PCL

Printer Control Language

Users Guide and

Reference Manual

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Introduction

AVERY DENNISON PCL stands for **AVERY DENNISON P**rinter **C**ontrol **L**anguage. AVERY DENNISON PCL is a set of commands, which allows data to be transferred to the AVERY DENNISON 630, 650, 960, 636, 656, 676, 686, 545, and SNAP printers. In this documents, the AVERY DENNISON 630, 650, 960, 636, 656, 676, 686, 545, and SNAP printers will be referred to as PCL Printers.

AVERY DENNISON PCL was developed to allow any device that can transmit data through an RS232 connection to transfer information to the AVERY DENNISON PCL Printer. This capability allows the PCL Printer to be driven by many different types of computer equipment. The SNAP printers also support communications via USB and Ethernet.

Users Guide

Overview

AVERY DENNISON PCL is a description language for the AVERY DENNISON PCL printers. PCL allows a user to describe a tag layout to a printer. Also PCL allows a user to send multiple sets of information to a printer. These sets of information will be printed using either a tag layout that was sent to the printer using PCL or a tag layout that is stored on the printer.

PCL is based on the concept of formats and batches. The format describes what the label will look like, while a batch contains the actual data to be printed. A single format can be used with multiple batches to create labels that have a common appearance, but different data. A batch set is a group of batches that are associated with the same format and are printed at the same time, usually on the same material.

A format contains all the physical descriptions of a tag or label. The format consists of a Format Header followed by one or more field definitions. The Format Header contains information about the tag in general, such as tag size, sense mark type, print speed, material and ink type, etc. Fields are individual pieces of information that are to be printed on the tag. Each field has a field definition that defines the type of data (alphanumeric, barcode, logo, etc.) and the information about the field that the printer needs to print it properly, such as the field position, size, rotation, etc.

The actual information to be printed is sent in a Batch. Each batch contains the information to print one or more tags. The formats can be sent to a printer using a communications channel just prior to the information that is to be printed or the formats can reside in the printer. If the format resides in the printer then only the batch data needs to be sent via the communications channel.

This manual describes the PCL commands that are used to create formats and batches. There is also a set of commands used to control the PCL printers. These commands are included in the AVERY DENNISON Printer Control Language Reference Manual.

The following sections in this document explain how to make a format and send it to the printer and also explain how to present the batch data to the printer. These sections give realistic examples that can be referred to when making a format.

Each PCL command starts with a Command Identifier. This is a single character that tells the printer that a PCL command follows. Generally, the ~ (tilde) is used as the Command Identifier. However, some mainframe systems cannot generate the tilde character, so the printer will also accept the ASCII ESC (1B hex, 27 decimal) character or the up caret (^)Whatever Command Identifier is used must be consistent throughout the format or batch. For example, if the first Command Identifier in a format is a tilde, the entire format must use the tilde. Also, the Command Identifier character may not be used as data. For example, if a batch uses the tilde as the Command Identifier, the tilde may not appear in a ~D field.

Building a Format

There are some important terms that are used when building a format which are defined here.

Pull Direction - The pull direction is used to describe one side or dimension of a tag/label. The pull direction is the direction that the stock travels through the printer.

Web Direction - The web direction is used to describe another side or dimension of a tag/label. The web direction is best illustrated by the width of a roll of stock. The web direction is the dimension that is directly related to the print head.

INSIDE EDGE

PULL

WEB

WEB
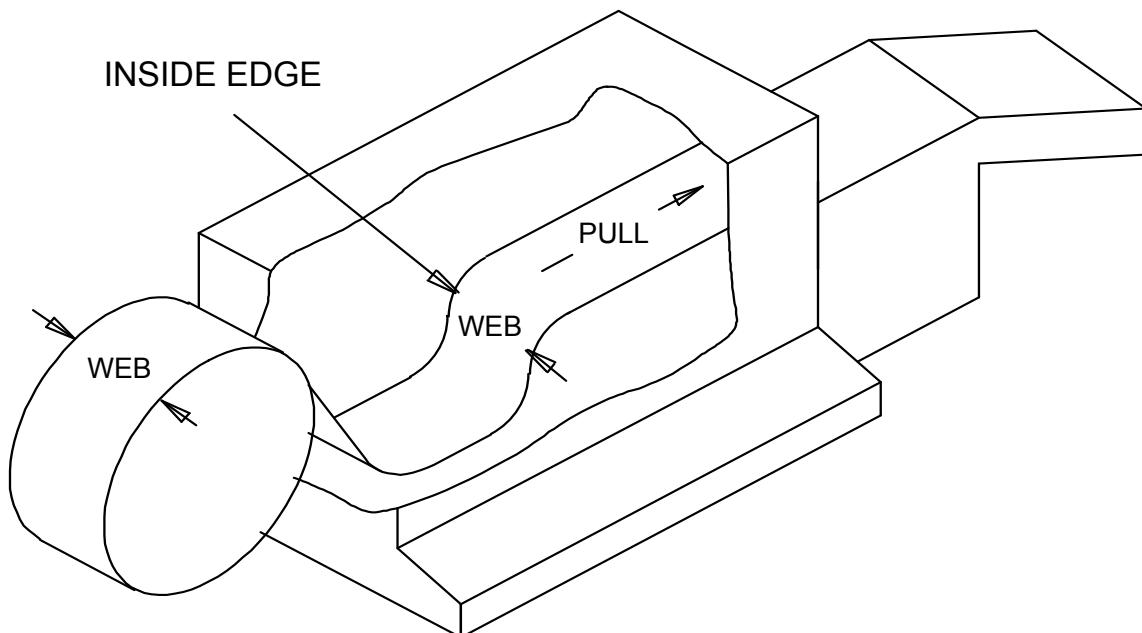
The pull and web directions are very important when laying out a tag / label. If these dimensions are not determined correctly then the orientations of the fields that are placed on the tag/label will be incorrect.

Format Header

The Format Header contains information that pertains to the physical characteristics of the tag and any other print characteristics. There are several commands that are necessary for the format header information. The first is ~XA. The XA command is the start command for a format header. This command is required at the beginning of every format that is sent to a printer.

The next two commands which must follow the XA command are the ~XW and ~XP commands. These commands tell the printer the tags web size and pull size. It is important that these commands are included in the format header because the printer cannot print the tags correctly if these commands are omitted or are incorrect. These commands should also be the first format header commands sent to the printer because other header commands use the size information from these commands.
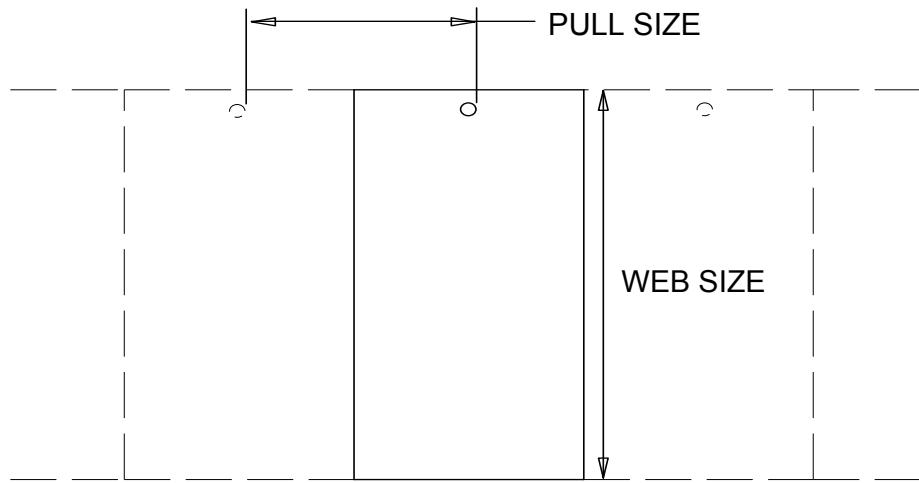
For a tag that has a web size of 3" the command would be ~XW3000. (All measurements are in units of thousandths of an inch.) For a pull size of 2-1/4", the command would be ~XP2250. If the tag is a sense mark tag, the best way to determine the pull size is to measure from the leading edge of one sense mark to the leading edge of the next sense mark on a continuous roll of stock.

Note: When using Pressure Sensitive stock you must use the distance from sense mark to sense mark for the tag's pull length but remember when you are laying out the fields that the actual sticker area which is printed on is smaller.

If the information which is to be printed on the stock is to be registered to a sense mark, the command ~XM must be used to tell the printer what type of sense mark is being used and the distance from the sense mark to the cut position. The cut position is determined by measuring from the leading edge of the sense mark to the trailing edge of the tag/label in the pull direction (see the drawing below). (The "leading edge" and "trailing edge" are determined by the path of the stock through the printer. The leading edge arrives at the printhead first and the trailing edge arrives at the printhead last.) This distance is referred to as the "sense to cut" distance.

SENSE MARK
POSITION

WEB

PULL
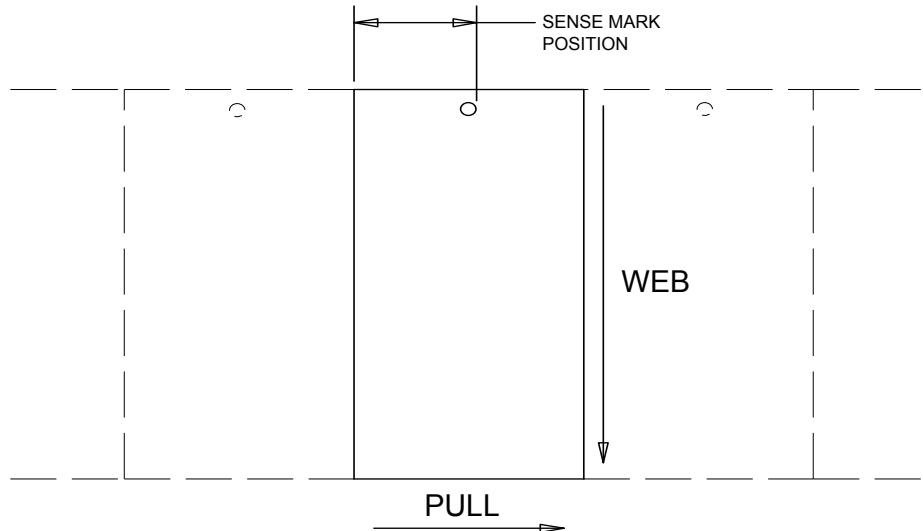
If it is a hole sense mark the command is ~XMH. If it is a reflective sense mark the command is ~XMR. This command is followed immediately by the sense mark's position. If the 3" X 2-1/4" tag described above had a hole sense mark in the middle of the tag, the sense mark command would be ~XMH1125. If the sense to cut distance is 0, a properly adjusted printer will cut at the leading edge of the sense mark.

Another common command for header information is the flagging command. The flag is the tag or pair of tags that are made to separate batches. The flagging command is ~XF. The flagging command has several options that are described in the Reference Manual. This tag will use the ~XFL command. This tells the printer to do a long/short flag between the batches.

The complete format header for this example would be:

~XA~XP2250~XW3000~XMH1125~XFL

The field definitions would follow the header information. At the end of the field definitions the command ~XZ is required to signal the end of the format description.

The overall format description would be structured like this:

~XA{Format Header}{Field 1 Desc.}{Field 2 Desc.}...~XZ

There are more features that can be presented in the format header information. These other features are specific to certain printer and tag characteristics. The commands for these features are described in the Reference manual.

Field Description

The most important item to understand when doing a field description is the point of reference on the tag for placing a field and the point of reference on a field for doing a rotation of the field.

All field positions are referenced from the corner of the tag that is formed at the point where the trailing edge of the tag and the edge of the tag that is closest to the machine as the stock travels through the machine meet. The corner of the tag that is formed by these two sides is referred to as the top left hand corner of the tag.

TOP LEFT CORNER

WEB

PULL
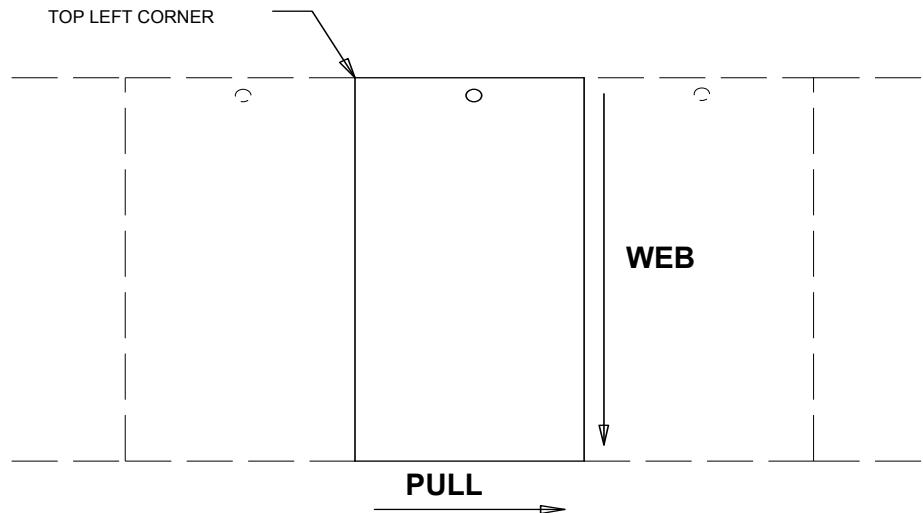
The point of reference to a field is also the top left hand corner. When a field of text is in a normal reading position so that the text can be read from left to right, the top left hand corner is the corner formed by the left edge of the first letter and the top edge of the letters. This is the point of a field that is used to position a field on a tag and also is the pivot point for a field when it is rotated.

PULL

WEB
POSITION

PULL
POSITION

TEXT

WEB
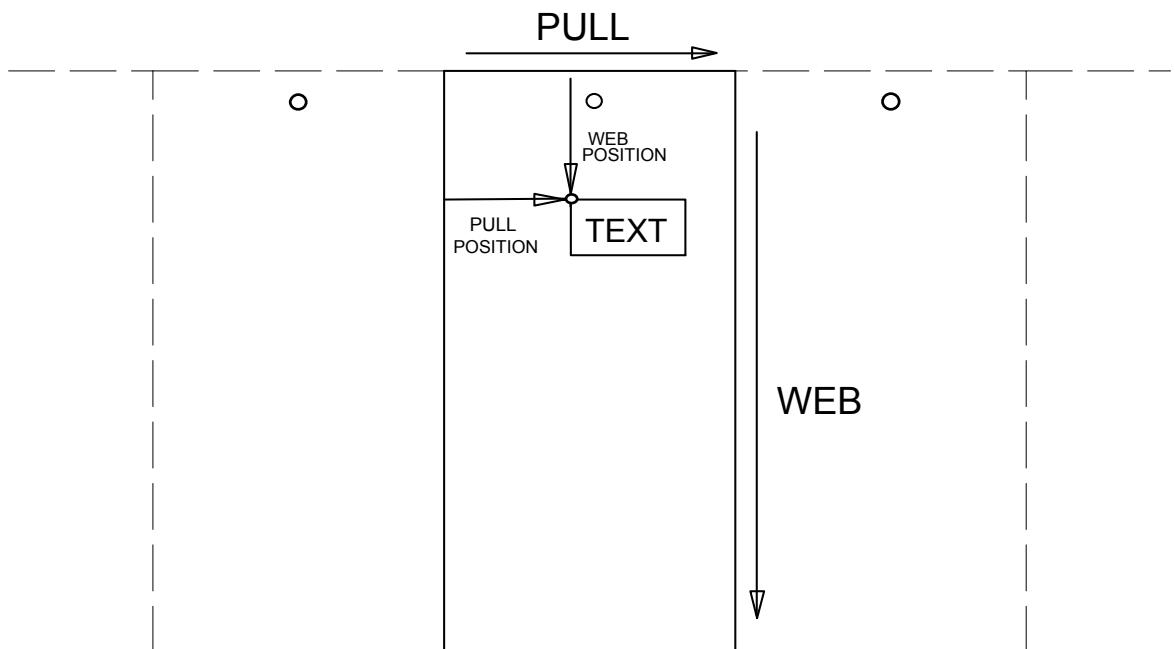
A field definition starts with ~FA for an alphanumeric field, ~FB for a barcode field, ~FL for a box / underline field, ~FG for a logo field, and ~FS for a care symbol field. (Refer to the section Field Information for a list of all field types available for each printer model.) Once the printer receives one of these commands, it considers the format header information to be complete and will ignore any other header commands that are sent. The printer expects all the commands that follow the field definition start command to be information for that field. Any commands that are sent that are not commands for the field type specified in the field definition start command will be ignored. To start the definition of another field, send another field definition start command. Once all the field definitions have been sent, then an ~XZ command should be sent to signal that the format definition is complete.

All field definitions must have a web position and a pull position specified. These positions are set using the ~FW and ~FP commands. Another feature for a field is rotation. The rotation is specified using the ~FR command.

PULL	PULL	PULL
270°	270°	270°
180°	180°	180°
TEXT 0°	0 1234567890 5 0°	"Logo" 0
90°	90°	90°
WEB	WEB	WEB
Alphanumeric Rotation	**Barcode Rotation**	**Logo Rotation**
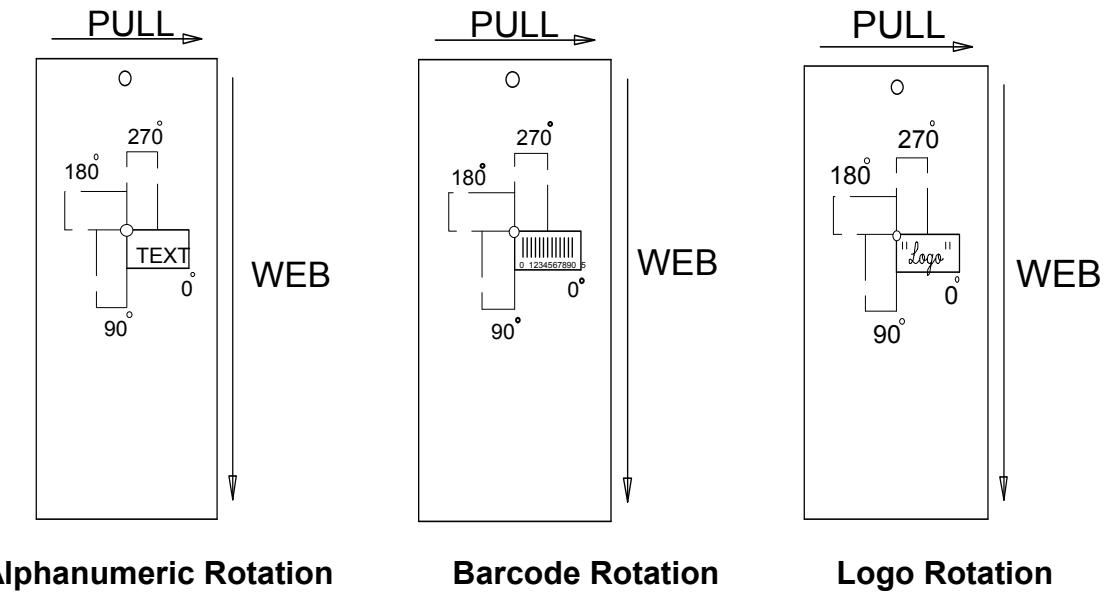
Alpha-Numeric Field Definition

Each field definition will consist of a Field Definition command (~FA for an alphanumeric field, ~FB for a barcode field, etc.) and one or more field attribute commands. Some of the field attribute commands are common to all field types and will start with a ~F, while some commands are unique to a particular field type. For example, commands for alphanumeric fields begin with ~A.

