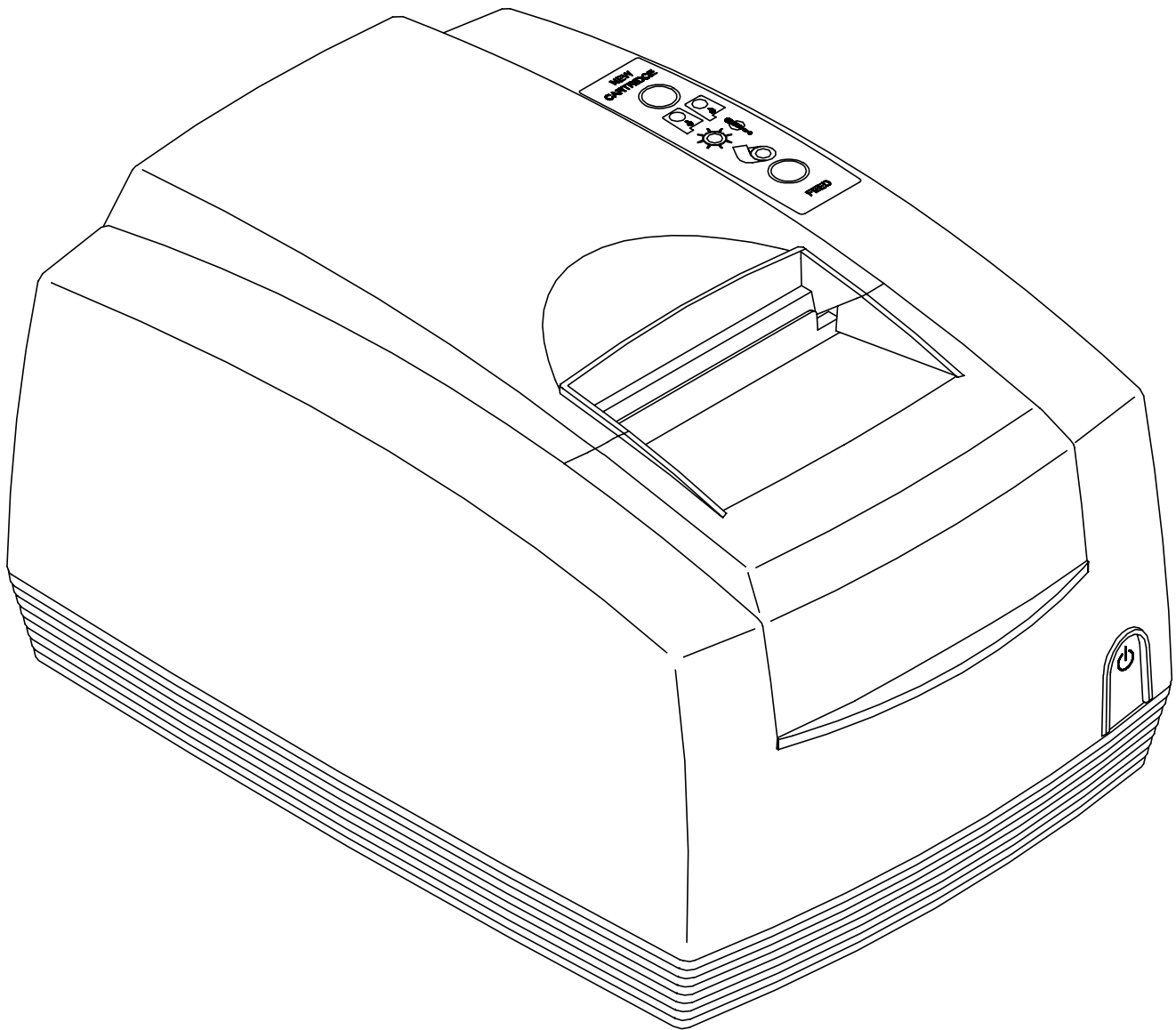


**POSjet™ 1000**

---

# PROGRAMMER'S GUIDE



---

**ithaca**<sup>®</sup>  
a product of TRANSACT

PN: 12-02397  
Rev F  
May-2001

## Change Log

**Rev A** April 19, 2000

1. Initial Release Rev A

**Rev B** June 2, 2000

1. Removed pre-release change log.
2. Added references to Color Ready Configurations and how to configure to Color operation.
3. Added an ordering supplies section
4. Corrected a number of command titles
5. Corrected the quick reference table. Commands and descriptions were shifted.

**Rev C** December 4, 2000

1. Substantial Rewrite
2. Add Auto-Cut command to PcOS
3. Added Undocumented commands to Epson TM U200
4. Added Dark Print and Pre-Cut feed configuration options.
5. Removed Thai Code Page

**Rev D** December 19, 2000

1. Clarified the ENQ inquiry overview.
2. Added Inquire Error Status Command. [ENQ]<22>.
3. Updated Inquire all Printer Status Command. [ENQ]<20>.
4. Added Inquire Mechanical Error Status. [ENQ]<14>.
5. Updated Dynamic Response Command.
6. Corrected the [ESC]y Command descriptions.
7. Added a section on Mechanical Error Recovery.
8. Removed the Epson Language table from the Ithaca PcOS Descriptions.

**Rev E** January 17, 2001

1. Corrected Paper Roll Width.
2. Added Updated Configurable Features.
3. Updated Keypad drawings to reflect new overlay design.

**Rev F** May, 2001

1. Rewrote barcode section to reflect printer firmware improvements.
2. Added Right to left entry to [ESC]P command
3. Added Arabic Font Option.
4. Added [ENQ]24 commands to support multi-color operation
5. Rewrote Color graphics descriptions to reflect Multi Color support descriptions.
6. Added Universal Color Graphics features.
7. Flag item as start-up macro incorrectly represents 's' was hex 6D and decimal 109, should be hex 73 and decimal 115.
8. [Esc] X was not referenced on Quick reference chart.
9. [ESC] 0 and [ESC] 3 should not be referenced under Horizontal Motion on Quick reference chart.
10. Added a graphics description to the specification section.

## Disclaimer

Information in this publication is subject to change without notice. However, as product improvements become available, TransAct Technologies Incorporated will make every effort to provide updated information for the products described in this publication. TransAct Technologies Incorporated cannot guarantee that changes in software and equipment made by other manufacturers, and referred to in this publication, do not affect the applicability of information in this publication.

