and is not intended to be used for actual programming.

      1   Text (Default)
      2   Byte
      9   Verbose

2.4.8   ^D564)n   (Select Measurement Units)

This command used to select the prevailing unit of measure the printer will use. Some commands and/or calculations use a constant unit of measure and will not change with the issuance of this command. These commands and/or calculations that use a constant unit of measure are noted in their respective descriptions. This command is always the first command to be processed by the printer regardless of the placement within a script. This is helpful in forcing a unit of measure for troubleshooting and support capabilities.

      1   Inches
      2   Millimeters

2.4.9   ^D565)n   (Select Speed Units)

This command used to select the desired unit of measure used for the speed parameter. This command is independent from the "^D564)" command. The valid selections for the "n" parameter are listed below with the default being a "1" (Inches). This command is always processed first in a script or just after the "^D564)" command by the printer regardless of the placement within a script. This is helpful in forcing a unit of measure for troubleshooting and support capabilities.

      1   Inches per Second (ips)
      2   Centimeters per Second (cm/sec)

2.4.10   ^D566)n   (Select Temperature Units)

The "^D566)" command is used to select the temperature unit of measure the printer will use for displaying the print head temperatures in degrees. This command is always processed first in a script or just after the "^D564)" and "^D565)" commands by the printer regardless of the placement within a script. This is helpful in forcing a unit of measure for troubleshooting and support capabilities.

      1   Fahrenheit
      2   Centigrade

2.4.11   ^D567)filename   (Select Power-up Script)

The "^D567)" command is used to select the script that is processed on a printer power-up. It is used in conjunction with the "^D720)" command to automatically process the selected script on a power-up. Issuing the "^D567)" without a parameter builds and lists the scripts that have been saved into the printers flash memory. The filename may contain to a maximum of 20 characters in length and include any character from ASCII 0x20 and 0x41 to 0x7A (alphabetical characters plus [\]_'and SP (space character)) with the exception of the caret (^) character. Script filenames can not use a leading zero ("0") or 0x30 characters.

2.4.12   ^D570)n   (Select Active Port)

The "^D570)" command is used to select the printer's active port. When the Autodetect is selected the printer will automatically determine and set the port based on which port is connected at power-up. If both serial and USB ports are connected, the autodetect will select the USB as the active port. If autodetect is selected and neither the Serial nor the USB is connected at power up, the Serial port will be selected as the active port. The Autodetect feature will only determine the active port at power up and will continue to use the selected port for the duration of the power up time. The valid parameters for "n" are listed below.

        0   Autodetect (Serial/USB)
        1   RS-232 Serial Port
        2   USB Type 1 (serial port disabled)
        5   Wired Ethernet (serial port disabled)

2.4.13   ^D581)n   (Select Stock Out Handling Method)

This command is used to select the procedure the printer will use when handling >STOCK OUT< conditions. The valid arguments for "n" are listed below. A selection of "1" instructs the printer to immediately halt on a >STOCK OUT< condition. A button press clears the error condition and reprints the last label format. A selection of "2" instructs the printer to finish printing the current format before halting when a >STOCK OUT< condition occurs. A button press clears the error condition and printing is resumed, if a print job is in process, without reprinting the last script. If the printer could not finish the last script, the >INCOMPLETE FORM< or 0x1D error response is generated along with the >STOCK OUT< message. Once this occurs a button press is used to clear the error and the last script that was incomplete is reprinted.

        1   Immediate halt upon detection of stock-out.
        2   Finish current label before halting.

2.4.14   ^D597)n   (Select Dispense Mode)

This command may be used for either Peel-N-Dispense, Tag/Tear dispense, and/or use with optional cutters. The Tag/Tear dispense method is when the perforation of a tag that has printed is advanced out to the peel edge to make removal easier. The Peel-N-Dispense method is when die-cut media is used and advanced so that the "peeled" media stays on the peel edge after printing. When used with the cutter, the printer should be advanced to the cut point. The "n" is used to adjust the dispense methods, according to the list below, and may be issued from outside a script or from within a script file. Depending on the desired dispense method, the value for advancing to the peel, tear edge, or cut point varies. To adjust the dispense distance, refer to the "^D642)" command. A LPD (Label Present Detector) and a "^D508)" selection are both required for the dispense modes listed below

that identify that the LPD is enabled. If a "^D508)" selection is omitted or if a LPD does not exist on the printer, the media will immediately retract after printing has stopped.

The >STOCK ADVANCED< or 0x87 response is generated when the printer has advanced the media to the desired dispense point. This response will be reported until the media is removed or the "^D641)" delay time has expired causing the media to be retracted. When the media is in the advanced position, the indicator light is solid amber in color.

Valid selections for the "n" parameter –

     0   No Advance/Retract – This will disable the Dispense mode.

     1   Advance after every label (LPD Enabled) – Causes the label or tag perforation to be advanced to the peel edge after every label is printed. Before the printer retracts, it will wait for both the label to be taken and any advance delay time setting.

     2   Advance after copies count (LPD Enabled) – Causes the label or tag perforation to be advanced to the peel edge after the set copies count has been reached. Before the printer retracts, it will wait for both the label to be taken and any advance delay time setting.

     3   Advance when idle (LPD Disabled) – This will cause the label or tag perforation to be advanced to the peel edge when the printer has no pending data on the communications port. When new data is sent through the port the printer will retract and then begin the printing process.

     4   Advance after every label (LPD Disabled) - Causes the label or tag perforation to be advanced to the peel edge after every label is printed. Before the printer retracts, it will wait only for any advance delay time setting.

     5   Advance after copies count (LPD Disabled) - Causes the label or tag perforation to be advanced to the peel edge after the set copies count has been reached. Before the printer retracts, it will only wait for any advance delay time setting.

2.5 6xx Series Commands

The 6xx series commands control the configurable settings and may be issued outside and/or inside a script file. Commands will return the current status and/or setting if the ^Dxx command is entered without an argument. Entering a question mark ("?") after the ^Dxx command causes the printer to report the commands current setting as well as the verbose description and help text associated with that particular command.

2.5.1   ^D629)n1,n2   (Set Takeup Pre and Post Timing)

This command sets the pre and port takeup timing. The takeup is an optional feature that is used to takeup media or backing material before the printers main motor starts moving and also Post takeup to continue running after the main motor has stopped. This feature is used with a rewind or takeup motor. The value for n1 sets the Pre Takeup time and has a range

of -1 to 1. Negative values cause the take up to start after the main motor and n1 time has elapsed. The n2 value sets the Post takeup time with the range being from 0 to 10 seconds. If the value is set to a 0, the takeup will run when the main motor starts. The D729 command controls the enablement of this takeup control and must be enabled before this command functions.

> n1   The n1 value sets the pre takeup timing. Positive turns the takeup motor on before the stock retracts. A value of zero would turn the takeup motor on at the same time as retraction. Negative values turn the takeup motor on after the print motor. The range is -1.0 to 1.0 seconds.

> n2   The n2 sets the post takeup timing. This timing is a timeout on when to turn off the takeup motor after printing. If using dispense mode (^D597)1) of one, the take will stop after the label is removed. The range is 0.0 to 10.0 seconds.

2.5.2   ^D630)n1, n2   (Set Takeup Motor Reverse Timing)
Command used to set the optional takeup motor reverse timing. If used, the takeup motor will reverse for the set timing. This is helpful on systems that are using an advance retract command and need to reverse the media. The D729 command controls the enablement of this takeup control and must be enabled before this command functions.

> n1   Positive value turns the takeup motor on before the stock is retracted. A value of zero turns the takeup motor on at the same time as stock retraction. The range for n1 is 0.0 to 10.0 seconds.

> n2   Positive value turns the take up off when the stock retraction completes and sets a pause for the motor to settle. Negative values turn the takeup motor off before stick retraction completes. A value of zero turns the take up motor off when stick retraction completes.

2.5.3   ^D631)n   (Set Media Width)
This command specifies the width of the media using the current selected prevailing unit of measure selected by the "^D564)" command. The maximum width is the width of the print head installed on the printer. This command is also a parameter in the "^D200)" script header command. See also, LSX.

2.5.4   ^D632)n   (Set Media Height)
This command specifies the height of the media using the current selected prevailing unit of measure selected by the "^D564)" command. The maximum LSY height is 24". This command is also a parameter in the "^D200)" script header command. See also, LSY.

2.5.5   ^D633)n   (Set GAP Size)
This command sets the height distance, as viewed inside the printer, of the registration mark that identifies the label and/or tag size and is entered using the current selected prevailing unit of measure selected by the "^D564)" command. This would be the backing material found between die-cut labels, blowhole sense mark, and/or the blackline height. This command is also a parameter in the "^D200)" script header command. See also, GAP.

2.5.6   ^D634)n   (Distance To Registration Mark)
This command is only used when the registration mark is not located at the edge of the media. The "DRM" is the distance from the leading edge of the media to the beginning of the registration mark and is entered using the current selected unit of measure. This command is also a parameter in the "^D200)" script header command. See also, DRM.

2.5.7   ^D635)n   (Set Print Speed)
The "^D635)" command sets the print speed of the printer using the current selected unit of measure. Parameter "n" has a range of 1-6 inches per second or 2.54 - 15.24 cm/second. This command is also a parameter in the "^D200)" script header command. See also, SPD.

2.5.8   ^D636)n   (Set Detection Mode)
This command selects the type of method the printer uses for detecting registration marks on the different media types. A selection of a "0" disables the detection of registration marks and used in conjunction with media that does not contain a registration mark like continuous media. A selection of a "1" uses the reflective detection method and is used when detecting registration marks located on the bottom side of the media. A selection of a "2" uses the transmissive detection method which can be used with any type of media but is not recommended when only detecting registration marks located on the bottom side of the media.   A selection of a "3" also uses the transmissive detection method and is used in conjunction with media containing a blowhole. Both upper and lower gap detectors are required for stock out detection regardless of the type of registration mark detection. This command is also a parameter in the "^D200)" script header command. See also, DET.