The definition of an alphanumeric field with a length of seven characters would start as ~FA07. The field is to be placed at a position that is 1/2" in the web direction and 1/2" in the pull direction. These commands would be ~FW0500 and ~FP0500. The rotation of the field is zero degrees which would be ~FR0. The field would be printed with the top left of the first character in the field starting 1/2" in from the trailing edge of the tag and 1/2" in from the inside edge of the stock as it traveled through the printer. A 10-point font size could be selected for the field by using the command ~AP10 and font 8 selected by using the command ~AF08. The full field definition would be:

~FA07~FW0500~FP0500~FR0~AF08

There are more features which can be implemented for alphanumeric fields described in the Reference manual under the ~A commands.

Barcode Field Definition

The definition of a barcode field with a length of twelve would start with an ~FB12. The field is to be placed at a position that is 1" from the inside edge in the web direction and 1/2" in from the trailing edge in the pull direction. The commands for these positions would be ~FW1000 and ~FP0500. The top left corner of a barcode includes the quiet zone area of the barcode. The rotation for this field is zero degrees so the command would be ~FR0. This barcode is to be a UPCA Barcode so the command ~BF01 is to be used with the barcode type 01. The barcode is to have Human Readable Information underneath it, so the command ~BA08, is used to specify an HRI using a 10 point font for the numbers. Also the barcode is to be 1/2" tall so the command ~BH0500 is used to specify a bar height of 1/2".

This barcode field definition will look like:

~FB12~FW1000~FP0500~FR0~BF01~BA08 ~BH0500

There are more features which can be implemented for barcode fields described in the Reference manual under the ~B commands.

Box / Underline Field Definition

The definition of a box / underline field starts with an ~FL. There is not a field length associated with a box / underline field. Starting point for a box / underline field is the initial web and pull position. This position is presented with the ~FW command and the ~FP command. The web position for the end web coordinate is specified with the ~LW command. The pull position for the end pull coordinate is specified with the ~LP command. The LW command and LP command should always contain values greater than the FW and FP commands. The width in dots of the lines used to make the box / underline field is specified using the ~LV for the lines in the web direction and the ~LH command for the width of the lines in the pull direction.

A box that started at web position 1/2" and pull position 1/2" and had a web size of 1" and pull size of 1" and line widths of 2 dots would have the command string of:

~FL~FW0500~FP0500~LW1500~LP1500~LV02~LH02

Logo Field Definition

The definition of a logo field with one logo would have a starting command of ~FG01. The logo is to be placed at web position 1" and pull position 1-1/2". The position commands would be ~FW1000 and ~FP1500.

The logo type would be in the command ~GT. The logo type is determined by the logo size class which the logo is in. The logo's must reside on the printer and the logo type information must be presented with the logo files (650 type) or IC card (630 type) when they are received. In this case the logo type will be one.

The logo command string would be:

~FG01~FW1000~FP1500~GT01

Care Symbol Field Definition

The definition of a care symbol field is very similar to a logo field. The start command ~FS04 specifies the start of a care symbol field which contains four symbols. The symbols can be placed at web position 2" and pull position 1" using the commands ~FW2000 and ~FP1000. The care symbols reside on the printer and the care symbol type is usually a fixed type whose number should be included with the care symbol information that's with the printer. For a care symbol type of nine the care symbol type command is ~ST09.

The care symbol command string is:

~FS04~FW2000~FP1000~ST09

The last field definition in a format is followed by the command ~XZ. This command signals to the printer that the format description is complete. Once this information is transferred to the printer multiple groups of information known as batches can be sent to the printer to be printed.

The commands discussed in this section are the basic commands required to make a format using PCL. These commands are the MINIMUM commands required to create a format. There are more field types and commands that allow other features to be utilized in the printers. These commands are described in the Reference manual.

Batch Data Description

The batch data is the information that will be printed on a tag. The format description for a tag must have already been sent to a printer or must already reside in the printer before batch data can be sent to the printer.

There are two choices for selecting the format to be used: the format may be sent to the printer in the same way that the batch is (via the printer's serial port, USB or Ethernet, depending on the printer), or the format may be stored in the printer's memory.

If the format is sent to the printer via a communications channel, it is considered to be Format number 00. Formats stored on the printer may be formats 01 through 99 (see below for details about the format name).

Formats sent to the printer must be sent before the corresponding batch. The downloaded format will be deleted if the printer loses power, or if the all the batches are cleared. (In the SNAP printers, this will occur if the Clear All Batches function is used, or the Clear Batch function is used and there is only one batch in the printer.) If a batch is received that calls out the downloaded format and no downloaded format exists, the batch will be ignored.

 The command ~ZD is the start of data command. If the format was sent to the printer using PCL or if the format from the previous batch is the same as the one for this batch the ZD command uses zero for the format number. If the batch data is to be used with a specific format that already resides on the printer, then the format number follows the ZD command. So if the batch data is to be printed using the same format as the previous batch or if the format was sent to the printer using PCL the batch data start command would be ~ZD00. If the batch data is to be printed using format two which resides in the printer the batch data start command would be ~ZD02.

Formats stored in the printer must have a file name FORMAT99.PCL, where 99 is the format number specified in the ~ZD command. For example, if the format stored in the printer is named FORMAT02.PCL, the batch must begin with the ~ZD02 command.

The specific field information for the batch follows the batch data start command. For all field types except graphic fields, the data field information is preceded by a ~D. If the first field in the format was an alphanumeric field that specified the color of an item

the data field might be ~DBLUE. The printer would then print BLUE at the position defined by the field definition in the format, using the attributes specified in that field definition.

The data fields must be sent to the printer in the same order that they are described in the format. Box / underline fields which don't have any data associated with them are automatically skipped so an ~D command should not be sent for a box / underline field.

Graphic data fields are preceded by a ~I followed by the image data in either BMP or PCX format.

Once the last field data has been sent it should be followed by the ~ZZ command. This command means that the batch information is complete and the printer can print the batch. The ZZ command also includes the quantity. If ten tags were to be printed using the data which preceded the ZZ command, the command would be ~ZZ0010~. The ~ZZ command must <u>ALWAYS</u> be followed by a ~. The final ~ character signals the end of the quantity string. The printer will not start printing a batch until it receives the final ~ character.

An example of a batch of data would be:

<p align="center">**~ZD00~DBLUE~D012345678905~D01~D23,32,33,42~ZZ0010~**</p>

The ~D command has some built in safety features. If a format describes a field as having seven characters and then that field receives data from an ~D field which contains nine characters the last two characters of the data in the ~D command will be dropped. If a field is described as being seven characters long and the ~D command only sends six characters the field will be padded out with spaces to seven characters before it is printed. Also if there are more ~D data fields sent in a batch then there are fields described in the format, the extra data fields at the end of the batch data will be dropped.

The ~D command has a few useful variations. If an ~D command is followed immediately by another ~D or ~ZZ so that no data follows the ~D command, then the data from the previous batch will be used for that field. If the ~D command is followed by one space character and then followed by another ~D or ~ZZ, then that field will be blank for the current batch.

Carriage Returns may be used freely throughout the format and batch data to enhance readability. However, it is good practice to only use carriage returns between commands and data fields. In most cases, carriage returns are ignored within data fields. However, the carriage return is a valid character in some field types such as the Datamatrix bar code.

Reference Guide

NOTE: In the Reference Guide, 6X6 refers to the 636, 656, 676, 686, and 545 printers as a group. Where differences between these printers exist, they will be defined individually.

Format Header

~XA   630,650,960,6X6,SNAP

This command specifies the beginning of a format. This command precedes any tag or field commands. When the PCL Printer receives this command it automatically sets the current format to the default settings. Default settings can be found in Appendix B. All of the ~X commands must be sent before any field commands are sent.

~XW9999   630,650,960,6X6,SNAP

This command specifies the web of the tag in thousandths of an inch. For example: If the tag web size is 3-1/4 inches the command would be ~XW3250.

Compatibility Note:

630 The 630 maximum web size of a tag is 5000 or 5" (127mm). The actual resolution or smallest increment is 0.0042" (0.206mm).

650 The 650 maximum web size of a tag is 4800 or 4.8" (122mm). The actual resolution or smallest increment is 0.0042" (0.206mm).

960 The 960 maximum web size of a tag is 4000 or 4" (101.6mm). The largest print area is 3.55" (90.2mm). The resolution is 0.007" (0.18mm).

636, 656, 676, 686 The maximum web size of a tag is 5125 or 5.125" (130.2mm). The actual resolution or smallest increment is 1/dpi of the printer.

- 240 DPI = 0.004" (0.1mm)

- 300 DPI = 0.0033"(0.084mm)

545 The 545 maximum web size of a tag is 1500 or 1.5" (38.1mm). The largest print area is 1375 or 1.375" (34.9mm) and this value should not be exceeded with the ~XW command. The actual resolution or smallest increment is 0.005" (0.127mm).

SNAP 500, SNAP 600 The maximum web size is 2000 or 2" (50.8mm). The actual resolution is 0.0033" (1/305") or 0.083mm (1/12mm).

SNAP 700 The maximum web size is 5000 or 5" (127mm). The resolution is the same as SNAP 500 and SNAP 600.

~XP99999   630,650,960,6X6,SNAP

This command specifies the pull length of the tag in thousandths of an inch. For example: If the tag pull length is 4-1/8 inches the command would be ~XP4125.

Note: If the stock that is being printed on has sense marks for print registration then special care should be taken in determining a tag's pull length. The pull length of the tag should be determined by measuring from the leading edge of one sense mark to the leading edge of the next sense mark on a continuous roll of stock. If the pull length is incorrect, the result may be Missed Sense Mark errors.

Compatibility Notes:

630 The 630 maximum pull length of a tag is 7000 or 7" (177.8mm). The actual resolution or smallest increment is 0.0042" (0.206mm)..

650 The 650 maximum pull length of a tag is 14000 or 14" (355.6mm). The actual resolution or smallest increment is 0.0042" (0.206mm)..

960 The 960 maximum pull length of a tag is 6000 or 6" (152.4mm). The resolution is 0.014" (0.36mm).

636, 656, 676, 545 The maximum pull length of a tag is 14000 or 14" (355.6mm). The actual resolution or smallest increment is 1/dpi of the printer.

- 240 DPI = 0.0042" (0.206mm)

- 300 DPI = 0.0033" (0.084mm)

- 545 = 0.005" (0.127mm)

SNAP 500, SNAP 600, SNAP 700 – The maximum pull length is 28" (711.2mm). The actual resolution is 0.0033" (0.084mm).

~XM_9999   630,650,960,6X6,SNAP

This command specifies that the format is a sense mark format. Replace the '_' with an **H** if a hole sense mark is used or an **R** if a Reflective sense mark is used. Specify the sense to cut distance in thousandths of an inch. The sense to cut distance is measured in the pull direction from the leading edge of the sense mark to the trailing edge of the tag as it passes through the printer. For example: A particular tag stock is using a punched hole as a sense mark. The distance from the leading edge of one hole to the leading edge of another hole is 4 inches. Therefore the tag pull length is 4 inches. The sense mark occurs in the middle of what will be the finished tag after it has been printed and cut. This distance from the leading edge of one hole to where the cut will occur at the trailing edge of the tag is 2 inches. The sense to cut value is 2 inches. The command for the printer is ~XMH2000. The H specifies that a punched hole is used for the mark and the 2000 is the 2 inch sense to cut value sent in thousandths of an inch.

Compatibility Notes:

630, 650 These printers resolution or smallest increment for the sense to cut distance is 33 thousandths.

960 The 960 resolution or smallest increment is 7 thousandths in the web direction and 14 thousandths in the pull direction. The 960 only supports reflective sensing.

6X6, SNAP The actual resolution or smallest increment is 1/dpi of the printer. Replace the '_' with an **H** if a hole sense mark is used, an **R** if reflective sense mark is used on the bottom, a **T** if reflective sense mark is used on the top, or a C for the contrast sensor.

~XF_   630,650,960,6X6,SNAP

This command controls flagging. The underscore should be replaced by one of the following.

N - No Flagging This command turns off flagging for this format.

L – Long / Short This means that two blank tags will appear after a batch is printed when the tag has a sense mark. The first blank tag is cut long by .23 inches and the second is cut short by the same amount. These blank tags act as a separator when the tags are in the printer's stacker. When there is no sense mark on the tag, the blank tag is longer by .23 inches than the printed tags.

D - Double length This command produces a flag that is two tags in the pull length.

T - Stock Saving Flag All tags are printed but the cut on the next to last tag is .125 inches short, which makes the last tag .125 inches longer in the pull length. All tags can be used.

V - Verifier Flag This command is to be used if a verifier is active on the printer. The batch quantity is increased by 2 and the stock saving feature is activated. The print is carried over to the flag that prevents the verifier from halting the printer when a barcode is not scanned.

B - Double blank Flag This command produces a flag that is blank and two tags in the pull length.

S - Small Flag This command produces a flag that is .078 inches longer than the tag in the pull length. When the tag has a sense mark, the first tag is cut long by .078 inches and the second is cut short by the same amount.

M - Medium Flag This command produces a flag that is .15 inches longer than the tag in the pull length. When the tag has a sense mark, the first tag is cut long by .15 inches and the second is cut short by the same amount.

X - Extra Large Flag This command produces a flag that is .31 inches longer than the tag in the pull length. When the tag has a sense mark, the first tag is cut long by .31 inches and the second is cut short by the same amount.

Z - Zero length Flag This command produces a flag that is equal to the tag in the pull length. When the tag has a sense mark, only one tag is generated for the flag.

Compatibility Notes:

630 The 630 does Long / Short flagging but the flags are controlled by the pull length of the tag and cannot be controlled by this command. Meaning if a tag is less than 1.400" (35.6mm), the batches will be flagged with a Double Length flag. All batches whose tags are greater than 1.400" (35.6mm)will be flagged with Long / Short flags. The 630 does not support the B, S, M, X commands.

650 The 650 does not support the T, S, M, X commands.

960 If the 960 is doing a non-sense mark tag and is flagging, the tag pull length cannot be longer than 5.756" (146.2mm). This tag pull length allows the longer flag to be created and to be less than the 6" (152.4) maximum for tag pull size. The 960 does not support the T, V, B, S, M, X commands.

6X6, SNAP These printers do not support the D, V, B commands. With the S, M, L, X commands, it is possible to produce flags with print other than what is printed on the tags. See the ~FD command definition.

~XG_   PcMate Plus Display

This command assists PCMate Plus in distinguishing whether a graphic field is alphanumeric or logo during import. The printers ignore the command. The underscore should be replaced by one of the following:

A - Specifies that the graphic field is an alphanumeric field.

L - Specifies that the graphic field is a logo field.

P - Specifies the point size of a graphic alphanumeric field. Not required for graphic logo fields.

Compatibility Notes:

Only formats exported using PCMate Plus version 3.02 alpha or later will contain this command in the PCL stream. Earlier versions of PCMate Plus will not export this command.

Restrictions:

If manually editing the PCL stream to add this command, the command MUST immediately precede the ~FM command which defines the graphic field. Otherwise, the field will not import properly.

~XL9   630, 650, 960, 636, 656, 676, 686

This command specifies how many tags to print across the web. This is often referred to as "X-up", e.g. "2-up" or "3-up". When this command is used the printer accepts information for the layout of a tag as if the printer was printing only one tag across the web of the stock. The printer then duplicates this one tag multiple times across the web. Extreme care should be taken when specifying the tag web size for this type of format. Also it should be determined that the total width of the number of tags across the web is less than or equal to the capabilities of the printer.

Note: The use of this command requires special stock. If multiple up formats are desired, your AVERY DENNISON representative should be contacted to help you with this type of layout.

Compatibility Note:

630, 636, 656, 676, 686, SNAP 700 These printers are capable of producing up to 4 tags across the web as long as the width of all four tags combined is less than 4.8" (121.9mm).

SNAP 500, SNAP600 Because of the narrow web capabilities of these printers, X-up printing is impractical. However, these printers do support this command.

650, 960 The 650 and 960 printers are only capable of producing 2 tags across the web.

~XS99   630, 650, 636, 656, 676, 686, 545

This command sets the Print Speed. The 99 in the command should be replaced by the speed in tenth inches per second.. For example: To set the speed for 5.0 inches/sec for a tag layout the command would be ~XS50. Although a printer may have multiple speeds, certain combinations of stock and ink may print best at certain speeds, For example, most fabrics print best at speeds less than 6 ips. Specifying a faster print speed will result in degraded print quality.

If a speed of greater than the maximum is specified, the printer will still run at the maximum speed. If a speed of less than the minimum is specified, the printer will run at the minimum speed. If a speed is specified that is not supported by the printer, generally the printer will run at the nearest speed that is not greater than the specified speed. For example, if a format specifying a print speed of 5 ips is sent to a SNAP 500 printer, it will print at 4.5 ips.

NOTE: The SNAP printers allow the operator to override the print speed setting. If this override is in place, the printer will print at the override speed rather than the format speed.

AVAILABLE PRINTER SPEEDS	
630	**3, 4, 5 ips**
650	**2.5, 3, 3.5, 5.5, 6, 6,5 ips**
636	**3, 4.5, 6 ips**
656	**3, 4.5, 6, 7 ips**
676	**3, 4, 5 ips**
686	**7, 10, 12 ips**
545	**4, 6, 8, 10 ips**
SNAP 500	**3, 4.5, 6, 7 ips**
SNAP 600, SNAP 700	**3, 4.5, 6, 7, 8,10,12 ips**

~XH99   630

This command sets the head strobe value. The head strobe range is from 1 to 15. This adjusts the amount of heat that is used to transfer the ink to the stock. A good setting for this value is around 5 or 6. The type of stock or ink that is used can effect this setting.

Note: This command can effect the head life of the thermal printhead that is used in the 630. Running a format with a high strobe value may reduce the head life of the thermal printhead.

~XT99   650, 636, 656, 676, 686

This command sets the transfer type. The transfer types are designed so that the printhead is driven properly for a combination of stock and ink. The 99 in the command should be replaced with the correct value found in the transfer type table in Appendix A.

~XI   650, 656, 676

This command tells the printhead to attempt to do head lift with the format. Head lift allows for ink saving on the printer. When there is an area in the format which is at the

beginning or end of the tag that does not have any fields printed in it - and the area is greater than the minimum amount required on the printer, the printer will lift the head and stop the ink while this area of the tag is moving under the printhead.

Compatibility Notes:

650 The 650 requires an area of 5/8 inches with no print in the area.

656, 676 The printer requires an area of 9/10 inches with no print in the area.

~XC99   630,6X6,SNAP

This command tells the printer how many tickets to print before it makes a cut. The maximum number of tickets that the printer can wait between cuts is 99. If no cuts are needed within the batch a value of 00 should be sent. If 00 is sent then a cut only occurs at the beginning of a batch. For example: A format calls for only cutting once every 3 tags. The command would be ~XC03.

~XV_..._   636,656,676,686,SNAP

This command tells the printer the setup information that is to be passed to the verifier. A verifier must be attached to the printer. As many options as are necessary can be placed after the command. For example: If a barcode command has these settings - ~XVRSCC00A00 then the verifier will reject barcodes with a grade C or lower. The options consist of:

> **N** - Halt the printer on a no read only.
>
> **B** - Halt the printer on both a no read and a symbol quality reject.
>
> **W** - Halt the printer on warnings generated by the barcode.
>
> **R** - Halt the printer on barcode symbol quality rejects only.
>
> **S_** - Quality level of the barcode is checked. The _ is replaced by the grade of **B, C, D,** or **F.**
>
> **C99** - Consecutive failures of a barcode where 99 is replaced by **00** for Disable, or **01** thru **10.**
>
> **A99** - Accumulative failures of a barcode where 99 is replaced by **00** for Disable, or **01** thru **20.**

~XR_   636 Beige,656 Beige

This command tells the printer the color of the ink.

