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Introduction

This manual is intended to be used by software developers for the purpose of creating or modifying applications to make use of the special features offered to use of thermal printers

Printer Model and Key Features

thermal printer offer solutions for a wide variety of printing applications. The model support flexible paper widths, printing from roll stock or flat stock in easy loading cassettes, label printing enhancements, and several host interface choices.

Model	Max Paper Size	Label /Ticket printing	Host interfaces	
	W x D x H (mm)		Rs-232	Bluetooth
202	69.3 x 32.7 x15.3	Not available	Standard	standard

Control codes and escape sequences grouped by function

Introduction

This section describes the control code and escape sequences. These are used to control printer operation. An ASCII control code is a single character in the range 00hex through 1Fhex, and 7Fhex. The ESC(Escape) control code(1Bhex) is used to introduce character strings called escape sequences, which provide an extension of the commands available with ASCII control codes.

If a sequence accepts one numeric parameter, it will be represented as “n”. If a sequence accepts more than one numeric parameter, they will be represented as “n1 n2………nx”.

Spaces are used when documenting sequences to increase readability. If a space character is actually a valid part of the sequence, it will be represented as “SPACE”. Characters that appear in italics are not sent to the printer as is; they are used as a place holder indicating that some value must be supplied.

Multiple character strings without intervening spaces typically represent control codes. For example, BS is the Backspace control code (08hex), not the two characters “B” and “S”(42 and 53hex), SPACE is the space character(20hex).

Communications

This section describes various methods of controlling the flow of data to and from the printer. It indicates whether the command is one that is “received “ by the printer, or “transmitted” by the printer. The Baud rate of printer is set to 115200. XON\XOFF flow control enabled in this firmware and it cannot be disabled.

- **End of text (received by printer)**

  Syntax: ETX

  If “ETX/ACK” is set to “on” in the serial interface menu, then processing of an etx from the printer’s input buffer causes the printer to transmit an ack to the host computer.

  Control code: ETX

  Hexadecimal: 03

- **Acknowledge (transmitted by printer)**

  Syntax: ACK

  Control code: ACK

  Hexadecimal: 06

- **End of transmission (transmitted by printer)**

  Syntax: EOT

  The printer sends an eot character each time the printer’s input buffer becomes empty to indicate the printer is idle.

  Control code: EOT

  Hexadecimal: 04

- **Transmitter on (transmitted by printer, serial only)**

  Syntax: XON (DC1)

  When enabled for the serial interface, this character is transmitted by the printer to indicate that the printer is on line and ready to receive data

  Control code: XON

  Hexadecimal: 11

- **Transmitter off (transmitted by printer, serial only)**

  Syntax: XOFF(DC3)

  When enabled for the serial interface, this character is transmitted by the printer to indicate that the printer's input buffer is nearly full and the host computer should stop the sending. When printer is able to accept data again, it will transmit xon/dc1.

  Control code: XOFF

  Hexadecimal: 13

Character size and line spacing

- **Select character pitch/font**

2 inch 384 dots paper width 54mm

Syntax: ESC k n

n value(hex)	character pitch/font	matrix	characters per line
00	05.5 cpi Sans Serif	37x60	10 characters per line
01	10.2 cpi Sans Serif	20x26	19 characters per line
02	10.7 cpi Sans Serif	19x26	20 characters per line
03	12.7 cpi Courier	16x23	24 characters per line
04	13.5 cpi Courier	15x23	25 characters per line
05	14.5 cpi Courier	14x23	27 characters per line
06	15.6 cpi Courier	13x23	29 characters per line
07	16.9 cpi Courier	12x23	32 characters per line
08	18.5 cpi Courier	11x23	34 characters per line
09	20.3 cpi Courier	10x23	38 characters per line
0A	22.6 cpi Courier	09x23	42 characters per line
0B	25.4 cpi Courier	08x23	48 characters per line
0C	16.9 cpi Sans Serif	12x23	32 characters per line
0D	18.5 cpi Sans Serif	11x23	34 characters per line
0E	20.3 cpi Sans Serif	10x23	38 characters per line
0F	04.2 cpi Sans Serif	48x60	8 characters per line

Example 1: the following escape sequence will select 12.7 cpi courier font

Escape sequence: ESC K 3

Hexadecimal: 1B 4B 03

Example 2: the following escape sequence will select 20.3 cpi courier font

Escape sequence: ESC K 14

Hexadecimal: 1B 4B 0E

- **Double height on**

Syntax: FS

When printer receives this byte the height of font is doubled. This command must be sent before start of a line. If sent in between a new line will be inserted and following characters will be printed in double height.