## Federal Communications Commission Radio Frequency Interference Statement

The *POSjet™ 1000* Printer complies with the limits for a Class A computing device in accordance with the specifications in Part 15 of FCC rules. These regulations are designed to minimize radio frequency interference during installation; however, there is no guarantee that radio or television interference will not occur during any particular installation. Interference can be determined by turning the equipment off and on while the radio or television is on. If the printer causes interference to radio or television reception, try to correct the interference by one or more of the following measures:

1. Reorient the radio or television receiving antenna
2. Relocate the printer with respect to the receiver
3. Plug the printer and receiver into different circuits

If necessary, the user should consult their dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio/TV Interference Problems*. This booklet is available from the US Government Printing Office, Washington, DC 20402. Ask for stock number 004-000-00345-4.

## Canadian Department of Communications Radio Interference Statement

The *POSjet™ 1000* Printer does not exceed Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

## Regulatory Compliance

FCC Class A

ULc

CE Mark

UL 1950

TUV

© 2000 TransAct Technologies Incorporated. All rights reserved.

Revision Level E

May, 01

Printed in USA

PcOS and POSjet™ are registered trademarks of Transact Technologies Incorporated. Ithaca is a registered trademark of TransAct Technologies. IBM is a registered trademark of the International Business Machines Corporation. Epson and ESC/POS are registered trademarks of the Seiko Epson Corporation. Microsoft, Windows, Windows NT, and Plug and Play are trademarks of the Microsoft Corporation. Patents Pending.

## Table of Contents

Disclaimer .....	iii
Federal Communications Commission Radio Frequency Interference Statement.....	iii
Canadian Department of Communications Radio Interference Statement .....	iii
Regulatory Compliance.....	iii
Table of Contents.....	iv
Table of Tables .....	xi
Table of Figures .....	xii
Table of Flow Charts.....	xii
<b>General Description POSjet™ 1000 Inkjet Receipt Printer .....</b>	<b>1</b>
Standard Features .....	1
Optional Features .....	2
<b>General Specifications .....</b>	<b>3</b>
Printing Specifications.....	3
Character Pitch.....	4
Character Generation.....	5
Standard Print.....	5
Draft Font.....	5
Large Draft Font.....	5
Near Letter Quality (NLQ) Font.....	6
Rotated Print.....	6
Graphics Generation .....	7
Physical Specifications .....	8
Dimensions.....	8
Weight .....	8
Electrical Characteristics.....	9
External Powered AC .....	9
External Powered DC.....	9
Environmental .....	10
Temperature.....	10
Humidity.....	10
Media Specifications .....	11
<i>Ink Cartridge Overview</i> .....	11
Receipt Paper (one-ply receipt) .....	11
Receipt Printing.....	12
Receipt Printing, Auto-cutter Position .....	12
Auto-cutter (Partial Cut Option).....	12
Paper Out.....	12
Paper Low .....	12
Audio Alert (Kitchen Buzzer).....	13
Cover Interlock .....	13
Communications Interface .....	13
Parallel Interface .....	13
Signal Levels .....	13
Current requirements.....	13
RS-232 Serial Interface .....	14
Serial Port Features.....	14

Signal Voltage and Current levels .....	14
Display Pass Through.....	14
USB Interface .....	14
Cash Drawer .....	15
Interface Description .....	15
Customer Support .....	17
Service Information .....	17
Warranty Information .....	17
TransAct Product Support.....	17
Return Materials Authorization and Return Policies .....	17
Shipping Printers.....	18
Where Can You Find More Information? .....	18
Our Internet Support and Sales Services.....	18
TransAct Product Support.....	18
Internet Support.....	18
Operator's Guide .....	18
Contacting TransAct's Ithaca Facility.....	19
Technical Support .....	19
Sales.....	19
Setup Procedures .....	20
Verifying the configuration .....	20
Verify the communications interface card .....	20
Parallel Interface.....	20
Serial Interface.....	20
USB Interface .....	20
Changing Interface Cards .....	20
Removing the Old Interface Card.....	20
Install the new interface card.....	21
Verify the Cash Drawer Interface .....	21
Configuring the Cash Drawer Interface.....	22
Installing cables.....	23
Connecting power .....	23
Internal Supply.....	23
External Supply.....	24
Connecting Communications Cables .....	24
Serial.....	24
Parallel .....	24
USB.....	24
Verify the Firmware Configuration.....	24
Installing and Changing Ink Cartridges .....	25
Using Ink Cartridges .....	26
Care of Ink Cartridges.....	26
Paper Low Adjustment.....	27
Adjusting the Paper-Low Sensor.....	27
Paper Low Adjustment Requirements.....	28
Paper and Core Diameters .....	28
Installing Paper .....	29
Installing Windows™ Printer Drivers .....	30
Printer Driver Installation Instructions for WIN95, 98, Me .....	30
Printer Driver Installation Instructions for NT4.0, 2000 .....	30
OPOS drivers Installation Instructions .....	31

To Install the USB drivers.....	31
Operational Controls .....	32
How to Operate the POSjet™ 1000 Printer.....	32
Keypad Overview .....	32
POSjet™ 1000 Buttons.....	32
⌘ Button.....	33
FEED Button .....	33
NEW CARTRIDGE Button.....	33
Cartridge Status Monitoring.....	33
Using the NEW CARTRIDGE Button in Self-Test Mode.....	34
Exiting Self-Test Mode .....	34
Remote Power Down .....	34
Indicator Lights (LED) .....	35
The five POSjet™ indicator lights are: .....	35
Power Indicator (LED) .....	35
Error Indicator (LED) .....	35
Paper Indicator (LED).....	35
Cartridge Indicators (LED-left and right) .....	35
Fault Indicators.....	35
Three types of faults exist .....	35
Fully-recoverable and Status.....	36
Semi-recoverable.....	36
Non-recoverable .....	36
Ink Cartridge Status .....	37
Determining Ink Cartridge Status .....	37
Error Indicator Chart.....	38
Testing the Printer Overview.....	39
Using Self-Test Mode.....	39
Entering Self-Test Mode.....	39
TEST-Pyramid .....	40
TEST-Burn-in.....	40
TEST-Bar Codes .....	40
TEST-Rolling ASCII .....	40
Level 0 Diagnostics .....	41
Level 0 diagnostics perform the following tasks: .....	41
Cold Power On.....	41
Firmware Test .....	41
Boot Loader Mode.....	41
Extended Diagnostics.....	42
Self-Test Diagnostics.....	42
Hex-dump Mode.....	42
Changing the Configuration of the POSjet™ .....	43
Configuration Mode Overview.....	43
Manual Configuration .....	43
Most Frequent Configuration Incompatibilities .....	43
Parallel Printer .....	43
Serial Printer .....	43
How to Change Configuration Settings.....	43
Entering into Configuration Mode.....	43
Viewing Current Configuration Settings .....	44
Using the NEW CARTRIDGE Button in Configuration Mode.....	44