0	None	(gap sensors are disabled)
1	Blackline	(lower gap sensor is enabled)
2	Die-cut	(upper and lower gap sensors are enabled)
3	Blowhole	(upper and lower gap sensors are enabled)

2.5.8.1   Detection Mode - None (0)
This mode is typically used with continuous media. Even though it is not necessary to sense a registration mark, it is still important that the Upper and Lower Sensors are vertically aligned to sense out-of-stock or stock out conditions.
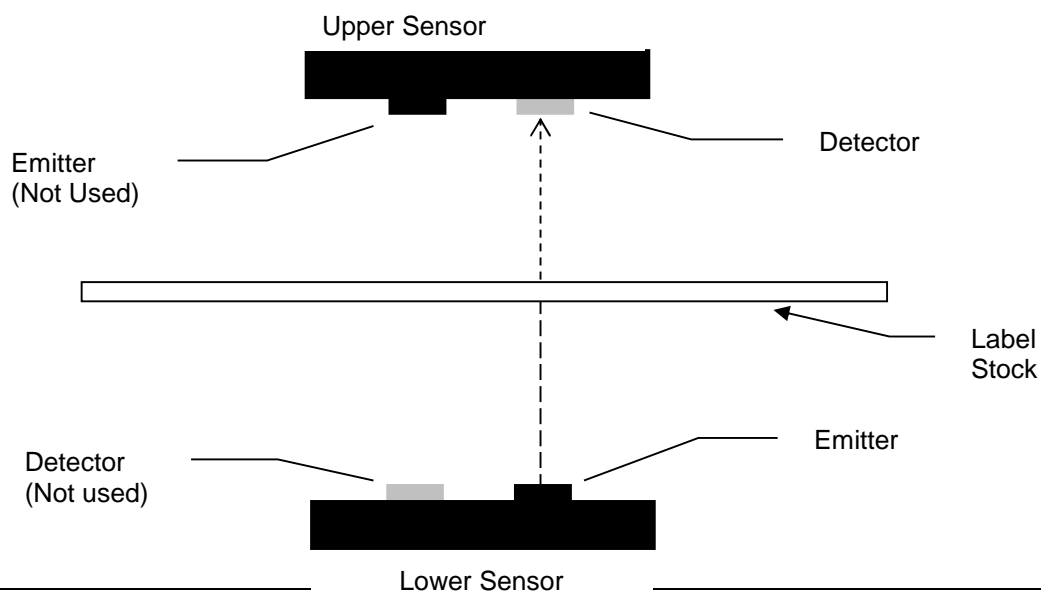
Figure 6   Detection Mode - None

2.5.8.2   Detection Mode - Blackline (1)

This detection mode used when a black line on the underside of the media is used to register the labels. The Lower Sensor detector "senses" the amount of light reflected off of the label from the Lower Sensor emitter. While registration is determined by the Lower Sensor only in this mode, the upper gap sensor is used for out-of-stock or stock out conditions.
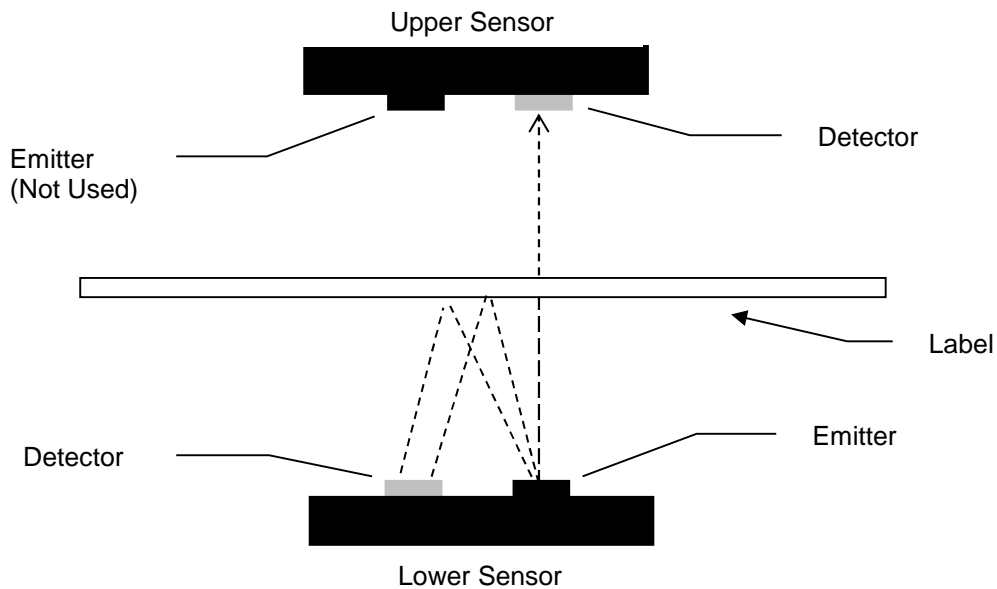
Figure 7   Detection Mode - Blackline

2.5.8.3   Detection Mode - Die-cut (2) and Blow-hole (3)

Die-cut sensing refers to die-cut label registration where the difference in the transparency of [label] and [label + backing] is detected (gap between labels is registration point).

Blow-hole sensing refers to label stock with holes punched out as registration marks. In this case, the Upper and Lower Sensors must be aligned so that the hole in the stock passes over the sensors.

Dies-cut and blow-hole use the same basic method of detection. However, because of the difference in light intensity and stock out detection, they each require their own Detection Mode setting (^D636).

.

Upper Sensor

Emitter
(Not Used)

Detector

Label
Stock

Detector
(Not used)

Emitter
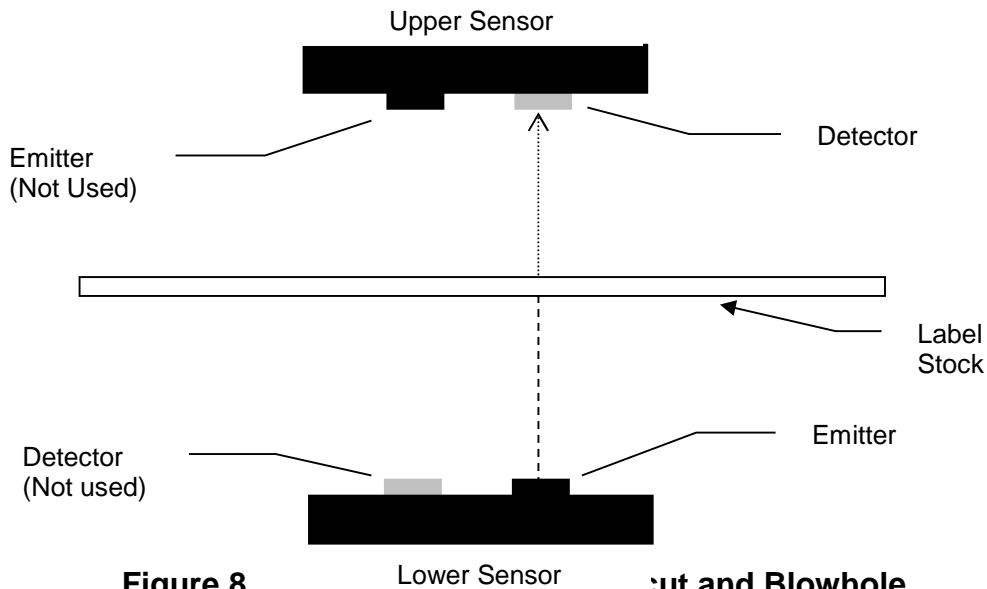
Figure 8   Lower Sensor   **:ut and Blowhole**

2.5.9   ^D637)n   (Offset X Direction)
This command moves or offsets all fields in the "X" direction without altering the field's insertion points. The value is entered using the current selected unit of measure. This command is also a parameter in the "^D200)" script header command. See also, OFX.

2.5.10   ^D638)n   (Offset Y Direction)
This command moves or offsets all fields in the "Y" direction without altering the field's insertion points. The value is entered using the current selected unit of measure. This command is also a parameter in the "^D200)" script header command. See also, OFY.

2.5.11   ^D639)n   (Set Centering Offset)
The "^D639)" command is used to set the image position offset in the X direction independently of OFX or "^D637)" command. This command is used to compensate for mechanical misalignments that can not be adjusted mechanically. The value is entered using the current selected unit of measure or "^D564)" command. This command is a "property" which means that it controls a specific distance that is set at the factory. The property commands may be set back to their default values using the "^D392)1" command.

2.5.12   ^D640)n   (Set Delay Time Between Labels)
This command delays the printing between labels in a batch. The value for "n" is entered in decimal seconds and has a maximum of 15 seconds.

2.5.13   ^D641)n   (Set Retraction Delay Time)
This command is used in conjunction with the dispense modes ("^D597)" command) and/or when a cutter is used. The delay controls how long the media is presented before being retracted. The value for "n" is entered in decimal seconds with a 15 second maximum.

2.5.14 ^D642)n (Set Advance/Retract Distance)
This command is used to set the distance the media advances and retracts after printing while in dispense modes ("^D597)" command) or when a cutter is installed. The distance "n" is entered in based on the unit of measure selected by the "^D564)" command.

2.5.15 ^D643)n (Set Print Head to LPD Distance)
This command sets the distance from the print head to the LPD (Label Present Detector) using the unit of measure selected by the "^D564)" command. This distance is the distance media is retracted after reaching the LPD so that the media is properly positioned at the print head. The distance is entered using the current unit of measure selected by the "^D564)" command. This command is a "property" which means that it controls a specific distance that is set at the factory. The property commands may be set back to their default values using the "^D392)1" command.

2.5.16 ^D644)n (Set Idle Recognition Delay)
The "^D644)" command is used to set the time after a printer goes idle before idleness is recognized and is used in conjunction with the "^D597)3" command. The value for "n" is entered in decimal seconds, with tenths of a second resolution.

2.5.17 ^D645)n1 (Set Advance/Retract Speed)
This command is used to set the speed that the printer advances and retracts while in a "^D597)" dispense mode. The value entered is based on the current unit of measure or "^D565)" command setting. If media slippage occurs, the speed should be lowered to reduce this from reoccurring.

2.5.18 ^D646)n (Set Platen Roller Compensation)
This command is used to set the drive roller compensation factor to accommodate the tolerance of the drive roller. This command is set at the factory and should only be changed if a new drive roller is installed. The value for "n" is entered using the current unit of measure that is set by the "^D564)" command and is the distance of the lines generated by the "^D394)1" command. This command is a "property" which means that it controls a specific distance that is set at the factory. The property commands may be set back to their default values using the "^D392)1" command.

2.5.19 ^D647)dc,dp (Set Print Head Parameters)
The "^D647)" command is used to identify and specify the values for the print head installed on the printer. The "dc" parameter specifies the "dot count" or total number of dots on the print head while the "dp" or "dot pitch" identifies the dots per millimeter value. This command is available in all access modes with the exception being LOCKOUT mode only. This command is typically set at the factory and never changed. Refer to the following table for the available print heads and their appropriate values. This command is a "property" which means that it controls a specific distance that is set at the factory. The property commands may be set back to their default values using the "^D392)1" command.

