PRINTRONIX AUTO ID

STGL, a SATO® SGL ® Printer Protocol

Programmer's Reference Manual

Thermal Series Printers

Trademark Acknowledgments

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1 *Introduction*

About This Manual

This manual explains the differences between Printer Protocol Interpreter SATO® Graphic Language (STGL) Utility and the SATO printer language. Use this manual with your Administrator's Manual for complete printer-protocol operation.

Bi-Directional Communication

Thermal printers have several bi-directional protocols, which allow the host to establish a two-way communication with the printer. It allows the host to request printer status and operational information.

NOTE: Bi-directional communication is available through the serial, parallel IEEE-1284, USB, and Ethernet interfaces.

To enable bi-directional communication the following conditions must be met:

- STGL emulation must be active.
- Set *Comm. Protocol* to **Status 3** or **Status 4** in the *Application* > *STGL Setup* menu to enable bi-directional communication.

NOTE: The interface in which the status is returned is the same interface in which the data is received.

NOTE: If the Windows driver is used in combination with STGL, do not use bi-directional communication, use the Standard communication protocol setting.

Return Status Port

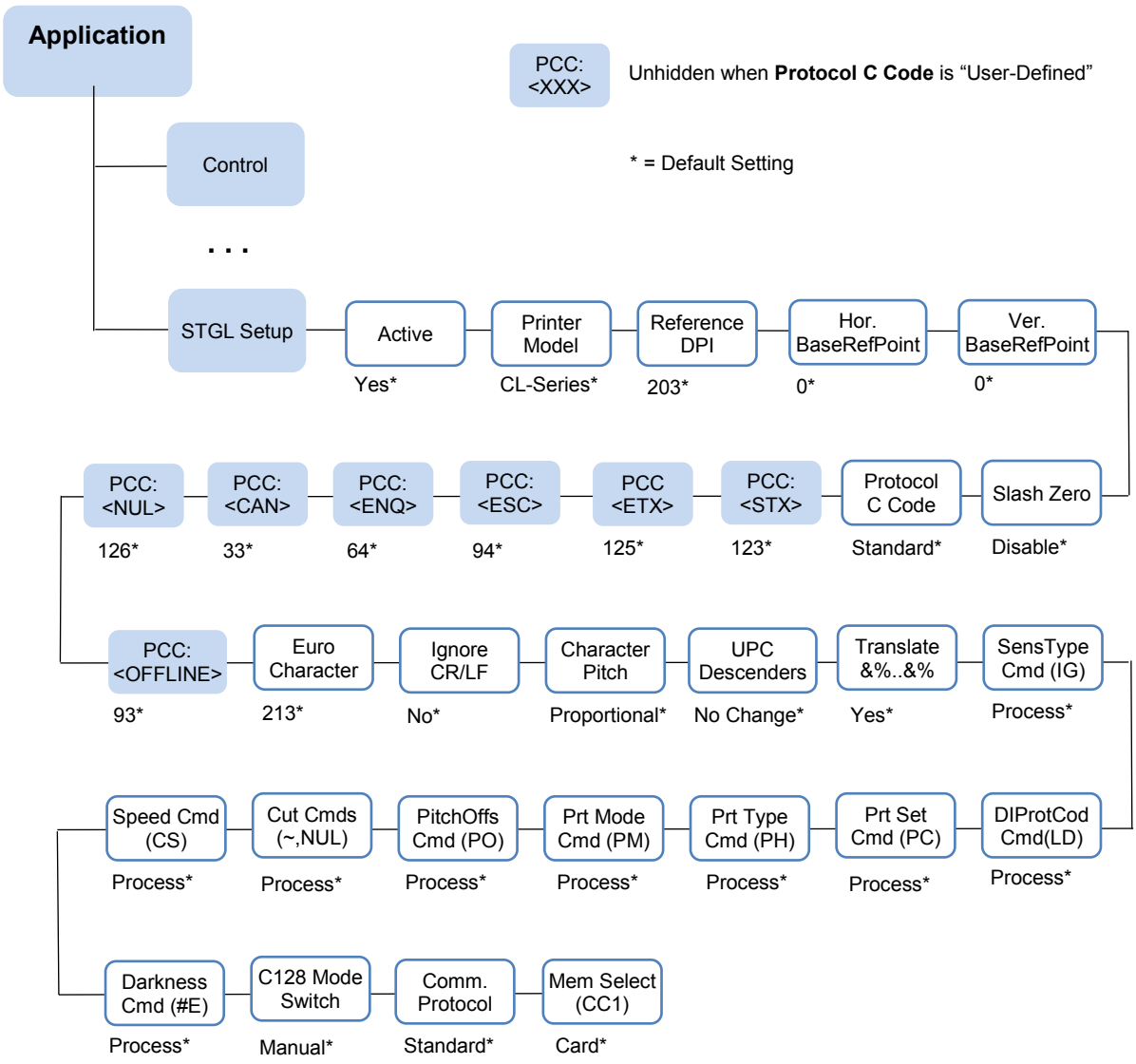
For *Comm. Protocol* **Status 2** to **Status 5**, configure the return status port using *System* > *Printer Mgmt* > *Ret. Status Port* menu.

NOTE: The return status port does not need to be the same as the active host interface on which data is received. For example, it is possible to receive data on the serial port, and send out the status through the Ethernet interface. Using Ethernet only, it is possible to return status through the port through which data was received (data port), but it is also possible to use another port for returning status (status port).

The port number for the status port can be set through the menu *System* > *Printer Mgmt* > *Status Port Number*.

STGL Setup Menus

The *STGL Setup* submenu is found by selecting the Application icon within the Settings section of the User Interface. The STGL Setup submenu will only be present when the *Application* > *Control* > *Active IGP Emul* is set to STGL.



STGL Setup Menus

IMPORTANT **The STGL Setup submenu will only be present when the Active IGP Emulation menu *Application > Control > Active IGP Emul* is set to STGL.**

Application > STGL Setup > Active	
Indicates if the STGL parser should process all incoming data, or that all data should be passed to the bottom emulation.	
Yes	STGL is active, process SATO commands.
No	STGL is inactive, used to print pure text.
Factory Default	Yes

Application > STGL Setup > Printer Model	
This setting indicates whether or not to emulate certain legacy models. These models have the following differences: Bolder M-Font and Larger WB-Font.	
CL-Series	Emulate current CL-Series models.
CL-Legacy	Emulate older legacy printer models.
Factory Default	CL-Series

Application > STGL Setup > Reference DPI	
When parameters are defined as number of dots, these values translate to the actual printhead resolution as necessary. Graphics and downloaded bitmaps will not be scaled since this usually does not result in an image that is acceptable to users.	
203	Incoming parameters are assumed to be in 300 DPI. On a 300 DPI printer, they will be scaled.
305	Incoming parameters are assumed to be in 305 DPI. On a 203 DPI printer, they will be scaled.
M8450 1xDotExp	Compatibility with a M8450 printer, parameters area assumed to be in 300 DPI.
M8450 2xDotExp	Compatibility with a M8450 printer, parameters area assumed to be in 150 DPI.
M8450 3xDotExp	Compatibility with a M8450 printer, parameters area assumed to be in 100 DPI.
Factory Default	203