Note: Printer will continue printing in double height till it is turned off.

Control code: FS

Hexadecimal: 1C

- **Double height off**

Syntax: GS

This command will turn off double height font. This must be sent before printing, If sent in between a new line will be inserted and following characters will be printed in normal height.

Control code: GS

Hexadecimal: 1D

- **Double height/double width on**

Syntax: DC2 D

When printer receives this command the height and width of font is doubled. This command must be sent before start of a line. If sent in between a new line will be inserted and following characters will be printed in double height and double width.

Note: Printer will continue printing in double height and double width till it is turned off.

Control code:	DC2	D
Hexadecimal:	12	44

- **Double height/width off**

Syntax: DC2 d

This command will turn off double height and double width font. This must be sent before printing, If sent in between a new line will be inserted and following characters will be printed in normal height.

Control code:	DC2	d
Hexadecimal:	12	64

- **Set text line spacing**

Syntax: ESC a n Where $0 \leq n \leq 10$

This command sets the number of dot rows to be inserted in between two successive character line. The height of dot rows is 0.125mm

Example: the following escape sequence sets the line spacing to zero

Escape sequence:	ESC	a	00
Hexadecimal:	1B	61	00

Character attributes

- **Set emphasized mode**

Syntax: ESC U n

Where n is n = selection

0 off

1 on

When this mode is enables the printer will increase the intensity of fonts. This command must be sent before start of new line. If sent in between a new line will be inserted and this will take effect from next line.

Note: Printing speed will be slower when this mode is enabled.

Example: the following escape sequence will set the emphasized mode to on.

Escape sequence: ESC U 1

Hexadecimal: 1B 55 31

Character sets

- **Select extended character set**

Syntax: ESC F n

Where n is	n	=	character set
	1		international character set
	2		PC line drawing character set

selects the character set to be used when printing extended characters(80-ff).when using PC lite drawing set the text line spacing should be set zero doing so will allow the vertical line characters to form continues lines

Example: the following escape sequence will select the international character set

Escape sequence:	ESC	F	1
Hexadecimal:	1B	46	31

Horizontal position

- **carriage return**

Syntax: CR

This byte will advance the paper by one line and set the position to beginning of next line.

Control code: CR

Hexadecimal: 0D

- **Backspace**

Syntax: BS

This will delete previous character in printer buffer. This can go up to beginning current line.

Control code: BS

Hexadecimal: 08

- **Horizontal tab**

Syntax: HT

Advances to the next horizontal tab stop. If no tab stop exists between the active column and the right margin, the print position will advance to the beginning of the next line. default tab stops are set to every fourth column , i.e. 5,9,13,17,21,25,29,33…..

Control code: HT

Hexadecimal: 09

- **Set horizontal margins**

Syntax: ESC H l r

Sets the left and right margins in millimeters. l and r may be set from zero up to ½ the length.

Example: the following escape sequence will set the both left and right margins to 10mm (0.394")

Escape sequence:	ESC	H	10	10
Hexadecimal:	1B	48	0A	0A

Vertical positions

- **Line feed**

Syntax: LF

This byte will advance the paper by one line and set the position to beginning of next line.

Control code: LF

Hexadecimal: 0A

- **Variable size line feed**

Syntax: ESC J n

Where n is $0 \leq n \leq 255$

This will advance printer by n dot lines(n x 0.125mm) (the height of dot line is(0.125 mm).