Print Head Part Number	Printhead Type	dc Parameter	dp Parameter
630015-0000	2" 203 DPI	448	8

630035-0000	2" 300dpi	672	12
630018-0000	3" 203 DPI	640	8
630021-0000	3" 300 DPI	960	12
630020-0000	4" 203 DPI	832	8
630019-0000	4" 300 DPI	1280	12
630014-0000	4" 203 DPI	832	8
630017-0000	4" 300 DPI	1280	12

Table 7   Print Head Parameters

2.5.20   ^D648)n   (Set Blackline Sensor to Print Head Distance)

The "^D648)" command is used to set the blackline sensor to print head distance at the factory. This command is a "property" which means that it controls a specific distance that is set at the factory. The property commands may be set back to their default values using the "^D392)1" command.

2.5.21   ^D649)n   (Set Gap Sensor to Print Head Distance)

The "^D649)" command is used to set the gap sensor to print head distance at the factory. This command is a "property" which means that it controls a specific distance that is set at the factory. The property commands may be set back to their default values using the "^D392)1" command

2.5.22   ^D650)n   (Set AGD Value)

Sets the AGD or Activate Gap Detector header value. The AGD is the distance that the printer will move with the registration sensors disabled. This feature is useful when preprint text or other marks might trigger false detection. The value for "n" uses the prevailing units configured by the ^D564 command.

2.5.23   ^D655)n   (Set Labels Printed)

This command gives the user the ability to set a count down counter specified as "Labels Printed" on the printer that is reported either by issuing the "^D655)" without a parameter, a ^D655)?, or "^D324)" (List Statistics) command.
If the value for 'n' is set to a negative (-1), the command is disabled. A positive value for 'n' sets a countdown counter and once 0 is reached, the printer status would report a 0x14 or >PM< depending on the ^D550 status selection. This >PM< is a status message that the host system could trigger on to instruct the user to perform some preventative maintenance.

2.5.24   ^D670)   (Set Serial Port)

The "^D670)" command is used to configure the serial port. The command starts with the "^D670)" and is then followed by four parameters or arguments. The first parameter must

be separated from the ^D command by a space and the following parameters must be separated from each other using the comma delimiter. The command is entered using following structure, ^D670) b, p, d, s. When changing the serial parameters, the host needs to be set to the new serial parameters that take effect immediately after setting. If the host parameters are not changed to the correct settings, the host and the printer will not communicate properly. The "^D670)" command defaults to 9600,n,8,1 when the printer enters the diagnostic mode by pressing the print button in while applying power.

Command Syntax: ^D670) b, p, d, s

Parameter	Parameter Description	Valid Arguments
b	Baud rate	1200,9600,19200,38400,57600,115200,230400
p	Parity	n = none, o = odd, e = even
d	Data word width	7, 8
s	Stop bits	1, 2

Table 8   ^D670) Parameters

2.5.25   ^D673)n   (Set DHCP)
This command is used to set or enable/disable the Ethernet DHCP. The printer ships from the factory with DHCP enabled (^D673)1). If the host does not assign a DHCP within 30 seconds, the printer will automatically assign an Auto IP address. If a static address is desired, the DHCP should be disabled; ^D673)0.

2.5.26   ^D674)n   (Set Ethernet Port Number)
The "^D674)" command is used to set the printer's Ethernet port number. This command is provided in all access modes. The recommended Stream Printing Ethernet port is "9100". The printer uses the new settings only after a power cycle and/or reset command. This is typically set to 9100.

2.5.27   ^D675)n   (Set Printer IP Address)
This command is used to set the printer's IP address. This command is provided in all access modes. The default address is set to "255.255.255.255" at the factory. The printer uses the new settings only after a power cycle and/or reset command. This is typically set to your IP address.

2.5.28   ^D677)n   (Set Gateway IP Address)
The "^D677)" command is used to set the Gateway IP address. This command is provided in all access modes. The default Gateway address is set to "255.255.255.255" at the factory. The printer uses the new settings only after a power cycle and/or reset command.

2.5.29   ^D679)n   (Set Net Mask Address)
This command is used to set the Net Mask address. This command is provided in all access modes. The default Net Mask address is set to "255.255.255.255" at the factory.

The printer uses the new settings only after a power cycle and/or reset command. This is typically set to 255.255.255.0.

2.5.30   ^D680)n   (Set Gap Threshold)

The "^D680)" command is used to set the Gap threshold. The printer's default threshold is set to "30" and typically does not require any adjustment. The command is provided in all access modes in the event that this threshold requires adjustment to correct registration issues using different types of die-cut or blow-hole media. The values reported by the "^D900)" Tick-Tick command will increase when sensing the registration mark and decrease when the sensor is looking at label and backing of the media. The threshold should be set to a mid-point between these two points.

2.5.31   ^D681)n   (Set Blackline Threshold)

The "^D681)" command is used to set the blackline threshold. The printer's default threshold is set to "128" and typically does not require any adjustment. The command is provided in all access modes in the event that this threshold requires adjustment to correct registration issues with media using a blackline registration mark. The values reported by the "^D900)" Tick -Tick command will decrease when sensing the black registration mark and increase when the sensor is looking at more reflective portions of the media. The threshold should be set to a mid-point between the black mark and more reflective portion. If the media contains preprint, the threshold should be lowered until proper registration occurs.

2.5.32   ^D682)n   (Set Stock Sensor Threshold)

The "^D682)" command is used to set the stock sensor or out of stock detection. The printer's default threshold is set to "110" and typically does not require any adjustment. The command is provided in all access modes in the event that this threshold requires adjustment to correct the proper detection of stock out conditions. The values reported by the "^D900)" Tick -Tick command will increase when sensing out of stock conditions The default threshold is set to a point that should detect most stock out conditions. If the media contains preprint, the threshold should be increased until proper registration occurs.

2.5.33   ^D690)n   (Set Darkness Range)

The "^D690)" command is used to set the contrast of the printers output and does not correlate to actual print head temperature. The value for "n" is a range from 1 to 100 with a setting of 80 being the printers default. The lowest setting that produces the desired result should be used to extend print head life and performance.

2.6 7xx Series Commands

The 7xx series commands are used to control configurable enablements. These commands may be issued either outside or inside a script file. Commands will return the current status and/or setting if the ^Dxx command is entered without an argument. Entering a question mark ("?") after the ^Dxx command causes the printer to report the commands current setting as well as the verbose description and help text associated with that particular command.

2.6.1   ^D720)n   (Enable Auto Power-Up Script)

This command allows scripts stored in the printer's flash memory to be processed on power-up or a reset condition. The printer has a default power-up script, @default, that will be used if a script has not been selected using the "^D567)" command. Once a script has been

selected, the "^D720)" command processes the script on power-up as if it was normally received by the printer.

>   0   Disable
>   1   Enable

2.6.2   ^D721)n   (Enable Auto Enquiry After Print)

The "^D721)" command sends an enquiry or "^D327)1" after each script in the queue has completed printing, or if printing has halted due to an error condition automatically when enabled. Refer to section 6.2 for additional information regarding the possible enquiry responses.

>   0   Disable
>   1   Enable

2.6.3   ^D723)n1,n2   (Enable Auto TOF on Power up and Autoload)

This command will issue the "^D311)" command on power-up and/or a reset condition automatically. This command is very helpful when using continuous media so that the starting edge of the media is aligned to the print head reducing media waste. This command requires that the printer is equipped with an LPD and that it has been selected using the "^D508)" command. The value for n1 enables auto TOF on power up which causes the printer to find the edge of the media and position it at the TOF position. The value for n2 controls the autoload function. The printers ^D723 default is set to 0,1.

>   0   Disable
>   1   Enable

2.6.4   ^D726)n   (Enable Auto ACK/NAK)

This command enables the automatic acknowledgement after each command. With this command enabled, the printer automatically issues the command ACK (Human readable descriptive text if in verbose mode, the >OK< response if in text mode, or 0x06 if in byte mode) after a successful command. If a command was not successful, the appropriate error response or NAK would be generated automatically. The responses are sent automatically and do not require sending either the serialized "^D327)1" command or the immediate ^E enquiry command. Refer to section 6.2 for additional information regarding the possible enquiry responses.

>   0   Disable
>   1   Enable

2.6.5   ^D727)n   (Enable Auto Error Reporting)

The "^D727)" command automatically reports halting errors immediately upon recognition of the error condition when enabled. The "^D550)" commands configuration determines if the error is reported as text or as a byte code. This command automatically reports the error and does not require sending either the serialized "^D327)1" command or the immediate ^E enquiry command.

>   0   Disable
>   1   Enable

2.6.6   ^D729)n   (Enable Takeup Motor Control)
The D729 command is used to enable the forward and/or reverse takeup motor control.
The takeup is an optional motor typically used to take up backing material and used in a
peel n dispense operation. Use the D629 and D630 commands to configure the take up
motor control.

         0   Disable
         1   Forward Enabled and Reverse disabled
         2   Both Forward and Reverse Enabled

2.6.7   ^D740)n   (Enable Cutter)
This command is used to control the enablement of a cutter that has been selected using
the "^D506)" command. If a cutter is not installed, selected, and this command is enabled,
the printer issues the >CUTTER INOPERATIVE< or 0x11 depending on the "^D550)"
command configuration.

         0   Disable
         1   Enable

2.7 9xx Series Commands

The 9xx series commands are reserved for printer self tests, factory configuration, and
setup commands. Most of the ^D9xx series commands are not available in access modes
lower than SERVICE level. Commands will return the current status and/or setting if the
^Dxx command is entered without an argument. Entering a question mark ("?") after the
^Dxx command causes the printer to report the commands current setting as well as the
verbose description and help text associated with that particular command.

2.7.1   ^D900)d, s   (Diagnostic Tic-Tic Mode)
This command is used to enable the tic-tic mode which steps the motor while reporting the
current readings from the registration mark sensors. This command is available in all
access levels. The Tic-Tic mode reports the sensor data based on the current selected
detection method or outside script sensor configuration. The sensor type must be selected
for the desired operation using the "^D636)" command before entering Tic-tic mode.
Pressing the print button cancels this diagnostic mode.

Parameter	Parameter Description	Valid Arguments
d	Direction	f = forward, r = reverse
s	Speed	"^D565)" command configurable

Table 9   ^D900) and ^D902) Parameters

The printer is set up from the factory to sense proper registration with a wide range of
different stocks. However, it may be necessary to adjust the threshold in order to properly
register some media. The ^D680 and ^D681 commands are used to adjust the registration
mark sensor thresholds.