Application > STGL Setup > Hor. BaseRefPoint	
This setting changes the horizontal base reference point for all subsequent label jobs. Its effect is identical to the <ESC>A3 Base Reference point command.	
Minimum	-9999
Maximum	9999
Factory Default	0 dots

Application > STGL Setup > Ver. BaseRefPoint	
This setting changes the Vertical base reference point for all subsequent label jobs. Its effect is identical to the <ESC>A3 Base Reference point command.	
Minimum	-9999
Maximum	9999
Factory Default	0 dots

Application > STGL Setup > Slash Zero	
This parameter allows you to print the numeral “0” with or without the slash.	
Disable	Zero is printed without a slash.
Enable	Zero is printed with a slash.
Factory Default	Disable

Application > STGL Setup > Protocol C Code	
Protocol Control Codes are the special control characters that prepare the printer to receive instructions. For example, the <ESC> character tells the printer that a command code will follow and the <ENQ> character asks for the printer status. See Table 1.	
Standard	Use the predefined Standard (non-printable) Protocol Control Codes.
Non Standard	Use the predefined Non-Standard (printable) Protocol Control Codes.
User Defined	New menu options in the form “PCC: <XXX>” will be unhidden to define hex-values for each Protocol Control Code Character.
Factory Default	Standard
IMPORTANT	The <ESC>LD command (Custom Protocol Command Codes Download) will place the menu-setting in User-Defined mode and overrides the user-defined character codes in the menu with the defined characters in the command.

Table 1 Protocol Control Codes

Control Char	Standard	Non-Standard	Description
STX	0x02	0x7B = {	Start of Data
ETX	0x03	0x7D = }	End of Data
ESC	0x1B	0x5E = ^	Command code to follow
NULL	0x00	0x7E = ~	Cutter command
ENQ	0x05	0x40 = @	Get printer status, Bi-Com mode
CAN	0x18	0x21 = !	Cancel print-job, Bi-Com mode
Off-Line	0x40	0x5d =]	Take printer offline

Application > STGL Setup > PCC: <STX>	
This menu to select the STX character is unhidden when the menu Protocol C Code is set to “User-Defined”.	
Minimum	0
Maximum	255
Factory Default	123

Application > STGL Setup > PCC: <ETX>	
This menu to select the ETX character is unhidden when the menu Protocol C Code is set to “User-Defined”.	
Minimum	0
Maximum	255
Factory Default	125

Application > STGL Setup > PCC: <ESC>	
This menu to select the ESC character is unhidden when the menu Protocol C Code is set to “User-Defined”.	
Minimum	0
Maximum	255
Factory Default	94

Application > STGL Setup > PCC: <ENQ>	
This menu to select the ENQ character is unhidden when the menu Protocol C Code is set to “User-Defined”.	
Minimum	0
Maximum	255
Factory Default	64

Application > STGL Setup > PCC: <CAN>	
This menu to select the CAN character is unhidden when the menu Protocol C Code is set to “User-Defined”.	
Minimum	0
Maximum	255
Factory Default	33

Application > STGL Setup > PCC: <NUL>	
This menu to select the NUL character is unhidden when the menu Protocol C Code is set to “User-Defined”.	
Minimum	0
Maximum	255
Factory Default	126

Application > STGL Setup > PCC: <OFFLINE>	
This menu to select the OFFLINE character is unhidden when the menu Protocol C Code is set to “User-Defined”.	
Minimum	0
Maximum	255
Factory Default	93

Application > STGL Setup > Euro Character	
This selection allows the user to specify the hexadecimal code for the character which is replaced with the Euro Character.	
Minimum	0
Maximum	255
Factory Default	213 (0xD5)

Application > STGL Setup > Ignore CR/LF	
This selection tells the printer to strip out all carriage return/line feed pairs (CRLF) from the data stream, except for Graphics and 2D bar code data. It is used primarily to maintain compatibility with earlier models of SATO printers.	
No	Allow CR/LF in the data stream.
Yes	Remove all CR/LF from the data stream.
Factory Default	No

Application > STGL Setup > Character Pitch	
This selection allows you to set the default character pitch for the proportional Matrix & Auto Smoothing Fonts to either fixed character spacing or proportional character spacing. This command is overridden by the <ESC>PR or <ESC>PS Character Pitch Commands.	
Proportional	Print with proportional spacing.
Fixed Pitch	Print with fixed-pitch spacing.
Factory Default	Proportional

Application > STGL Setup > UPC Descenders	
Allows the user to force UPC/EAN barcodes to print with or without descenders.	
No Change	Use default behavior, matching Sato.
Always	Force UPC/EAN to print with Descenders.
Never	Force UPC/EAN to print without Descenders.
Factory Default	No Change

Application > STGL Setup > Translate &%..&%	
This setting allows replacing of the string &%CC&% by one single control character with a hex value equal to that of string CC.	
No	Hex Transparency option disabled.
Yes	Hex Transparency option enabled.
Factory Default	No
IMPORTANT	This option might be extended in the future to use user-defined introducers.

Application > STGL Setup > SensType Cmd(IG)	
Determines whether the Sensor Type Command is processed or ignored.	
Process	Process the Sensor Type Command. This command is used to select the Reflective/Transmissive/No Sensor.
Ignore	Ignore the Sensor Type Command.
Factory Default	Process

Application > STGL Setup > DlProtCodCmd(LD)

Determines whether the downloading of user-defined Protocol Control Codes is processed or ignored.	
Process	Process the downloading of Protocol Control codes.
Ignore	Ignore the downloading of Protocol Control codes.
Factory Default	Process

Application > STGL Setup > Prt Set. Cmd(PC)	
Determines whether the Printer Setting Command is processed or ignored.	
Process	Process the Printer Setting Command. Allows changing several configuration options.
Ignore	Ignore the Printer Setting Command.
Factory Default	Process

Application > STGL Setup > Prt Type Cmd(PH)	
Determines whether the Print Type Command is processed or ignored.	
Process	Process the Print Type Command. Selects the Thermal Transfer or Direct Thermal print type.
Ignore	Ignore the Print Type Command.
Factory Default	Process

Application > STGL Setup > Prt Mod Cmd(PM)	
Determines whether the Print Mode Command is processed or ignored.	
Process	Process the Print Mode Command. Selects continuous, cut, tear-off or peel-off print modes.
Ignore	Ignore the Print Mode Command.
Factory Default	Process

Application > STGL Setup > PitchOffsCmd(PO)	
Determines whether the Pitch Offset Command is processed or ignored. When this command is processed, it affects *the Media* > *Image* > *Paper Feed Shift* menu.	
Process	Process the Pitch Offset Command.
Ignore	Ignore the Pitch Offset Command.
Factory Default	Process

Application > STGL Setup > Cut Cmds (~,NUL)	
Determines whether the Cut Commands are processed or ignored. SATO printers cut after each page per default when the Cut option is enabled. With STGL, the default behavior is not to cut after each label, but only upon receipt of a cut command.	
Process	Process the Cut commands.
Ignore	Ignore all Cut Commands.
Factory Default	Process
IMPORTANT	If cutting is required after each label, the *Media* > *Handling* > *Media Handling* should be set to “Cut.” In addition, this menu should be set to “Ignore”.