> **R** - Allows red ink to be used in the printer. Without this command the sensor sees through red ink, indicating there is no ink in the printer.
>
> **B** - Black ink is used in the printer. This is the default.

~XN_   676,545,SNAP

This command tells the printer to select the print station designated in the command. All print station dependent PCL commands will affect only the designated print station. The print station dependent commands include the ~XT command for transfer type. The ~XA command will set the defaults for all the print stations, then to change the default, precede the command with the ~XN command selecting the print station.

> **1** - Selects print station #1 (Bottom)
>
> **2** - Selects print station #2 (Top or Top Left for 676)
>
> **3** - Selects print station #3 (Top Right for 676 only)

~XO   6X6

This command tells the printer to print a mirror of the image. The image is mirrored on the axis that is parallel to the printhead. Fields will be printed right to left with the characters facing to the left as the fields go underneath the printhead.

~XD9999   PcMate Plus Display

This command refers to the dpi that was used to design the format. This is not a printer command and can not be used to change the dpi of the printer. This command is used for display purposes by the application that designs the formats for the printers.

240 - The format was designed for a 240-dpi printer.

300 - The format was designed for a 300-dpi printer.

~XX9999   PcMate Plus Display

This command refers to the specific printer the format was designed for. This is not a printer command. This command is used for display purposes by the application that designs the formats for the printers.

> **NOTE: This command is used by the SNAP printers to emulate the font engine used in the 6X6 printers. If the printer type specified in this command is not a SNAP printer, the printer will add intercharacter spacing to text field to emulate as closely as possible the same label printed on a 6X6 printer**.

636, 656, 676, 686, 545, 500 (SNAP 500), 600 (SNAP 600),

700 (SNAP 700) - The printer the format was designed for.

~XE   6X6,SNAP

This command tells the printer to halt after every batch is printed regardless of how many batches are in the printer. Without this command, the printer does not halt but prints the batches continuously until there are no more batches in the printer.

~XJ99   636,656,676, 686,SNAP

This command specifies the number of minimum scans that must be obtained for each barcode on the tag to pass verification.

~XZ   630,650,960,6X6,SNAP

This command tells the PCL Printer that this is the end of the format layout description. This command must be sent after the description of the last field.

~XU_   6X6,SNAP

This command allows additional features to be added by replacing the _ with the following;

B9 – Barcode Exclusion   SV100 Scanner Only

This command allows for specified barcodes on the tag **NOT** to be verified. This command is **ONLY** valid with the **SV100** verifier. The barcodes can be excluded by replacing the 9 with the following;

0 = Exclude none

1 = Exclude UPC-A, UPC-E, EAN-8, EAN-13

---

2 = Exclude Code 39

4 = Exclude Code 128, EDI Code 128

8 = Exclude Interleave 2 of 5

16 = Exclude Code 93

To exclude multiple barcodes, replace the 9 with the sum of the values designating the barcodes to exclude.

Example: To exclude code 39 and Interleave 2 of 5, add the 2 and the 8 together and the command would be ~**XUB10**.

> NOTE: This command does not allow the exclusion of specific barcodes, only barcode types. For example, if a label contains two Code 128 barcodes, excluding Code 128 barcodes will stop the verification of BOTH Code 128 barcodes

C9 – Future Expansion

S9 – Security Feature

This command indicates that the batch is a secure batch. The printer will maintain a count of the number of tags actually printed and return that count to the host upon request. See Appendix F Secure Batch Feature for details. The 9 will be replaced as follows:

> 0 – Disabled (default if command is not present)
>
> 1 – Enabled

R999 - RFID Read Power   SNAP 700RFID

This command specifies the read power to be used when reading an RFID transponder embedded in the label. If this command is not present in an RFID format, the printer's default read power setting will be used.

W999 - RFID Write Power   SNAP700RFID

This command specifies the write power to be used when writing to an RFID transponder embedded in the label. If this command is not present in an RFID format, the printer's default write power setting will be used.

A9 – RFID Signal Adjust   SNAP 700RFID

This command specifies the Signal Adjust level to be used when writing to an RFID transponder embedded in the label. If this command is not present in an RFID format, the printer's default signal adjust setting will be used.

X9 – RFID Write Retries   SNAP 700 RFID

This command specifies the number of write retries to be used when writing to an RFID transponder embedded in the label. If this command is not present in an RFID format, the printer's default Write Retries setting will be used.

P99 – RFID Protocol   SNAP 700RFID

This command specifies the RFID protocol to be used for the label. If this command is not present, the printer's default Protocol setting will be used. The 99 is replaced by the protocol number. As of this writing, the following protocols are available:

> 1 – Class 1 Gen 2
>
> 2 – Class 1 Gen 1 96 bit EPC

---

3 – Class 1 Gen I EPC64/96

4 – EM4122

Field Information

These are control codes for general field information.

~FA99   630,650,960,6X6,SNAP

This command specifies the beginning of an alphanumeric field where 99 is replaced with the maximum number of characters in the data string for the field.

Note: This command tells the printer that all the following commands are for this new alphanumeric field. Any commands other than alphanumeric or general field commands are ignored. The description of this field ends when the printer is sent a new beginning of field command (FB, FL, FS, FY, FG, or FM) or the end of format layout description command (XZ).

Compatibility Notes:

630, 650, 960 The maximum number of characters which can be in a field is 64.

6X6,SNAP The maximum number of characters which can be in a field is 128.

~FB99   630,650,6X6,SNAP

This command specifies the beginning of a barcode field where 99 is replaced with the maximum number of characters in the data string for the field.

Note: This command tells the printer that all the following commands are for this new barcode field. Any commands other than barcode or general field commands are ignored. The description of this field ends when the printer is sent a new beginning of field command (FA, FL, FS, FY, FG, or FM) or the end of format layout description command (XZ).

Compatibility Notes:

630, 650 The maximum number of characters which can be in a field is 64.

6X6, SNAP The maximum number of characters which can be in a field is 128.

~FL   630,960,6X6,SNAP

This command specifies the beginning of a box / underline field.

Note: This command tells the printer that the following commands are for this new box / underline field. Any commands other than box / underline or general field commands are ignored. The description of this field ends when the printer is sent a new beginning of field command (FA, FB, FS, FY, FG, or FM) or the end of format layout description command (XZ).

~FG99   630,650,960,6X6,SNAP

This command specifies the beginning of a logo field where 99 is replaced with the number of logos that will appear in this field. Refer to Appendix E for details about printing logos and graphic image fields.

Note: This command tells the printer that the following commands are for this new logo field. Any commands other than logo or general field commands are ignored. The description of this field ends when the printer is sent a new beginning of field command (FA, FB, FS, FY, FL, or FM) or the end of format layout description command (XZ).

Compatibility Note:

650 The 650 is only capable of one logo per logo field. In order to have multiple logos, multiple logo fields will have to be created. If the number of logos specified in the command is greater than one, the 650 will map only the one logo.

~FS99   630,650,960,6X6,SNAP

This command specifies the beginning of a care symbol field where 99 is replaced by the number of symbols that will appear in the field.

Note: This command tells the printer that the following commands are for this new care symbol field. Any commands other than care symbol or general field commands are ignored. The description of this field ends when the printer is sent a new beginning of field command (FA, FB, FG, FY, FL, or FM) or the end of format layout description command (XZ).

Compatibility Note:

650 The 650 can only do one care symbol per field. In order to print multiple care symbols multiple care symbol fields must be used.

~FY99   960

This command specifies the beginning of a special symbol field where 99 is replaced by the number of symbols that will appear in the field.

Note: This command tells the printer that the following commands are for this new special symbol field. Any commands other than special symbol or general field commands are ignored. The description of this field ends when the printer is sent a new beginning of field command (FA, FB, FG, FS, FL, or FM) or the end of format layout description command (XZ).

~FM   630,6X6,SNAP

This command specifies the beginning of a graphic image field. Graphic images supported are PCX and BMP. The graphic image must follow industry standards for PCX and BMP file structures. Many applications produce both files. Refer to Appendix E for details on printing logos and graphic image files.

Note: This command tells the printer that the following commands are for this new special symbol field. Any commands other than special symbol or general field commands are ignored. The description of this field ends when the printer is sent a new beginning of field command (FA, FB, FG, FS, or FL) or the end of format layout description command (XZ).

~FK99   700RFID

This command specifies the beginning of an RFID field where 99 is replaced with the maximum number of characters in the data string for the field. The data string

represents an EPC for a RFID tag. This is the data will be written to a RFID transponder on the tag. The data string for the field must be ASCII hex

This command works only on a printer equipped for writing to Class 1 Gen 2 RFID transponders. There may be only one RFID field per format.

See Appendix G for a description of RFID operation.

The data field in the batch corresponding to this field will contain the data to be written to the transponder. The field is divided into the following subfields. Subfields are separated by the ASCII pipe (|) character.

- EPC Data – this is the EPC code to be written to the EPC register in the transponder. This is an ASCII hex data string.

- User Memory – This is the data in ASCII hex format to be written to the transponder's user memory. User memory is transponder dependent; it is the responsibility of the operator to ensure that the data in this subfield is appropriate. If the data does not match the user memory space of the transponder, undesired operation may result.

- Reserved – This subfield must be empty.

- Access Password – This is an 8 character ASCII hex value that will be written to the transponder's Access Password space.

- Kill Password – This is an 8 character ASCII hex value that will be written to the transponder's Kill Password space.

- Lock Code – This is a five digit value that specified the locking method to be applied to the transponder.

NOTE: The printer does not check the data. It is the responsibility of the user to determine that the data is correct for their application.

NOTE: As of this writing, the printers only accept EPC data. The other data fields are not implemented.

~FW9999   630,650,960,6X6,SNAP

This command specifies the field origin for the web direction in thousandths of an inch. This distance is measured from the edge of the web that is on the inside of the machine as the stock runs through the machine. This same edge would be the top edge of a finished tag. The field origin is the top left-hand corner of a field. This corner is also the reference point for field rotation. For example: If a field is to be placed two inches from the edge of a tag in the web direction the command would be ~FW2000.

Compatibility Notes:

630, 650 For the 630 and 650 printers the resolution or smallest increment is 0.0042" (0.11mm).

960 The 960 resolution is 0.007" (0.18mm) in the web direction.

636, 656, 676, 686, 545, SNAP The actual resolution or smallest increment is 1/dpi of the printer.

- 240 DPI = 0.0042 " (0.11mm)

- 300/305 DPI = 0.0033" (0.084mm)

- 545 = 0.005" (0.13mm)

NOTE: For an RFID field (~FK), this value is not used.

~FP99999   630,650,960,6X6,SNAP

This command specifies the field origin for the pull position in thousandths of an inch. This distance is measured from the trailing or left hand edge of the tag as the stock runs through the machine. The field origin is the top left-hand corner of a field. This corner is also the reference point for field rotation. For example: If a field is to be placed two inches from the edge of a tag in the pull direction the command would be ~FP2000.

Compatibility Notes:

630, 650 For the 630 and 650 printers the resolution or smallest increment is 0.0042" (0.11mm).

960 The 960 resolution is 0.014" (0.36mm) in the pull direction.

636, 656, 676, 686, 545, SNAP The actual resolution or smallest increment is 1/dpi of the printer.

- 240 DPI = 0.0042 " (0.11mm)

- 300 DPI = 0.0033" (0.084mm)

- 545 = 0.005" (0.13mm)

NOTE: For an RFID field, this value specifies the distance from the leading edge of the label to the leading edge of the transponder.

~FR9   630,650,960,6X6,SNAP

This command specifies the rotation of a field. The rotations can be performed in increments of 90 degrees. The increments are 0 degrees, 90 degrees, 180 degrees, 270 degrees. These rotations are represented in the command by 0, 1, 2, and 3 respectively. A field is rotated about its top left corner. The direction of rotation is clockwise.

Compatibility Note:

960 The 960 will accept 0,1,2,and 3 for rotations and will also accept 0, 90, 180, 270 as values for the rotation.

~FD_   960,6X6,SNAP

This command specifies which side of the tag that the field is printed on. Replace the _ with the appropriate letter.

Compatibility Note:

960	Use **F** for front, **B** for back and **A** for flag.
676, 545, SNAP	Use **1** to print field using head 1
676, 545, **SNAP**	Use **2** to print field using head 2
676	Use **3** to print field using head 3.
636, 656, 686	All have just one printhead – therefore all field commands will print on the same printhead. The correct default command is **2**.
676, 545, SNAP	Use **A1** to print on flag using head 1
676, 545, **SNAP**	Use **A2** or **A** - (default) to print on flag using head 2
676	Use **A3** to print on flag using head 3.
636, 656, 686	All have just one printhead – therefore all flag commands will print on the same printhead. The correct default command is **A**.

~FTR9   600RFID,700RFID

This command specifies that this field is to be populated with the transponder signature from the label. The printer must be equipped with an RFID unit and the tags / labels must contain a Class 0 Gen 1 transponder.

The value 9 has the following meaning and needs to be replaced with one of these values.

1 – RFID 64 bit value

2 – RFID 96 bit value

NOTE: There must be a data field as a place holder in the batch file for this field. Data in the batch file will be ignored.

~FTRP9   700RFID

This command specifies that this field is to be populated with the EPC data from the RFID field (see the RFID ~FK field definition command above).   The printer must be equipped with an RFID unit and the tags / labels must contain a Class 1 Gen 2 transponder.

The value 9 has the following meaning and needs to be replaced with one of these values.

1 – RFID 64 bit value

2 – RFID 96 bit value

NOTE: There must be a data field place holder in the batch file for this field. Any data in this field will be ignored.

This command allows the EPC code that is being written to the RFID transponder to be printed on the label. This attribute is only allowed for alphanumeric and bar code fields.

The sub-stringing attributes (~A199/~A299/~A399 or ~B199/~B299/~B399) allow only a portion of the EPC field to be printed.

Special Codes for Alphanumeric Fields

These are codes that are special to alphanumeric fields.

~AF9999   630,650,960,6X6,SNAP

This command specifies the font number for the characters in the alphanumeric field. Available character fonts are listed in Appendix A.

Compatibility Note:

636, 656, 676, 686, 545 This is only effective when the emulation mode on the printer
                                          is set to 630 or 650.

~AL9999   6X6,SNAP

This command specifies the scaleable font number for the characters in the alphanumeric field. Available scaleable fonts are listed in Appendix A.

~AC999 960,6X6,SNAP

This command selects the code page that is to be used for character translations. For example: To select code page 850 - send the command ~AC850. Currently available code pages are AVERY DENNISON Code Pages 000, 001 (Compatible with older AVERY DENNISON printers.), Code Page 437, Code Page 850, Code Page 851, Code Page 852, Code Page 857 and 866.

~AP99 6X6,SNAP

This command specifies the point size of the printed text in the field. This command only applies to the scaleable fonts.

Compatibility Note:

636, 656 (240 dpi) The range for the point size is 6 to 96.

636, 656, 676, 686 (300 dpi) The range for the point size is 4 to 96.

545 The range for the point size is 6 to 96.

~A199 630,650,6X6,SNAP

This command specifies the printed field order number for a source field in a Data Copy. (See note in command A3)

~A299 630,650,6X6,SNAP

This command specifies the start character for a Data copy. (See note in command A3)

~A399 630,650,6X6,SNAP

This command specifies the number of characters to be copied for a Data Copy.

Note: This group of Data Copy commands allows duplicate data to be sent just once and the printer will take care of copying the data into other fields.

The A1 command specifies the field number of the field containing the data to be copied. (The field number is determined by the order that the fields are listed in the format, with the first field being field one.)

The A2 command specifies the character position within the specified field to start copying. (The first character in the data string is character one.)

The command A3 specifies how many characters to be copied. This count includes the start character.

For example, if field number 2 contains the data AVERY DENNISON CORPORATION and this field should contain AVERY DENNISON, the commands ~A102 (Data source is field 2), ~A201 (starting character is the first character), and ~A314 (14 characters are to be copied) would be sent to the printer.

~AS99 630,650,6X6,SNAP

This command activates auto-incrementing. Auto-incrementing means that this field will start at the data value which it is sent and increment using the step size that is specified in this command. The step size of the increment is specified in 99. An increment of zero turns off auto-incrementing.

Compatibility Note:

630 The 630 printer allows the field to be sequenced by a value of 1 to 255.

650 The 650 printer allows the field to be sequenced by a value of 1 to 254. A value of 255 allows the field to be decrement by 1.

6X6, SNAP These printers allow the field to be sequenced by a value of
- 2,147,483,647 to + 2,147,483,647.

~AD99   630,960,6X6,SNAP

This command specifies the number of tags containing each count that should be printed when doing auto-incrementing. This is useful when printing an X-up format. For example, if the format is being printed 4-up (4 copies across the web), sending the ~AD04 command would print the same data on all for labels, then increment for the next set.

~AE_   630,650,960,6X6,SNAP

This command specifies how the data is to be justified in the field. The available codes are **L** for Left justified, **R** for Right justified, **C** for Centered, **A** for Print as is (the string is printed just as it was sent to the printer).

~AV9   630,650,960,6X6

This command specifies the expansion multiple for the height of the field. This command tells the printer to print the field with the font selected by the command AF and expand the height of the characters '9' number of times. For example, if the font size is specified as 12 point (~AF12) and the ~AV2 command is sent, the field will be printed with a horizontal size of 12 points and a vertical size of 24 points.

Compatibility Note:

630, 960 These printers can expand in multiples of 1 to 9.

650 The 650 can only expand in multiples of 2, 4, and 8.

6X6 This is only effective when the emulation mode on the printer is set to 630 or 650.

~AH9   630,650,960,6X6

This command specifies the expansion multiple for the width of the field. This command tells the printer to print the field with the font selected by the command AF and expand the width of the characters '9' number of times.

Compatibility Note:

630, 960 These printers can expand in multiples of 1 to 9.

650 The 650 can only expand in multiples of 2, 4, and 8.

6X6 This is only effective when the emulation mode on the printer is set to 630 or 650.

~AI99   630,960,6X6,SNAP

This command specifies the intercharacter spacing of the selected font. The value that is included in this command is the number of dots that will be between characters.

Compatibility Notes:

630 The resolution for these printers is 0.004" (0.10mm).

960 The resolution for this printer is 0.007" (0.18mm) in the web direction and 0.014" (0.36mm) in the pull direction.

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~AR9   630,650,960,6X6,SNAP

This command specifies how the field will be drawn on the label. There are four possible ways to place the field's image on the tag. The DIRECT option is the default and will print the image directly, as it was created. However, when part of the image or the entire image is coincident with any part of a previously printed image, the two field images will be compared in those areas where they are coincident. Using the DIRECT option can cause one field to clip an earlier field if they overlap.

The **DIRECT** option is specified by a **0** in the command. The dot will remain on only when it is on in the <u>last mapped image</u> for that same dot position.

The **AND** option is specified by a **1** in the command. The dot will remain on only when it is on in <u>both images</u> for that same dot position.

The **OR** option is specified by a **2** in the command. The dot will remain on if the dot is on in <u>either or both images</u> for that same dot position.

The **XOR** option is specified by a **3** in the command. The dot will remain on only when it is <u>on in one of the images</u> - but <u>will not be on if it is on in both images</u> for that same dot position.

The **INVERSE** option is specified by a **3** in the command. The dot will remain on only when it is off in the <u>last mapped image</u> for that same dot position.

Compatibility Note:

630, 960 These printers support DIRECT, AND, OR, and XOR.

650 The 650 only supports DIRECT, OR, and XOR.

6X6, SNAP These printers only supports DIRECT, OR, and INVERSE.