It is highly recommended that the threshold setting only be adjusted as a last resort. Registration problems may occur with other types of label stock when the threshold setting has been changed. The ^D900 command is used to determine a threshold value that will work for a specific media type.

2.7.1.1   Blackline Threshold Calculation Example

Follow the process outlined below for an example to determine the blackline or reflective sensor threshold calculation. The values reported will vary depending on the different types of media used.

1.   Verify that the sensors are clean and are unobstructed.

2.   Load black line media into printer.

3.   Establish communication with a terminal emulation program (HyperTerminal, Tera Term Pro, MCT, etc.).

4.   Be sure that the printer is in the reflective detection mode selected is a "1" by issuing the "^D636)?" command.

5.   Enter Tic-Tic mode by issuing the "^D900)f,3" command.

6.   The printer will return a numerical value for the sensor output selected by the ^D636 command.

7.   A high value should be returned for the area outside of the black line. A low value should be returned when the black line passes over the black line.

8.   Enter a new threshold value (between the high value and the low value) using the Black Line Sensor Threshold command ^D681)n
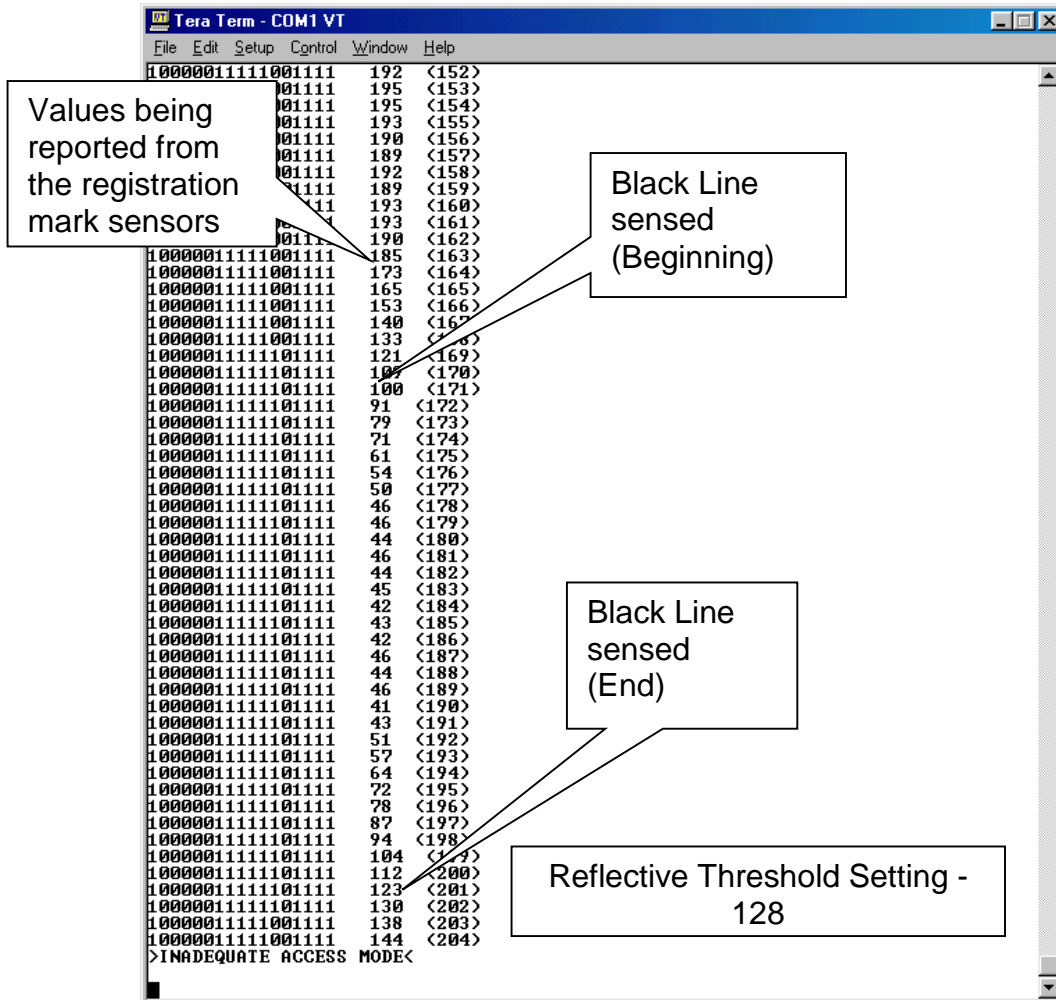
Figure 9   ^D900 Blackline Listing
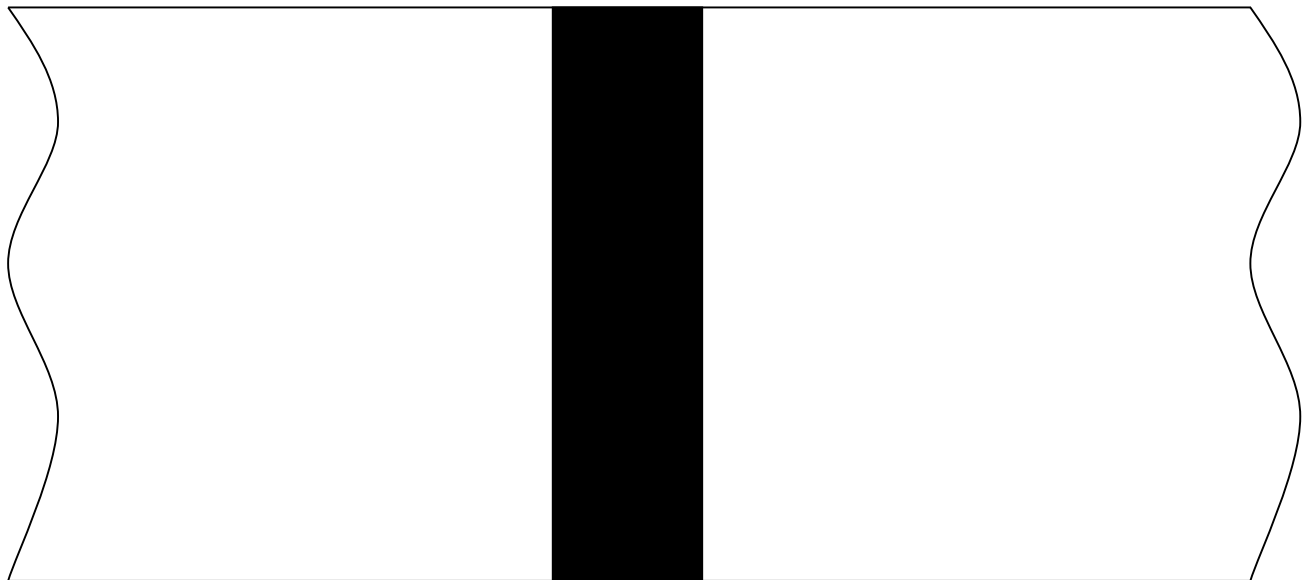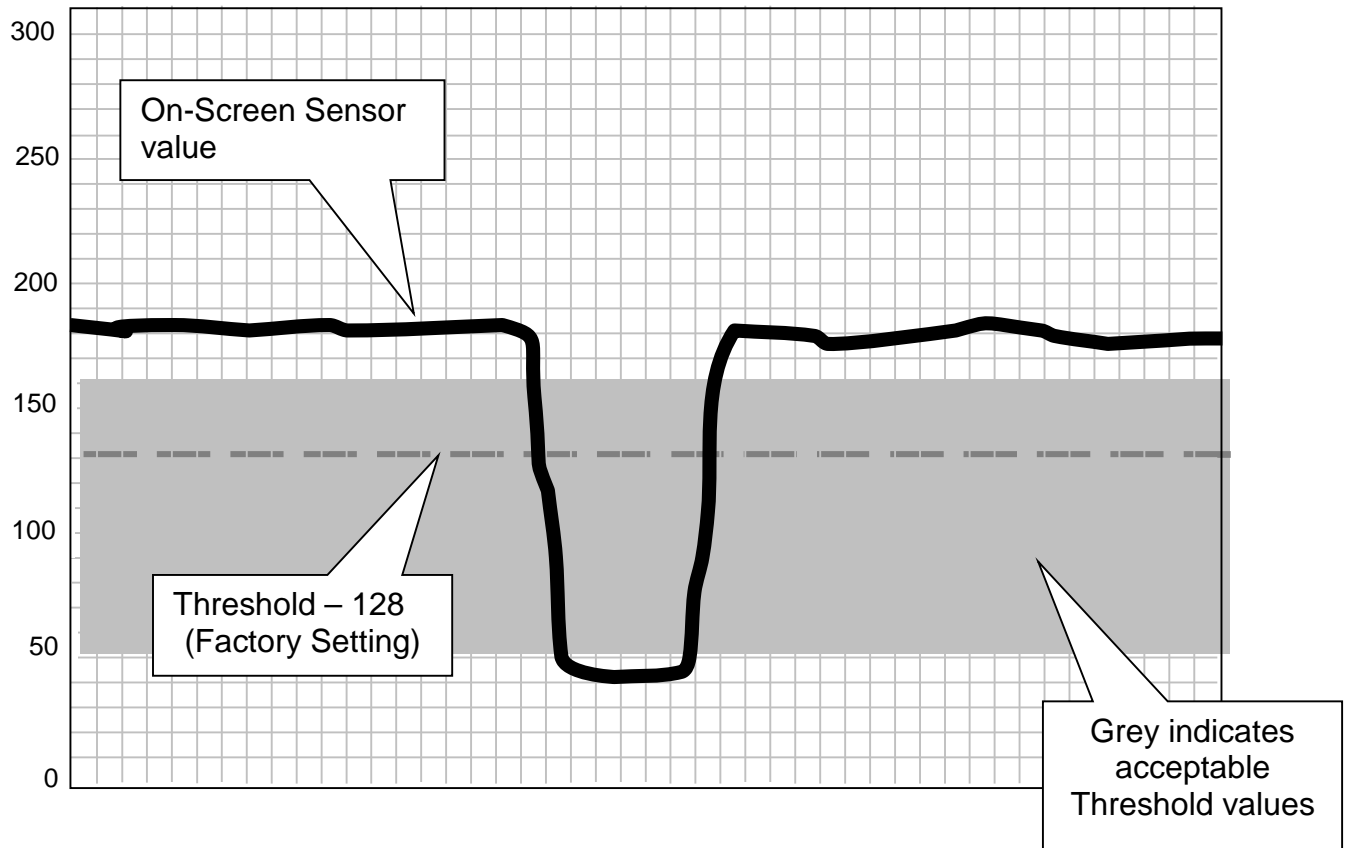
Figure 10 ^D900 Blackline Threshold Example

2.7.1.2   Die-Cut/Blowhole Threshold Calculation Example

Follow the process outlined below for an example to determine the die-cut/blowhole or transmissive sensor threshold calculation. The values reported will vary depending on the different types of media used.