Application > STGL Setup > Speed Cmd (CS)	
Determines whether the Print Speed Command is processed or ignored.	
Process	Process the Print Speed Command.
Ignore	Ignore the Print Speed Command.
Factory Default	Process

Application > STGL Setup > Darkness Cmd (#E)	
Determines whether the Darkness (Intensity) Commands are processed or ignored.	
Process	Process the Darkness #E commands.
Ignore	Ignore all Darkness #E Commands.
Factory Default	Process

Application > STGL Setup > Code 128 Mode Switch	
Code 128 subset switching compatibility with older Sato printers.	
Manual	Application is responsible for deciding when to switch Code 128 subsets (A,B,C).
Automatic	Encodes C128 barcode data using automatic mode switching which results in smaller barcodes.
Factory Default	Proportional

Application > STGL Setup > Comm. Protocol	
This setting defines the protocol used for serial communication. This printer supports bi-direction communication through Serial, Parallel, USB, and Ethernet interfaces.	
Standard	The standard communication protocol is used as configured in the *Host IO* > *Serial* > *Data Protocol* menu.
Status 3	SATO communication status 3 protocol.
Status 4	SATO communication status 4 protocol.
Status 2	SATO communication status 2 protocol.
Factory Default	Standard
IMPORTANT	When using a protocol other than Standard over the serial interface, the *Host IO* > *Serial* > *Data Protocol* should be set to DTR. Any other Serial Data Protocol would interfere with the SATO Status-Protocol.

Application > STGL Setup > Mem Select (CC1)	
Determines how the “a” parameter within the STGL CCa command refers to the memory type.	
Card	The “a” parameter refers to memory type as follows: 1 = External Memory Cartridge 2 = Flash ROM
Memory	The “a” parameter refers to memory type as follows: 1 = Flash ROM 2 = External Memory Cartridge
Factory Default	Card

2 *Supported Commands*

General Commands

Command	Command Description	Support	Reference
A	Start Code	Full	page 22
A1aaaabbbb	Media Size	Full	page 23
A Z	Form Feed	Full	page 22
AOa	Auto Online	Not Supported	
AR	Normal Print Length	Full	page 22
A3H-aaaa-Vbbbb	Base Reference Point	Full	page 23
Babbcccd	Bar Codes	Partial	page 24
BDabbcccd	Bar Codes	Partial	page 24
BKaabbcddeeefffnn...n	PDF417	Partial	page 24
BLn...n	Postbar	Not Supported	
BPn...n	Postnet	Partial	page 24
BQabcc, (ddeeff,) g (hhhh) n	QR Codes	Full	page 24
BTabbccddee	Bar Codes	Full	page 24
BVa,b,c,ddddddddd,ee e,fff,gg..g	Maxicode	Full	page 24
BWaabbb	Bar Codes Expansion	Full	page 24
BXaabbccddeeefffghh	Data Matrix	Full	page 24
C	Repeat Label	Full	page 24
CLa	Ignore CR/LF	Not Supported	
CSa	Print Speed Selection	Full	page 24
Dabbcccd	Bar Codes	Full	page 24
DCxx...x	Data Matrix	Full	page 24
DNk,n~n	Data Command	Full	page 24
DSmmm,n~n	Data Commands	Full	page 24

Command	Command Description	Support	Reference
Eaaa	Line Feed	Full	page 24
EP	Print End Position	Not Supported	
EUaaabbn~n	EAN/UCC Composite Symbol	Full	page 25
EX0	Expanded Print Length	Full	page 25
Faaaabccccddee	Sequential Numbering	Full	page 25
FC	Print Circle	Partial	page 25
FT	Print Triangle	Partial	page 25
FWaaHbbbb	Horizontal Line	Full	page 25
FWaabbVcccHdddd	Box	Full	page 25
FWccVddd	Vertical Line	Full	page 25
FXaaabcccdddeee	Data Matrix	Full	page 25
Gabbbccc(data)	Custom Graphics	Full	page 25
GMaaaaa	BMP File	Full	page 25
GPaaaaa	PCX File	Full	page 25
Haaaa	Horizontal Position	Full	page 25
IDaa	Store Job ID	Full	page 25
IP0nn	EPC Code Write Designation	Full	page 26
IP1	EPC Code Read Designation	Full	page 26
J	Journal Print	Full	page 26
Kab90cc	Recall Custom Designed Characters	Full	page 26
Laabb	Character Expansion	Full	page 26
LAa	Display Language	Not Supported	
LHa	Zero Slash	Not Supported	
M	Font Type	Full	page 26
OA	Font Type	Full	page 26
OB	Font Type	Full	page 26
OL	Online Printer Status Change	Not Supported	
Paa	Character Pitch	Full	page 26
PR	Fixed Font Spacing	Full	page 26
PS	Proportional Font Spacing	Full	page 26
Qaaaaaa	Print Quality	Full	page 26

Command	Command Description	Support	Reference
RDabb,ccc,dddn..n...n	Font Type	Full	page 26
RFaabbbbn...n	Recalls and prints custom fonts and logos	Not Supported	
RK	RFID Write	Full	page 26
RMaaaa,bbbb	Mirror Image	Full	page 27
RZ	Message Print Register	Not Supported	
S	Font Type	Full	page 27
Tabcc(data)	Store Custom Designed Characters	Full	page 27
TMx	EPC Trade mark Print	Partial	page 27
U	Font Type	Full	page 27
Vbbbb	Vertical Position	Full	page 27
WBa	Font Type	Full	page 27
WDHaaaaVbbbbXcccc Ydddd	Copy Image Area	Full	page 27
WKnn..n	Job Name	Full	page 27
WLa	Font Type	Full	page 27
XM	Font Type	Full	page 27
XS	Font Type	Full	page 28
XU	Font Type	Full	page 28
X20	Font Type	Not Supported	
X21	Font Type	Not Supported	
X22	Font Type	Not Supported	
X23	Font Type	Not Supported	
X24	Font Type	Not Supported	
XBa	Font Type	Full	page 28
XLa	Font Type	Full	page 28
Z	Stop Code	Full	page 28
%a	Rotate	Full	page 28
$a,b,c,d	Vector Font	Partial	page 28
$=(data)	Data for Vector Font	Partial	page 28
#Ea	Print Darkness	Full	page 28
(aaaa,bbbb	Reverse Image	Full	page 28

Command	Command Description	Support	Reference
&	Store Form Overlay	Full	page 28
/	Recall Form Overlay	Full	page 28
0 (zero)	Replace Data	Full	page 28
*a	Clear Print Job(s) and Memory	Partial	page 28
@	Off-Line	Full	page 29
~aaaa	Cut Job	Full	page 29
~Aaaaa	Cut	Full	page 29
~B	Cut Last	Full	page 29
2D10	PDF417	Full	page 29
2D12	MicroPDF417	Full	page 29
2D20	Maxicode	Full	page 29
2D30	QR Code Mode2	Full	page 29
2D31	QR Code Mode1	Full	page 29
2D32	Micro QR Code	Full	page 29
2D50	DataMatrix	Full	page 29

Supported General Commands

A – Start Code

Begins all print jobs.