Using Configuration Mode .....	45
Manual Emulation Setup .....	46
Remote Configuration .....	46
Color Configuration .....	47
Color Ready Configuration .....	47
Single Cartridge Operation .....	47
Single Cartridge Operation (Color-Ready Configuration) .....	47
Two Cartridge Operation .....	47
Configurable Features .....	48
<b>Programming Controls .....</b>	<b>55</b>
Control Codes Overview .....	55
Nomenclature .....	55
Standard Emulation .....	56
IPCL Codes .....	56
EPOS Emulation .....	56
Citizen 3500 Emulation .....	56
Star Emulation .....	56
Ithaca® Microline Emulation .....	56
Application Development .....	56
Ithaca Control Codes and Commands .....	57
PcOS Printer Control Codes .....	57
Quick PcOS Reference Chart .....	58
Low Level Paper Motion Control .....	63
Print/Paper Motion .....	63
Horizontal Motion Control .....	64
Vertical Motion Control .....	66
Character Pitch .....	70
Character Font .....	73
Character sets and Code Pages .....	75
OCR Characters .....	82
Character Attributes .....	83
Print Rotation Commands .....	87
Rotated Print Summary .....	89
Graphic Mode .....	92
Standard APA Graphics .....	92
Extended APA Graphics .....	93
Horizontal Graphics (Color Graphics) .....	95
Graphics Compression .....	96
User Store (Graphic Save) .....	97
Defining Macros .....	97
User-Store Commands .....	99
User Macros .....	102
Programming Considerations .....	102
Bar Codes .....	104
Interleaved 2 of 5 .....	104
Code 39 .....	104
Code 128 .....	105
UPC A .....	105
UPC E .....	105
EAN-13 .....	105
EAN-8 .....	105
Code 93 .....	106
Codabar .....	106

Miscellaneous Control .....	108
Remote Power Control .....	114
Documented Extended Control commands .....	114
Printer Status .....	116
Status Inquire .....	116
Serial and USB Mode Inquire .....	116
IEEE 1284 Mode Inquire .....	117
Dynamic Response Mode .....	117
Inquire Commands .....	117
Series 50 Compatibility Commands .....	125
Control Codes Summary by Code .....	126
ESC/POS™ Codes .....	132
EPOS Deviations .....	132
Undocumented Epson Commands .....	132
Real-time Status .....	132
Supported TM-200 Commands .....	133
TM-U200 Restrictions .....	135
Undocumented TM U200 Commands .....	135
Supported EPOS Commands .....	136
TM-U200 and EPOS Command Descriptions .....	139
Print and Feed Commands .....	139
Line Spacing Commands .....	141
Character Commands .....	141
International Character Sets .....	143
Panel Button Commands .....	149
Paper Sensor Commands .....	150
Print Position Commands .....	151
Bit-Image Commands .....	153
Status Commands .....	154
Bar Code Commands .....	160
Mechanism Control Commands .....	163
Miscellaneous Commands .....	164
Macro Function Commands .....	167
User-defined Memory Commands .....	169
Ithaca® Specific POSjet™ Commands .....	173
Panel Button Commands .....	173
Paper Out/Low Sensor Commands .....	173
Star Control Codes .....	174
Star Command Summary .....	174
Citizen Codes .....	176
Citizen Command Summary .....	177
POSjet™ Color Graphics .....	177
Printing Graphics .....	177
Character Graphics .....	177
APA Graphics .....	181
Procedure for APA graphics: .....	181
Color Graphics .....	182
Procedure for color horizontal graphics: .....	183
POSjet™ Universal Color Graphics .....	185
Print File Graphics .....	185
To generate a print file .....	185
Store Graphics in the printer: .....	185
To Store a graphic in the printer .....	186
Print a stored graphic .....	186



Generate a file to store graphics into a printer .....	186
How universal graphics is done.....	186
How to use IPCL commands in text strings .....	187
Load and store named graphic image .....	187
Recall and print stored named graphic image .....	187
Cautions .....	187
Universal Color Command Descriptions .....	188
<b>POSjet™ Extended Printer Control .....</b>	<b>190</b>
<b>Communications .....</b>	<b>192</b>
Protocol and Print Buffers .....	192
USB.....	195
USB Support.....	195
Parallel Port.....	196
Parallel Port Protocol.....	196
Printer Buffer Size .....	197
Parallel Port Inquire and IEEE 1284 .....	197
IEEE 1284 Response Buffer.....	197
Mode 4 .....	198
Mode 0 .....	198
Time-outs .....	199
Active State.....	199
Inquire Responses.....	199
Parallel Port Plug and Play.....	199
The Plug and Play response follows. ....	199
Serial Port .....	200
Serial Port Protocol .....	200
Print Buffer Flow .....	202
Printer Buffer Size .....	204
Serial Mode Plug and Play.....	204
Using DSR.....	204
Serial Device Identification .....	205
Serial Port Inquire.....	206
Display Pass Through.....	207
The Restrictions and Considerations for Pass through.....	207
Remote Power Control.....	207
Remote Printer Reset .....	208
Reset in Serial Mode .....	208
Reset in Parallel Mode .....	208
Miscellaneous Communication Features.....	209
Power-cycle Recovery.....	209
Data Pass-through .....	209
Multi-drop Configuration .....	209
Off-line Active .....	209
Recovery from Mechanical Errors.....	210
Programmer's Notes .....	210
<b>Appendix A.....</b>	<b>211</b>
Code Page Definition Table .....	211
<b>Appendix B.....</b>	<b>213</b>
ASCII Code Table .....	213