1.   Verify that the sensors are clean and are unobstructed.

2.   Load media into the printer.

3.   Establish communication with a terminal emulation program (HyperTerminal, Tera Term Pro, MCT, etc.).

4.   Be sure that the printer is in a transmissive detection mode ("2" or "3") by issuing the "^D636)?" command.

5.   Enter Tic mode [^D900)f,3].

6.   The printer will return a numerical value for the Gap Sensor output.

7.   A high value should be returned for the area outside of the black line. A low value should be returned when the black line passes over the black line.

8.   Enter a new threshold value (between the high value and the low value) using the Gap Sensor Threshold command [^D680)n]

Values being reported from the registration mark sensors

Label sensed (Beginning)

Threshold is "crossover point" between [label backing] and [label backing + label].

Threshold will be a value between upper value and lower average value.

Label sensed (Beginning)

Gap Threshold Setting – 30 (Factory Setting)

Figure 11   ^D900 Die-cut Listing
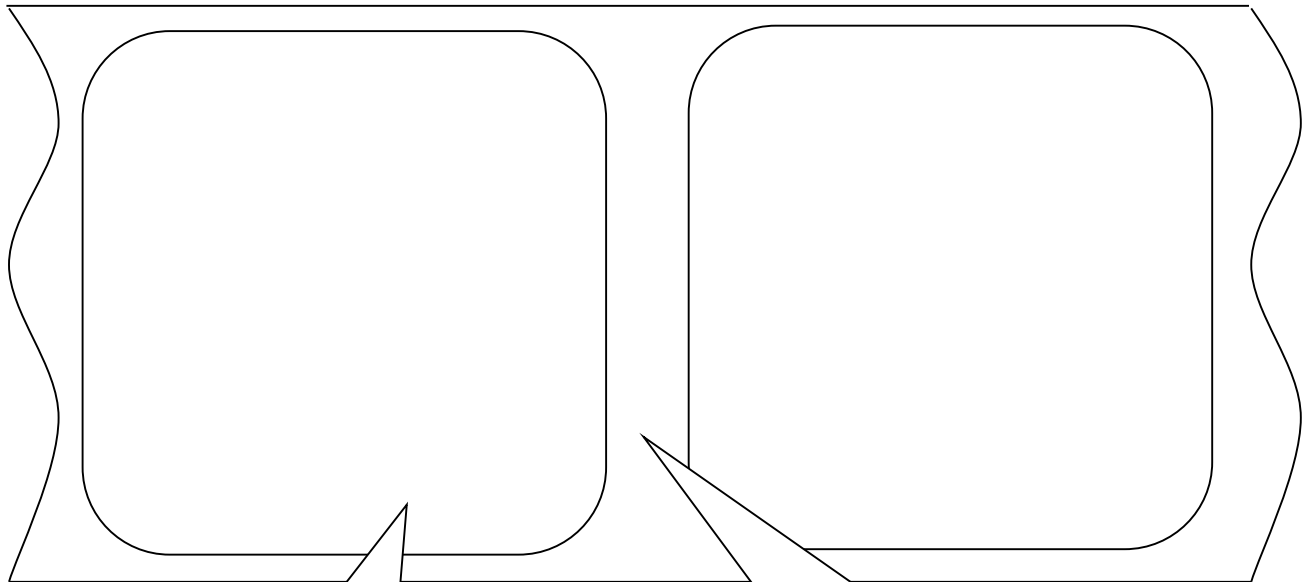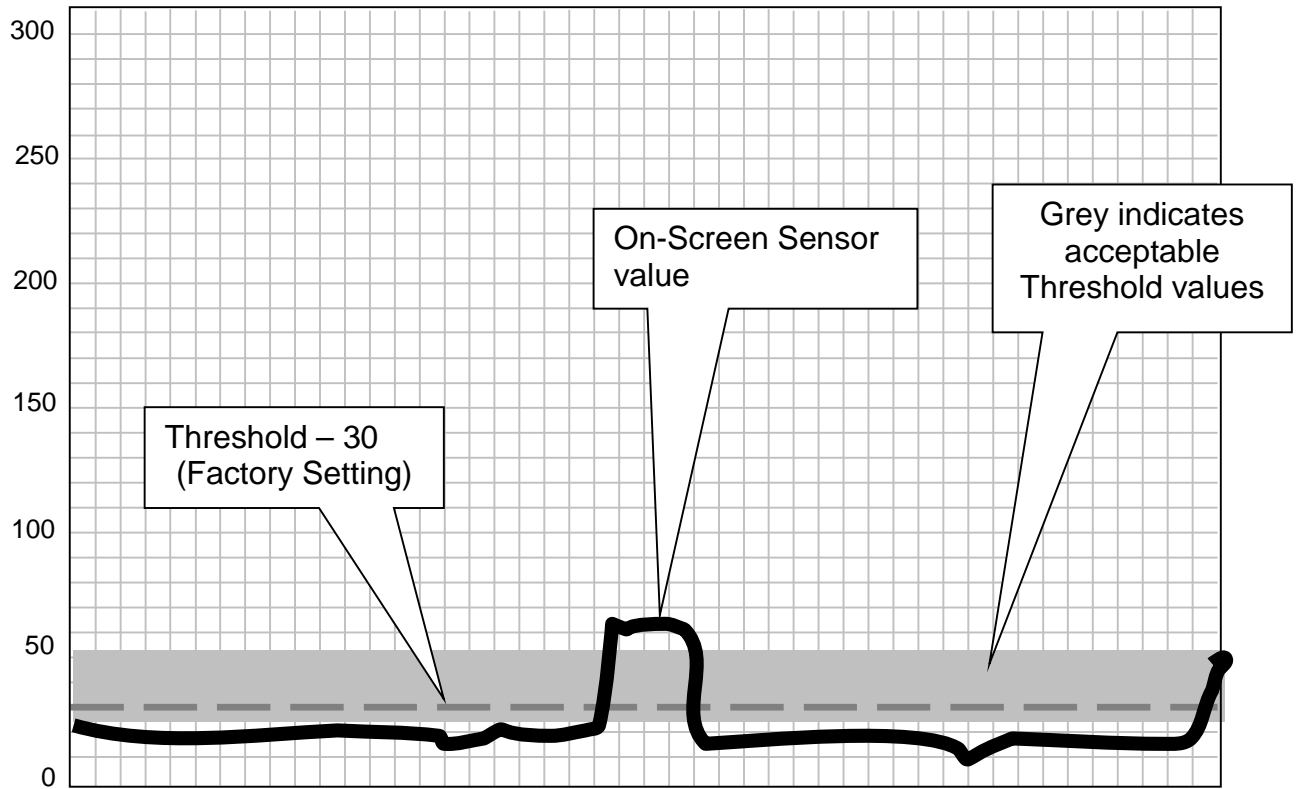
Figure 12   ^D900 Die-cut Threshold Example

2.7.2   ^D930)level   (Get Access Code Key)

This command returns an access code that is used to change the printer's current access level. Once issued, the access code is the same until the "^D930)" command is issued again. Once an access code has been acquired, Microcom Corporation support is contacted and a password will then be issued. This is only required when higher than "BASIC" access level is desired. The "level" parameter is the desired access level (BASIC, FACT, and SERVICE) and will only work for that access level. Refer to the "^D931)" command for additional information regarding the access levels and their meanings.

2.7.3   ^D931)level, password   (Change Access Level)

The "^D931)" command is used to change the access level of the printer. A password in required to access a higher privilege level. The access levels may be changed to a lower level without a password but would still require a password to set back to the original higher level. The level parameter is the desired access level while the password parameter is the actual password for that access level. The password is received by Microcom Corporation support departments with the appropriate "^D930)" access code. The access levels and their meaning are listed in the table below.

Access Level	Access Level Description
FACT	Access level intended for internal Microcom Corporation factory personnel used to setup and configure the printer.
SERVICE	Access level intended for approved third party service groups used to perform diagnostics, troubleshooting, and maintenance capabilities.
BASIC	Access level used by most users that provides access to most commands with the exception of some diagnostics, troubleshooting and maintenance capabilities.

Table 10   Access Levels

2.7.4   ^D932)   (List Access Passwords)

This command causes the printer to list the current access password along with the other lower level passwords.

Example: If the current access level was SERVICE and the "^D932)" command was issued, the SERVICE and BASIC access level passwords would both be reported.

2.7.5   ^D945)n   (List Diagnostic Dump)

This command causes the printer to list all of the printer's current setup through the active port and is used for setup and diagnostic purposes. Each line of the listing is terminated

with a CR LF (0x0D 0x0A) that may be used to assist in programming delineation while the entire listing is terminated with either an additional CR+LF or 0x1A character depending on the "^D550)" command configuration. The list is generated by issuing the command without the "n" parameter. Issuing the "^D945)" command with the "?" character will always report the "^D550)" commands configuration as "9" for VERBOSE mode because the "?" cause the printer to report the VERBOSE descriptive text. The "n" parameter may be used to select one item from the numbered listing to report only its current value followed by a CR+LF (0x0D+0x0A) used for termination. The "^D945)" command listing is continually updated to provide additional information but all new information is added to the end of the listing for backwards compatibility.

2.7.6   ^D960)n   (Print Test Pattern)

This command causes the printer to print diagonal lines used to verify the condition of the dots on the print head. The diagnostic pattern prints using the previous scripts configuration or the media layout ^D63x persistent command settings if a script has not yet been processed. The "^D960)1" is the serialized version of the "^K" immediate control code.

       1   Diagonal Lines
       2   2-On 30-Off Vertical Lines
       3   5x5 Checkers
       4   50% Grey (1x1 checkers)

2.7.7   ^D971)n   (Edit Inches Printed Statistic)

The "^D971)" command is used to enter, reset, and/or change the Inches Printed statistics field. This statistic is only incremented while the printer is actually printing. The Inches Printed statistic is used to record the print use of the printer between service periods and is reset to "0" when service and/or repair is completed. The "^D971)" command is available in access modes SERVICE and higher.