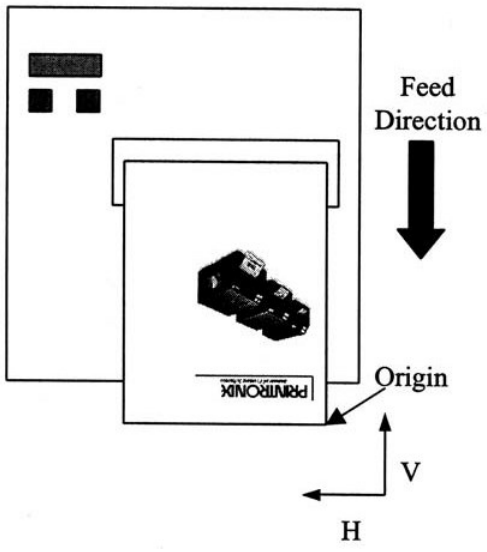
A Z – Form Feed

Feeds a blank tag or label.

AR – Normal Print Length

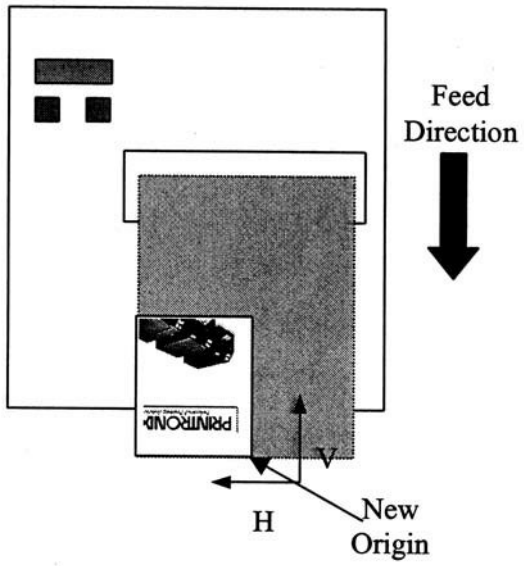
This command resets the printer to the Standard print length (7 inches).

Sato printers print labels similar to Printronix Thermal printers top-first, with the label-edge aligned to the left side of the printer when viewed from the front. The coordinate origin of the label is per default located at the bottom- right.



A1aaaabbbb – Media Size

This command can be used to set the media size. It moves the default origin towards the left, and causes the page-bitmap to clip at the specified length. Without this command, the width is equal to the maximum width, and the length is the maximum length. The maximum length on SATO printers is by default 7 inches (<ESC>AR cmd), can be expanded to 49.2 inches with the <ESC>EX0 command.

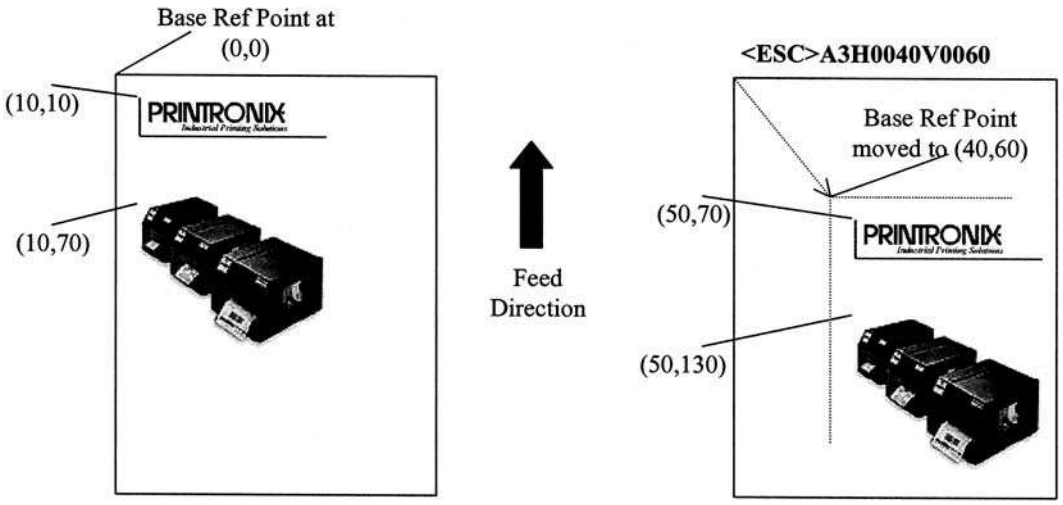


NOTE: STGL has the ability to set the maximum physical page-length in the Media-Size menu. This value is used when no AR, EX0 or A1 command is present in the host data. On continuous media, the actual printed page length depends on the size of the printed data. The printer will feed as long as there is data to print, up to a maximum of the current physical page length. On gapped media, the feed length is determined by the gap detection.

A3H-aaaa-Vbbbb – Base Reference Point

Establishes a new base reference point position in dots for the current label.

The base reference command repositions the page-bitmap inside the page created with the Media Size command by adding a horizontal and vertical offset to every positioning command. This offset is relative to the current Media Origin.



Babbcccd – Bar Codes

Prints a 1:3 ratio bar code.

BDabbcccd – Bar Codes

Prints a 2:5 ratio bar code.

BKaabbcddeeefffnn...n – PDF417

Prints PDF417 2-D symbols.

BPn...n – Postnet

Prints Postnet bar codes.

BQabcc, (ddeeff,) g(hhhh)n – QR Code

Prints QRCode bar codes.

BTabbccddee – Bar Codes

Variable ratio.

BXaabbccddeeefffghh – Data Matrix

Data Format. Specifies the format of the Data Matrix 2-D symbology.

BVa,b,c,ddddddddd,eee,f f f,gg..g – Maxicode

Prints 2-D Maxicode symbols per AIM I.S.S. specifications.

BWaabbb – Bar Codes Expansion

Works together with the BT command to specify an expansion factor and the bar code height.

C – Repeat Label

Prints a duplicate of the last label printed.

CSa – Print Speed Selection

Specifies a unique print speed in inches/seconds through software for a particular label.

Dabbcccd – Bar Codes

Prints 1:2 ratio bar code.

DCxx...x – Data Matrix

Prints Data. Prints data using Data Matrix format specified in BX Data Format command.

DNk,n~n

Data for 2-D Barcode commands.

DSmmm,n~n

Data for 2-D Barcode commands.

Eaaa – Line Feed

Provides the ability to print multiple lines of the same character size without specifying a new print position for each line.

EUaaabbn~n – EAN/UCC Composite Symbol

Prints barcodes using <ESC>EU command.

EX0 – Expanded Print Length

Expands the print length to 9999 dots. See A1aaaabbbb – Media Size on page 23.

Faaaabccccddee – Sequential Numbering

Allows the printing of sequencing fields (text, bar codes) where all incrementing is done within the printer.

FC – Print Circle

Prints a circle. Patterns are not supported

FT – Print Triangle

Prints a triangle. Patterns are not supported.

FWaaHbbbb – Horizontal Line

Prints a horizontal line.

FWaabbVcccHdddd – Box

Prints a box.

FWccVddd – Vertical Line

Prints a vertical line.

FXaaabcccdddeee – Data Matrix

Sequential Numbering. Prints sequential numbered Data Matrix 2-D symbols.