~AO99   6X6,SNAP

This command specifies the slant of the characters within the field. This command tells the printer to print the field with the scaleable font selected by the command AL and slant the characters giving the field an italic look. The range of the slant is **-90** to **90**.

~AT_   6X6,SNAP

This command specifies the character orientation. With this command, the scaleable font defined by the command AL is oriented as defined within the field. The option of **H** for Horizontal text is the default selection. With this selection, the text is printed left to right just as it always has been. The option of **V** allows the text to be printed with each character rotated 90 degrees counter clockwise within the field. This gives the appearance of each character following below the last character instead of beside it.

~AM_   6X6,SNAP

This command causes internal data from the printer to be printed. Depending on the selection, the information requested is obtained and printed on the tag in the field defined. In the batch data, a ~D must be present as a place holder for this field, but any data will be ignored. The underscore should be replaced by one of the following.

D - Specifies the date is to be printed on the tag (mm/dd/yy format). The date is obtained internally from the printer and can not be edited.

E - Specifies the date is to be printed on the tag using the European style (dd/mm/yy format). The date is obtained internally from the printer and can not be edited.

T - Specifies the time is to be printed on the tag (hh:mm:ss AM/PM format). The time is obtained internally from the printer and can not be edited.

Q - Specifies the quantity of the batch is to be printed on the tag. The value printed is obtained from the command ZZ.

I - Specifies the Batch ID is to be printed on the tag. The Batch ID printed is obtained from the command ZI.

600RFID

L - Specifies the contract or order number to be embedded in the log filename of the file that will contain RFID values. This command is used for a customer-specific application and is not for general use. It is listed here for reference only.

~AW9999   6X6,SNAP

This command specifies the width of the field. If this command is not present, the field will be printed with the character proportions as defined in the font file. If this command is present, the width of the characters may be modified according to the method specified in the ~AQ command (below) to fit the text to the width specified Some of the scaleable fonts are variable widths, which means that each batch can look slightly different due to the text printed. This command gives the text a uniform width requirement for the batches. This command is needed in order to justify the field using the command AE when the font selected is scaleable. Also, this command is needed in order to fit the text within the field using the command AQ when the font selected is scaleable. The actual resolution or smallest increment is 1/dpi of the printer.

~AQ_   6X6,SNAP

This command specifies how the characters printed are to be sized within the width defined in the command AW. The underscore should be replaced by one of the following.

0 - **Squeeze to fit** With this option, if the width of the characters in the text exceeds the width defined in the command AW then the characters are squeezed (reduced in width) into the width defined in the command AW. If the width of the characters in the text does not exceed the width defined in the command AW then the characters are mapped as is.

1 - **Proportion to fit** With this option, the widths of the characters in the text are proportioned within the width defined in the command AW.

2 - **Stretch to fit** With this option, if the width of the characters in the text is less than the width defined in the command AW then the characters are stretched into the width defined in the command AW. If the width of the characters in the text exceeds the width defined in the command AW then the characters are squeezed into the field width defined in the command AW.

3 - **Regular fit** With this option, the characters are printed with the proportion defined in the font file.

> CAUTION: Use of commands that modify the appearance of the characters (such as the ~AW and ~AQ commands) can result in labels that appear slightly different when printed on different types of printers.

~AA_   Reserved for Future Use

Reserved for future printers.

This command specifies the direction that the characters are to be printed. The direction of print can be either left to right or right to left.

~AB_   Reserved for Future Use

This command specifies the area to be used by alphanumeric fields. The area defined can be configured with ascenders and descenders. If the area is not defined then the full character will not be printed.

A - Allow area for ascenders.

D - Allow area for descenders.

B - Allow area for ascenders and descenders.

O - No area for ascenders or descenders is allowed.

Special Codes for Barcode Fields

These control codes are special for barcode fields.

~BF99   630,650,6X6, SNAP

This command specifies the barcode type. The barcode types are listed in Appendix A.

~B199   630,650,6X6,SNAP

This command specifies the printed field order number for a source field in a Data Copy. (See note in command B3)

~B299   630, 650, 636, 656, 676, 686, 545

This command specifies the start character for a Data copy. (See note in command B3)

~B399   630, 650, 636, 656, 676, 686, 545

This command specifies the number of characters to be copied for a Data Copy.

Note: This group of Data Copy commands allows duplicate data to be sent just once and the printer will take care of copying the data into other fields.

The A1 command specifies the field number of the field containing the data to be copied. (The field number is determined by the order that the fields are listed in the format, with the first field being field one.)

The A2 command specifies the character position within the specified field to start copying. (The first character in the data string is character one.)

The command A3 specifies how many characters to be copied. This count includes the start character.

For example, if field number 2 contains the data AVERY DENNISON CORPORATION and this field should contain AVERY DENNISON, the commands ~A102 (Data source is field 2), ~A201 (starting character is the first character), and ~A314 (14 characters are to be copied) would be sent to the printer.

~BS99   630,650,6X6,SNAP

This command activates auto-incrementing. Auto-incrementing means that this field will start at the data value which it is sent and increment using the step size that is specified in this command. The step size of the increment is specified in 99. An increment of zero turns off auto-incrementing.

630 The 630 printer allows the field to be sequenced by a value of 1 to 255.

650 The 650 printer allows the field to be sequenced by a value of 1 to 254. A value of 255 allows the field to decrement by 1.

6X6,SNAP These printers allow the field to be sequenced by a value of - 2,147,483,647 to + 2,147,483,647.

~BD99   630,6X6,SNAP

This command specifies the number of tags containing each count that should be printed when doing auto-incrementing.

~BH9999   630,650,6X6,SNAP

This command specifies the height for the barcode bars. The height is described in thousandths of an inch. For example: If a barcode is to be 3/4 of an inch in height the command would be ~BH0750. This command does not apply to the GS1 Databar barcode types.

Compatibility Notes:

> **630, 650** For these printers the resolution or smallest increment is 0.0042" (011mm).

> **6X6,SNAP** The actual resolution or smallest increment is 1/dpi of the printer.

~BW9   630,6X6,SNAP

This command specifies the module width for a barcode (also called the expansion). The module width is the size of the narrowest bar in the barcode in pixels. The '9' in this command is the multiple of the narrowest bar.

Compatibility Notes:

> **630, 650** For these printers the resolution or smallest increment is 0.004" (0.1mm).

> **6X6,SNAP** The actual resolution or smallest increment is 1/dpi of the printer.

~BX9999   630,6X6,SNAP

This command specifies the length of the Barcode guard bars. This command allows the guard bars of the barcode to be extended down around the human readable information. The '9999' of this command is the size of the guard bars in thousandths of an inch. This command does not apply to the GS1 Databar barcode types.

Compatibility Notes:

630, 650 For these printers the resolution or smallest increment is 0.0042" {0.11mm).

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~BC   630, 650,6X6,SNAP

This command specifies that a check digit should be calculated for the barcode. This command does not apply to the GS1 Databar barcode types.

Note: If the check digit calculation command is used then the data string that is sent for this field should not include a check digit.

~BZ_   630,6X6,SNAP

This command specifies where the **H**uman **R**eadable **I**nformation (HRI) should be printed in reference to the barcode. Using **T** places the HRI on the top of the barcode, using **B** places the HRI on the bottom of the barcode. This command does not apply to the GS1 Databar barcode types.

~BA99   630,650,6X6

This command specifies the text font that should be used for the **H**uman **R**eadable **I**nformation (HRI). A selection of zero for the font turns off the HRI. The values for '99' are located under character fonts in Appendix A. Code page 437 is used for the HRI of a Code 128 barcode. This command does not apply to the GS1 Databar barcode types.

636, 656, 676, 686, 545 This is only effective when the emulation mode on the printer is set to 630 or 650.

~BL9999   6X6,SNAP

This command specifies the <u>scaleable</u> font that should be used for the **H**uman **R**eadable **I**nformation (HRI). A selection of zero for the font turns off the HRI. The values for '99' are located under scaleable fonts in Appendix A. This command does not apply to the GS1 Databar barcode types.

~BP99   6X6,SNAP

This command specifies the point size of the printed text for the **H**uman **R**eadable **I**nformation (HRI). This command only applies to the scaleable fonts. This command does not apply to the GS1 Databar barcode types.

Compatibility Note:

636, 656 (240 dpi) The range for the point size is 6 to 96.

636, 656, 676, 686 (300 dpi) The range for the point size is 4 to 96.

545 The range for the point size is 6 to 96.

~BI99   6X6,SNAP

This command specifies the intercharacter spacing of the selected font used in the HRI. The value that is included in this command is the number of dots that will be between characters. The actual resolution or smallest increment is 1/dpi of the printer. This command does not apply to the GS1 Databar barcode types.

~BB9999   630,6X6,SNAP

This command specifies the barcode margin. The barcode margin is the white space at the beginning and end of the bars in the barcode. This area is known as quiet area and is required for barcode scanners to properly scan the barcodes. The barcode margin is defined in thousandths of an inch.

Compatibility Notes:

630, 650 For these printers the resolution or smallest increment is 0.0042" (0.11mm).

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~BJ9999   630,6X6,SNAP

This command controls the horizontal movement of the system digit and the check digit of a UPC barcode. The movement is performed in reference to the barcode. The system digit and check digit always start out at the very edge of the barcode margin. The value in '9999' is the distance to move the system digit and check digit in towards the barcode. The distance is in thousandths of an inch. This command does not apply to the GS1 Databar barcode types.

Compatibility Notes:

630, 650 For these printers the resolution or smallest increment is 0.004" (0.1mm).

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~BK9999   630,6X6,SNAP

This command controls the vertical movement of the system digit and the check digit of a UPC barcode. The movement is performed in reference to the barcode. The system digit and check digit always start out at the same vertical position as the human readable information. The value that is placed in '9999' is the distance the system digits will be moved vertically from the starting position. This command does not apply to the GS1 Databar barcode types.

Compatibility Notes:

630, 650 For these printers the resolution or smallest increment is 4 thousandths.

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~BR9   630,650,6X6,545

This command specifies how the field will be drawn on the label. There are four possible ways to place the field's image on the tag. The DIRECT option is the default and will print the image directly, as it was created. However, when part of the image or the entire image is coincident with any part of a previously printed image, the two field images will be compared in those areas where they are coincident.

The **DIRECT** option is specified by a **0** in the command. The dot will remain on only when it is on in the last mapped image for that same dot position.

The **AND** option is specified by a **1** in the command. The dot will remain on only when it is on in both images for that same dot position.

The **OR** option is specified by a **2** in the command. The dot will remain on if the dot is on in either or both images for that same dot position.

The **XOR** option is specified by a **3** in the command. The dot will remain on only when it is on in one of the images - but will not be on if it is on in both images for that same dot position.

The **INVERSE** option is specified by a **3** in the command. The dot will remain on only when it is off in the last mapped image for that same dot position.

Compatibility Note:

630 These printers support DIRECT, AND, OR, and XOR.

650 The 650 only supports DIRECT, OR, and XOR.

6X6,SNAP These printers only supports DIRECT, OR, and INVERSE.

~BG9   650,6X6,SNAP

This command allows the format of the HRI Segmentation to be specified. The 9 in the command would be replaced by a segmentation type number from Appendix A. This command does not apply to the GS1 Databar barcode types.

~BM_   6X6,SNAP

This command specifies the option to be used on the selected barcode. Not all options apply to all barcodes. The options are as follows:

R99 Wide to narrow ratio of the barcode. The only applies to variable length barcodes such as Code 39 and Interleave 2 of 5 barcodes. The valid values that should

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replace the '99' are **20, 21, 22, 23, ..., 28, 29, 30** for the ratio values of 2.0:1, 2.1:1, 2.2:1, 2.3:1, ..., 2.8:1, 2.9:1, 3.0:1.

S9 Supplement to the UPC / EAN barcodes. Supplemental bars can be appended to the main barcode by selecting the values of **2** for the +2 supplement, and **5** for the +5 supplement. The number of characters must be increased in the command FB to accommodate the supplement.

D99 Matrix size for the Data Matrix barcode. Replace 99 with one of the following values;

X9 Specifies the X undercut for the GS1Databar barcodes. Each bar will be reduced in width by this value (in pixels) to compensate for thermal blooming. Must be at least 1 less than the specified expansion (X Dimension). Default is 0.

Y9 Specifies the Y undercut for the GS1 Databar barcodes. The barcode will be reduced in height by this value (in pixels)to compensate for thermal blooming. Default is 0.

N99 Specifies the maximum number of segments per row for the GS1 Databar Expanded barcode. If the data required more than this number of segments, the barcode will be split into 2 or more rows (referred to as a GS1 Databar Expanded Stacked barcode). Must be an even value from 2 to 22. Default is 22, which will print the barcode as a single row.

Value	Row x Column	Maximum Number of Characters Alpha	Maximum Number of Characters Numeric	Value	Row x Column	Maximum Number of Characters Alpha	Maximum Number of Characters Numeric
0	Auto Detect	2335	2710	16	64x64	418	560
1	10 x 10	3	6	17	72 x 72	550	736
2	12 x 12	6	10	18	80 x 80	682	912
3	14 x 14	10	16	19	88 x 88	862	1152
4	16 x 16	16	24	20	96 x 96	1024	1392
5	18 x 18	25	36	21	104 x 104	1222	1632
6	20 x 20	31	44	22	120 x 120	1573	2100
7	22 x 22	43	60	23	132 x 132	1954	2608
8	24 x 24	52	72	24	144 x 144	2335	2710
9	26 x 26	64	88	25	8 x 18	6	10
10	32 x 32	91	124	26	8 x 32	13	20
11	36 x 36	127	172	27	12 x 26	22	32
12	40 x 40	169	228	28	12 x 36	31	44
13	44 x 44	214	288	29	16 x 36	46	64
14	48 x 48	259	348	30	16 x 48	72	98
15	52 x 52	304	408				

The matrix size is data dependent - which means the data entered determines the number of characters allowed. The number of characters shown is the maximum number of characters allowed. Depending on the data, the number of characters may have to be less or the matrix size larger. For example, changing from upper case characters to lower case characters requires extra data space. Changing from numeric to alpha within the data stream would also require extra data space.

The number of rows in the matrix size is also key in determining the barcode height. The height is calculated by (module width * number of rows) / DPI of printhead.

Special Codes for Box / Underline Information

~LW9999   630,960,6X6,SNAP

This command specifies the end web position of a box / underline field. The web position is in thousandths of an inch.

Note: The starting web coordinate is the position that is specified in the FW command.

Compatibility Notes:

630, 650 For these printers the resolution or smallest increment is 33 thousandths.

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~LP99999   630,960,6x6,SNAP

This command specifies the end pull position of the box / underline field. The pull position is in thousandths of an inch.

Note: The starting pull coordinate is the position that is specified in the FP command.

Compatibility Notes:

630, 650 For these printers the resolution or smallest increment is 33 thousandths.

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~LV99   630,6X6,SNAP

This command specifies the width of the vertical lines in dots.

Compatibility Notes:

630, 650 For these printers the resolution or smallest increment is 4 thousandths.

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~LH99   630,6X6,SNAP

This command specifies the width of the horizontal lines in dots.

Compatibility Notes:

630, 650 For these printers the resolution or smallest increment is 4 thousandths.

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~LT_   960,6X6,SNAP

This command specifies what type of shape is being drawn. An **L** means draw a line using the two points. A **B** means draw a box using the two points.

~LF9   630,960,6X6,SNAP

This command specifies the mode in which the box / underline image is created on the tag. The **0** mode displays the box / underline as a normal box or underline. The **1** mode clears the box even if the box overlays another fields image. The **2** mode fills the box.

Compatibility Note:

630 The 630 has an additional mode **3** that XOR's the box.

~LR9   960,6X6,SNAP

This command specifies how the field will be drawn on the label. There are four possible ways to place the field's image on the tag. The DIRECT option is the default and will print the image directly, as it was created. However, when part of the image or the entire image is coincident with any part of a previously printed image, the two field images will be compared in those areas where they are coincident.

The **DIRECT** option is specified by a **0** in the command. The dot will remain on only when it is on in the <u>last mapped image</u> for that same dot position.

The **AND** option is specified by a **1** in the command. The dot will remain on only when it is on in <u>both images</u> for that same dot position.

The **OR** option is specified by a **2** in the command. The dot will remain on if the dot is on in <u>either or both images</u> for that same dot position.

The **XOR** option is specified by a **3** in the command. The dot will remain on only when it is <u>on in one of the images</u> - but <u>will not be on if it is on in both images</u> for that same dot position.

The **INVERSE** option is specified by a **3** in the command. The dot will remain on only when it is off in the <u>last mapped image</u> for that same dot position.

Compatibility Note:

960 These printers support DIRECT, AND, OR, and XOR. If the LF1 function for clearing a box is selected the LR command will be ignored.

6X6,SNAP These printers only supports DIRECT, OR, and INVERSE.

Special Codes for Logo Information

<div style="border:1px solid black; text-align:center; font-weight:bold;">
Refer to Appendix E for details on
printing logos and graphic image files.
</div>

~GH9   630

This command specifies the expansion multiple for the logo in the pull direction.

~GV9   630

This command specifies the expansion multiple for the logo in the web direction.

~GT99   630,650,960,6X6,SNAP

This command specifies the logo set number. Refer to Appendix E for details about printing logos and graphic image files.

Compatibility Note: The 630 is limited to only eight types of logo types.

630 The logo images reside on the I.C. card which plugs into the side of the 630 printer. In order for a logo type to be chosen the logo type must be present on the I.C. card and the I.C. card must be plugged into the printer in order for a format layout that contains a logo field to work.

650 The 650's logo images reside in a file on the hard disk drive in the 650. In order for the logo type to be chosen and printed the logo's file must on the 650.

~GM9   6X6,SNAP

This command specifies the file structure type of the image. The valid values are

3 Specifies the file type to be **BMP**. Currently logos are prepared as BMP files. The BMP file structure must follow industry standards.

4 Specifies the file type to be **PCX**. The graphic image must follow industry standards for the PCX file structure. Many applications produce the PCX files.

~GE_

Reserved for future printers.

This command specifies the horizontal justification of the logo. The '_' should be replaced by one of the options.

L The logo will be left justified.

C The logo will be centered.

R The logo will be right justified.

~GU_

Reserved for future printers.

This command specifies the vertical justification of the logo. The '_' should be replaced by one of the options.

T The logo will be top justified.

C The logo will be centered vertically.

B The logo will be bottom justified.

~GR9 630, 650, 960, 636, 656, 676, 686, 545

This command specifies how the field will be graphically placed on the tag. There are four possible ways to place the field's image on the tag. The DIRECT option is the default and will print the image directly, as it was created. However, when part of the image or the entire image is coincident with any part of a previously printed image, the two field images will be compared in those areas where they are coincident.

The **DIRECT** option is specified by a **0** in the command. The dot will remain on only when it is on in the last mapped image for that same dot position.

The **AND** option is specified by a **1** in the command. The dot will remain on only when it is on in both images for that same dot position.

The **OR** option is specified by a **2** in the command. The dot will remain on if the dot is on in either or both images for that same dot position.

The **XOR** option is specified by a **3** in the command. The dot will remain on only when it is on in one of the images - but will not be on if it is on in both images for that same dot position.

The **INVERSE** option is specified by a **3** in the command. The dot will remain on only when it is off in the last mapped image for that same dot position.

Compatibility Note:

630, 960 These printers support DIRECT, AND, OR, and XOR.

650 The 650 only supports DIRECT, OR, and XOR.

636, 656, 676, 686, 545 These printers only supports DIRECT, OR, and INVERSE.

~GI99 630

This command specifies the intercharacter spacing of the selected logo. The value that is included in this command is the number of dots that will be between the logos. These dots are equivalent to 4 thousandths.