2.7.8   ^D972)n   (Edit Total Inches Run Statistic)

This command is used to enter the total inches run or motor movement statistic of the printer. The "^D972)" command is only set at the factory and is only reset if the printer's CPU is replaced. The total inches run is used for warranty replacement of the print head and its value should be recorded when a new print head is installed in the unit. This command is only available in FACT mode, as it is the printer's odometer.

2.7.9   ^D973)n   (Edit Power on Time Statistic)

The "^D973)" command is used to enter, reset, and/or change the Power on Time statistics field. This statistic is only incremented while the printer is actually on. The Power on Time statistic is used to record time the printer is powered and in only set at the factory. The "^D973)" command is only available in FACT mode.

2.7.10   ^D974)n   (Edit Head Up Cycles Statistic)

This command is used to enter the Head Up cycle's statistic of the printer. The "^D974)" command is only set at the factory and is never reset. This command is only available in FACT mode. This statistic field is only available on models that contain head up detection.

2.7.11   ^D975)n   (Clear All Statistics)

The "^D975)" command is used at the factory for the initial setup. This command resets all of the statistical parameters to "0". This command is only available in modes FACT access mode.

2.7.12   ^D976)n   (Edit Unit Serial Number)

This command is used to enter serial number of the printer manually at the factory. This command is only available in modes FACT access mode.

2.7.13   ^D977)n   (Edit Cutter Cycles Statistic)

The "^D977)n" command is used to enter the total cutter cycles that have been performed on a cutter installed on the printer. The cutter is an optional component and does not exist on all printers. This cutter count is used to verify the use of a cutter for reliability and warranty purposes. The "^D977)" command is available in access modes SERVICE and higher.

2.7.14   ^D978)0xn   (Edit Ethernet MAC Address)

This command is used to set the printer's unique Ethernet MAC address. A unique Ethernet MAC address is assigned and set at the factory and is never edited and/or reissued. Microcom Corporation MAC addresses begin with "000257". The MAC address is entered by issuing the "^D978)" command followed by the "0x" characters (indicating that the value for "n" will be in HEX) and then the "n" value would be the last six digits. This command is only available in FACT access mode.

2.7.15   ^D979)n   (Edit CPU Serial Number)

This command is used to enter serial number of the printer manually at the factory. This command is only available in modes SERVICE or FACT access modes.

2.7.16   ^D980)n   (Calibrate Sensors)

The "^D980)" command is used to calibrate the printer's sensors. The factory calibration should work for most applications and typically does not require recalibration. The calibration should only be executed if the printer is a new printer and/or new registration sensors have been installed on the printer. If the printer does not register properly, the thresholds may require adjusting. Refer to the "^D680)", "^D681)", "^D682)", and "^D683)" commands to adjust the threshold in order to correct registration issues.   The values for "n" are listed below.

> 0   Calibrate All Sensors
> 1   Calibrate Blackline Sensor
> 2   Calibrate GAP Sensor
> 3   Calibrate LPD Sensor

Appendix

Appendix A: Limited Warranty

Microcom Corporation printers, excluding thermal print heads, which are warranted separately below, are warranted against defects in material and workmanship for twelve (12) months from the date of original shipment by Microcom Corporation. This warranty does not cover normal wear and tear and shall be null and void if the printer is modified, improperly installed or used, damaged by accident or neglect, or in the event any parts are improperly installed or replaced by the user.

The thermal print head is covered by a limited warranty of three (3) months or 500,000 linear inches to be free from defects in material and workmanship. The length of media run through the printer may be verified using the printer's internal statistical counter. Although the user is not required to purchase Microcom Corporation brand supplies, to the extent it is determined that the use of other supplies (such as non-approved label stock, ribbons, and cleaning solutions) shall have caused any defects in the thermal print head for which the warranty claim has been made, the user shall be responsible for Microcom Corporation's customary charges for labor and materials to repair such defects.

MICROCOM CORPORATION'S SOLE OBLIGATION UNDER THIS WARRANTY SHALL BE TO FURNISH PARTS AND LABOR FOR THE REPAIR OR REPLACEMENT OF PRODUCTS FOUND TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP DURING THE WARRANTY PERIOD.

Except for the express warranties stated, Microcom Corporation disclaims all warranties on products, including all implied warranties of merchantability and fitness for a particular purpose. The stated warranties and remedies are in lieu of all other warranties, obligations or liabilities on the part of Microcom Corporation for any damages, including, but not limited to, special, indirect, or consequential damages arising out of or in conjunction with the sale, use, or performance of these products.

MICROCOM CORPORATION SHALL NOT, UNDER ANY CIRCUMSTANCES WHATSOEVER, BE LIABLE TO THE BUYER OR ANY OTHER PARTY FOR LOST PROFITS, DIMINUTION OF GOODWILL OR ANY OTHER SPECIAL OR CONSEQUENTIAL DAMAGES WHATSOEVER WITH RESPECT TO ANY CLAIM HEREUNDER. IN ADDITION, MICROCOM CORPORATION'S LIABILITY FOR WARRANTY CLAIMS SHALL NOT, IN ANY EVENT, EXCEED THE INVOICE PRICE OF THE PRODUCT CLAIMED TO BE DEFECTIVE. NOR SHALL MICROCOM CORPORATION BE LIABLE FOR DELAYS IN THE REPLACEMENT OR REPAIR OF PRODUCTS.

Appendix B: RMA Procedure

Return Material Authorization (RMA) Procedure

A Return Material Authorization (RMA) number must be obtained prior to the return of printers and/or materials to Microcom Corporation's Service Department. The purpose of the RMA number is to provide effective tracking and control of returned printers and/or materials. Microcom Corporation will not be responsible or held accountable for printers and/or materials returned without proper authorization.

Shipping Charges:

The return of printers and/or materials to Microcom Corporation for repair should be returned freight and insurance prepaid. Microcom Corporation will pay the return shipping charges (standard ground service) on all warranty repairs; expedited services will be paid at the customer's expense. The return of non-warranty repairs to printers and/or materials will be shipped by a shipping carrier and service determined by the customer.

Receiving a Return Material Authorization (RMA) number:

1.   To receive an RMA number, either complete the online RMA request form located at Microcom's website (https://www.microcomcorp.com/rma-2/) or contact the Microcom Corporation Service Department and provide the representative with the following information:
- Company name.
- Contact name and phone number.
- Model number.
- Printer serial number.
- A detailed description of the problem.
- Service option requested (1 Day, 3 Day, 5 Day, or Standard turnaround).
- Purchase Order Number.

2.   The shipping label should contain the following information:
Microcom Corporation
Attn: RMA# <place RMA number here>
855 Corduroy Rd
Lewis Center, OH 43035 USA

3.   Return the defective item(s) for repair to the address listed above, freight and insurance prepaid.

4.   Upon receipt of an RMA number, the customer contact will be notified by a Microcom Corporation representative regarding repair charges, at which time the ship method will be determined. Items returned for repair with inadequate packaging material will be returned to the customer in Microcom Corporation approved packaging at the customer's expense.

Appendix C: ^D Command Summary

Control Codes are special one character hex sent to the printer to perform various functions. The control codes process as fast as possible unlike ^D commands that are queued up. The list below is a summary of the control codes that are available on the printer.

CODE	HEX VALUE	FUNCTION
^A	0x01	**Begin Script:** Marks the beginning of a script file.
^C	0x03	**Clear Halting Error:** When issued five times in a row, the printer clears errors that are halting the printer.
^D	0x04	**Standard Command Preface:** Combined with a 3 digit value to perform different function in the printer. Refer to Chapter 2 for detailed information.
^E	0x05	**Printer Enquiry:** Causes the printer to report its status to the active communication port.
^K	0x0B	**Print Test Pattern:** Causes the printer to print a diagonal test pattern used to verify the integrity of the thermal dots on the printhead.
^L	0x0C	**Form Feed:** Issues a blank form the size of the last executed script or non-volatile command header settings.
^M	0x0D	**Carriage Return:** Sends a Carriage return to the printer.
^O	0x0F	**TOF:** Causes the printer to perform a TOF or Top of Form.
^P	0x10	**Print:** Issues a print command when issued.
^R	0x12	**Reset:** Causes the printer to reset and reboot.
^U	0x15	**List Selections:** Report that shows the selection commands current value.
^V	0x16	**List Settings:** Report that shows the setting commands current value.
^W	0x17	**List Statistics:** Report that shows the printer current statistics.
^Y	0x19	**List Enablements:** Report that shows the enablement commands current value.
^Z	0x1A	**End Script:** Marks the end of a script file.
^]	0x1D	**Cancel All Jobs:** Deletes all jobs in the printer queue.

The following is the list of ^D commands in numeric order (Commands follow the "^Dxxx" formatting unless otherwise noted):

^D	VALUE	COMMAND
200		**Script Header:** Followed by fields that control the placement and type of fields to be printed. Header parameters in order: lsx, lsy, gap, dtm, spd, det, ofx, ofy, agd
202	n	**Text Replacement Header:** Command used to recall a saved format (n) and replace the text data in the script.
203		**Direct Image Script Header:** This command replaces the need of the D200 script header and allows users to print a graphic without needing to save it to the printer first. The ^F and ^T fields are ignored when printing a full-page graphic image. Header parameters in order: lsx,lsy,gap,dtm,spd,det,ofx,ofy,agd,binary tag, file size.
300	n	**Print Command:** Prints a single label or starts the printing of a batch of labels that matches the value for "n" (Equivalent to ^C).
305	n	**Infinity Print:** If "n" is set to a 1, the printer will print the script until the printer is turned off.
311	1	**Issue TOF:** The printer will issue a TOF (Top of Form) using the configured sensor set by the ^D508) command.
312	1	**Form Feed:** This command cause a blank form based on the last script header to be printed (Equivalent to the ^L).
313	n1,n2	**Advance distance and Speed:** The value for n1 sets the advance distance while the value for n2 sets the advance speed.
323	1	**List Enablements:** Command reports the printers enablement commands to the printers active port (Equivalent to the ^Y).
324	1	**List Statistics:** Command reports the printers statistical information to the printers active port (Equivalent to the ^W).
325	1	**List Selections:** Command reports the printers selection commands to the printers active port(Equivalent to the ^U).
326	1	**List Settings:** Command reports the printers setting commands to the printers active port (Equivalent to the ^V).
327	1	**List Status:** Command reports the printers current status to the printers active port (Equivalent to the ^E).
339	size	**Load Firmware:** Command used to update the printers firmware. The "size" parameter is the size of the download zip file.