Gabbbccc(data) – Custom Graphics

Allows the creation and printing of graphic images using a dot-addressable matrix. This image format is available in SATO printers, and is supported by STGL.

GMaaaaa – BMP File

Downloads BMP file to the internal graphics image memory. Standard BMP file format, only black and white non-compressed BMP files are supported. This image format is available in SATO printers, and is supported by STGL.

GPaaaaa – PCX File

Standard PCX file format. Downloads PCX file to the internal graphics image memory. This image format is available in SATO printers, and is supported by STGL.

Haaaa – Horizontal Position

From the base reference point, the number of dots horizontally.

IDaa – Store Job ID

Stores the Job ID number.

IP0nn – EPC Code Write Designation

Writes to the RFID tag without moving the paper unless there is printable data on the same label. This follows the syntax for legacy Sato printers.

IP1 – EPC Code Read Designation

The UHF RFID read command. This follows the syntax for legacy Sato printers.

J – Journal Print

Provides the ability to print text line by line.

Kab90cc – Recall Custom Designed Characters

Recalls for printing a custom character stored by the Tabcc(data) command.

Laabb – Character Expansion

Expands characters in both directions up to 12 times (all except raster and vector fonts).

M – Font Type

Specifies the 13W x 20H dot matrix font.

OA – Font Type

Specifies the OCR-A font dot matrix.

OB – Font Type

Specifies the OCR-B font dot matrix

Paa – Character Pitch

Designates the number of dots between characters (all except raster fonts).

PR – Fixed Font Spacing

Returns the rpinter to fixed character spacing mode.

PS – Proportional Font Spacing

Places the printer in the proportional character spacing mode.

Qaaaaaa – Print Quality

Specifies the total number of labels to print.

RDabb,ccc,ddd,nn...n – Font Type

Specifies the internal AGFA raster fonts. The STGL Agfa fonts will match the SATO raster font characteristics. Using the SATO <ESC>RD command, one of two Agfa fonts can be selected. It allows specification of both width and height of the font (in dots or as point-size) and whether it should be printed in bold/normal. The font-style can be either CG Times (16 999 dots or
P08 - P72) or CG Triumvirate (16 -1 999 dots or P08 - P72).

RK – RFID Write

Specifies data to be written into RFID tags.

<ESC>RK1,a,b,D16,c..c – RFID Write

a RFID tag Error Ignore. Valid range is from 0-9.

	0-Disable (default when value is omitted)
	1-Enabled
	2-9 Auto retry on tag error.
	This command is ignored for STGL. The error handling for all RFID commands on all supported emulations is set according to the RFID menu on the front panel. Using the RFID menu, the user can set the error handling, number of retries, and tag type.
b	Write Protector Designation. Valid range is from 0 to 1.
	0-Fixed (default)
D	Writing Data Size Recognition Character. Writes data size in number of characters. Valid data size is 16 characters.
16 or 24	Specification of Writing Data Size. Valid data size is 16 or 24 characters.
c..c	EPC data (fixed at 16 characters). Valid range is 0 to 9 or A to F only.
Example	<ESC>RK1,0,0,D16,ABCDEF1234567543

RMaaaa,bbbb – Mirror Image

Prints mirror image of data.

S – Font Type

Specifies the 8W x 15H dot matrix font.

Tabcc(data) – Store Custom Designed Characters

Creates and stores custom characters or images in the printer's memory.

TMx – EPC Trade Mark Print

Specifies printing of an EPC trademark logo on a tag label.

U – Font Type

Specifies the 5W x 9H dot matrix font.

Vbbbb – Vertical Position

From the base reference point, the number of dots vertically.

WBa – Font Type

Specifies the 18W x 30H dot matrix font.

WDHaaaaVbbbbXccccYdddd – Copy Image Area

To copy an image to another location of the label.

WKnn..n – Job Name

Stores the job name.

WLa – Font Type

Specifies the 28W x 52H dot matrix font.

XM – Font Type

Specifies the 24W x 24H dot matrix font.

XS – Font Type

Specifies the 17W x 17H dot matrix font.

XU – Font Type

Specifies the 5W x 9L dot matrix font.

XBa – Font Type

Specifies the 48W x 48H dot matrix font.

XLa – Font Type

Specifies the 48W x 48H dot matrix font.

Z – Stop Code

Ends all print jobs.

%a – Rotate

Fixed Base Reference Point.

$a,b,c,d – Vector Font

Specifies printing of the unique SATO vector font. The SATO vector font allows for printing of the Helvetica Bold font in both proportional and fixed- pitch spacing, with a user-defined size of 50x50 – 999x999 dots.

SATO can also print this font in 10 different font variations. STGL only supports variation 0 and 8 (Standard and Italic, Agfa font #92244). The other variations (several types of Outlined, Gray, Shadow, and Mirrored fonts) will print in the standard variation.

$=(data) – Vector Font Data

Data for vector fonts. See $a,b,c,d – Vector Font on page 28.

#Ea– Print Darkness

Specifies a new print darkness setting.

(aaaa,bbbb – Reverse Image

Reverse image from black to white and vice versa.

& – Store Form Overlay

Stores a specified label image in the printer's volatile form overlay memory.

/ – Recall Form Overlay

Recalls the label image from the printer's form overlay memory for printing.

0 (zero) – Replace Data (Partial Edit)

Provides the ability to replace a specified area of the previous label with new data.

*a – Clear Print Job(s) and Memory

Clears individual memory and buffers. When parameter "a" is not specified, the command aborts all jobs received prior to this command.

NOTE: Without prarameter "a', this command is not supported. When parameter "a" is included, it specifies the memory section to be cleared. See Expanded Memory Functions on page 32.

@ – Off-Line

Signals the printer to go off-line after the completion of a print job.

~aaaa – Cut Job

Cuts labels at a specified interval in a print job.

~Aaaaa – Cut

Specifies the number of labels to print between each cut.

~B – Cut Last

Cuts any printed labels that remain in the printer.

2D10 – PDF417

Command for PDF417 symbology.

2D12 – MicroPDF417

Command for MicroPDF417 symbology.

2D20 – Maxicode

Command for Maxicode symbology.

2D30 – QR Code Mode2

Command for QR Code Mode2 symbology.

2D31 – QR Code Mode1

Command for QR Code Mode1 symbology.

2D32 – Micro QR Code

Command for Micro QR Code symbology.

2D50 – DataMatrix

Command for DataMatrix symbology.

Calendar Option Commands

The commands to set and use the real time clock (RTC) as defined in the SATO manual are fully supported by STGL if there is an RTC. Clock and calendar commands are not functional if RTC is not installed.

Command	Command Description	Support	Reference
WA (elements)	Calendar Print	Full	page 30
WPabbb	Calendar Increment	Full	page 30
WTaabbccddee	Calendar Set	Full	page 30

Supported Calendar Option Commands

WA(elements) – Calendar Print

Prints the data and/or time field (up to 16 characters) from the printer's internal clock.

WPabbb – Calendar Increment

To add a value to the printer's current date and/or time.

WTaabbccddee – Calendar Set

To set the time and date of the printer's internal clock.

Expanded Memory Option Commands

NOTE: Information writes to Flash Memory or SD card if installed.