Special Codes for Care Symbol Information

~SH9   630

This command specifies the expansion multiple for the care symbol in the horizontal direction.

~SV9   630

This command specifies the expansion multiple for the care symbol in the vertical direction.

~ST99   630,960,6X6,SNAP

This command specifies the care symbol type.

Compatibility Note:

630 The care symbol images reside on the I.C. card which plugs into the side of the 630 printer. In order for a care symbol type to be chosen the care symbol type must be present on the I.C. card and the I.C. card must plugged into the printer in order for a format layout that contains a care symbol field to work. The standard type for care symbols on the 630 is type **9**. The 630 will default to type **9** when the care symbol field is created. This command is only necessary if the care symbols are stored as a non-standard type number.

960 On the 960, a symbol type of **1** is printed as large care symbols and a symbol type of **2** is printed as small care symbols.

6X6,SNAP On these printers, a symbol type of **1** is printed as small care symbols and a symbol type of **2** is printed as large care symbols.

~SR9   630,650,960,6X6,SNAP

This command specifies how the field will be drawn on the tag. There are four possible ways to place the field's image on the tag. The DIRECT option is the default and will print the image directly, as it was created. However, when part of the image or the entire image is coincident with any part of a previously printed image, the two field images will be compared in those areas where they are coincident.

The **DIRECT** option is specified by a **0** in the command. The dot will remain on only when it is on in the <u>last mapped image</u> for that same dot position.

The **AND** option is specified by a **1** in the command. The dot will remain on only when it is on in <u>both images</u> for that same dot position.

The **OR** option is specified by a **2** in the command. The dot will remain on if the dot is on in <u>either or both images</u> for that same dot position.

The **XOR** option is specified by a **3** in the command. The dot will remain on only when it is <u>on in one of the images</u> - but <u>will not be on if it is on in both images</u> for that same dot position.

The **INVERSE** option is specified by a **3** in the command. The dot will remain on only when it is off in the <u>last mapped image</u> for that same dot position.

Compatibility Note:

630, 960 These printers support DIRECT, AND, OR, and XOR.

650 The 650 only supports DIRECT, OR, and XOR.

636, 656, 676, 686, 545 These printers only supports DIRECT, OR, and INVERSE.

~SI99   630,960,6X6,SNAP

This command specifies the inter-character spacing of the selected care symbols. The value that is included in this command is the number of dots that will be between the care symbols.

Compatibility Notes:

630, 650 For these printers the resolution or smallest increment is 4 thousandths.

6X6,SNAP The actual resolution or smallest increment is 1/dpi of the printer.

~SP99   6X6,SNAP

This command specifies the point size of the printed symbols. This command only applies to the scaleable fonts. The range for the point size is 4 to 96.

~SW9999   6X6,SNAP

This command specifies the width of the field. If this command is not defined, then the scaleable symbol is printed as is. This command gives the symbols a uniform width requirement for the batches. This command is needed in order to fit the symbols within the field using the ~SQ command. The actual resolution or smallest increment is 1/dpi of the printer.

~SQ_   6X6,SNAP

This command specifies how the symbols printed are to be sized within the width defined in the ~SW command. The underscore should be replaced be one of the following:

0 = Squeeze to fit With this option, if the width of the symbols in the text exceeds the width defined in the command SW then the symbols are squeezed into the width defined in the command SW. If the width of the symbols in the text does not exceed the width defined in the command SW then the symbols are printed as is.

1 = Proportion to fit With this option, the width of the symbols in the text are proportioned within the width defined in the command SW.

2 = Stretch to fit With this option, if the width of the symbols in the text is less than the width defined in the command SW then the symbols are stretched into the width defined in the command SW. If the width of the symbols in the text exceeds the width defined in the command SW then the symbols are squeezed into the field width defined in the command SW.

3 = Regular fit With this option, the field is printed as is using the width given for each symbol.

~SE_   6X6,SNAP

This command specifies how the text will be justified. This edit code specifies a format for the symbol that will appear in the field. The available codes are *L* for Left justified, *R* for Right justified, *C* for Centered, *A* for Print as is (the string is printed just as it was sent to the printer).

This command specifies the slant of the symbols within the field. This command tells the printer to print the field with the scaleable symbols and slant the characters giving the field an italic look. The range of the slant is **-90** to **90**.

Special Codes for Special Symbol Information

~YH9   Reserved for Future Printers

This command specifies the expansion multiple for the special symbol in the horizontal direction.

~YV9   Reserved for Future Printers

This command specifies the expansion multiple for the special symbol in the vertical direction.

~YT99   960

This command specifies the special symbol type. The 960 has the following special symbol types.

Type	Description
1	Trademark symbol (Tm)
2	Registered symbol
3	10pt Fractions
4	12pt Fractions
5	Size Symbols
6	Centimeter symbol (cm)

~YR9   960

This command specifies how the field will be graphically placed on the tag. There are four possible ways to place the field's image on the tag. The DIRECT option is the default and will print the image directly, as it was created. However, when part of the image or the entire image is coincident with any part of a previously printed image, the two field images will be compared in those areas where they are coincident.

The **DIRECT** option is specified by a **0** in the command. The dot will remain on only when it is on in the <u>last mapped image</u> for that same dot position.

The **AND** option is specified by a **1** in the command. The dot will remain on only when it is on in <u>both images</u> for that same dot position.

The **OR** option is specified by a **2** in the command. The dot will remain on if the dot is on in <u>either or both images</u> for that same dot position.

The **XOR** option is specified by a **3** in the command. The dot will remain on only when it is <u>on in one of the images</u> - but <u>will not be on if it is on in both images</u> for that same dot position.

The **INVERSE** option is specified by a **3** in the command. The dot will remain on only when it is off in the <u>last mapped image</u> for that same dot position.

~YI99   960

This command specifies the intercharacter spacing of the selected special symbols. The value that is included in this command is the number of dots that will be between the special symbols.

Special Codes for Graphic Image information

~MH9   630

This command specifies the expansion multiple for the logo in the pull direction.

~MV9   630

This command specifies the expansion multiple for the logo in the web direction.

~MR9   630,6X6,SNAP

This command specifies how the field will be drawn on the tag. There are four possible ways to place the field's image on the tag. The DIRECT option is the default and will print the image directly, as it was created. However, when part of the image or the entire image is coincident with any part of a previously printed image, the two field images will be compared in those areas where they are coincident.

The **DIRECT** option is specified by a **0** in the command. The dot will remain on only when it is on in the <u>last mapped image</u> for that same dot position.

The **AND** option is specified by a **1** in the command. The dot will remain on only when it is on in <u>both images</u> for that same dot position.

The **OR** option is specified by a **2** in the command. The dot will remain on if the dot is on in <u>either or both images</u> for that same dot position.

The **XOR** option is specified by a **3** in the command. The dot will remain on only when it is <u>on in one of the images</u> - but <u>will not be on if it is on in both images</u> for that same dot position.

The **INVERSE** option is specified by a **3** in the command. The dot will remain on only when it is off in the <u>last mapped image</u> for that same dot position.

Compatibility Note:

630 These printers support DIRECT, AND, OR, and XOR.

636X6,SNAP These printers only supports DIRECT, OR, and INVERSE.

Special Codes for RFID Fields

~KS99   700RFID

This command activates auto-incrementing. Auto-incrementing means that this field will start at the data value which it is sent and increment using the step size that is specified in this command. The step size of the increment is specified in 99. An increment of zero turns off auto-incrementing.

> **NOTE**
> The printer does not check the formatting of the EPC field. It is the user's responsibility to ensure that incrementing is limited to the serialized portion of the EPC field. For example, if the last 4 characters of the EPC field are reserved for serialization, batches greater than 9999 will overflow the serial field.

Special Codes for Secure Batches

~QRS – Secure Batch Count   6X6,SNAP

This command is used by the host and printer to transfer the Secure Batch Count to secure storage. See Appendix F Secure Batch Operation for details. The format of the ~QRS command is:

~QRS,XXXXXXXX,99999

where XXXXXXXX is the Batch ID and 99999 is the number of tickets printed.

Control Codes for Data

~ZD99   630,650,9606X6,SNAP

This command denotes the start of a batch and specifies the number of the format to be used. If the format number is 00, the last format received by the printer is used., and the printer will retain all of the data from the previous batch (if any). This means that only the data that has changed from the previous batch needs to be sent for the current batch (see the description for the data field ~D for details of how data is retained from the previous batch). If no format was received since the printer was turned on, the batch will be ignored.

If the format number is other than 00, then the printer will use the format stored in the printer with the filename FORMAT99.PCL, where 99 is the format number included with the ~ZD command. For example, if the batch starts with the command ~ZD37, then the format FORMAT37.PCL will be used to print the data using the batch data. If the format does not exist, the batch will be ignored.

~D_____   630,650,960, 6X6, SNAP

This command specifies the start of a data string. The end of the data string is marked by the ~ of the command following the data string. If this command is sent without any data then the data for this field will be the same as the previous batch unless the ZD command for the current batch specified a format number other than zero. If the ZD command specified the format number of a format that resides on the printer then the data for this field will be precanned data from the format description. If this command is sent with one space as its data, then the field will be blank instead of using the data from the previous batch. For example: For the regular transmission of data string 'HELLO', the command would be ~DHELLO. If in the next batch hello is also to be printed the command would be ~D followed by the ~D for the next fields data. In order to print a blank field send ~D<SPACE> and then the ~D for the next field. (<SPACE> stands for the single character Space.)

Compatibility Notes:

630, 650, 960 All data sent to the PCL printer must be UPPERCASE.

6X6,SNAP Data can be sent to the PCL printer as uppercase or lowercase.

~I_____   630, 636, 656, 676, 686, 545

This command specifies the start of a graphic image. The data following the ~I is either a standard monochrome BMP or PCX file. The file must be included in its entirely.

~ZB9999   630,6X6,SNAP

This command tells the printer to take the batch that is being sent and print it as multiple batches of size 9999. For example: If 1000 tickets need to be printed with the same information but the tickets need to be grouped in batches of 100, the ZB command would be sent with a value of 100 (~ZB0100) and the ZZ command would be sent at the end of the batch with a value of 1000 (~ZZ1000~). If the ZZ quantity is not an even multiple of the ZB quantity then the remainder of the total quantity will be printed as the final batch.

Note: This command must be sent before the ZZ command. The ZZ signifies the end of a batch and all other commands must be sent before the ZZ command.

~ZZ9999   630,650,960,6X6,SNAP

This command specifies the end of the batch. Included in this command is the number of tags or quantity of tags to be printed with this information. This data set constitutes a batch. This is the last command the PCL Printer receives before it prints a batch. This command must be followed by an ~. The final ~ tells the PCL Printer that it is at the end of the quantity data. For example: If 100 tickets of the current batch are to be printed then the command would be ~ZZ0100~.

~ZI_____   6X6, SNAP

This command specifies the Batch ID that is to be associated with the batch. The feature always the batch to be tracked if a Batch ID has been assigned. The Batch ID can be up to 8 characters. The Batch ID is not required, but it is displayed on the printer control panel and can be printed on the label.

~ZE ……….   SNAP

This command specifies the extended batch information that is to be associated with the batch, most likely to be used with a secure batch. This command allows the batch to be tracked by the batch information assigned. The extended batch information is variable in length. The command character of the next command denotes the end of the extended batch information. For this reason, the extended batch information may not contain any of the valid command characters, which at this time are the tilde (~), the up carat (^) and the ESC (ASCII 0x1b). The extended batch information is not required in the batch. But when this command is present, the content in the command not the Batch ID is sent back to the host for a secure batch.

Configuration Commands

~CC   630

This command instructs the printer to return the ASCII character 'FS' (Hexadecimal 1C, Decimal 28) every time a tag is printed. This feature allows the connected computer to maintain a count. This command must be sent with every batch. It is cleared upon completion of the batch.

~CF_   630,650,960,6X6,SNAP

This command controls flagging in the current batch. The underscore should be replaced by one of the following.

N - No Flagging This command turns off flagging for this format.

L = Long / Short This means that two blank tags will appear after a batch is printed when the tag has a sense mark. The first blank tag is cut long by .23 inches and the second is cut short by the same amount. These blank tags act as a separator when the tags are in the printers stacker. When there is no sense mark on the tag, the blank tag is longer by .23 inches than the printed tags.

D = Double length This command produces a flag that is two tags in the pull length.

T = Stock Saving Flag All tags are printed but the cut on the next to last tag is .125 inches short, which makes the last tag .125 inches longer in the pull length. All tags can be used.

V = Verifier Flag This command is to be used if a verifier is active on the printer. The batch quantity is increased by 2 and the stock saving feature is activated. The print is carried over to the flag which prevents the verifier from halting the printer when a barcode is not scanned.

B = Double blank Flag This command produces a flag that is blank and two tags in the pull length.

S = Small Flag This command produces a flag that is .078 inches longer than the tag in the pull length. When the tag has a sense mark, the first tag is cut long by .078 inches and the second is cut short by the same amount.

M = Medium Flag This command produces a flag that is .15 inches longer than the tag in the pull length. When the tag has a sense mark, the first tag is cut long by .15 inches and the second is cut short by the same amount.

X = Extra Large Flag This command produces a flag that is .31 inches longer than the tag in the pull length. When the tag has a sense mark, the first tag is cut long by .31 inches and the second is cut short by the same amount.

Z = Zero length Flag This command produces a flag that is equal to the tag in the pull length. When the tag has a sense mark, only one tag is generated for the flag.

F = Flag According to the Format Returns the flagging mode to whatever was defined in the format.

Compatibility Notes:

630 The 630 does Long / Short flagging but the flags are controlled by the pull length of the tag and cannot be controlled by this command. Meaning if a tag is less than 1.400 inches, the batches will be flagged with a Double Length flag. All batches whose tags are greater than 1.400 inches will be flagged with Long / Short flags. The 630 does not support the B, S, M, X commands.

650 The 650 does not support the T, S, M, X options.

960 If the 960 is doing a non-sense mark tag and is flagging, the tag pull length cannot be longer than 5.756 inches. This tag pull length allows the longer flag to be created and to be less than the 6-inch maximum for tag pull size. The 960 does not support the T, V, B, S, M, X options.

636, 656, 676, 686, 545 The 636/656 does not support the D, V, B options. With the S, M, L, X options, it is possible to produce flags with print other than what is printed on the tags.

~CI   6X6,SNAP

This command indicates to the printer that the Batch ID assigned to the batch is to be sent to the host upon completion of the batch. The Batch ID will be sent when the last ticket of the batch is cut.

~CK_   6X6,SNAP

This command controls cuts in the current batch. This command is a configurable command and must be included in every batch that the cut is to be suppressed. The underscore should be replaced by one of the following options.

A - All cuts for this batch are suppressed. These cuts include flag and cut count requests along with the cut at the beginning of the batch.

B - The cut at the beginning of the batch is suppressed. This will also suppress the cut between the batch and the flag if flagging is active as the flag is treated as a separate batch.

~CE   6X6,SNAP

This command specifies to the printer that the printer is to halt after printing the batch. This is a configuration command and is placed with the batch data commands between the ~ZD and ~ZZ commands. The start button on the printer must be pressed to resume printing. If a flagging is active, printing halts after the flag.

Connection Guide

Serial Connection Specifications

All AVERY DENNISON PCL printers can communicate through an RS232 port. The Baud rates that are supported vary by printer. However, all printers are set to **8** data bits, **1** stop bit, **No Parity.**

The 6X6 serial port is configured as a DCE (Data Communications Equipment) and the computer serial port is configured as a DTE (Data Terminal Equipment), Therefore, a straight-through serial cable is required to connect the host with the printer.

The SNAP serial port is configured as a DTE (Data Terminal Equipment). Therefore, a null modem is required to connect the host with the printer. Pinout for a null model serial cable is shown below.

When using serial communications, flow control is used to control the transmission of data from the host to the printer. The printer has an input buffer than holds data from the host until it can process it. The host computer can send data much faster than the printer can print it, so the printer must tell the host to stop sending data when the buffer is almost full. Otherwise, data can be lost. Once the printer has processed the data, it then tells the host to start sending again.

PCL printers can use either XON/XOFF or RTS/CTS as a Flow Control Protocol. If the host does not provide this type of flow control then a different type of host must be used. XON/XOFF flow control uses control characters that are sent over serial data lines from the printer to the host. RTS/CTS use special lines between the host and the printer for controlling data flow. It is important to use a serial cable that contains all the standard RS232 signals for proper operation.

AVERY DENNISON Printer Specific Connection Information

AVERY DENNISON 630

In order for the 630 to receive PCL commands the printer must be set for PCL mode. Look in the 630 Operation / Maintenance Guide under Direct Downloading for information on how to set the printer for this mode.

The 630 can be placed in a PCL command Debug mode by setting the printer up for Direct Downloading and then holding the Test button down while powering on the printer. Once the printer is in PCL Debug mode every command that is sent to the printer is printed out on the current stock that is in the printer.

AVERY DENNISON 650

The 650 must have the AVERY DENNISON PCL program running with the 650's display and keyboard connected to receive PCL Commands from the host. The PCL program will display a "Waiting for Host" screen.

Currently a debug mode is not available on the 650 printer.

AVERY DENNISON 960

The 960 printer must have the PCL option installed on the printer in order to accept PCL Commands.

Currently there is not a debug mode available on the 960 printer.

AVERY DENNISON 6X6,SNAP

Currently there is not a debug mode available on the 636, 656, 686 or 545 printers.

AS/400 Communications Information for a AVERY DENNISON PCL Printer

> NOTE: The following information is for legacy applications. The equipment mentioned may not be available and the information may be obsolete. Please contact your IT specialist for more information.

Listed below are the settings required by an IBM AS/400 using Andrew Corporation's Interlynx protocol converter. These settings must be correct in order for the communications and batching to work properly with a AVERY DENNISON 630 or 650 printer using PCL. The communications with an AS/400 has only been tested using an Interlynx protocol converter. This example uses a straight thru RS232 cable that is unmodified between the Interlynx protocol converter and the AVERY DENNISON Printer.

AS/400 Local Settings: (OS Ver 2 Rel 1 Mod 1)

Display Device Description

Device description	DEVD	PX
Option	OPTION	*ALL
Category of device		*PRT
Device class	DEVCLS	*LCL
Device type	TYPE	5225
Device Model	MODEL	4
Advanced function printing . .	AFP	*NO
Port Number	PORT	5
Switch Setting	SWTSET	3
Online at IPL	ONLINE	*YES
Attached controller	CTL	CTL01
Form feed	FORMFEED	*CONT
Printer error message	PRTERRMSG	*INQ
Message queue	MSGQ	RDSP040CB
Library		*LIBL

Text . . . .   TEXT   AVERY
DENNISON - 630

AS/400 Remote Settings: (OS Ver 2 Rel 1 Mod 1)

Display Device Description

Device description	DEVD	PX
Option	OPTION	*ALL
Category of device		*PRT
Device class	DEVCLS	*RMT
Device type	TYPE	5225
Device Model	MODEL	4
Advanced function printing . .	AFP	*NO
Local location address	LOCADR	08
Online at IPL	ONLINE	*YES
Attached controller	CTL	RCTL04B
Form feed	FORMFEED	*CONT
Printer error message	PRTERRMSG	*INQ
Message queue	MSGQ	RDSP040CB
Library		*LIBL
Maximum length of request unit.	MAXLENRU	*CALC
Pacing	PACING	7
Text	TEXT	AVERY

DENNISON - 630

Interlynx/400 or Interlynx 5251 Protocol Converter Configuration:

1. Device Type	PRINT-
2. Associated Work Station Address	1+
3. Bit Rate	9600
4. Number of Bits/Char (Excluding Parity)	8
5. Parity	NONE
6. Number of Stop Bits	1
7. Communications Interface	DTE
8. Auto Answer Mode	No
9. Flow Control From Converter	XON
10. Flow Control From Device	XON
11. Device Ready Signal	NONE

IBM 3270 Connection using Interlynx 3287

The Interlynx 3287 can connect to a AVERY DENNISON PCL printer using a straight thru RS232 cable and the following settings;

- Interface = Serial

- DCE/DTE switch set to DTE

- 9600 baud, 8 data bits, Parity=NONE (Interlynx uses 1 stop bit, not configurable)

- Ready Signal = NONE

- Busy Signal = NONE

- Auto-Hold Print = NONE

- Printer Error Timeout = NONE, Retry Forever

Connecting to an AVERY DENNISON SNAP Printer using USB

> **NOTE: The standard SNAP printer has a USB host connector in the connector panel on the back of the printer. This CANNOT be used to connect the printer to a computer. USB only supports host to peripheral communications. Host to host connections are not supported. An optional USB peripheral board is available to support USB.**

The AVERY DENNISON SNAP printers can optionally be equipped with a USB peripheral connector. This option allows the printer to be connected to a host computer using USB, which gives much higher data transmission rates, reducing the time it takes to transmit large formats and batches to the printer. This is particularly useful with graphics intensive formats.