## Table of Tables

Table 1 Character Specifications .....	3
Table 2 Print Speed Specifications .....	3
Table 3 Possible Character Pitches .....	4
Table 4 Basic Cell Size for Draft, Large Draft, and NLQ Fonts .....	5
Table 5 Printer Dimensions .....	8
Table 6 Standard Power Input Requirements .....	9
Table 7 Power Input Requirements Optional 24-volt DC Supplied from Host .....	9
Table 8 Parallel Interface Pin-outs .....	13
Table 9 Serial Interface Pin-outs .....	14
Table 10 Cash Drawer Connector .....	16
Table 11 Carriage Configurations .....	26
Table 12 Paper Low Setup .....	28
Table 13 Error Indicator Chart: General Problems .....	38
Table 14 Error Indicator Chart: Serious Problems .....	38
Table 15 Extended Diagnostics .....	42
Table 16 How to Change Configuration Settings .....	44
Table 17 Configurable Options .....	54
Table 18 Character Pitch .....	71
Table 19 Inter-character Spacing .....	72
Table 20 Language Table ID's .....	75
Table 21 Code Page Definition Table .....	77
Table 22 Euro Character Substitution Matrix .....	78
Table 23 OCR MA-3 .....	82
Table 24 Paper Sensor Commands .....	111
Table 25 Paper Sensor Commands .....	111
Table 26 Supported TM-200 Commands .....	134
Table 27 TM-U200 Restrictions .....	135
Table 28 Command Support for Various Epson Printers .....	135
Table 29 Undocumented TM U200 Commands .....	135
Table 30 Supported EPOS Commands .....	136
Table 31 International Character Sets .....	143
Table 32 Character Code Pages .....	145
Table 33 Character Code Table .....	146
Table 34 Print Modes .....	147
Table 35 Rotation Modes .....	148
Table 36 Paper Sensor Commands .....	150
Table 37 Paper Sensor Commands .....	150
Table 38 Print Density Selection .....	153
Table 39 Automatic Status Back (ASB) Values for <n> .....	154
Table 40 Automatic Status Back (ASB) First Byte (Printer Information) .....	155
Table 41 Automatic Status Back (ASB) Second Byte (Error Information) .....	155
Table 42 Automatic Status Back (ASB) Third Byte (Paper Sensor Information) .....	156
Table 43 Automatic Status Back (ASB) Fourth Byte (Paper Sensor Information) .....	156
Table 44 Paper Sensor Status (<n> = 1, 49) .....	156
Table 45 Drawer Kick-out Connector Status (<n> = 2, 50) .....	156
Table 46 Values for the Status Function, <n> .....	157
Table 47 Printer Status (<n> = 1) .....	157
Table 48 Off-line Status (<n> = 2) .....	157
Table 49 Error Status (<n> = 3) .....	158
Table 50 Paper Roll Sensor Status (<n> = 4) .....	158
Table 51 Peripheral Status (<n> = 0, 48) .....	158
Table 52 Paper Status .....	159
Table 53 Bar Code System Based on <m> .....	160
Table 54 Bar Code System Based on <m> .....	161

Table 55 Printing Position of HRI Characters .....	161
Table 56 Font for Human Readable Interpretation (HRI) Characters.....	162
Table 57 Printer ID .....	164
Table 58 Type ID (<n> = 2 or 50) .....	164
Table 59 Peripheral Device Bit Definitions .....	165
Table 60 Macro Control Bit Definitions .....	168
Table 61 User-defined Bit-image Resolutions .....	172
Table 62 Star Commands .....	176
Table 63 Supported Citizen Commands.....	177
Table 64 Parallel-port Timing.....	197

## Table of Figures

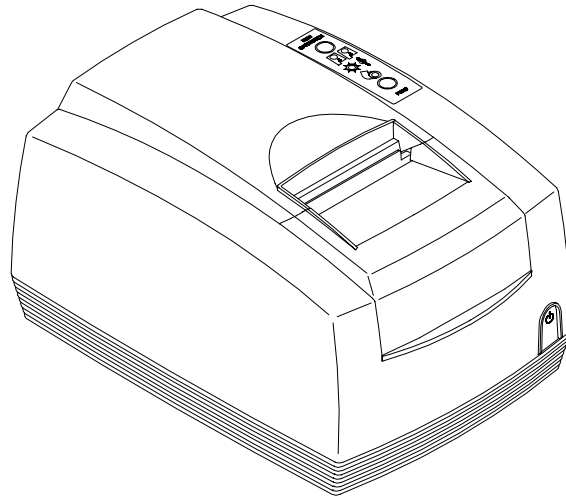
Figure 1 Draft 12 x 12 Font .....	5
Figure 2 Large 12 x 14 Font.....	5
Figure 3 NLQ 24 x 16 Font .....	6
Figure 4 Printer Dimensions .....	8
Figure 5 Temperature and Humidity Ranges.....	10
Figure 6 Receipt Printable Area.....	12
Figure 7 Cash Drawer Pin Assignment.....	16
Figure 8 Cash Drawer Selection .....	22
Figure 9 Cash Drawer Shunt .....	22
Figure 10 Power and Communications Ports .....	23
Figure 11 3-pin mini DIN plug .....	24
Figure 12 Installing Ink Cartridges .....	25
Figure 13 Paper Low Setup (adjusting the sensor) .....	27
Figure 14 Core and Paper Diameters.....	28
Figure 15 Keypad layout.....	32
Figure 16 Configuration Example .....	46
Figure 17 Example of Character Graphics .....	178
Figure 18 Example Commands for a Sample Receipt.....	179
Figure 19 Sample Receipt .....	180
Figure 20 Receipt with graphics.....	184
Figure 21 Typical POS System.....	192
Figure 22 Host to Printer Link .....	193
Figure 23 Printer Communications Buffer Flow .....	194
Figure 24 Parallel-port Data Timing.....	196
Figure 25 Parallel Port ACK Timing Options .....	197
Figure 26 Serial Port Flow Control Using DTR .....	200
Figure 27 XON/XOFF Serial Port Flow Control .....	201

## Table of Flow Charts

Flow Chart 1 Serial Buffer Operation .....	202
Flow Chart 2 Print Controller Using Data.....	203
Flow Chart 3 Inquire Flow .....	206

## General Description

### POSjet™ 1000 Inkjet Receipt Printer



#### Standard Features

- The following features are common to the entire family of printers:
- Up to 12 lines per second at 10 characters per line
- 5.0 inches per second paper slew speed
- 2.5" print zone
- One color printing
- Latch-in ink cartridge
- Dual cash drawer drivers with status (Single Modular)
- Centronics parallel or serial RS-232C interface
- Configurable receiver buffer
- Custom logo graphic print buffer in nonvolatile memory
- **Insta-Load™** paper loading capability
- **PowerPocket™** (External power supply that can be housed inside printer)
- Self diagnostics
- Set up and configuration utility program
- Characters per inch (dpi) selections from 1 to 30 with 13, 14.8, and 17.3 as defaults
- Three print fonts - Draft, Large Draft, and Near Letter Quality (NLQ)
- Selectable printing of bold, italic, size scaling and/or rotated (4- 90° rotations)

## Optional Features

The optional features either replace a standard feature or enhance the operation of the printer. All optional features are installed at the factory and must be selected when the printer is ordered.