^D	VALUE	COMMAND
340	**n1,2,3**	**Save File:** Command used to save files into the printer. The parameters for the command include the name, size, and comment. Only the name is required if sending a zip file. File types included graphics, scalable fonts, and bitmapped fonts.

341 **n** **List Files:** Command used to list the stored in the printer.
File types for n"
    1 – list all file types
    2 – list graphic files
    4 – list font files
    5 – list script files

342 **n** **Delete Files:** Command used to delete files stored in the printer.
The asterisk (*) character may be used as a wildcard
Example:
    *x - would delete files ending in x
    x* - would delete files starting with x
    x*y - would delete files starting with x and ending with y
    x - would delete file containing x anywhere in the file

343 **n** **List Script File:** Command used to list the contents of a stored script file to the active port. The value "n" is the filename.

350 **n** **Load Script File:** Command used to load and execute a saved script file. The value for "n" is the name of the stored script file.

360 **?** **List Memory Available:** Command lists the available RAM and Flash memory.

365 **?** **List Status Commands:** Command generate a list through the active port that displays the status command messages available in Byte and Text form.

390 **1** **Reset Command:** Command used to reset the printer. This command operates like power cycle to the printer and will cause the printer to reboot.

391 **1** **Restore Configuration Defaults:** Command sets configuration command default values.

392 **1** **Restore Property Defaults:** Command sets the property command to their default values.

501 **n** **Select Language Mode:**

506 **n** **Select Cutter Type:** Selects the cutter type installed on the printer; n= 0 none, 1 guillotine, 2 rotary, 3 Microcom cutter.

^D	VALUE	COMMAND

508   **n**   **Select LPD Type:** Selects the type of LPD (Label Present Detector) installed on the printer; n = 0 none, 1 reflective, 2 transmissive.

509   **n**   **Select INPUT 1 Response:** Selects when the optional input 1 sensor would report the >INPUT 1< message. n = 0 no response, 1 >INPUT 1< message when sensor blocked, 2 >INPUT 1< message when sensor unblocked, 3 error when blocked, 4 error when unblocked.

511   **n**   **Select INPUT 2 Response:** Selects when the optional input 2 sensor would report the >INPUT 2< message. n = 0 no response, 1 >INPUT 2< message when sensor blocked, 2 >INPUT 2< message when sensor unblocked, 3 error when blocked, 4 error when unblocked.

541   **n**   **Select Button 1 Response:** This command is used to select the operation and response of Button 1 which is typically referred to as the print button.

      1   Short press = reprint; button held = continuous feed (default)
      2   Short press = form feed; button held = continuous feed
      3   Short press = ">BUTTON 1 TAPPED<" response;
              button held = continuous feed
      4   Short press = ">BUTTON 1 TAPPED<";
              button held = ">BUTTON 1 HELD<"
      5   Short press = Initiates a TOF (^D311); button held = continuous feed

550   **n**   **Select Response Set:** This command used to select the response set. The response sets determine how the printer will react to commands, functions, and enquiry responses.

      1   Text (Default)
      2   Byte
      9   Verbose

564   **n**   **Select Linear Measurement Units:** This command is used to select the prevailing unit of measure the printer will use.

      1   Inches
      2   Millimeters

565   **n**   **Select Speed Units:** This command is used to select the desired unit of measure used for the speed parameter. This command is independent from the "^D564)" command.

      1   Inches per Second (ips)
      2   Centimeters per Second (cm/sec)

566   **n**   **Select Temperature Units:** This command is used to select the desired unit of measure used for the temperature parameter.

      1   Fahrenheit
      2   Centigrade

^D	VALUE	COMMAND
567	**n**	**Select Power up Format:** Command used to select the power up format that is loaded at boot time. The value for "n" is the filename of the stored format.

570   **n**   **Select Active Port:** Command used to select the active communication port that will be used.

        0   Autodetect on power up (Auto selects connected port)
        1   RS232
        2   USB
        5   Wired Ethernet, WIFI, or Bluetooth

581   **n**   **Select Stock Out Handling:** Command that selects what the printer does when a stock out error condition is detected.

        1   Halt immediately, reprint once error cleared, no stock ejection
        2   Finish Form and eject

597   **n**   **Select Dispense Mode:** Command selects which dispense mode to use. Dispense mode controls what the printer does after printing.

        0   No Advance/Retract – This will disable the Dispense mode.

        1   Advance after every label (LPD Enabled) – Causes the label or tag perforation to be advanced to the peel edge after every label is printed. Before the printer retracts, it will wait for both the label to be taken and any advance delay time setting.

        2   Advance after copies count (LPD Enabled) – Causes the label or tag perforation to be advanced to the peel edge after the set copies count has been reached. Before the printer retracts, it will wait for both the label to be taken and any advance delay time setting.

        3   Advance when idle (LPD Disabled) – This will cause the label or tag perforation to be advanced to the peel edge when the printer has no pending data on the communications port. When new data is sent through the port the printer will retract and then begin the printing process.

        4   Advance after every label (LPD Disabled) - Causes the label or tag perforation to be advanced to the peel edge after every label is printed. Before the printer retracts, it will wait only for any advance delay time setting.

        5   Advance after copies count (LPD Disabled) - Causes the label or tag perforation to be advanced to the peel edge after the set copies count has been reached. Before the printer retracts, it will only wait for any advance delay time setting.

^D	**VALUE**	**COMMAND**
629	**n1,n2**	**Set Takeup Motor Timeouts:** Command used to control optional takeup PRE and POST timeouts. The value for n1, sets the Pre Takeup run time and has a range of -1 to 1 second. The value for n2 sets the Post Takeup time with a range of 0 to 10 seconds.
630	**n1,n2**	**Set Takeup Motor Reverse Timing:** Command used to control optional takeup reverse timing. Positive value for n1 causes the takeup motor to run before retracting the stock. A value of zero for n1 causes the takeup to run at the same time as the retraction. A negative value for n2, turns the takeup off before retraction. A value of zero for n2 turns off after retraction. If n2 is a position value, the take motor will turn off after retraction and after the time entered.
631	**n**	**Set Format Width:** Sets the width value. The same as the header LSX value but if sent outside a script, the value is non-volatile. The value for "n" is the width and entered using the units selected by the D564 command.
632	**n**	**Set Format Length:** Sets the height value of the page size. The same as the header LSX value but if sent outside a script, the value is non-volatile. The value for "n: is the height and entered using the units selected by the D564 command.
633	**n**	**Set GAP size:** Command sets the format header GAP parameter that is the height of the registration mark being used. The value for "n: is the GAP height and entered using the units selected by the D564 command.
634	**n**	**Set DRM size:** Commands sets the format header DRM or Distance to Registration Mark size. The value is persistent and non-volatile if sent outside of a script file. The value for "n: is the distance from the first printable area to the beginning of the registration mark and entered using the units selected by the D564 command.
635	**n**	**Set Print Speed:** Command sets the printer speed of the printer and is the same as the SPD header parameter. The value is persistent and non-volatile if sent outside of a script file. The value for "n: is the distance from the first printable area to the beginning of the registration mark and entered using the units selected by the D564 command.
636	**n**	**Set Detector Mode:** Command sets the detection type being used and is the same as the DET header parameter. The value is persistent and non-volatile if sent outside of a script file. The value for "n: detection type and entered using the units selected by the D564 command. 0 Continuous 1 Blackline 2 Die-cut 3 Blow-hole

^D	VALUE	COMMAND
637	n	**Set X Offset:** Sets the offset in the X direction and is the same as the OFX header parameter. The value is persistent and non-volatile if sent outside of a script file. The value for "n: is the distance that the field will move to the right in the X direction of the format and entered using the units selected by the D564 command.
638	n	**Set Y Offset:** Sets the offset in the Y direction and is the same as the OFY header parameter. The value is persistent and non-volatile if sent outside of a script file. The value for "n: is the distance that the field will move to the right in the Y direction of the format and entered using the units selected by the D564 command.
640	n	**Set Delay Time Between Formats:** Command used to add a delay between prints. The value for "n"entered in seconds and has a maximum value of 15.
641	n	**Set Retraction Delay Time:** Command used with the D597 dispense modes and controls how long the printer will wait before retracting the media after dispensing. The value for "n" entered in seconds and has a maximum value of 15.
642	n	**Set Advance/Retraction Distance:** Sets the distance that the printer used for advancing the media after printing and then retracts the same distance. Used in conjunction with the D597 dispense modes.
644	n	**Set Idle Recognition Delay:** Used in conjunction with the ^D597)3 command and sets the time that the printer goes idle before advancing. The value for "n" entered in as decimal seconds with tenths of a second resolution.
645	n1,n2	**Set Advance/Retract Speed:** Sets the advance/retract speed of the printer when using the D597 dispense modes. The value for "n1" sets the advance speed while the value for "n2" sets the retraction speed.
646	dc,dp	**Set Printhead Parameters:** Used to set the printhead parameters of the printer. The "dc" sets the dot count while the "dp" sets the dot bytes per row. Only trained service providers should use this command to prevent damaging the printer by not following proper procedures.
648	n	**Set Reflective to Printhead Distance**: The distance from the reflective blackline sensor to the printhead distance. This command is set at the factory to reflect the model used.
649	n	**Set Transmissive to Printhead Distance**: The distance from the transmissive sensor to the printhead distance. This command is set at the factory to reflect the model used.
650	n	**Set AGD Distance**: This is a format header parameter and sets the distance that the printer will not trigger. This is useful when looking to skip areas on the media that might false trigger a registration mark.