Command	Command Description	Support	Reference
BJ(aa..abb..b	Start TrueType Font Storage	Full	page 32
BJDcccccddddee...e	Download Bitmapped TrueType Font Data	Full	page 32
BJ)	End TrueType Font Storage	Full	page 32
BJFaaaaaaa	Initialize Memory Card	Full	page 33
BJRabbccddeeeeff..f	TrueType Font Recall	Full	page 33
BJS	Expanded Memory Status	Ignore	
BJTaa,bb,cc,dd,ee,fff, gg..g	TrueType Font Recall	Full	page 33
CCa	Memory Area Select	Full	page 33
GCaaa	Recall BMP Graphic	Full	page 33
Glabbbcccdddee...e	Store Custom Graphics	Full	page 33
GRccc	Recall Custom Graphics	Full	page 33
GTaaa,bbbbn..n..n	Store BMP Graphics	Full	page 33
Plaaa,bbbbb,Plaaa,bbbbb,cc...c	Store PCX Graphics File	Full	page 33
PYaaa	Recall PCX Graphics File	Full	page 33
K1abbn..n	Recalls 16Wx16H User-defined Characters	Full	page 33
K2abbn..n	Recalls 24Wx24H User-defined Characters	Full	page 33
k1abbn..n	Recalls 16Wx16H User-defined Characters	Full	page 33
k2abbn..n	Recalls 24Wx24H User-defined characters	Full	page 33
YR,aaa/D,bb,cc..c	Recall Format/Field	Full	page 34
YS,aaa/Nbb,cc	Store Format/Field	Full	page 34
&R,aa	Recall Form Overlay	Full	page 34
&S,aa,bbbb,cccc	Store Form Overlay	Full	page 34
*a,bbb	Clear Card Memory	Full	page 34

Supported Expanded Memory Option Commands

BJ(aa..abb..b – Start TrueType Font Storage

Prepares the Expanded Memory to accept TrueType font data.

Expanded Memory Functions

SATO printers with expanded memory installed can store the following items for later use. Each item is addressable with a unique number, specifying a memory location in a specific section reserved for the same object types.

- 999 SATO graphic files Location # 001 - 999
- 999 BMP or PCX files Location # 001 - 999
- 999 Formats Location # 001 - 999
- 99 Form-Overlays Location # 01 - 99
- 100 Bit-Mapped TrueType Fonts Location # 00 - 99

On SATO printers, these objects can be stored in two selectable designated memory areas:

1. PCMCIA Expanded Memory Card
2. Internal Expanded Flash-ROM

In STGL, the SD card (when installed) is used for #1 PCMCIA Expanded Memory Card and #2 FLASH memory otherwise. If the SD card is not installed, then the command to select the memory area (<ESC>CC a) will be ignored and FLASH memory will be used exclusively. Images and objects will be saved using the following names:

TrueType bitmap fonts	STGL_tnn.bmp	where nn is the ID, 00-99
BMP images	STGL_nnn.bmp	where nnn is the ID, 001-999
PCX images	STGL_nnn.pcx	where nnn is the ID, 001-999
Custom graphics images	STGL_nnn.img	where nnn is the ID, 001-999
Formats	STGL_nnn.fmt	where nnn is the ID, 001-999
Overlays	STGL_nnn.ovl	where nnn is the ID, 001-999

Examples

ppi4_t03.bmp (in flash) TrueType bitmapped font at location 03.

ppi4_012.pcx (in flash) PCX image at location 12.

Users can view the FLASH contents by using the System > Flash File Edit > Print File List feature and view the SD card contents by using the System > SD File Edit > Print File List feature. This shows the STGL files present in the file systems using the names listed above.

BJDcccccddddee...e – Download Bit Mapped TrueType Font Data

Downloads the bitmapped TrueType font data to the memory area specified.

BJ) – End TrueType Font Storage

Ends the bitmapped TrueType font storage process. See Expanded Memory Functions on page 32.

BJFaaaaaaaa – Initialize Memory Card

Initializes the Memory Area and formats it for use. See Expanded Memory Functions on page 32.

BJRabbccddeeeeff..f – TrueType Font Recall

Recalls a previously stored bitmapped TrueType font for use. See Expanded Memory Functions on page 32.

BJTaa,bb,cc,dd,ee,ff,gg..g – TrueType Font Recall

Recalls a previously stored bitmapped TrueType font for use. See Expanded Memory Functions on page 32.

CCa – Memory Area Select

Selects the memory area for all following Expanded Memory commands. CC1 selects the SD card and CC2 selects the internal FLASH.

GCaaa – Recall BMP Graphic

Recalls BMP graphic files stored in Expanded Memory. See Expanded Memory Functions on page 32.

Glabbbcccdddee...e – Store Custom Graphics

Stores a graphic image in the memory card to be called later for printing on a label. See Expanded Memory Functions on page 32.

GRccc – Recall Custom Graphics

Recalls for printing the graphic image stored by the GI command. See Expanded Memory Functions on page 32.

GTaaa,bbbbb,nn...n – Store BMP Graphics

Stores BMP files in Expanded Memory. See Expanded Memory Functions on page 32.

K1abbn..n – Recalls 16Wx16H User-Defined Characters

Recalls 16Wx16H user-defined characters and prints the string in horizontal orientation.

K2abbn..n – Recalls 24Wx24H User-Defined Characters

Recalls 24Wx24H user-defined characters and prints the string in horizontal orientation.

k1abbn..n – Recalls 16Wx16H User-Defined Characters

Recalls 16Wx16H user-defined characters and prints the string in vertical orientation.

K2abbn..n – Recalls 24Wx24H User-Defined Characters

Recalls 24Wx24H user-defined characters and prints the string in vertical orientation.

Plaaa,bbbbb,Plaaa,bbbbb,cc...c – Store PCX Graphics File

Stores a PCX graphics file. See Expanded Memory Functions on page 32.

PYaaa – Recall PCX Graphics File

Recalls a PCX graphics file. See Expanded Memory Functions on page 32.

YR,aaa/D,bb,cc...c – Recall Format/Field

To recall a field from a format previously stored in the memory card.

YS,aaa/Nbb,cc – Store Format/Field

To store a field in a format in the memory card. See Expanded Memory Functions on page 32.

&R,aa – Recall Form Overlay

Recalls a label image previously stored in Expanded Memory. See Expanded Memory Functions on page 32.

&S,aa,bbbb,cccc – Store Form Overlay

Stores a label image in Expanded Memory. See Expanded Memory Functions on page 32.

*a,bbb – Clear Card Memory

Clears individual memory and buffer areas. See Expanded Memory Functions on page 32.

Printer Configuration Commands

Command	Command Description	Support	Reference
IGa	Sensor Type	Full	page 34
LD,a,b,c,d,e,f,g,i,j j	Download Protocol Command Codes	Full	page 34
PCaa,bbPFC,a,.....z	Printer Setting	Partial	page 34
PHa	Print Type	Full	page 34
PMa	Print Mode	Full	page 35
POabcc	Pitch Offset	Ignored	

Supported Printer Configuration Commands

IGa – Sensor Type

Selects the sensor type.