- Auto-cutter (partial cut)
- Two-Color Printing
- Two-Color Ready<sup>1</sup>
- USB Interface
- Adjustable Paper Low Sensor
- Kitchen Buzzer

---

<sup>1</sup> The POSjet printer is available with a dual cartridge carriage but without the second cartridge installed. This printer is termed Color Ready. See the configuration section for changing a "Color Ready" printer to two color.

## General Specifications

### Printing Specifications

Printing method	Thermal ink jet
Cartridge arrangement	12 nozzle
Print dot diameter	0.012" (0.34 mm)
Print dot pitch	0.0096" (0.244 mm)
Printing directions	Bidirectional, logic seeking
Print zone (maximum)	2.5" (63.5 mm)

Characters per second	Refer to Table 1
Characters per line	Refer to Table 1
Characters per inch	Refer to Table 1

Print Pitch Capability (Characters per Inch)				Max Characters/Line (2.5-inch Print Zone)			Approximate Characters per Second <sup>2</sup>
Font	Half Wide (Max CPI)	Single-wide (Max CPI)	Double- wide	Max	Typ	Dbl-wide	
NLQ	Not Available	13.0	6.5	32	32	16	100
Large Draft	29.72	14.86	7.43	74	37	18	315
Small Draft	29.72	17.3	8.67	74	43	21	360

Table 1 Character Specifications

Characters per Line	Minimum Lines per Second <sup>3</sup>
10	12
20	10
30	8
40	6

Table 2 Print Speed Specifications

<sup>2</sup> The value is based on a single full 2.5" print line printing single width, small draft font. Line feed time is not included.

<sup>3</sup> Print speed is calculated with the 12 x 12 single wide font at 17.3 cpi and 8 lpi spacing. If head maintenance needs to be done, the print speed will be less.

## Character Pitch

Each character has at least one half-column inter-character spacing included within the cell size. The inter-character spacing provides the maximum character pitch as shown in the table below. Change the spacing between characters in one of two ways. The first is to request that right side spacing be added between characters; the other is to request a specific pitch in characters per inch. When a specific character per inch (cpi) is selected, the printer calculates the number of half dot columns that must be inserted or removed between characters to print at the requested cpi. If the single width characters will overlap excessively, the printer will switch to half width characters. It is not always possible to print at exactly the requested pitch. The printer selects the closest possible pitch to the one chosen.

Requested CPI	Result	Font Format		
		NLQ 24 x 16 Font	Small Draft 12 x 12 Font	Large Draft 12 x 14 Font
1	1.000 CPI	Std Font	Std Font	Std Font
2	2.000 CPI	Std Font	Std Font	Std Font
3	3.014 CPI	Std Font	Std Font	Std Font
4	4.000 CPI	Std Font	Std Font	Std Font
5	4.952 CPI	Std Font	Std Font	Std Font
6	5.943 CPI	Std Font	Std Font	Std Font
7	6.933 CPI	Std Font	Std Font	Std Font
8	8.000 CPI	Std Font	Std Font	Std Font
9	9.043 CPI	Std Font	Std Font	Std Font
10	9.905 CPI	Std Font	Std Font	Std Font
11	10.947 CPI	Std Font	Std Font	Std Font
12	12.235 CPI	Std Font	Std Font	Std Font
13	13.000 CPI	Std Font	Std Font	Std Font
14	13.867 CPI	Std Font	Std Font	Std Font
15	14.857 CPI	Std Font	Std Font	Std Font
16	16.000 CPI	Std Font	Std Font	Std Font
17	17.333 CPI	Not recommended	Std Font	Std Font
18	17.333 CPI	Not recommended	Std Font	Std Font
19	18.909 CPI	Not recommended	Std Font	Half Width
20	20.8 CPI	Not recommended	Half Width	Half Width
21	20.8 CPI	Not recommended	Half Width	Half Width
22	23.111 CPI	Not recommended	Half Width	Half Width
23	23.111 CPI	Not recommended	Half Width	Half Width
24	23.111 CPI	Not recommended	Half Width	Half Width
25	23.111 CPI	Not recommended	Half Width	Half Width
26	26.000 CPI	Not recommended	Half Width	Half Width
27	26.000 CPI	Not recommended	Half Width	Half Width
28	26.000 CPI	Not recommended	Half Width	Half Width
29	29.714 CPI	Not recommended	Half Width	Half Width
30	29.714 CPI	Not recommended	Half Width	Half Width
31	29.714 CPI	Not recommended	Half Width	Half Width

Table 3 Possible Character Pitches



## Character Generation

### Standard Print

The three resident fonts in the printer are Draft, Large Draft, and Near Letter Quality (NLQ). The cell size for each is different. In addition, the Small and Large draft fonts can be printed in Double, Single and Half wide versions. All the width variations are based on the single width and use mathematical algorithms to convert them to different widths. The following discussion is based on the basic single width character.

Character Cell	Draft	Large Draft	NLQ
Horizontal	12	14	16
Vertical	12	12	24

Table 4 Basic Cell Size for Draft, Large Draft, and NLQ Fonts

### Draft Font

The draft font is defined in the 12 x 12 cell to use 6 full-columns and 5 half-columns horizontally. In general, most characters are only nine dots wide; however, to provide readable international characters, the minimum cell size is kept at 12. The minimum cell size provides at least 1 half-column between any character.

The vertical format never uses the top dot, and the bottom 2 dots are used for character decenders and underline. The draft font provides the most print per line and the most efficient use of ink per character.

```

01      .....
02      ...0.0....
03      ...0...0...
04      ..0....0...
05      .0.....0..
06      .0.0.0.0.0..
07      .0.....0..
08      .0.....0..
09      .0.....0..
10      .0.....0..
11      .....
12      .....

```

Figure 1 Draft 12 x 12 Font

### Large Draft Font

The large draft font is defined in the 12 x 14 cell to use 7 full, and 6 half-columns horizontally, which provides at least 1 half-column between any character.

The vertical format uses the first 10 rows for the characters and the bottom 2 for character decenders and underline. The large draft font is larger than the draft font and is more readable. It, however, provides fewer characters per line and uses more ink per character.

```

01      .....0.0.....
02      ....0...0.....
03      ....0...0.....
04      ...0....0.....
05      ..0.....0....
06      ..0.....0....
07      .0.0.0.0.0.0..
08      .0.....0....
09      0.....0.....
10      0.....0.....
11      .....
12      .....