The major drawback to USB is that the printer must be location close to the host computer. The USB specification limits the maximum cable length to 5 meters (16 feet 5 inches). This can be extended my using USB hubs. Up to 5 hubs can be connected in series for a total length of 30 meters (98 feet), but this become expensive and unwieldy.

A USB driver is included with PCMate Platinum. Instructions for installing the driver can be found in Engineering Bulletin 06_025_SNAP_USB_Setup.doc.

Connecting to an AVERY DENNISON SNAP Printer using Ethernet.

The SNAP printer line supports communications via Ethernet to a Local Area Network (LAN). This allows the printer to be located remotely from the host computer, allows communicating with the printer from multiple host computers, and allows much faster communications.

To set up the SNAP printer, you must have the IP address and possibly a Gateway address and Sub-Mask address. These values are unique for each network and can be

obtained from your IT specialist. Avery Dennison cannot provide this information since it is unique for your network.

You will need to connect a standard PC monitor and keyboard to the printer. To set up the printer IP address, perform the following steps:

1. Turn on the printer. During the initialization, the message "Press F1 to Enter Setup" will appear on the monitor. Press the F1 key on the keyboard. This message will only appear for about one second. If you don't press F1 key in time, simply turn off the printer and try again.

2. A window will appear asking for a password. Enter IP, then press the Enter key.

3. A menu will appear with options to view or enter the IP, Gateway and Sub-Mask addresses. To view the current IP address, enter IP, then press Enter. The current IP address will be displayed. To set the IP address, type IP followed by the IP address, then press Enter. For example, if your IP address is 198.68.1.1, you would enter

        IP 198.68.1.1 <Enter>

4. Repeat step 3 for the Gateway and Sub-Mask addresses.

5. To exit, type EXIT followed by the Enter key. The printer will restart.

For more information, see Engineering Bulletin 06_019_Ethernet_Configuration.doc.

Glossary of Terms

Batch

Groups of tags with the same information.

DPI

Dots per inch

Format

Describes all the physical descriptions of a tag or label

HRI

Human Readable Information - This is the human interpretation of the barcode.

PCL

Printer Control Language

Pull

The direction which the stock travels through the machine

Tag

Printed information describing an item

Web

The width of a roll of stock

APPENDIX A – PCL Values

Character Font Numbers Associated with the AL and BL Commands.

Value	Font	Supported by
5	Swiss 721 Bold	636, 656, 676, 686, 545
102	Swiss 721 Heavy	6X6, SNAP
173	Swiss 721 Black Condensed	6X6, SNAP
596	Monospace 821 Roman	6X6, SNAP
598	Monospace 821 Bold	6X6, SNAP
759	Swiss 721 Medium	6X6, SNAP

Character Font Numbers Associated with the AF and BA Commands.

Value	Font	Supported by
1	6 Point Condensed	630, 650, 960
2	6 Point Standard	630, 650, 960
3	6 Point Bold	630
4	8 Point Condensed	630, 650, 960
5	8 Point Standard	630, 650, 960
6	8 Point Bold	630, 650, 960
7	10 Point Condensed	630, 650, 960
8	10 Point Standard	630, 650, 960
9	10 Point Bold	630, 650, 960
10	12 Point Condensed	630, 650
11	12 Point Standard	630, 650, 960
12	12 Point Bold	630, 650, 960
13	OCR A	630, 650

Barcode Font Numbers Associated with the BF Commands.

Value	Font	Supported by
1	UPC-A	650, 6X6, SNAP
1	UPC-A with 1-5-5-1 HRI segmentation	650
3	UPC-E	630, 6X6, SNAP
4	Code 39	630, 650, 6X6, SNAP
5	EAN-8	630, 650, 6X6, SNAP
6	EAN-13	630, 650, 6X6, SNAP
7	Interleave 2 of 5	630, 650, 6X6, SNAP
10	Code 128	630, 650, 6X6, SNAP
11	EDI Code 128	630, 650, 6X6, SNAP
12	UPC-A with 4-4-4 HRI segmentation	630
13	Code 39 with Sears HRI segmentation	630
14	UPC-A with extended bars	650
14	Interleave 2 of 5 with 3:1 Ratio	630
15	Expanded Code 128	650
16	Reduced Code 128	650
17	Code 93	6X6, SNAP
18	Data Matrix	SNAP
19	GS1 Databar Omnidirectional	SNAP
20	GS1 Databar Stacked Omnidirectional	SNAP
21	GS1 Databar Truncated	SNAP
22	GS1 Databar Stacked	SNAP
23	GS1 Databar Limited	SNAP
24	GS1 Databar Expanded	SNAP

Transfer Type Values Associated with the XT Commands.

Value	Transfer Type	Supported by
0	Topcoated card stock & HR-4111 Ink	650
	NonTopcoated card stock & HR-4111 Ink	650
4	PS Non Thermal Receptive & TT-1111 Ink	650
5	Pressure Sensitive Non Thermal Receptive & HR-1111 Ink	650
8	Tyvek & TT-1111 Ink	650
10	PS Non Thermal Receptive & TF-1111 Ink	650
11	Tyvek & TF-1111 Ink	650
14	Fabric 2800 & HC-3111 Ink	650
15	Size Stickers & TW-1111 Ink	650
51	Heat Seal & SD-1111 Ink	6X6, SNAP
52	Topcoated card stock & TT-3111 Ink	6X6, SNAP
53	Topcoated card stock & TT-1111 Ink	650, 6X6, SNAP
54	Topcoated card stock & HR-3111 Ink	650, 6X6, SNAP
55	Topcoated card stock & HR-1111 Ink	650, 6X6, SNAP
56	Topcoated Card Stock & TW-1111 Ink	650, 6X6, SNAP
57	Topcoated card stock & TW-1151 Ink	6X6, SNAP
58	Pressure Sensitive & TT-3111 Ink	6X6, SNAP
59	Pressure Sensitive Thermal Receptive & TT-1111 Ink	650, 6X6, SNAP
60	Pressure Sensitive Thermal Receptive & TW-1111 Ink	650, 6X6, SNAP
61	Pressure Sensitive & TW-1151 Ink	6X6, SNAP
62	Pressure Sensitive & HR-3111 Ink	6X6, SNAP
63	Uncoated Tag Stock & TT-3111 Ink	6X6, SNAP
64	Uncoated Tag Stock & TT-1111 Ink	6X6, SNAP
65	Uncoated Tag Stock & HR-3111 Ink	6X6, SNAP
66	Uncoated Tag Stock & HR-1111 Ink	6X6, SNAP
67	Uncoated Tag Stock & TW-1111 Ink	6X6, SNAP
68	Uncoated Tag Stock & TW-1151 Ink	6X6, SNAP
69	Fabric 2800 & TT-1111 Ink	650, 6X6, SNAP
70	Fabric 2800 & HR-3111 Ink	6X6, SNAP
71	Fabric 2800 & TT-3111 Ink	6X6, SNAP
72	Fabric 2800 & HC-3111 Ink	6X6, SNAP
73	Fabric 2800 & HR-1111 Ink	650, 6X6, SNAP
74	Fabric 2795 & TT-1111 Ink	650, 6X6, SNAP
75	Fabric 2795 & HR-3111 Ink	6X6, SNAP
76	Fabric 2795 & TT-3111 Ink	6X6, SNAP
77	Fabric 2795 & HC-3111 Ink	6X6, SNAP
78	Fabric 2795 & HR-1111 Ink	650, 6X6, SNAP

Value	Transfer Type	Supported by
79	Coated Tag Stock & HR-4111 Ink	6X6, SNAP
80	Pressure Sensitive & HR-4111 Ink	6X6, SNAP
81	Uncoated Tag Stock & HR-4111 Ink	6X6, SNAP
82	Fabric 2800 & HR-4111 Ink	6X6, SNAP
83	Fabric 2795 & HR-4111 Ink	6X6, SNAP
84	New Pressure Sensitive (no xfer) & TT-3111 Ink	6X6, SNAP
85	New Pressure Sensitive (no xfer) & TT-1111 Ink	6X6, SNAP
86	New Pressure Sensitive (no xfer) & TW-1111 Ink	6X6, SNAP
87	New Pressure Sensitive (no xfer) & TW-1151 Ink	6X6, SNAP
88	New Pressure Sensitive (no xfer) & HR-1111 Ink	6X6, SNAP
89	New Pressure Sensitive (no xfer) & HR-3111 Ink	6X6, SNAP
90	New Pressure Sensitive (no xfer) & HR-4111 Ink	6X6, SNAP
91	Coated Tag Stock & GP-1111 Ink	650, 6X6, SNAP
92	Uncoated Tag Stock & GP-1111 Ink	650, 6X6, SNAP
93	New Pressure Sensitive (no xfer) & GP-1111 Ink	650, 6X6, SNAP
94	2800 Fabric & GP-1111 Ink	6X6, SNAP
95	2795 Fabric & GP-1111 Ink	6X6, SNAP
96	2795 Fabric & CT-1111 Ink	6X6, SNAP
97	4800 Fabric & CT-1111 Ink	6X6, SNAP
98	4800 Fabric & CT-1114 (Blue)	6X6, SNAP
99	4800 Fabric & GP-1111	6X6, SNAP
100	2395NWT Fabric & CL-1111 (UK)	6X6, SNAP
101	2395NWT Fabric & XC-3111 (UK)	6X6, SNAP
102	2395NWT Fabric & HR-1111 (UK)	6X6, SNAP
103	2495NWT Fabric & CL-1111 (UK)	6X6, SNAP
104	2495NWT Fabric & XC-3111 (UK)	6X6, SNAP
105	2495NWT Fabric & HR-1111 (UK)	6X6, SNAP
106	4000NWT Fabric & CL-1111 (UK)	6X6, SNAP
107	4000NWT Fabric & XC-3111 (UK)	6X6, SNAP
108	4000NWT Fabric & HR-1111 (UK)	6X6, SNAP
109	4002NWT Fabric & CL-1111 (UK)	6X6, SNAP
110	4002NWT Fabric & XC-3111 (UK)	6X6, SNAP
111	4002NWT Fabric & HR-1111 (UK)	6X6, SNAP
112	G.S. Satin & XC-3111 (UK)	6X6, SNAP
113	2012T Fabric & XC-3111 (UK)	6X6, SNAP
114	1021T Fabric & XC-3111 (UK)	6X6, SNAP
115	2800 Fabric & CT-1111	6X6, SNAP
116	591SST Fabric & CT-1111	6X6, SNAP
117	591SST/601SST Fabrics & CT-1114	6X6, SNAP
118	601SST Fabric & CT-1111	6X6, SNAP

Value	Transfer Type	Supported by
119	591SST/601SST Fabrics & CT-1115	6X6, SNAP
120	591SST/601SST Fabrics & CT-1117	6X6, SNAP
121	591SST Fabric & CT-1112	6X6, SNAP
122	601SST Fabric & CT-1112	6X6, SNAP
155	4900NWT / 4900HSA & HS1111	6X6, SNAP
156	1800FRA & TW1111	6X6, SNAP
157	1800FRA & GP1111	6X6, SNAP
158	2085NWT / 2495NWT / 2360NWT & HS1111	6X6, SNAP
159	2360NWT / 2800NWT & XC3111	6X6, SNAP
160	2895NWT / 2800NWT & HS1111	6X6, SNAP
161	2895NWT & XC3111	6X6, SNAP
162	2895NWT & HC3111	6X6, SNAP
163	1800MWA & GP1111	6X6, SNAP
164	1800MWA & TW1111	6X6, SNAP
165	604LKP / 601LKP & DS7501 / 7502 / 7504	6X6, SNAP
166	604LKP / 601 LKP & DS7503	6X6, SNAP
167	4800NBC Fabric & HS1011	6X6, SNAP
168	2012T Fabric & HS1111/1112	6X6, SNAP
169	4360NBT Fabric & SD1011	6X6, SNAP
170	4041THS Fabric & HS1111	6X6, SNAP
171	4700TWT Fabric & PL1111	6X6, SNAP
172	4800TST Fabric & CT1111	6X6, SNAP
173	4800TST Fabric & CT1112	6X6, SNAP
174	4800TST Fabric & CT1114	6X6, SNAP
175	4800TST Fabric & CT1115	6X6, SNAP
176	4800TST Fabric & CT5137	6X6, SNAP
177	4800TST Fabric & HS1111	6X6, SNAP
178	770SWT Fabric & CT1112	6X6, SNAP
179	770SWT Fabric & CT1114	6X6, SNAP
180	770SWT Fabric & CT1115	6X6, SNAP
181	770SWT Fabric & CT5137	6X6, SNAP
182	772SWT Fabric & CT1112	6X6, SNAP
183	772SWT Fabric & CT1114	6X6, SNAP
184	772SWT Fabric & CT1115	6X6, SNAP
185	772SWT Fabric & CT5137	6X6, SNAP
201	New Tag Stock A & GN - 1111	686
202	New Tag Stock B & GN - 1111	686
203	New Tag Stock C & GN - 1111	686
204	New Tag Stock D & GN - 1111	686
205	New Tag Stock E & GN - 1111	686

Barcode Segmentation Values Associated with the BG Commands.

Value	Font	Supported by
0	None	650, 6X6, SNAP, 686, 545
1	4-4-4 UPC (3 of 4)	650, 6X6, SNAP, 686, 545
2	1-5-5-1 UPC	650, 6X6, SNAP, 686, 545
3	Sears Code 39	650, 6X6, SNAP, 686, 545
4	1-6-6 EAN	650, 6X6, SNAP, 686, 545
5	UCC128	650, 6X6, SNAP, 686, 545
6	2&4	650, 6X6, SNAP, 686, 545
7	1&6	650, 6X6, SNAP, 686, 545
8	3-3-3-3 UPC (4 of 3)	650, 6X6, SNAP, 686, 545
9	4-4	650, 6X6, SNAP, 686, 545

APPENDIX B - Default Values

Format Defaults When Printer Receives a ~XA command:

630:

Web Size = 0

Pull Size = 0

No Sense mark

No Flags

1-UP

Head Strobe = 6

Print Speed = 5.0 inches/sec

Sense to Cut = 0

Cut count = 1

Number of fields = 0

650:

Web Size = 5.0" (Max Value)

Pull Size = 7.0"

No Sense mark

No Flags

1-UP

Print Speed = 6.5 inches/sec

Sense to Cut = 0

No Head Lift

Transfer Type = 0 (Topcoat card stock & TT-1111 Ink)

Number of fields = 0

960:

Web Size = 2.0"

Pull Size = 1.0"

No Sense mark

Sense to Cut = 0

636:

Web Size = 1.0"

Pull Size = 1.0"

No Sense mark

No Flags

1-UP

Print Speed = 5.5 inches/sec

Sense to Cut = 0

Cut count = 1

Transfer Type = 91 (Topcoat card stock & TT-1111 Ink)

Number of fields = 0

656:

Web Size = 1.0"

Pull Size = 1.0"

No Sense mark

No Flags

1-UP

Print Speed = 7.0 inches/sec

Sense to Cut = 0

Cut count = 1

No Head Lift

Transfer Type = 91 (Topcoat card stock & TT-1111 Ink)

Number of fields = 0

676:

Web Size = 1.0"

Pull Size = 1.0"

No Sense mark

No Flags

1-UP

Print Speed = 5.0 inches/sec

Sense to Cut = 0

Cut count = 1

No Head Lift

Transfer Type = 91 (Topcoat card stock & TT-1111 Ink)

Number of fields = 0

686:

Web Size = 1.0"
Pull Size = 1.0"
No Sense mark
No Flags
1-UP
Print Speed = 12.0 inches/sec
Sense to Cut = 0
Cut count = 1
No Head Lift
Transfer Type = 201 (New Tag Stock A & GN - 1111 Ink)
Number of fields = 0

545:

Web Size = 1.0"
Pull Size = 1.0"
No Flags
1-UP
Print Speed = 10.0 inches/sec
Cut count = 1
Number of fields = 0

Format Defaults When Printer Receives a ~FA Command:

630:

        No Datacopy

        No Increment

        Font = 8 Point Standard

        Field Position = 0, 0

        No Expansion

        Inter Character Spacing of 3

        Field Rotation = 0 degrees

650:

        No Datacopy

        No Increment

        Font = 8 Point Standard

        Field Position = 0, 0

        No Expansion

        Field Rotation = 0 degrees

960:

        Side = Front

        Web = 0.250"

        Pull = 0.250"

        Field Rotation = 0 degrees

        No Edit codes

        No Expansion

        Font = 8 Point Standard

636 / 656 / 676 / 686 / 545:

        Web = 0.062"

        Pull = 0.062"

        No Increment

        Length = 1

        Font = Monospace 821 Bold

        Pointsize = 8

        Field Rotation = 0 degrees

        Code Page = 437

        Justification = Left

        Inter Character Spacing of 3

Format Defaults When Printer Receives a ~FB Command:

630:

No Datacopy

No Increment

Barcode Type = UPC-A

Barcode height = 1/2"

Module width = 1

No Guard bars

Field Position = 0, 0

Field Rotation = 90 degrees

No Check Digit

No Human Readable Information

Barcode margin (Quiet Zone) = 0

System Digit position = 0,0

650:

No Datacopy

No Increment

Barcode Type = UPC-A

Barcode height = 1/2"

Field Position = 0, 0

Field Rotation = 90 degrees

No Check Digit

No Human Readable Information

636 / 656 / 676 / 686 / 545:

No Datacopy

No Increment

Barcode Type = UPC-A

Length = 12

Barcode height = 1/2"

Module width = 0.13"

No Guard bars

Web = 0.062"

Pull = 0.062"

Field Rotation = 90 degrees

No Check Digit

No Human Readable Information

Barcode margin (Quiet Zone) = 0

System Digit position = 0,0

HRI Font = Monospace 821 Bold

HRI Point size = 8

HRI Code Page = 437

HRI segmentation = 1-5-5-1

HRI Position = bottom

Justification = Left

Inter Character Spacing of 3

Format Defaults When Printer Receives a ~FS Command:

630:

Field Position = 0, 0

No Expansion

Spacing between symbols = 5 dots

Field Rotation = 0 degrees

Symbol type = 9

650:

Field Position = 0, 0

No Expansion

Field Rotation = 0 degrees

960:

        Side = Front

        Web = 0.250"

        Pull = 0.250"

        Field Rotation = 0 degrees

        No Expansion

636 / 656 / 676 / 686 / 545:

        Web = 0.062"

        Pull = 0.062"

        Length = 1

        Image Type = BMP

        Justification = Left

        Inter Character Spacing of 3

Format Defaults When Printer Receives a ~FG Command:

630:

        Field Position = 0, 0

        No Expansion

        Spacing between symbols = 5 dots

        Field Rotation = 0 degrees

        Logo type = 1

650:

        Field Position = 0, 0

        No Expansion

        Field Rotation = 0 degrees

        Logo type = 1

960:

        Side = Front

        Web = 0.250"

        Pull = 0.250"

        Field Rotation = 0 degrees

        No Expansion

        Logo type = 1

636 / 656 / 676 / 686 / 545:

        Web = 0.062"

        Pull = 0.062"

        Image Type = BMP

Format Defaults When Printer Receives a ~FL Command:

630:

Field Start Position = 0, 0

Field End Position = 0,0

Line Width Horizontal and Vertical = 2 dots

960:

Field Start Position = 0.250", 0.250"

Field End Position = 0.250", 0.250"

Line Width Horizontal and Vertical = 1 dot

636 / 656 / 676 / 686 / 545:

Web = 0.062"

Pull = 0.062"

End Web = 1.062"

End Pull = 1.062"

Line Width Horizontal and Vertical = 3 dots

Shape = Box

APPENDIX C – Volatile Logos

Volatile Logos are temporary image files that are stored in the printer only until the printer is turned off or until they are deleted. Volatile logos are useful when multiple batches use the same image files. By downloading a volatile logo, it can be used by multiple batches simply by referencing its number. This eliminates the need to download the same image file multiple times, reducing the amount of data that has to be sent to the printer and reducing transmission time.