LD,a,b,c,d,e,f,g,i,j j – Download Protocol Command Codes

Downloads a user defined set of Alternate Protocol Command Codes. See Protocol C Code on page 11.

PCaa,bbPCF,a,.....z – Printer Setting

Sets the default printer configuration in Flash ROM. The host commands to modify configuration settings will modify the current configuration values as if the user changed them manually on the front panel. They will however not be saved to NOVRAM as the SATO printer does. It will be the user's responsibility to save the appropriate configuration as well as the power-up configuration.

PHa – Print Type

Selects the thermal printing method.

PMa – Print Mode

Selects desired backfeed operation.

Legacy Commands

Command	Command Description	Support	Reference
AX	Expanded Print Length	Full	page 35
N	Rotate	Full	page 35
R	Rotate	Full	page 35

Supported Legacy Commands

AX – Expanded Print Length

This command sets the printer to the Expanded print length (14 inches). EX0 is the recommended replacement.

N – Rotate, Moving Base Reference Point

Sets the original base reference point and returns printing to normal orientation. % is the recommended replacement.

R – Rotate, Moving Base Reference Point

Rotates the printing of all subsequent images by 90 degrees counterclockwise each time it is used. Also moves the base reference point,
% is the recommended replacement.

Downloadable Fonts

The Sato printer allows downloading and storing of TrueType fonts as Bitmap. By default, since Printronix printers have internal FLASH, STGL supports downloading of bitmapped TrueType fonts to FLASH. Sato's memory card manager utility (MC manager) must be used to convert files in TrueType font format (.ttf extension) to the proprietary bitmap formats that SATO printers use to download the fonts.

ID for the fonts is not assigned via the command. The printer assigns the first unused ID itself. For instance, if fonts with IDs 00 and 01 already exist, a new downloaded font is assigned ID 02.

How the SATO printer re-issues IDs of deleted fonts is unknown. For example, a new download on a printer where fonts 1 and 2 were deleted after installing fonts 0 to 3 resulted in assigning ID 2 to the new font. Downloading another font did not result in re-using ID number 1, but ID number 4. To obtain IDs in the order they were downloaded (starting at 00), always initialize the flash memory before downloading, and then download all the required fonts.

STGL uses the first unused ID.

Custom Designed Characters

Allows for the creation, storage, and printing of custom characters, such as special fonts or logos. Up to 50 individual characters may be stored in the custom character volatile memory. Allowable sizes include 16x16 and 24x24 dot matrices.

Image Manipulation

Three commands are available to manipulate a rectangular area of the page bitmap. It can *copy* an area to another section on the page, *reverse* an area and *mirror* an area.

3 *Printer Configuration*

SATO printers have four ways of configuring the operational parameters printer settings:

- Dip switches
- Potentiometers
- LCD menu settings
- Commands in the data stream.

The host commands to modify configuration settings will modify the current configuration values as if the user changed them manually on the front panel.

NOTE: Unlike the SATO printers, the modified configuration settings will not be saved to NOVRAM. It is the user's responsibility to save the appropriate configuration and the power-up configuration.

Configuration Setting Compatibility

The available printer control menu settings is used and non-existent settings are added to a new STGL menu to emulate all settings that can be supported.

The following sections list the SATO configuration setting along with a description of its behavior on SATO printers, and the corresponding Printronix menu setting.

PotentioMeters

- SATO setting: PRINT
  Potentiometer to adjust print darkness.
  Printronix setting: Media > Image > Print Intensity
- SATO setting: OFFSET
  Potentiometer to adjust the amount of backward/forward feed for dispenser/ cutter/tear-off bar position (+/- 3.75 mm).
  Printronix setting: Media > Image > Paper Feed Shift
- SATO setting: PITCH
  Potentiometer to adjust home position of the label (+/-3.75 mm). Affects stop position of the label feed, print position, and dispense position.
  Printronix setting: Media > Image > Vertical Shift

DIP Switches

- SATO setting: DSW1 Serial Port Settings
  Printronix setting: *Host IO* > *Serial* menus
- SATO setting: DSW2-1
  Print Mode Selection. Selects between direct thermal printing on thermally sensitive paper and thermal transfer printing using a ribbon.
  Printronix setting: *Media* > *Handling* > *Print Mode*
- SATO setting: DSW2-2
  Sensor Type Selection. Selects between the use of a label gap or a reflective Eye-Mark detector.

Printronix setting: *Sensors > Control > Gap/Mark Sensor*

- SATO setting: DSW2-4
  Hex Dump Selection. Selects Hex Dump Mode.
  Printronix setting: *Tools > Diagnostics > Hex Dump Mode*
- SATO setting: DSW2-6
  Firmware Download. Places the printer in the Firmware Download mode for downloading new firmware into flash ROM.
  Printronix setting: Download Mode/PPM
- SATO setting: DSW2-7
  Protocol Code Selection. Selects the Standard or Non-Standard command codes used for protocol control.
  Printronix setting: *Application > STGL Setup > Protocol C Code*
- SATO setting: DSW3-1, DSW3-2
  Backfeed Sequence. Backfeed is used to correctly position the label for application and then retract the next label to the proper print position.
  Possible modes are Continuous, Tear-Off Strip, Peel Off, and Cut.
  Printronix setting: *Media > Handling > Media Handling*
- SATO setting: DSW3-3
  Label Sensor Selection. Enables or disables the Label Sensor.
  Printronix setting: *Sensors > Calibrate > Gap/Mark Sensor*
- SATO setting: DSW3-4
  Back-Feed Selection. When Back-Feed is enabled, the printer positions the last printed label for dispensing and retracts it before printing the next label.
  Printronix setting: *Media > Handling > Media Handling*
- SATO setting: DSW3-5
  EXT Print Start Signal Selection. Allows an external device to initiate a label print for synchronization with the applicator.
  Printronix setting: Supported through GPIO
- SATO setting: DSW3-6 External Signal Type Selection.
  Printronix setting: Supported through GPIO
- SATO setting: DSW3-7
  Both the polarity and signal type (level or pulse) of the external print synchronizing signal can be selected.
  Printronix setting: Supported through GPIO
- SATO setting: DSW3-8
  Repeat Print via External Signal. Allows the applicator to reprint the last label of the print job.
  Printronix setting: Supported through GPIO

LCD Panel, Normal Mode

- SATO setting: PRINT DARKNESS
  Used to adjust the amount of heat (i.e. power) applied to the head for printing.
  Printronix setting: *Media > Image > Print Intensity*
- SATO setting: PRINT SPEED
  Sets the print speed in inch/second.
  Printronix setting: *Media > Speed > Print Speed*
- SATO setting: PITCH OFFSET
  The label Pitch is the distance from the leading edge of a label and the leading edge of the next label.