Example: the following escape sequence will set a line feed of five millimeters

Escape sequence:	ESC	J	40
Hexadecimal:	1B	4A	28

- **Variable size reverse line feed**

Syntax: ESC Q J n

Causes paper to moved in reverse direction by n dot lines (n x 0.125mm)

Example: The following sequences will a set reverse direction two millimeters (2%0.125)

Escape sequence:	ESC	Q	J	16
Hexadecimal:	1b	51	4A	10

- **Vertical tab**

Syntax: VT

Advances the paper five lines. If a partial line exits in a buffer that line will be printed including a carriage return and line feed, and the paper advanced five lines.

Control code: VT

Hexadecimal: 0B

- **Form feed**

Syntax: FF

Will print the current line and advance to beginning of next line. If current line partial remaining positions will be filled with spaces.

Control code: FF

Hexadecimal: 0C

Bar Codes

Several types barcode symbols may be printed using the following command. The specification for each barcode type is also described.

- **Bar Code Command Formats:**

Syntax: ESC a t n h data barcode

Variable	Value	Description
a	z(lower case)	Print bar code only
	Z(upper case)	print bar code and human readable text
t	1	Code 39
	2	Code 128,UCC/EAN-128
	3	Interleaved 2 of 5
	4	UPC/EAN/JAN
	5	Codabar
n	$1 \leq n \leq 255$	Number of characters in the bar code
h	$1 \leq n \leq 255$	Height of the bar code in increments of 0.125mm
data		n characters to be represented in the bar code

Code 39 specifications

Description: Each symbol starts with Leading Quiet Zone, followed with start symbol, data symbols, ending with stop symbol and Trailing Quiet Zone.

Character set: 43 ASCII characters including A to Z (upper case only),0-9,.(period),-$,/,+,% and space

Elements per symbol: 9 (5 bars, 4 spaces)

Character density: 6.25 CPI

Bar width: 0.25mm(narrow to wide ratio=1:3)

Example: The following escape sequence print a bar code containing the characters "ANALOGICS" that 10mm high and followed with human readable text

Escape sequence: ESC Z 1 9 80 A N A L O G I C S

Hexadecimal: 1B 5A 31 09 50 41 4E 41 4C 4F 47 49 43 53

Code 128 Specifications

Description: Each symbol starts with Leading Quiet Zone, followed with start symbol, data symbols, ending with stop symbol and Trailing Quiet Zone.

Character set: 256 ASCII via three Code Sets and an "extend" function.

Elements per symbol: 6 (3 bars, 3 spaces)

Character density: 9.1 CPI

Bar width: 0.25mm

Start character	Code set	Characters sent to printer	Characters read by scanner
87	A	20 - 5F 60 - 7F	20 - 5F 00 - 32
88	B	20 - 7F	20 - 7F
89	C	Pairs of 30-39	Numeric character Pairs 30,30 --- 39,39 (00-99 Dec)

Type: Code set - A

Example 1: The following escape sequence print a bar code containing “ABCDEF” that is 10mm high and followed with human readable text

Escape sequence:	ESC	Z	2	7	80	Start A	A	B	C	D	E	F
Hexadecimal:	1B	5A	32	07	50	87	41	42	43	44	45	46

Type: Code set - B

Example 2: The following escape sequence print a bar code containing “ABC123” that is 10mm high and followed with human readable text

Escape sequence:	ESC	Z	2	7	80	Start B	A	B	C	1	2	3
Hexadecimal:	1B	5A	32	07	50	88	41	42	43	31	32	33

Type: Code set - C

Example 3: The following escape sequence print a bar code containing “123456” that is 10mm high and followed with out human readable text

Escape sequence: ESC z 2 7 80 Start C 1 2 3 4 5 6

Hexadecimal: 1B 7A 32 07 50 89 31 32 33 34 35 36

Type: Code set C with mixture of alphanumeric and numeric pairs

Example 4: The following escape sequence print a bar code containing “ABC123” using Code Sets that allow a mixture of alphanumeric and numeric pairs. The barcode will be 20mm high and followed with human readable text

Escape sequence: ESC Z 2 7 160 Start A A B C 1 Switch C 2 3

Hexadecimal: 1B 5A 32 07 A0 87 41 42 43 31 89 32 33

Type: **UCC/EAN-128 Specifications**

Description: The UCC/EAN-128 specification is an internationally recognized format for application identifiers in code 128 bar codes. The bar code symbology is identical to code 128. Only recognized bodies of the UCC or EAN may assign application identifiers.