A volatile logo may not be downloaded within a format (between the ~XA and ~XZ commands) or a batch (between the ~ZD and ~ZZ commands), and must be downloaded to the printer before the batch that uses it. It may be downloaded after the format, but before the first batch that references it.

Once a volatile logo is downloaded to the printer, it is retained until the printer is turned off or until a Delete Volatile Logos command is received. When the Delete Volatile Logos command is received, all volatile logos are deleted. However, if there are batches ready to print, the volatile logos that were stored in the printer when the batches were received will be retained until the batches are printed or cleared from the printer. This eliminates the need to wait until printing is complete to send the Delete Volatile Logos command.

> **NOTE: Sending two volatile logos with the same reference number without an intervening Delete Volatile Logos command will result in unspecified operation.**

For example, the host sends the following data to the printer:

VOLATILE LOGO 1

VOLATILE LOGO 2   *These logos go with these batches*

BATCH 1

BATCH 2

DELETE VOLATILE LOGOS

VOLATILE LOGO 1

VOLATILE LOGO 2   *These logos go with these batches*
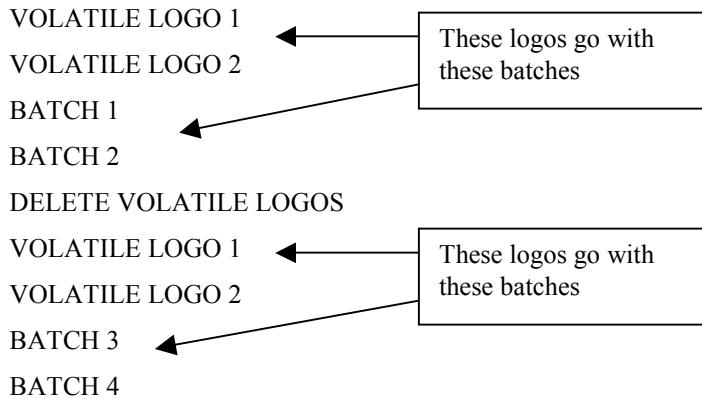
BATCH 3

BATCH 4

Batches 1 and 2 will use the first set of volatile logos, and batches 3 and 4 will use the second set of volatile logos. This will work properly independent of the timing of transmission or printing.

Volatile logos are referenced using a standard logo field (~FG). The ~GT command will indicate a logo type V (~GTV) to denote that the field will use a temporary logo. The corresponding ~D field in the batch will identify the logo number defined in the ~V command. See the example below in the ~V command description. Note that the ~FG field definition included the ~GTV command, which indicated that the image will come from the volatile logo set. In the batch, the ~D42 indicates that volatile logo number 42 will be used.

Volatile Logos use the following commands:

~VVV999   500, 600, 600RFID, 700

This command allows graphics to be transmitted to the printer and kept for printing until the printer is powered off. This is referred to as volatile or temporary graphics. The graphic will exist in the printer's memory until either the printer is powered off or the ~VD command is received.

The graphic received can be either a BMP or a PCX. The 999 is replaced by a unique number that is used to reference the volatile logo in the batch.

This command can be sent either before the ~XA and after the ~XZ or before the ~ZD and after the ~ZZ but not between those commands. The graphic must be downloaded before it can be used for printing. It must be downloaded before the batch in which it is referenced. If a graphic with the graphic number specified is not found, the label will print with no logo.

To be able to print this graphic, a field type defining the graphic needs to be present in the format. Using the option V in the ~GT command will indicate the graphic is in the volatile queue. In the batch, the data for the graphic field will be the graphic number assigned to the graphic from the ~V command. For an example, a format to print a temporary graphic would look like:

~VVV42<GRAPHIC DATA>~

~XA~XP2250~XW3000~XMH1125~XFL

~FG01~FW1000~FP1500~GTV

~XZ

~ZD00~D42~ZZ0010~

~VD   500, 600, 600RFID, 700

This command deletes all volatile graphics that have previously been downloaded to the printer since the printer has been powered on. Any batches that have been received by the printer prior to receiving this command will use the volatile logos in place when those batches were received (see the example in the text above).

APPENDIX D – PCL Summary 7.2

Format Commands

Command	Description	Available on
~XA	**Start of Format**	630, 650, 960, 6X6, SNAP
~XW9999	**Tag Web Size** Up to 5000 (5.0") by increments of 33 (.033") Up to 4800 (4.8") by increments of 33 (.033") Up to 4000 (4.0") 1000 (1.0") to 5125 (5.125") 500 (0.5") to 1375 (1.375")	630 650 960 636, 656, 676, 686 545
~XP99999	**Tag Pull Size** Up to 7000 (7.0") by increments of 33 (.033") Up to 14000 (14.0) by increments of 33 (.033") Up to 6000 (6.0") 1000 (1.0") to 14000 (14.0") 625 (.625") to 14000 (14.0")	630 650 960 636, 656, 676, 686 545
~XM_9999	**Sense Mark Format** **H**:Hole, **R**:Reflective **H**:Hole, **T**:Top Reflective, **R**:Reflective (back option), **C**: Contrast sensor	630, 650, 960, 636, 656, 686 676, SNAP
~XF_	**Flagging** **N**: None **L**: Long / Short, **D**: Double, **T**: Tag, **V**: Verifier, **B**: Double blank **S**: Small, **M**: Medium, **X**: Extra Large, **Z**: Zero length	630, 650, 960, 6X6, SNAP 630, 650, 960, 6X6, SNAP 630, 650, 960 630, 6X6, SNAP 630, 650 650 6X6, SNAP 6X6, SNAP
~XG	**Graphic Field Designation** **A**: Graphic field is an alphanumeric field. **L**: Graphic field is a logo field. **P**:Point size of a graphic alphanumeric field.	PcMate Plus Display
~XL9	**Number of Tags Across the Web** Up to 4 tags Up to 2 tags	630, 636, 656, 676, SNAP 650, 960
~XS99	**Print Speed** **50**: 5.0"/sec, **40**: 4.0"/sec, **30**: 3.0"/sec **65**: 6.5"/sec to **25**: 2.5"/sec by .5"/sec **70**: 7.0", **60**: 6.0", **45**: 4.5", **30**: 3.0"/sec **120**: 12", **100**: 10", **70**: 7.0", **30**: 3.0"/sec **100**: 10", **80**: 8", **60**: 6.0", **40**: 4.0"/sec **120**: 12', **100**: 10", **80**: 8", **70**: 7", **60**: 6:, **45**: 4.5", **30**: 3"	630, 676 650 636, 656, SNAP 500 686 545 SNAP 600, SNAP 700
~XUC9	**Future Command**	

~XUB9	**Barcode Exclusion**
	   B9 – Barcode Exclusion SV100 Scanner Only
	  This command allows for specified barcodes on the tag
	    NOT to be verified. This command is **ONLY** valid with
	    the SV100 verifier. The barcodes can be excluded by
	    replacing the 9 with the following;
	    0 = Exclude none
	    1 = Exclude UPC-A, UPC-E, EAN-8, EAN-13
	    2 = Exclude Code 39
	    4 = Exclude Code 128, EDI Code 128
	    8 = Exclude Interleave 2 of 5
	    16 = Exclude Code 93
	  To exclude multiple barcodes, replace the 9 with the sum
	    of the values designating the barcodes to exclude.
	Example: To exclude code 39 and Interleave 2 of 5, add the
	2 and the 8 together and the command would be **~XUB10**.
		636, 656, 676, 686, SNAP

~XUR999	**RFID Read Power**	SNAP 700
~XUW999	**RFID Write Power**	SNAP 700
~XUA9	**RFID Signal Adjust**	SNAP 700
~XUX9	**RFID Write Retries**	SNAP 700
~XUP99	**RFID Protocol**	SNAP 700
~XH99	**Head Strobe Value** - 1 to 15	630

~XT99	Transfer Type	
	9: Topcoated Card Stock w/TF-1111 (lightest-650 only)	650
	74: Fabric 2795 w/TT-1111	650, 636, 656, 676, SNAP
	60: PS Thermal Receptive w/TW-1111	650, 636, 656, 676, SNAP
	15: Size Stickers w/TW-1111	650
	14: Fabric 2800 w/HC-3111	650
	11: Tyvek w/TF-1111	650
	59: PS Thermal Receptive w/TT-1111	650, 636, 656, 676, SNAP
	73: Fabric 2800 w/HR-1111	650, 636, 656, 676, SNAP
	69: Fabric 2800 w/TT-1111	650, 636, 656, 676, SNAP
	10: PS Non Thermal Receptive w/TF-1111	650
	8: Tyvek w/TT-1111	650
	4: PS Non Thermal Receptive w/TT-1111	650
	53: Topcoated card stock w/TT-1111	650, 636, 656, 676, SNAP
	54: Topcoated card stock w/HR-3111	650, 636, 656, 676, SNAP
	0: Topcoated card stock w/HR-4111	650
	0: NonTopcoated card stock w/HR-4111	650
	5: PS Non Thermal Receptive w/HR-1111	650
	56: Topcoated Card Stock w/TW-1111	650, 636, 656, 676, SNAP
	78: Fabric 2795 w/HR-1111	650, 636, 656, 676, SNAP
	55: Topcoated card stock w/HR-1111 (darkest-650 only)	650, 636, 656, 676, SNAP
	51: Heat Seal w/SD-1111	636, 656, 676, SNAP
	52: Topcoated card stock w/TT-3111	636, 656, 676, SNAP
	57: Topcoated card stock w/TW-1151	636, 656, 676, SNAP
	58: Pressure Sensitive w/TT-3111	636, 656, 676, SNAP
	61: Pressure Sensitive w/TW-1151	636, 656, 676, SNAP
	62: Pressure Sensitive w/HR-3111	636, 656, 676, SNAP
	63: Uncoated Tag Stock w/TT-3111	636, 656, 676, SNAP
	64: Uncoated Tag Stock w/TT-1111	636, 656, 676, SNAP
	65: Uncoated Tag Stock w/HR-3111	636, 656, 676, SNAP
	66: Uncoated Tag Stock w/HR-1111	636, 656, 676, SNAP
	67: Uncoated Tag Stock w/TW-1111	636, 656, 676, SNAP
	68: Uncoated Tag Stock w/TW-1151	636, 656, 676, SNAP
	70: Fabric 2800 w/HR-3111	636, 656, 676, SNAP
	71: Fabric 2800 w/TT-3111	636, 656, 676, SNAP
	72: Fabric 2800 w/HC-3111	636, 656, 676, SNAP
	75: Fabric 2795 w/HR-3111	636, 656, 676, SNAP
	76: Fabric 2795 w/TT-3111	636, 656, 676, SNAP
	77: Fabric 2795 w/HC-3111	636, 656, 676, SNAP

~XT99 (Con't)	Transfer Type	
	79: Coated Tag Stock w/HR-4111	636, 656, 676, SNAP
	80: Pressure Sensitive w/HR-4111	636, 656, 676, SNAP
	81: Uncoated Tag Stock w/HR-4111	636, 656, 676, SNAP
	82: Fabric 2800 w/HR-4111	636, 656, 676, SNAP
	83: Fabric 2795 w/HR-4111	636, 656, 676, SNAP
	84: New Pressure Sensitive (no xfer) w/TT-3111	636, 656, 676, SNAP
	85: New Pressure Sensitive (no xfer) w/TT-1111	636, 656, 676, SNAP
	86: New Pressure Sensitive (no xfer) w/TW-1111	636, 656, 676, SNAP
	87: New Pressure Sensitive (no xfer) w/TW-1151	636, 656, 676, SNAP
	88: New Pressure Sensitive (no xfer) w/HR-1111	636, 656, 676, SNAP
	89: New Pressure Sensitive (no xfer) w/HR-3111	636, 656, 676, SNAP
	90: New Pressure Sensitive (no xfer) w/HR-4111	636, 656, 676, SNAP
	91: Coated Tag Stock w/GP-1111	636, 656, 676, SNAP
	92: Uncoated Tag Stock w/GP-1111	636, 656, 676, SNAP
	93: New Pressure Sensitive w/GP-1111	636, 656, 676, SNAP
	94: 2800 Fabric w/GP-1111	636, 656, 676, SNAP
	95: 2795 Fabric w/GP-1111	636, 656, 676, SNAP
	96: 2795 Fabric w/CT-1111	636, 656, 676, SNAP
	97: 4800 Fabric w/CT-1111	636, 656, 676, SNAP
	98: 4800 Fabric w/CT-1114 (Blue)	676, 656, 676, SNAP
	99: 4800 Fabric w/GP-1111	636, 656, 676, SNAP
	100: 2395NWT Fabric w/CL-1111 (UK)	636, 656, 676, SNAP
	101: 2395NWT Fabric w/XC-3111 (UK)	636, 656, 676, SNAP
	102: 2395NWT Fabric w/HR-1111 (UK)	636, 656, 676, SNAP
	103: 2495NWT Fabric w/CL-1111 (UK)	636, 656, 676, SNAP
	104: 2495NWT Fabric w/XC-3111 (UK)	636, 656, 676, SNAP
	105: 2495NWT Fabric w/HR-1111 (UK)	636, 656, 676, SNAP
	106: 4000NWT Fabric w/CL-1111 (UK)	636, 656, 676, SNAP
	107: 4000NWT Fabric w/XC-3111 (UK)	636, 656, 676, SNAP
	108: 4000NWT Fabric w/HR-1111 (UK)	636, 656, 676, SNAP
	109: 4002NWT Fabric w/CL-1111 (UK)	636, 656, 676, SNAP
	110: 4002NWT Fabric w/XC-3111 (UK)	636, 656, 676, SNAP
	111: 4002NWT Fabric w/HR-1111 (UK)	636, 656, 676, SNAP
	112: G.S. Satin w/XC-3111 (UK)	636, 656, 676, SNAP
	113: 2012T Fabric w/XC-3111 (UK)	636, 656, 676, SNAP
	114: 1021T Fabric w/XC-3111 (UK)	636, 656, 676, SNAP
	115: 2800 Fabric w/CT-1111	636, 656, 676, SNAP
	116: 591SST Fabric w/CT-1111	636, 656, 676, SNAP
	117: 591SST/601SST Fabrics w/CT-1114	636, 656, 676, SNAP
	118: 601SST Fabric w/CT-1111	636, 656, 676, SNAP
	119: 591SST/601SST Fabrics w/CT-1115	636, 656, 676, SNAP
	120: 591SST/601SST Fabrics w/CT-1117	636, 656, 676, SNAP
	121: 591SST Fabric w/CT-1112	636, 656, 676, SNAP
	122: 601SST Fabric w/CT-1112	636, 656, 676, SNAP
	155: 4900NWT / 4900HSA & HS1111	636, 656, 676, SNAP
	156: 1800FRA & TW1111	636, 656, 676, SNAP
	157: 1800FRA & GP1111	636, 656, 676, SNAP
	158: 2085NWT / 2495NWT / 2360NWT & HS1111	636, 656, 676, SNAP
	159: 2360NWT / 2800NWT & XC3111	636, 656, 676, SNAP
	160: 2895NWT / 2800NWT & HS1111	636, 656, 676, SNAP
	161: 2895NWT & XC3111	636, 656, 676, SNAP
	162: 2895NWT & HC3111	636, 656, 676, SNAP
	163: 1800MWA & GP1111	636, 656, 676, SNAP
	164: 1800MWA & TW1111	636, 656, 676, SNAP
	165: 604LKP / 601LKP & DS7501 / 7502 / 7504	636, 656, 676, SNAP
	166: 604LKP / 601 LKP & DS7503	636, 656, 676, SNAP
	167: 4800NBC Fabric & HS1011	636, 656, 676, SNAP

~XT99 (Con't)	Transfer Type	636, 656, 676, SNAP
	168: 2012T Fabric & HS1111/1112	636, 656, 676, SNAP
	169: 4360NBT Fabric & SD1011	636, 656, 676, SNAP
	170: 4041THS Fabric & HS1111	636, 656, 676, SNAP
	171: 4700TWT Fabric & PL1111	636, 656, 676, SNAP
	172: 4800TST Fabric & CT1111	636, 656, 676, SNAP
	173: 4800TST Fabric & CT1112	636, 656, 676, SNAP
	174: 4800TST Fabric & CT1114	636, 656, 676, SNAP
	175: 4800TST Fabric & CT1115	636, 656, 676, SNAP
	176: 4800TST Fabric & CT5137	636, 656, 676, SNAP
	177: 4800TST Fabric & HS1111	636, 656, 676, SNAP
	178: 770SWT Fabric & CT1112	636, 656, 676, SNAP
	179: 770SWT Fabric & CT1114	636, 656, 676, SNAP
	180: 770SWT Fabric & CT1115	636, 656, 676, SNAP
	181: 770SWT Fabric & CT5137	636, 656, 676, SNAP
	182: 772SWT Fabric & CT1112	636, 656, 676, SNAP
	183: 772SWT Fabric & CT1114	636, 656, 676, SNAP
	184: 772SWT Fabric & CT1115	636, 656, 676, SNAP
	185: 772SWT Fabric & CT5137	636, 656, 676, SNAP
	201: New Tag Stock A & GN – 1111	686
	202: New Tag Stock B & GN – 1111	686
	203: New Tag Stock C & GN – 1111	686
	204: New Tag Stock D & GN – 1111	686
	205: New Tag Stock E & GN - 1111	686
~XI	**Head Lift**	650, 656, 676
~XC99	**Number of Tags Before a Cut**	630, 6X6, SNAP
~XV_..._	**Verifier Setup Information**	636, 656, 676, 686, SNAP
	As many commands as are necessary can be placed after the ~XV command	
	W: Halt on warnings	
	N: Halt the printer on a no read only.	
	B: Halt the printer on both a no read and a symbol quality reject.	
	R: Halt on Symbol quality rejects only	
	S_: Quality level where _ is replaced by one character grade B,C,D,F	
	C99: Consecutive failure where 99 is replaced by 00=Disable or 01 thru 10	
	A99: Accumulative failure where 99 is replaced by 00=Disable or 01 thru 20	
~XR_	**Ink Color**	636 Beige,656 Beige
	R: Red ink, **B**: Black ink	
~XN	**Print Station Selection**	
	1:Station 1, **2**:Station 2, **3**:Station 3	676, 545, SNAP
~XO	**Mirror Image**	6X6, SNAP
~XD	**DPI Definition**	PcMate Plus Display
	240: 240 dpi, **300**: 300 dpi	
~XX	**Printer Definition**	PcMate Plus Display
	6X6, SNAP	
~XE	**Printer Halt After Batch Command**	6X6, SNAP
~XJ99	**Minimum Barcode Scans**	6X6, SNAP
~XZ	**End of Format**	630, 650, 960, 6X6, SNAP