```

Figure 2 Large 12 x 14 Font

**Near Letter Quality (NLQ) Font**

The near letter quality font is defined in the 24 x 16 cell that is printed in 2 passes. Horizontally, 15 dots are typically used, providing at least 1 half-column between any two characters.

The vertical format uses rows 4 - 19 for the basic character, rows 1 - 3 for accents, and rows 20 - 24 for decenders and underlines. Because NLQ font makes two passes, the vertical size is slightly larger than large draft font. Vertical resolution is doubled.

NLQ font is easily readable and has a higher contrast than the draft or large draft fonts. It, however, provides fewer characters per line and uses more ink per character than either draft font.

```

01 .....
02 .....
03 .....
04 .....0.....
05 .....0.....
06 .....0.0.....
07 .....0..0.....
08 .....0..0.....
09 ....0....0.....
10 ....0....0.....
11 ....0....0.....
12 ...0.....0....
13 ...0.....0....
14 ..0000000000...
15 ..0.....0....
16 ..0.....0....
17 .0.....0..
18 .0.....0..
19 0000.....0000.
20 .....
21 .....
22 .....
23 .....
24 .....

```

Figure 3 NLQ 24 x 16 Font

In non-Ithaca® emulation modes, only the draft and large draft fonts are available. They provide a close approximation to the Epson 9 x 9 and 7 x 9 formats available in the TM-U200 model printer.

**Rotated Print**

To provide printing flexibility, rotated print is available. Rotated print mode rotates the print in any of three 90° orientations. In 90° and 270° rotated mode, the print data is first buffered by the printer, processed (rotated), and then printed. Buffering the data delays the print process as it takes some time to process the data before it is printed. In 180° mode, the print is simply inverted. Rotated print is not available for NLQ font or when the printer is in Epson mode.

## Graphics Generation

The POSjet™ 1000 supports both APA graphics and Color Raster graphics (Horizontal graphics). In APA graphics mode the following print resolutions are supported.

Mode	Horizontal	Vertical	Data
APA graphics  NOTE: Not all resolutions are available in all emulations.	60 dpi *	96	8-bit slices
	120 dpi *	96	8-bit slices
	120 dpi *	192	8-bit slices
	240 dpi *	192	8-bit slices
	80 dpi *	96	8-bit slices
	72 dpi *	96	8-bit slices
	90 dpi *	96	8-bit slices
	144 dpi *	96	8-bit slices
	160 dpi *	96	8-bit slices
	104 dpi	120	24-bit slices
	208 dpi	240	24-bit slices
Horizontal graphics	104 dpi	96 dpi	1 horizontal 1 vertical pass
	208 dpi	96 dpi	2 horizontal 1 vertical pass
	104 dpi	192 dpi	1 horizontal 2 vertical passes
	208 dpi	192 dpi	2 horizontal 2 vertical passes

❖ These horizontal resolutions are converted by scaling in the printer. They are printed in 104 or 208 dpi resolution.

Color graphics are supported in Horizontal graphics mode only.

## Physical Specifications

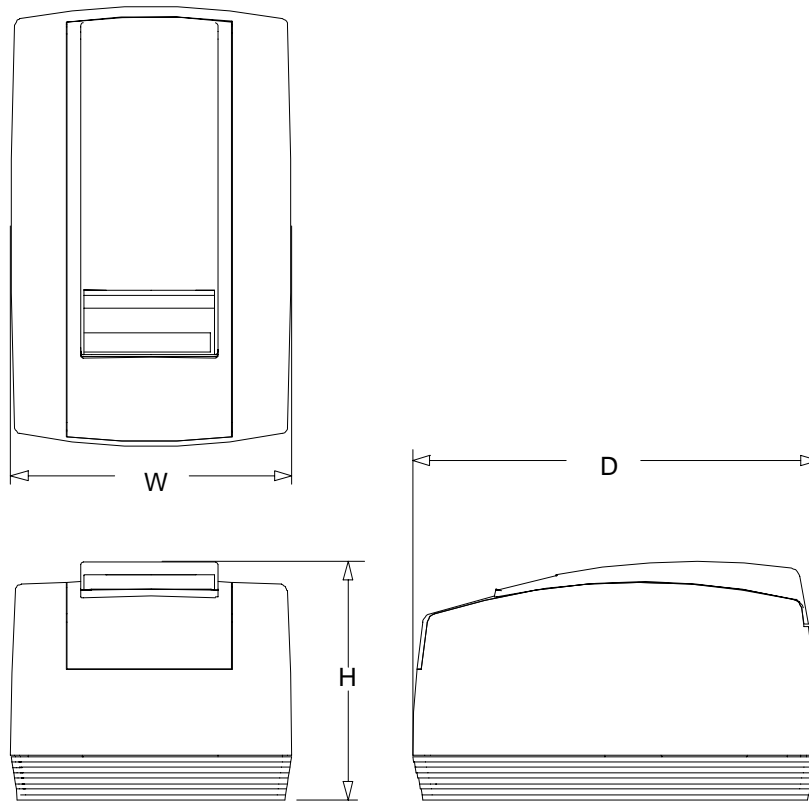


Figure 4 Printer Dimensions

## Dimensions

Maximum Dimensions	Without Knife			With Knife		
	W	D	H	W	D	H
Dimensions in inches	6.75	9.75	5.34	6.75	9.75	5.81
Dimensions in mm	171.45	247.65	135.64	171.45	247.65	147.57

Table 5 Printer Dimensions

## Weight

Approximate weight	6 lbs. (2.7 kg)
Shipping weight	8 lbs. (3.6 kg)

## Electrical Characteristics

### External Powered AC

The POSjet™ 1000 Printer is designed to be AC self-powered in domestic and international markets. The printer is equipped with a detachable universal input power supply that is designed to operate worldwide without modification.

Supply Voltage Rating (VAC)	Supply Voltage Range (VAC)	Frequency (Hz)	Rated Power (watts)	Idle Current (amps)	Printing Current (amps)
100-240	90-264	47 - 63	25	0.08 @ 120VAC 0.04 @ 240VAC	.435 @ 100 VAC .281 @ 240 VAC

Table 6 Standard Power Input Requirements

### External Powered DC

Optionally, the POSjet™ 1000 Printer can be operated with an external 24-volt DC power supply.