Character set: 256 ASCII via three Code Sets and an “extend” function.

Elements per symbol: 6 (3 bars, 3 spaces)

Character density: 9.1 CPI

Bar width: 0.25mm

Example: The following escape sequence print an all numeric bar code containing “1234” in an EAN-128 format that is 10mm high and followed by human readable text

Escape sequence: ESC Z 2 6 80 FNC1 1 2 3 4

Hexadecimal: 1B 5A 32 06 50 86 31 32 33 34

UPC/EAN/JAN Specifications

Description: Each symbol starts with Leading Quiet Zone, followed with Left Guard Bars, Left data symbols, Center Bar Pattern, Right data symbols, Check Character, ending with Right guard Bars and Trailing Quiet Zone.

Character set: numeric fixed length as follows:

- UPC-A – Requires 12 digits. The first 11 will be printed and the 12th will be replaced by a check digit calculated by a printer.
- UPC-E – Requires 7 digits. (the check digit will be added by the printer).
- EAN/JAN-8 – Requires 8 digits. The first 7 will be printed and the 8th will be replaced by a check digit calculated by the printer.
- EAN/JAN-13 – Requires 13 digits. The first 12 will be printed and the 13th will be replaced by a check digit calculated by the printer.

Elements per symbol: 4 (2 bars, 2 spaces)

Character density: 14.5 CPI

Bar width: 0.25mm

Type: UPC-A bar code

Example 1: The following escape sequence print a UPC-A bar code containing “12345678901” that is 30mm high and followed with human readable text. Note that check digit “9”is also sent, but will be ignored and recalculated by the printer.

Escape sequence:	ESC	Z	4	12	240	1	2	3	4	5	6	7	8	9	0	1	9
Hexadecimal:	1B	5A	34	0C	F0	31	32	33	34	35	36	37	38	39	30	31	39

Type: UPC-E bar code

Example 2: The following escape sequence prints a UPC-E bar code containing “0234567” that is 30mm high and followed with human readable text.

Escape sequence: ESC Z 4 7 240 0 2 3 4 5 6 7

Hexadecimal: 1B 5A 34 07 F0 30 32 33 34 35 36 37

Type: EAN/JAN-8 bar code

Example 3: The following escape sequence print a EAN/JAN-8 bar code containing “4234567” that is 30mm high and followed with human readable text. Note that check digit “9” is also sent, but will be ignored and recalculated by the printer.

Escape sequence: ESC Z 4 12 240 4 2 3 4 5 6 7 9

Hexadecimal: 1B 5A 34 0C F0 34 32 33 34 35 36 37 39

Type: EAN/JAN-13 bar code

Example 4: The following escape sequence print a EAN/JAN-13 bar code containing “123456789012” that is 30mm high and followed with human readable text. Note that check digit “9” is also sent, but will be ignored and recalculated by the printer.

Escape sequence: ESC Z 4 13 240 1 2 3 4 5 6 7 8 9 0 1 2 9

Hexadecimal: 1B 5A 34 0D F0 31 32 33 34 35 36 37 38 39 30 31 32 39

Interleaved 2 of 5 specifications

Description: Each symbol starts with Leading Quiet Zone, followed with start symbol, data symbols, ending with stop symbol and Trailing Quiet Zone.

Character set: Numeric pairs.

Elements per symbol: 10 (5 bars, 5 spaces)

Character density: 11.11 CPI

Bar width: 0.25mm

Example: The following escape sequence print a bar code containing "123456" that is 10mm high and followed with human readable text

Escape sequence:	ESC	Z	3	6	80	1	2	3	4	5	6
Hexadecimal:	1B	5A	33	06	50	31	32	33	34	35	36

Codabar specifications

Description: Each symbol starts with Leading Quiet Zone, followed with start symbol, data symbols, ending with stop symbol and Trailing Quiet Zone.

Character set: 0-9, $, -, **:**, /, **.**, + and the start /stop pairs of A/T, B/N, C/* and D/E.