Field Commands

~FA99	Alpha Numeric Field Definition	
	1 to 64 characters	630, 650, 960
	1 to 128 characters	6X6, SNAP
~FB99	Barcode Field Definition	630, 650, 6X6, SNAP
~FL	Box / Line Field Definition	630, 960, 6X6, SNAP
~FG99	Logo Field Definition	630, 650, 960, 6X6, SNAP
~FS99	Care Symbol Field Definition	630, 650, 960, 6X6, SNAP
~FY99	Special Symbol Field Definition	960
~FM	Graphic Image Field Definition	630, 6X6, SNAP
~FK	RFID Field Definition	SNAP 700
~FW9999	Field Web Position	630, 650, 960, 6X6, SNAP
~FP99999	Field Pull Position	630, 650, 960, 6X6, SNAP
~FR9	Field Rotation	
	0: 0, **1**: 90, **2**: 180, **3**: 270 degrees	630, 650, 960, 636, 656, 676
~FD_	Side of Tag Field is Placed on	
	F:Front, **B**:Back	960, 676
	1:Station 1, **2**:Station 2, **3**:Station 3	676, 545 (only 1 & 2)
	2:Station 2	636, 656, 686
	A:Flag (Station 2 default),	960, 6X6, SNAP
	A1:Station 1 Flag, **A2**:Station 2 Flag, **A3**:Station 3 Flag	676, 545 (only A1 & A2)
~FTR9	RFID Transponder Read Field	SNAP 600RFID, SNAP
	1 – 64 bit signature	700RFID
	2 – 96 bit signature	
~FTRP9	RFID EPC Data Field Datacopy	SNAP 700RFID
	1 – 64 bit signature	
	2 – 96 bit signature	

Alphanumeric Field Commands

~AF9999	Alphanumeric Font Number	
	1:6 Pt CND, **2**:6 Pt STD,	630, 650, 960
	3:6 Pt BLD,	630,
	4:8 Pt CND, **5**:8 Pt STD, **6**:8 Pt BLD,	630, 650, 960
	7:10 Pt CND, **8**:10 Pt STD, **9**:10 Pt BLD,	630, 650, 960
	10:12 Pt CND, **11**:12 Pt STD, **12**:12 Pt BLD,	630, 650, 960
	13:OCR A	630, 650
~AL99999	Scaleable Fonts	
	5:Swiss 721 Bold	6X6, SNAP
	102:Swiss 721 Heavy	
	173:Swiss 721 Black Condensed	
	759:Swiss 721 Medium	
	596:Monospace 821	
	598:Monospace 821 Bold (default)	
~AC999	Code Page	960, 6X6, SNAP
	000, 001, 437, 850, 851, 852, 857, 866	
~AP99	Point Size of Scaleable Font	
	4 to 96	636, 656, 676, 686
	6 to 96	545
~A199	Data Copy Source Field	630, 650, 6X6, SNAP
~A299	Data Copy Start Character	630, 650, 6X6, SNAP
~A399	Data Copy Number of Characters	630, 650, 6X6, SNAP

~AS99	**Sequencing** **1** to **255** **1** to **254** **255**: Decrement by 1 **- 2,147,483,647** to **+ 2,147,483,647**	630, 960 650 6X6, SNAP
~AD99	**Number of Tags Before Sequencing**	630, 960, 6X6, SNAP
~AE_	**Edit Code** **L**:Left justified, **R**:Right justified, **C**:Center justified, **A**:Print as is	630, 650, 960, 6X6, SNAP
~AV9	**Height Expansion Multiple** 2, 4, and 8 1 to 9	650 630, 960
~AH9	**Width Expansion Multiple** 2, 4, and 8 1 to 9	650 630, 960
~AI99	**Intercharacter Spacing**	630, 960, 6X6, SNAP
~AR9	**Write Mode** **0**: Direct, **1**: And, **2**: Or, **3**: Xor **0**: Direct, **2**:Overlap, **3**:Inverse	630, 650, 960 6X6, SNAP
~AO99	**Oblique of Character (Slant)** -90 to 90	6X6, SNAP
~AT_	**Character Orientation** **V**:Vertical, **H**:Horizontal	6X6, SNAP
~AM_	**Function Field** **D**:Date – (mm/dd/yy), **E**:Date – (dd/mm/yy), **T**:Time – (hh:mm:ss AM/PM), **Q**:Quantity, **I**:Batch ID	6X6, SNAP
~AW9999	**Width of Field for Variable Width Fonts**	6X6, SNAP
~AQ9	**Quadrangle Field** **0**:Squeeze to fit, **1**:Proportion to fit, **2**:Stretch to fit, **3**: Regular fit	6X6, SNAP
~AA9	**Escapement** **0**:Left to Right, **1**:Right to Left	Future Command
~AB_	**Field Ascender / Descender Selection** **A**: Ascenders only, **D**: Descenders only, **B**: Ascender and Descenders, **O**: Neither Ascenders or Descenders	Future Command

Barcode Field Commands

~BF99	**Barcode Type**	
	1:UPC-A (1-5-5-1 HRI),	630
	1:UPC-A,	650, 6X6, SNAP
	3:UPC-E,	630, 6X6, SNAP
	4:Code 39, **5**:EAN-8, **6**:EAN-13, **7**:I 2 of 5,	630, 650, 6X6, SNAP
		630, 650, 6X6, SNAP
	10:Code 128, **11**:EDI Code 128,	630
		630
	12:UPC-A (4-4-4 HRI),	650
	13:Code 39 (Sears Code 39 HRI),	630
	14:UPC-A w/Extended guard bars,	650
	14:I 2 of 5 - 3:1 Ratio,	650
	15:Expanded Code 128,	6X6, SNAP
	16:Reduced Code 128,	6X6, SNAP
	17:Code 93	
	18: Data Matrix	6X6, SNAP
	19: GS1 DataBar Omnidirectional	6X6, SNAP
	20: GS1 DataBar Stacked Omnidirectional	6X6, SNAP
	21: GS1 DataBar Truncated	6X6, SNAP
	22: GS1 DataBar Stacked	6X6, SNAP
	23: GS1 DataBar Limited	6X6, SNAP
	24: GS1 DataBar Expanded	6X6, SNAP
~B199	**Data Copy Source Field**	630, 650, 6X6, SNAP
~B299	**Data Copy Start Character**	630, 650, 6X6, SNAP
~B399	**Data Copy Number of Characters**	630, 650, 6X6, SNAP
~BS99	**Sequencing**	630, 650, 6X6, SNAP
~BD99	**Number of Tags Before Sequencing**	630, 6X6, SNAP
~BH9999	**Height for the Barcode Bars**	630, 650, 6X6, SNAP
~BW9	**Module Width of the Bars**	630, 6X6, SNAP
~BX9999	**Length of Barcode Guard Bars**	630, 6X6, SNAP
~BC	**Check Digit Calculated**	630, 650, 6X6, SNAP
~BZ_	**HRI Placement**	
	T:Top, **B**:Bottom	630, 6X6, SNAP
~BA99	**HRI Font**	630, 650, 6X6, SNAP
~BL99999	**Scaleable Fonts**	
	5: Swiss 721 Bold	6X6, SNAP
	102: Swiss 721 Heavy	
	173: Swiss 721 Black Condensed	
	759: Swiss 721 Medium	
	596: Monospace 821	
	598: Monospace 821 Bold (default)	
~BP99	**Point Size of HRI**	
	4 to 96	636, 656, 676, 686
	6 to 96	545
~BI99	**Intercharacter Spacing**	6X6, SNAP
~BB9999	**Barcode Margin**	630
~BJ9999	**UPC System Digit / Check Digit Horizontal Placement**	630, 6X6, SNAP
~BK9999	**UPC System Digit / Check Digit Vertical Placement**	630, 6X6, SNAP
~BR9	**Write Mode**	
	0: Direct, **1**: And, **2**: Or, **3**: Xor	630, 650, 960
	0: Direct, **2**:Overlap, **3**:Inverse	6X6, SNAP

~BG9	**HRI Segmentation** **0**:None, **1**:4-4-4 UPC, **2**:1-5-5-1 UPC, **3**:Sears Code 39, **4**:1-6-6 EAN, **5**:UCC128 **6**:2&4, **7**:1&6, **8**:3-3-3-3, **9**:4-4	650, 6X6, SNAP 650, 6X6, SNAP 6X6, SNAP

~BM_	**Barcode Options**
	R99: Ratio for wide to narrow bars
	    20:2.0, **21**:2.1, **22**:2.2, ..., **29**:2.9, **30**:3.0
	S9: Supplement to UPC/EAN barcode
	    2:+2, **5**:+5
	D99: Data Matrix matrix size
	    1 to 30 (see chart with ~BM command in Reference
	       Guide)
	X99: X undercut (GS1 DataBar barcodes only)
	Y99: Y undercut (GS1 DataBar barcodes only)
	M99: Number of segments per row (GS1 DataBar Expanded
	    barcodes only)
		6X6, SNAP

Box / Line Field Commands

~LW9999	**End Web Position of Box / Line field**	630, 960, 6X6, SNAP
~LP99999	**End Pull Position of Box / Line field**	630, 960, 6X6, SNAP
~LV99	**Width of Vertical Line**	630, 6X6, SNAP
~LH99	**Width of Horizontal Line**	630, 6X6, SNAP
~LT_	**Type of Shape** **L**:Line, **B**:Box	960, 6X6, SNAP
~LF9	**Write Mode of Box** **0**:Normal, **1**:Clear, **2**:Fill	630, 960, 6X6, SNAP

~LR9	**Write Mode**
	    0: Direct, **1**: And, **2**: Or, **3**: Xor
	    0: Direct, **2**:Overlap, **3**:Inverse
		960
		6X6, SNAP

Logo Field Commands

~GH9	**Logo Pull Expansion Multiple**	630
~GV9	**Logo Web Expansion Multiple**	630
~GT99	**Logo Type**	630, 650, 960
~GM9	**Type of Image File** **1**:ASM, **2**:LGO, **3**:BMP, **4**:PCX	6X6, SNAP
~GE_	**Logo Horizontal Justification** **L**:Left, **C**:Center, **R**:Right	6X6, SNAP
~GU_	**Logo Vertical Justification** **T**:Top, **C**:Center, **B**:Bottom	6X6, SNAP

~GR9	**Write Mode**
	    0: Direct, **1**: And, **2**: Or, **3**: Xor
	    0: Direct, **2**:Overlap, **3**:Inverse
		630, 650, 960
		6X6, SNAP

~GI99	**Inter Logo Spacing**	630

Care Symbol Field Commands

~SH9	Care Symbol Pull Expansion Multiple	630
~SV9	Care Symbol Web Expansion Multiple	630
~ST99	**Care Symbol Type** **1**:Small set, **2**:Large set **3**:Nafta symbols **9**:Care symbol set	960, 6X6, SNAP 6X6, SNAP 630
~SR9	**Write Mode** **0**: Direct, **1**: And, **2**: Or, **3**: Xor **0**: Direct, **2**:Overlap, **3**:Inverse	630, 650, 960 6X6, SNAP
~SI99	**Spacing Between Care Symbols**	630, 960, 6X6, SNAP
~SP99	**Point Size of Symbol** 4 to 96 6 to 96	636, 656, 676, 686 545
~SW9999	**Care Symbol, Width of Field**	6X6, SNAP
~SQ_	**Care Symbol, Quadrangle Field** **0**:Squeeze to fit, **1**:Proportion to fit, **2**:Stretch to fit, **3**:Regular fit	6X6, SNAP
~SE_	**Edit Code** **L**: Left justified, **R**: Right justified, **C**: Center justified, **A**: Print as is	6X6, SNAP
~SO99	**Oblique of Character (Slant)** -90 to 90	6X6, SNAP

Special Symbol Field Commands

~YH9	Special Symbol Pull Expansion Multiple	960
~YV9	Special Symbol Web Expansion Multiple	960
~YT99	**Care Symbol Type** **1**:TM, **2**:cm, **3**:10 Pt fractions, **4**:12 Pt fractions, **5**:Size symbols	960 960
~YR9	**Write Mode** **0**: Direct, **1**: And, **2**: Or, **3**: Xor	960
~YI99	**Spacing Between Special Symbols**	960

Image Commands

~I	Graphic Image	630, 6X6, SNAP
~MH9	Image Width Expansion Multiple	630
~MV9	Image Height Expansion Multiple	630
~MR9	**Write Mode** **0**: Direct, **1**: And, **2**: Or, **3**: Xor **0**: Direct, **2**:Overlap, **3**:Inverse	630, 6X6, SNAP

RFID Commands

~KS99	**Sequencing** - 2,147,483,647 **to** + 2,147,483,647	SNAP 700RFID

Batch Commands

~ZD99	Start of Batch Data	630, 650, 960, 6X6, SNAP
~D	Data to be Printed on the Tag	630, 650, 960, 6X6, SNAP
~ZB9999	Batch Separation	630, 6X6, SNAP
~ZZ9999	End of Batch Data	630, 650, 960, 6X6, SNAP
~ZIXXXXXX XX	**Batch ID** XXXXXXXX Replaced with ID number	6X6, SNAP
~ZE………..	Extended Batch Information	SNAP
~CC	Tells Printer to Send FS for Each Tag	630, 6X6, SNAP
~CF_	**Current Batch Flagging** **N**:None, **L**:Long/Short, **D**: Double, **F**: Flag according to format, **T**: Tag, **V**: Verifier **B**: Double blank, **S**: Small, **M**: Medium, **X**: Extra Large **Z**: Zero length	630, 650, 960, 6X6, SNAP 630, 650, 960 630, 650, 960, 6X6, SNAP 630, 6X6, SNAP 630, 650 650 6X6, SNAP 676
~CI	Tells Printer to Send Batch ID After Printing	6X6, SNAP
~CK_	**Suppresses the Cut** **A**: All cuts in the batch are suppressed **B**: Only the cut between batches is suppressed	6X6, SNAP
~CE	Printer Halt After Batch Command	6X6, SNAP

APPENDIX E – Graphics

The PCL printers are designed to allow the printing of graphic images on the label. The printers support BMP and PCX formats (monochrome only). This discussion applies to the 6X6 and SNAP printers only.

There are two field types to support printing graphic images. When using the Graphic Image Field (~FM) , the graphic image is included in the batch data. When using the Logo Field (~FG), the graphic image is stored in the printer and only a reference value is sent with the batch.

Graphic Image Fields are the most versatile, since the image is sent with every batch. This is useful when many images are required or the images change often. However, the batch files become larger because the image has to be sent with every batch. Since graphic image files are binary files, problems can occur with applications that have difficulty handling binary data. For example, some applications have trouble handling non-ASCII values.

Logo Fields are best when there are relatively few images, and they seldom change. Since the actual image file is stored in the printer, only a reference to the file name is needed, so the batch is smaller. Also, since no binary data is included in the batch file, there is less chance of problems with applications that have difficulty handling binary data.

Graphic Image Fields

When the format contains a Graphic Image Field, the corresponding data field in the batch will start with a ~I. This is directly followed by the image file. Both BMP and PCX files contain field indicating the file size, so no file size command or terminator is required. The image file must not be modified in any way. Specifically, the binary file may not be broken with line breaks. This is sometimes a problem, most commonly with mainframe applications.

The field attribute commands described in the reference are used to indicate how the image file will be printed. Refer to the command reference descriptions for details.

Logo Fields

When using Logo Fields, the actual image file is stored in the printer. The image file name must be of the following form:

ABC12345.BMP or ABC12345.PCX

Where **ABC** is the Logo Prefix, **12** is the Logo Set, and **345** is the Logo Position. The Logo Set is specified in the format using the ~GT attribute command in the Logo Field definition. The Logo Position is specified in the batch, in the data field corresponding to the Logo Field.

It is very important to note that the Logo Prefix (**ABC)** is not used. Therefore, the files ABC01001.BMP and DEF01001.BMP are the same as far as the printer is concerned. If logo files with these names are stored in the printer, only the first one loaded will be accessible.

Volatile Logos

The Volatile Logo feature allows for storing logos in the printer temporarily. This feature is useful when there are many batches that use the same set of logos, but the logos change frequently. The temporary logos are downloaded before the batches, and they are referenced in much the same way as normal logos. Since the logo is only downloaded once and

referenced many times, the batch files are smaller and transmission time is reduced. When the batches that use the temporary logos are done, the logos can be deleted. Refer to Appendix C for more details.

APPENDIX F – RFID Operation

Certain models in the SNAP printer line have the capability of reading and/or writing RFID transponders embedded in labels. This section explains the details of designing the format for labels with RFID transponders.

Gen 0 (Read Only) Transponders

Class 1 Gen 0 transponders are read only. They contain a fixed 64-bit or 96-bit unique signature. The SNAP RFID printers are capable of reading this signature and printing it on the label. This is accomplished by defining an alphanumeric field on the tag of sufficient length to print the RFID transponder ID and adding the ~FTR command to the field definition (see the Command Reference for details of this command). Note that a data field (~D…) corresponding to this field must be present in the batch, but any data in the data field will be ignored.

In addition, the printer can create an association file that lists all RFID signatures that are associated with the SKU for the batch. This is a special application that involves complex software systems beyond the scope of this manual and will not be described here.

Gen 2 (Read/Write) Transponders

For printers having the capability of writing to Class 1 Gen 2 transponders, a special field type is used to provide the data to write to the device. This field type is defined by the ~FK field type command. For this field type, only the ~FP (Field Pull Position) command is active. This command defines the distance from the tag origin to the center of the transponder in the pull direction. This value is used by the printer to determine when the transponder is at the antenna. If this command is not included, the printer will assume that the transponder is centered in the tag. This may result in unreliable operation.

There is only a single attribute available for this field type. The ~KS command specifies that the EPC data is to be incremented for each tag. The increment value is included in the command (see the Command Reference for details). Only the EPC data can be incremented.

The data field for this field consists of several values, separated by the ASCII pipe character (|). These sub-fields are:

> EPC Data
>
> User Memory
>
> Reserved – must be empty
>
> Access Password
>
> Kill Password

The format and data allowed in these fields may vary by transponder type.

In addition to writing the data to the transponder, it is possible to print the EPC value on the tag. To do this, either an alphanumeric or barcode field should be defined and the ~FTRP9 command included in the field definition. The sub-stringing command (~A199/~A299/~A399 or ~B199/~B299/~B399) may be used to select a portion of the EPC value to be printed.

It is the format designer's responsibility to ensure that the field is configured to properly print the EPC value. For example, the field must be the correct size for the expected data and position so that the field resides completely on the tag. For a bar code field, the data and bar code type must be compatible.

Following is a list of commands specific to RFID. Descriptions of the commands is contained in the Command Reference section of this manual.

Format Header Commands

- ~XUR – RFID Read Power
- ~XUW – RFID Write Power
- ~XUA – RFID Signal Adjust

- ~XUX – RFID Retries
- ~XUP – RFID Protocol

RFID Field Definition Commands

- ~FK – RFID Field Definition
- ~KS – RFID Field Increment Value