Supply Voltage Rating (VDC)	Supply Voltage Range (VDC)	Frequency (Hz)	Power (watts)	Idle Current (amps)	Current (amps)
24-5+10%	22.8 - 26.4 <sup>4</sup>	DC	25W Avg. (Printing)	0.125	2.0 (Cash Drawer Fire) 1.0 (Printing)

Table 7 Power Input Requirements Optional 24-volt DC Supplied from Host

<sup>4</sup> For DC powered printers, the cash drawer is supplied directly from the DC input supply. The cash drawer requirements may effect the allowable range of voltages.

## Environmental

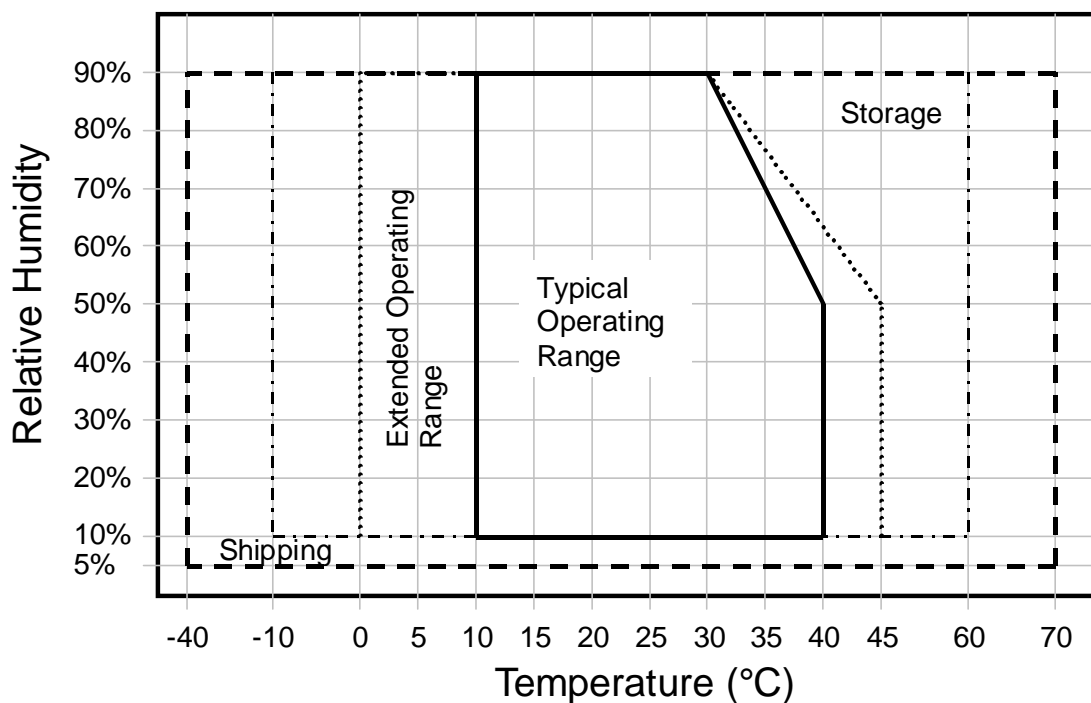


Figure 5 Temperature and Humidity Ranges

### Temperature

Typical Operating Range:	10°C to 40°C / 50°F to 104°F
*Extended Operating Range:	0°C to 45°C / 32°F to 113°F
Storage:	-10°C to 60°C / 14°F to 140°F
Shipping:	-40°C to 70°C / -40°F to 158°F

\* Exposure to high or low temperatures for periods of greater than 48 hours will lead to significantly reduced cartridge life. The Typical Operating Range provides full printer reliability. The Extended Operating Range may degrade the MTBF of the printer and life of the cartridge.

### Humidity

Operating:	10% to 90% ( <i>non-condensing</i> )
Storage:	10% to 90% ( <i>non-condensing</i> )
Shipping:	5% to 90% ( <i>non-condensing</i> )

Typical Operating Range as shown in Figure 5 provides full printer reliability. Extended range may degrade the MTBF of the printer and life of the Cartridge.

## Media Specifications

### ***Ink Cartridge Overview***

For complete print cartridge specifications refer to the HP C6602A Specification.

- Print cartridge specification **HP C6602A<sup>5</sup>**
- Cartridge arrangement **12 vertical nozzles**
- Typical print dot diameter **0.0100" (0.254 mm)**
- Vertical dot pitch **0.0104" (0.264 mm) or 96 dpi**
- Cartridge life **6 million characters at 16 dots per character (average)**
- Cartridge Color **Black and/or red (other colors when available)**
- TransAct Part Numbers
 

<b>3 Pac-Black</b>	<b>100-02347</b>
<b>3 Pac-Red</b>	<b>100-02349</b>
<b>6 Pac-Black</b>	<b>100-02348</b>
<b>6 Pac-Red</b>	<b>100-02350</b>
- HP Part Numbers
 

<b>Black Cartridge</b>	<b>HP C6602A</b>
<b>Red Cartridge</b>	<b>HP C6602R</b>

*(All cartridge information based on HP test data.)*

### **Receipt Paper (one-ply receipt)**

- Paper feed method **Friction feed**
- Paper feed pitch **default - 0.125" (1/8" or 3.175 mm)**
- Paper roll width **3.0" ± .02" (76mm ± .5mm)**
- Roll diameter **4.0" max. (101.6mm max)**
- Paper thickness **0.003" - .004" (0.076 - 0.102 mm)**
- Roll paper core outside Dia. **0.82" - 0.85" (20.8 – 21.6 mm) Dia.**
- Roll paper core inside Dia. **0.45" - 0.50" (11.4 – 12.7 mm) Dia.**
- Typical roll footage **330 feet (100 m)**
- Paper low indicator **Optional Paper Low Sensor based on paper roll diameter.**
- Receipt paper out **About 1.0" (25 mm) of paper remaining**
- TransAct Part Numbers
 

<b>1 Roll</b>	<b>98-02021</b>
<b>25 Case</b>	<b>98-02022</b>

---

<sup>5</sup> Print cartridge specifications are controlled by Hewlett Packard. Information here is for reference only.

## Receipt Printing

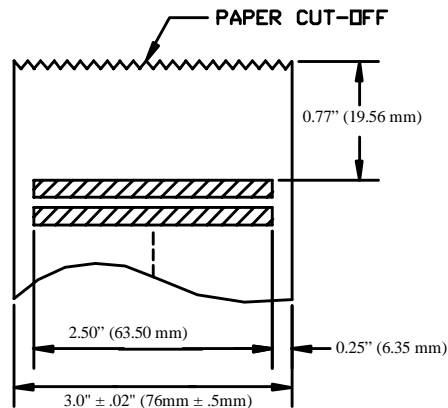


Figure 6 Receipt Printable Area

### Receipt Printing, Auto-cutter Position

The paper tear off is positioned 0.77" (19.56 mm) from the last line of print. The Auto-cutter is positioned 1.06" (26.92 mm) from the last print line.