Elements per symbol: 7 (4 bars, 3 spaces)

Character density: 8.1 CPI

Bar width: 0.25mm

Type: start/stop A/T

Example 1: The following escape sequence will print a bar code containing “123456” using A/T start/stop characters and 20mm high followed by without human readable text

Escape sequence: ESC z 5 8 160 A 1 2 3 4 5 6 T

Hexadecimal: 1B 7A 35 08 A0 41 31 32 33 34 35 36 54

Type: start/stop C/*

Example 2: The following escape sequence will print a bar code containing “123456” using C/* start/stop characters and 20mm high followed by human readable text

Escape sequence: ESC Z 5 8 160 C 1 2 3 4 5 6 *

Hexadecimal: 1B 5A 35 08 A0 43 31 32 33 34 35 36 54

Graphics

The printer uses a single line thermal print head with elements spaced at 0.125mm. The maximum number of graphic data bytes allowed for each model printer is shown for each command. After each line of graphic data, the paper is automatically advanced 0.125mm to position the paper for the next graphic line. To advance the paper by additional graphic increments without printing.

- **8-Bit Graphics command**

Syntax: ESC # h w data

Variable	Value	Description
H	$1 \leq h \leq 255$	Number of graphic lines in the data to follow
W	$0 \leq h \leq 72$	Number bytes per graphic line in the data to follow. Each byte contains 8 bits.
Data	A line of graphic data bytes where the value of each byte is 0 – 255	h x w bytes per line required

Example 1: The following escape sequence will print a horizontal line 2mm long starting from the left margin

Escape sequence: ESC # 1 4 0 0 255 255

Hexadecimal: 1B 5A 31 04 00 00 FF FF

- **8-Bit compressed Graphics**

Syntax: ESC v h w c data [c data] [c data]

Variable	Value	Description
h	$1 \leq h \leq 255$	Number of graphic lines in the image
w	$0 \leq h \leq 72$	Number bytes in each graphic of the image.
c	$0 \leq h \leq 255$	Counter(s) describing how following bytes are to be interpreted. A description how counter values and the following data are interpreted follows this table
data	A line of graphic data bytes where the value of each byte is 0 - 255	Graphic data bytes to be interpreted as specified by the preceding counter, c.

- **Vector Graphics commands**

Syntax: ESC > id lines size data (or)

Syntax: ESC > id p data t

id lines size data

0 lines = Eight bit value indicating the number of lines to be drawn. This is the number of distinct lines, not line segments.

Size = *wmsb wlsb hmsb hlsb* = 16 bit width and 16 bit height of the grid that the image will be specified in. The image does not have to be this large, but nodes may not be specified outside of the grid size. Maximum values: *w* = 65,535, *h* = 32,767.

Data = *xmsb xlsb ymsb ylsb* = 16 bit X position and 16 bit Y position of each node. Multiple lines are drawn in a single graphic image by setting the most significant bit of *ymsb* = 1 (0x80). This indicates the end of the current line and will cause no line segment to be drawn between this node and the next.

id **p data t**

1 **p** = A variable number of prefix characters that may be inserted by some signature capturing devices. These characters may not include a pair of adjacent characters that would represent a valid hexadecimal value (00-FF) at any position in the string. These characters will be ignored by the printer and are not required.

data = *xmsb xlsb ymsb ylsb* = 8 bit X position and 8 bit Y position of each node (xy). Each X and Y value is sent as a pair of ASCII characters that represent the hexadecimal value of the position. Maximum values: *x* = 127, *y* = 127. Multiple lines are drawn in a single graphic image by setting the most significant bit of *ymsb* = 1 (0x80). This indicates the beginning of a new line and will cause no line segment to be drawn between the previous node this node.

t = Terminating character. The vector graphic command is terminated by any
. ASCII control character (< 0x20) such as a Carriage Return (0x0d).

Black Mark Sensing

The printers can print on preprinted forms on roll media by using a “black mark” to sense the beginning of each form. The black mark is located on the form in a position where the printer’s paper out sensor can be used to detect its presence. Additionally, this model is capable of sensing a black mark on the back side of the form and for sensing the gap between labels.