Printronix setting: *Media > Image > Vertical Shift*

- SATO setting: CANCEL PRINT JOB
  If the printer has a print job(s) in memory, selecting YES will cause the job(s) to be cleared.
  Printronix setting: "Cancel Data" option in Home Screen

LCD Panel, Advanced Mode

- SATO setting: Zero Slash
  This setting determines if a zero is printed with a slash or without a slash.
  Printronix setting: *Application > STGL Setup > Slash Zero*
- SATO setting: AUTO ONLINE
  This setting determines the mode in which the printer powers up.
  Printronix setting: *System > Control > Power-up State*
- SATO setting: PRINT OFFSET V PRINT OFFSET H
  This setting changes the base reference point for all subsequent label jobs. Its effect is identical to the <ESC>A3 Base Reference point command.
  Printronix settings:
  Application > STGL Setup > Hor. BaseRefPoint
  Application > STGL Setup > Ver. BaseRefPoint
- SATO setting: IGNORE CR/LF
  This selection tells the printer to strip out all carriage return/line feed pairs (CRLF) from the data stream, including graphics and 2D bar codes. It is used primarily to maintain compatibility with earlier models of SATO printers.
  Printronix setting: *Application > STGL Setup > Ignore CR/LF*
- SATO setting: CHARACTER PITCH
  This selection allows you to set the default character pitch to either fixed character spacing or proportional character spacing. This command can be overridden by the <ESC>PR or <ESC>PS Character Pitch Commands.
  Printronix setting: *Application > STGL Setup > Character Pitch*

LCD Panel, Card Mode

- SATO setting: CARD MODE
  The Card Mode allows the operator to manage the Expanded Memory (PCMCIA Card or Internal Expanded Flash ROM). Typical operations are copying data between cards, formatting cards.
  Printronix setting: Copying is supported by upload in PPM or through operations in the *System > SD File Edit* menus.

LCD Panel, Service Mode

- SATO setting: GAP [X.X V] EYE [X.X V] INPUT [X.X V]
  This adjustment allows you to manually set the threshold voltage level, between the maximum and minimum light levels. If the value entered for the bottom line setting is "0.0V," then the printer automatically calculates the setting when the first label is fed. This happens after the printer is powered on or the head is closed.
  Printronix settings:
  Sensors > Control > Gap/Mark Thresh
  Sensors > Calibrate > Auto Calibrate
- SATO setting: ONLINE FEED
  This selection specifies whether or not the printer automatically feeds a blank label when it is placed in the ONLINE mode.
  Printronix setting: Supported through GPIO

- SATO setting: FEED ON ERROR
  This selection specifies whether or not the printer feeds a blank label automatically when an error condition is cleared.
  Printronix setting: Supported through GPIO
- SATO setting: REPRINT W/FEED
  This selection specifies whether or not the printer will print the last printed label stored in memory when the FEED key is pressed in the Normal ONLINE mode.
  Printronix setting: Supported through GPIO
- SATO setting: FORWARD/BACKFEED DISTANCE
  This display only appears when Backfeed is enabled (DSW3-4 = OFF) 0 - 255 mm.
  Printronix setting: *Media > Image > Paper Feed Shift*
- SATO setting: EURO CODE
  This selection allows the user to specify the hexadecimal code for the character which is replaced with the Euro Character. Default is 0xD5.
  Printronix setting: *Application > STGL Setup >Euro Code*
- SATO setting: SELECT LANGUAGE
  This selection allows the user to select the character set used by the printer LCD menu (English, French, German, Spanish, Italian, and Portuguese).
  Printronix setting: *System > Control > Display Language*
- SATO setting: PRIORITY SETTING
  This selection allows the user to assign a priority for CS (Print Speed), #5 (Print Darkness), A3 (Base Reference Point), IG (Sensor Type), PM (Print Mode), and PH (Print Type). If LCD is selected, the setting established via the LCD display/menu system is used for incoming label job, regardless of any different command settings. If Command is selected, any commands in the label job takes precedence and is used for printing the job. The LCD display reflects the new setting.
  Printronix setting: *Application > STGL Setup* > (menus to ignore commands)

LCD Panel, Counter Mode

- SATO setting: SELECT COUNTER
  HD:Head Counter (should be reset when printhead is replaced).
  Printronix settings: *TOOLS > Statistics > Head Print Dist*
  DSP: Dispense Counter CUT: Cutter Counter
  Printronix setting: *TOOLS > Statistics > Total Media Dist*
  SATO setting: CNTR CLEAR
  LIFE: Life Counter (cannot be reset)
  Printronix setting: Head life counter stored with head (cannot be reset)

LCD Panel, Test Print Mode

- SATO setting: TEST PRINT MODE
  This option allows you to print a test label.
  Printronix settings:
  Configs > Control > Print Config
  Tools > Print Tests > Run Tests

LCD Panel, Default Setting Mode

- SATO setting: DEFAULT SETTING
  Resets all printer configuration settings to their original default conditions.
  Printronix setting: *Configs > Control > Load Config* = “Factory”

A *ASCII Codes*

Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
NUL	0	00	EM	25	19	2	50	32	K	75	4B
SOH	1	01	SUB	26	1A	3	51	33	L	76	4C
STX	2	02	ESC	27	1B	4	52	34	M	77	4D
EXT	3	03	FS	28	1C	5	53	35	N	78	4E
EOT	4	04	GS	29	1D	6	54	36	O	79	4F
ENQ	5	05	RS	30	1E	7	55	37	P	80	50
ACK	6	06	US	31	1F	8	56	38	Q	81	51
BEL	7	07		32	20	9	57	39	R	82	52
BS	8	08	!	33	21	:	58	3A	S	83	53
HT	9	09	+	34	22	;	59	3B	T	84	54
LF	10	0A	#	35	23	<	60	3C	U	85	55
VT	11	0B	$	36	24	=	61	3D	V	86	56
FF	12	0C	%	37	25	>	62	3E	W	87	57
CR	13	0D	&	38	26	?	63	3F	X	88	58
SO	14	0E	+	39	27	@	64	40	Y	89	59
SI	15	0F	(	40	28	A	65	41	Z	90	5A
DLE	16	10	)	41	29	B	66	42	[	91	5B
DC1	17	11	*	42	2A	C	67	43	\	92	5C
DC2	18	12	+	43	2B	D	68	44	]	93	5D
DC3	19	13	,	44	2C	E	69	45	^	94	5E
DC4	20	14	-	45	2D	F	70	46	_	95	5F
NAK	21	15	.	46	2E	G	71	47	`	96	60
SYN	22	16	/	47	2F	H	72	48	a	97	61
ETB	23	17	0	48	30	I	73	49	b	98	62
CAN	24	18	1	49	31	J	74	4A	c	99	63
d	100	64	k	107	6B	r	114	72	y	121	79

Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex
e	101	65	l	108	6C	s	115	73	z	122	7A
f	102	66	m	109	6D	t	116	74	{	123	7B
g	103	67	n	110	6E	u	117	75	|	124	7C
h	104	68	o	111	6F	v	118	76	}	125	7D
i	105	69	p	112	70	w	119	77	~	126	7E
j	106	6A	q	113	71	x	120	78		127	7F

B *Contact Information*

Printronix Auto ID Customer Support Center

IMPORTANT **Please have the following information available prior to calling the Printronix Customer Support Center:**

- Model number
- Serial number (located on the back of the printer)
- Installed options (i.e., interface and host type if applicable to the problem)
- Configuration printout: Refer to the *Administrator's Manual.*
- Is the problem with a new install or an existing printer?
- Description of the problem (be specific)
- Good and bad pictures that clearly show the problem (faxing or emailing of these pictures may be required)

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