^D	VALUE	COMMAND
655	n	**Set Labels Printed Countdown**: Command use to set a countdown of printed labels. The value "n" sets the countdown and once reaching zero, the >PM< status message is active. If "n" is set to a -1 value, the field become a counter that increases with each print.
670	b,p,d,s	**Set Serial Port**: Command sets the serial parameters of the printer. The parameters are b=baud, p=parity,d=data, and s=stop.
673	n	**Set DHCP**: A 1 enables the use of DHCP while a 0 disables it.
674	n	**Set Ethernet Port Number**: Sets the port number for the Ethernet port. Default is set to 9100.
675	n	**Set Printer IP Address**: Sets the printer's IP address of the printer. The printer default is set to DHCP and if an IP address is not assigned within 30 seconds, an Auto IP address will be assigned. DHCP may be disabled and a static IP entered as well.
677	n	**Set the Gateway Address**: Command sets the printer's Gateway address. \Default is set to 0.0.0.0
679	n	**Set Net Mask Address**: Command sets the printer's Net Mask address. The default is set to 255.255.0.0.
680	n	**Set Gap Threshold**: Sets the threshold or trip point that the printer uses to determine a registration mark using the transmissive sensors. The default for "n" is set to 30 and should work for most media types.
681	n	**Set Blackline Threshold**: Sets the threshold or trip point that the printer uses to determine a blackline registration mark using the reflective sensor. The default value for "n" is set to 150 and should work for most applications.
682	n	**Set Stock Out Threshold**: Sets the threshold or trip point that the printer uses to determine if the printer is out of paper. The default value for "n" is set to 168 at the factory.
690	n	**Set Darkness Level**: Sets the printer darkness or contrast level used but the printer. The value for "n" is a range from 1 to 100 with 100 being the darkest setting.
720	n	**Enable Power Up Script**: A value of 1 enables the power up script selected by the ^D567 command to be the power up script.
721	n	**Enable Status After Print**: A value of 1 causes the printer to report its status automatically after print.
723	n1,n2	**Enable Auto TOF and Autoload on Power Up**: The value for n1 determines if the printer will automatically perform and Auto TOF on power up if set to a 1. The n2 parameter controls the autoload function of

the printer. Autoload function causes the media to be detected by the registration sensors and then advanced the home position if n2 is set to a 1.

^D	VALUE	COMMAND
726	**n**	**Enable Auto ACK/NAK Response**: Command enables the printer to send status message based on the ^D550 setting after command complete.
727	**n**	**Enable Auto Error Reporting**: Enabling this command causes the printer to automatically report an error status using the ^D550 command setting.
729	**n**	**Enable Takeup Motor:** Command that enables the optional take up motor control. Uses the D629 and D630 timeout settings and runs the takeup at the same time the main motor is moving. 0 = Disable Takeup 1 = Enable forward and disable reverse 2 = Enable forward and reverse
740	**n**	**Enable Cutter:** Command used to enable the cutter selected by the D115 command.
900	**n**	**Tick Tick Mode:** Diagnostic tool used to monitor the sensor inputs. Command is useful when setting the printers threshold trip point for the registration sensors (D680, D681 commands) and determining if the registration sensors are able to detect the target media properly.
930	**n**	**Get Access Code Key:** Command generates a Code key that is used to change the access level of the printer. The value for "n" is the desired access level (BASIC, SERVICE, and FACTORY). Once issuing the code, Microcom Corporation support should be contacted with the Code key to gain access using the ^D931 command. The code key is active until printer power cycled or a second ^D930 command issued.
931	**n1,n2**	**Change Access Level:** Command used to change the access level of the printer. The value for n1 is the access level desired and the value for n2 is the password received after using the D930 code key command and contacted Microcom Corporation Support.
945	**n**	**Command Listing:** Used to generate an indexed listing of the printer commands and values. Using a "?" character for the value for N causes the printer to generate a table that shows the index number, command, and value. If the value for "n" is the index number, the printer reports the value that is terminated with a CR LF CR LF (0x0d 0x0A 0x0D 0x0A) character combination.
960	**1**	**Test Pattern:** Command causes a diagonal line test pattern to print used

to identify printhead dots that might have an issue. The size of the printout uses the last executed script header or the nonvolatile header ^D command settings.

^D	VALUE	COMMAND
971	**n**	**Edit Inches Printed Statistic:** Command used to edit the Printed Inches counter. Must have access level of SERVICE or FACTORY to edit.
973	**n**	**Edit Power on Statistic:** Command used to edit the Power on Hours counter. Must have access level of FACTORY to edit.
974	**n**	**Edit Head Up Cycles:** Command used to edit the Head Up counter. Must have access level of FACTORY to edit.
975	**n**	**Clear All Statistics:** Command used to Clear and zero all counters. Used as part of setup at the factory. Must have access level of FACTORY to edit.
976	**n**	**Edit Unit Serial Number:** Command used to edit the printer serial number. Must have access level of FACTORY to edit.
977	**n**	**Edit Cutter Cycles:** Command used to edit the cutter cycles counter. Must have access level of SERVICE or FACTORY to edit.
978	**n**	**Set MAC Address:** Command used to set the unit MAC Address. Must have access level of FACTORY to edit.
979	**n**	**Edit CPU Serial Number:** Command used to edit the CPU Serial number. Must have access level of SERVICE or FACTORY to edit.
980	**n**	**Calibrate Sensors:** Command used to calibrate sensors. Requires an access mode of SERVICE or FACTORY mode and specific calibration cards to perform task. The value for "n:" is listed below.

    0 = Calibrate all sensors
    1 = Calibrate Reflective sensor
    2 = Calibrate Transmissive sensor
    3 = Calibrate LPD sensor

Glossary

Alphanumeric - A term used to identify characters consisting of letters, numbers, and other symbols (such as punctuation marks and mathematical symbols).

Bar code - Alphanumeric characters represented using a system of printed lines and can be read by a computer.

Black-line - A registration mark, typically a black line on the underside of certain media used to identify the starting position of a label.

Blow-hole - A registration mark, typically a notched or cutout in certain media used to identify the starting position of a label.

Continuous media - Media that contains no gap and continues as one piece of media.

CTS (Clear to Send) - A status signal from the printer to the host PC indicating when it is OK to send data to the printer. This signal is used in conjunction with RTS (Ready To Send). The PC (DTE) will only transmit to the printer (DCE) when it sees CTS up. CTS leaves the printer on pin #8 of the RS-232 connector.

Cutter - An optional device, mounted on the printer, which is used to cut media into custom sized labels after printing

DCD (Data Carrier Detect) - A status signal from the printer to the host PC that tells the PC (DTE) that the printer is powered up. This signal is +5Vdc when the printer is turned ON. DCD leaves the printer on pin #1 of the RS-232 connector.

DCE (Data-Circuit-terminating Equipment - The modem or printer end of an RS-232 serial communication link. Modem serial ports and other peripherals are typically configured as DCE.

Die-cut media - Media that is cut using a die to form individual labels that have a start and stop point. Typically the excess material surrounding the label is removed from the backing material.

Direct thermal - Method of printing with a special heat-sensitive media that directly contacts heat elements of a thermal print head. (See *Thermal print head*)

DPI (Dots Per Inch) - A unit of measure term used to identify the print resolution capability.

Drive roller - Platen roller that is located below the print head that is used to drive media through the printer.

DSR (Data Set Ready) - A status signal from the printer (DCE) to the host PC (DTE) telling the PC that the printer is powered up. Used in conjunction with DTR. Microcom Corporation does not use this signal.

DTE (Data Terminal Equipment) - The terminal or computer end of an RS-232 serial communication link. Serial ports on computers are typically configured as DTE.

DTR (Data Terminal Ready) - A status signal used to provide information about the status of the communication line connected to the DCE end of an RS-232 link. Used in conjunction with DSR. Microcom Corporation does not use this signal.

Ethernet - A fast and capable serial interface used by many networks for connecting host computers to various peripherals.

Fanfold media - Die-cut or tag media that is folded into stacks.

Flash memory - Memory that is used to store font, graphics and label formats for faster access. This is a non-volatile type of memory, which means that the information stored in the memory chip is retained even when the printer power is turned off. The 428M printers use two FLASH memory chips: a CODE flash (256K x 16), and a FONT flash (4M x 16)

GND (Signal Ground) - The ground terminal of a power supply's output, and all points that connect to it. This is an essential signal in an RS-232 communication link that is used to reduce noise spikes that can cause a receiver to misread logic levels. Signal also known as SG and SGND.

Guillotine Cutter – A cutter that has a blade that cuts perpendicular to the media path. This type of cutter can be setup to make "partial cuts" which leave a small piece of label uncut in the center of the label. Not all Guillotine cutters can make partial cuts; a special blade is required. Cuts paper weights in the range of $60 - 100$ gm/m^2.

LDS (Label Design Software) - This is the resident control software language that is used to develop label formats and controls the full function of the printer.

LPD (Label Present Detector) - This sensor, when enabled, detects when media is present. This sensor is also referred to as a LTS (Label Taken Sensor). This sensor is typically a reflective type sensor that is normally mounted above the paper stock looking down at the paper just past the print head.

Platen - Roller that is located below the print head, which the media rests upon. (See *Drive roller*)

RI (Ring Indicator) – An RS-232 handshaking signal that is NOT used on the 428M printers. RI would leave the printer on pin #9 of the RS-232 connector if it were used.

Rolled media - Media that has been rolled onto a core, typically cardboard in nature.

Rotary Cutter – A cutter that has multiple angled blades mounted to a shaft that cut media by rotating the shaft. This cutter only cuts in one direction, and cannot make "partial cuts". The rotary cutter is typically used when heavy label stock must be cut because it has higher cutting force than the Guillotine cutter. Cuts paper weights in the range of $60 - 200$g/m^2.

RS-232 - A popular and inexpensive asynchronous serial interface used for connecting host computers to various peripherals.

RTS (Request To Send) - A status signal from the host PC (DTE) to the printer (DCE) indicating when the PC has data to send to the printer. The printer (DCE) will only transmit data to the PC (DTE) when it sees RTS up. RTS comes into the printer on pin #7 of the RS-232 connector.

RXD (Receive Data) - An essential signal that carries data from the printer (DCE) to the host PC (DTE) for 2-way RS-232 serial communication. Signal is also known as RX and RD. RXD leaves the printer on pin #2 of the RS-232 connector.

SDRAM (Synchronous Dynamic Random Access Memory) – High density random access memory that is commonly used to store application code. The 324M & 424M printers do NOT use this type of memory.

SRAM (Static Random Access Memory) – High speed random access memory that is used to store label formats, graphics, and fonts temporarily. The slice buffer and serial buffer (10Kbyte) are also in SRAM. This is volatile memory, which means that the information is lost when the printer powers down. The 428M printers use a 512Kbyte SRAM configured as 256K x 16.

Tag stock - Media that typically has no adhesive backing, thicker in nature, and generally is a fanfold type media.

Thermal print head - A print head that uses thermal technology, to heat individual elements or dots to produce images. Also referred to as print head in this manual.

TXD (Transmit Data) - An essential signal that carries data from the host PC (DTE) to the printer (DCE) for 2-way RS-232 serial communication. Also known as TX and TD. This signal comes into the printer on pin #3 of the RS-232 connector.

USB (Universal Serial Bus) - A high-speed asynchronous serial interface that connects a PC to a peripheral, such as a printer.

User Notes

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