Black Mark Sensing Commands

For non-automatic paper positioning, the following commands may be used to cause the paper motion to stop when the black mark is sensed.

- **Set Paper Out Sensitivity**

Syntax**:** **ESC Q Q n**

This command sets the number of 0.125mm dot rows of paper motion that can occur after the paper out sensor detects the lack of paper before a paper out condition is displayed and the printer stops printing. Using this command to set a number of dot rows larger than the vertical size of the black mark, which looks like a lack of paper, allows the printer to continue operating in the area of the black mark. 0<n<255, the default value is 40.

Example: The following escape sequence will set the paper out sensitivity to 50 dot rows.

Escape Sequence:	ESC	Q	Q	50
Hexadecimal:	1B	51	51	32

- **Forward Seek Black Mark**

Syntax**:** **ESC Q F n**

This command causes the printer to move the paper forward up to n dot rows to seek the beginning of a black mark on a form where 0<n<255 0.250mm dot rows. If the black mark is found, the printer responds with the escape sequence ESC Q ? ? n1 n2 where n1 n2 represent the number of dot rows the paper was moved before the black mark was detected. If the black mark is not found, the printer responds with ESC Q 0 0 n1 n2 where n1 n2 represent the number of dot rows moved before the seek was aborted.

Example: The following escape sequence commands the printer to move the paper forward up to 200 * 0.250mm dot rows in search of a black mark on the form. This example also shows the printer's response that it found the beginning of the black mark in 183 dot rows.

Command sent to printer:

Escape Sequence:	ESC	Q	F	200
Hexadecimal:	1B	48	56	C8

Response from printer:

Escape Sequence:	ESC	Q	Q	?	?	;	7
Hexadecimal:	1B	51	51	3F	3F	3B	37

- **Reverse Seek Black Mark**

Syntax: ESC Q B n

This command is identical to Forward Seek Black Mark command described above except that the paper is moved in the reverse direction in order to seek the bottom edge of the black mark. Care should be taken not to move the paper very far in the reverse direction to avoid wrinkling the paper and creating the possibility of paper jams.

- **Black Mark Found (Response From Printer)**

  Syntax: ESC Q ? ? n1 n2

  This response is provided from the printer after detecting the presence of a black mark on the form in response to either a Forward Seek Black Mark or Reverse Seek Black Mark command.

- **Black Mark Not Found (Response From Printer)**

  Syntax: ESC Q 0 0 n1 n2

  This response is provided by the printer when the presence of a black mark is not detected on the form in response to either a Forward Seek Black Mark or Reverse Seek Black Mark command.

Printer controls

- **Bell**

Syntax: BEL

Causes the printer's bell to sound

Control code: BEL

Hexadecimal: 07

- **Cancel**

Syntax: CAN

Deletes all data in the printer's input buffer and resets the printer to power up default values.

Control code: CAN

Hexadecimal: 18

- **Print contrast**

Syntax**:**	ESC	P	n

Where n is 0 (0x30) $\leq$ n $\leq$ 9 (0x39)

Contrast command can be used to increase or decrease print intensity. '0' corresponds to highest intensity and '9' corresponds to lowest. The speed of printing decreases when intensity is increased.

Example: the following escape sequence with set the printer to a print contrast setting of "4".

Escape sequence:	ESC	P	n
Hexadecimal:	1B	50	34

- **Buffer mode**

Syntax:	ESC	P	#	or
	ESC	P	$	

Buffer mode may be used to force the printer to “hold” data until the entire print job is received. If buffer mode has been enabled, the printer continues to hold data in its input buffer until an eot character (04) has been received. Once the eot is received, the printer will print the data in the input buffer up to eot character. When buffer mode is not enabled (default) data are printed as received.

Example 1: the following escape sequence enables buffer mode.

Escape sequence:	ESC	P	$
Hexadecimal:	1B	4D	24

Example 2: the following escape sequence disables buffer mode

Escape sequence:	ESC	P	#
Hexadecimal:	1B	4D	23

- **Select format**

Syntax:	ESC	l	n

Where n is l ≥ n ≥ 5

Causes the current line to be printed, and then loads the format parameters for format n.

If format n is already selected, this command is ignored.

Example: This escape sequence selects format 2

Escape sequence:	ESC	l	2
Hexadecimal:	1B	6C	02

- **Reset**

Syntax: ESC c or ESC * 0

Deletes all data in the printer’s buffer and resets the printer to power up default values.

Escape sequence:	ESC	c	
Hexadecimal:	1B	63	
Escape sequence:	ESC	*	0
Hexadecimal:	1B	2A	00

- **Turn printer off**

Syntax: ESC * 1

Causes the printer to turn itself off

Escape sequence:	ESC	*	1
Hexadecimal:	1B	2A	01

PRINTER STATUS COMMANDS

- **Print battery status**

Syntax: ESC P ^

This command will cause the printer to print the current battery voltage and charge status followed by a carriage return and line feed.

If a partial line exists in the buffer, it will be printed prior to printing the battery information.

Escape sequence:	ESC	P	^
Hexadecimal:	1B	50	5E

- **Query printer status**

Syntax: STX or SYN

Each of these commands return character strings which provide information regarding the current print buffer status and the magnetic card reader status. Additionally, SYN will return the current battery voltage.

Each status is returned as an escape sequence and four ASCII hexadecimal digits followed by a Carriage Return and Line Feed. The hexadecimal digits are nibbles that have been "OR'ed" with 0x30. The statuses returned for each of the command are as follows**:**

Command	Returned Strings	Comment
STX	ESC B b1 b2 b3 b4 CR LF	Print Buffer Status
	ESC M m s1 s2 t CR LF	MCR Status
SYN	ESC B b1 b2 b3 b4 CR LF	Print Buffer Status
	ESC M m s1 s2 t CR LF	MCR Status
	ESC V v1 v2 v3 v4 CR LF	Battery Voltage Status

Print Buffer Status String

The print buffer status will be returned as a four digits representing the number bytes in the buffer that remain to be processed, divided by 32. For example if b1-b4=”0020”, this would indicate that there are at least 20 x 32, or 640, bytes remaining to be processed. A value of “0000” would indicate that the buffer is empty.

Magnetic Card Reader Status String

The MCR status indicates the presence of a reader in the printer, and if present, its current status.

m “0” if MCR is present. “X” if not installed in printer.

s1,s2 Number of seconds remaining for a good card swipe before the timeout specified in the read command occurs. If this value is “00” and a non-zero value for t is returned, the reader will not time out and must be cancelled by a Cancel Read Magnetic Card Reader command.

t The tracks to be read as specified by the read command. If this value is zero and m and s1,s2 are also zero, this indicates that the reader is present but currently disabled(no read pending).

Battery Voltage Status String

This string contains the current battery voltage in millivolts. A string where v1 through v4 contains “7123” would indicate that the battery voltage is currently 7123millivolts, or 7.123volts.

Example: The following control code will return the status of the print buffer, the magnetic card reader and the battery voltage.

Control Code: SYN

Hexadecimal: 16

The three example status strings that would be returned in response to this command are as follows.

Print Buffer Status: ESC B 0 0 4 2 CR LF
1,344bytes input buffer.

Hexadecimal: 1B 42 30 30 34 32 0D 0A

MCR Status: ESC M 0 1 2 4 CR LF Twelve seconds remain to read 1 & 2.

Hexadecimal: 1B 4D 30 31 32 34 0D 0A

Battery Voltage: ESC V 7 1 2 3 CR LF Battery voltage is 7.123 volts.

Hexadecimal: 1B 56 37 31 32 33 0D 0A

- **Query printer firmware version**

Syntax**:** ESC P (

Returns current firmware version.

Example: This following escape sequence requests the printer's firmware version.

Escape sequence: ESC P (

Hexadecimal: 1B 50 28

If the firmware version is 0.1.3 command will return

ESC (0 1 3 SPACE CR LF

- **Query Printer model**

Syntax **:** ESC P)

Returns current hardware model and revision level.

Example: this escape sequence requests the printer's model and revision level.

Escape sequence: ESC P)

Hexadecimal: 1B 50 29

If the hardware version is 3.5.0.B command will return

ESC) 3 5 0 B CR LF