### Auto-cutter (Partial Cut Option)

A receipt auto-cutter is an optional feature with all POSjet™ 1000 Printers.

- |                         |  |
|-------------------------|--|
| • Cutter type           | <b>Guillotine</b>                          |
| • Paper Roll Width      | <b>3.0" ± .02" (76mm ± .5mm)</b>           |
| • Media thickness range | <b>0.003" to 0.004" (0.076 to 0.10 mm)</b> |
| • Cut to line of print  | <b>1.06" (26.92 mm)</b>                    |
| • Cutter life           | <b>1,000,000 cuts</b>                      |

## Paper Out

A receipt paper out sensor is provided as a standard feature. It senses when there is approximately one inches of paper left on the paper roll.

## Paper Low

A receipt paper-low sensor is provided as an optional feature. An operator-adjustable paper-low assembly allows the printer to sense when the paper roll is between 1.42" and 0.885" (36.1mm and 22.5mm) in diameter. It is adjustable to compensate for various paper core dimensions.



## Audio Alert (Kitchen Buzzer)

The kitchen buzzer is a factory-installed option that can be provided as an optional feature. It is triggered upon command from the host terminal to make a sound loud enough to be heard under noisy conditions.

## Cover Interlock

A printer-cover interlock switch is provided as a standard feature. When the cover is open, the carriage assembly centers to allow servicing, and the printer goes off-line and removes drive power to the carriage. Going off-line prevents an operator from inadvertently getting their hands pinched by the carriage assembly.

## Communications Interface

### Parallel Interface

There are two parallel interface. One has a IEEE 1284-A 25-pin, D-shell connector. The pin-out is such that the printer interfaces to a standard IBM PC parallel printer interface with a one-to-one cable. The second card provides IEEE 1284-B which a standard Centronics 36-pin connector. Both Interface Cards provide a dual cash drawer interface. The following table lists Interface signals and pin.

25-pin Connector	36-pin Connector	Signal	Description	Direction
Pin 1	Pin 1	STROBE	Clock data to printer	Host to Printer
Pins 2-9	Pins 2-9	D0 - D7	Data	Host to Printer
Pin 10	Pin 10	ACK\	Printer accepted data	Printer to Host
Pin 11	Pin 11	BUSY	Printer busy	Printer to Host
Pin 12	Pin 12	PE	Paper Out/Status	Printer to Host
Pin 13	Pin 13	SLCT	Printer selected	Printer to Host
Pin 14	Pin 14	AUTOFD	Autofeed paper	Host to Printer
Pin 15	Pin 32	FAULT\	Printer error	Printer to Host
Pin 16	Pin 31	INIT\	Initialize printer	Host to Printer
Pin 17	Pin 36	SLIN	Select printer	Host to Printer
	Pin 17	FG	Frame ground	Printer to Host
-	Pin 18	+5V	Peripheral logic high	Printer to Host
Pins 18-25	Pins 16, 19-30	GND	Ground	

Table 8 Parallel Interface Pin-outs

### Signal Levels

Voltage levels	0 V and +5 V (nominal)	
Logic levels		
Logic one	Driver	+2.4 V to +5 V
	Receiver	+2.0 V to +5 V
Logic zero	Driver	0 V to +0.4 V
	Receiver	0 V to +0.8 V

### Current requirements

Logic one	Source	0.25 ma at +2.4 V
Logic zero	Sink	16 ma
Line termination		
Data and control		3.3k ohm to +5 V
Strobe		1.2k ohm to +5 V

## RS-232 Serial Interface

### Serial Port Features

The serial port features are as follows:

<b>Baud Rates</b>	300, 600, 1200, 2400, 4800, 9600, 19.2K, 38.4K, and 57.6K
<b>Bit Patterns</b>	8-bit no parity; 8-bit odd; 8-bit even; 7-bit no parity; 7-bit odd; 7-bit even
<b>Flow Control</b>	DTR and XON/XOFF

9-pin	25-pin	Signal	Description
Pin 1	Pin 8		Not Connected
Pin 2	Pin 3	RX	Receive Data
Pin 3	Pin 2	TX	Transmit Data
Pin 4	Pin 20	DTR	Data Terminal Ready
Pin 5	Pin 7	GND	Signal Ground
Pin 6	Pin 6	DSR	Data Set Ready
Pin 7	Pin 4	RTS	Request to Send
Pin 8	Pin 5	CTS	Clear to Send
Pin 9	Pin 11		Not Connected

Table 9 Serial Interface Pin-outs

### Signal Voltage and Current levels

The Serial Interface Meets EIA RS232 Interface Specifications:

Voltage Levels	Max	+/-15 Volts
	Min	+/- 3 Volts
Mark = Off =	-3 to -15 Volts	
Space = On =	+3 to +15 Volts	

Because both the host and printer are DTE's (Data Terminal Equipment), they use the same serial port pin-outs. If the cable that is used to connect the host to the printer is a pin-to-pin inter-connect, it will not work. Therefore, a null modem or turn-around cable must be used to interconnect the host and the printer.

### Display Pass Through

The display pass through feature allows a pole display to be interconnected with the printer. The printer is connected to a host system with a special serial cable. The host sends serial data to the printer and the printer sends serial data to the pole display. The printer does not provide power to the display. During normal printer operation, no data is passed to the display. In pass through mode, all received data is passed on to the display.

## USB Interface

The USB interface is a Version 1.1 interface that is Version 2.0 compliant. The standard USB interface card is implemented through a Standard Series "B" Receptacle as defined in the USB Specification. The printer is self-powered and does not draw power from the standard type B USB interface cable.

The Standard USB Type B connector has the following pin functions:

### Pin Signal

- 1 Vbus (+5 V dc) (Not used in the POSjet™ 1000)
- 2 Minus data
- 3 Plus data
- 4 Ground

Note: The standard USB interface does not have enough power to run the printer.

## Cash Drawer

### Interface Description

The POSjet™ 1000 Printer supports dual cash drawers with status. The driver in the printer is capable of supplying 24 V DC at up to 1.5 amps and 250 milliseconds. The POSjet™ 1000 Printer defines cash drawer closed as switch open. If the drawer is disconnected, the printer considers it closed. Since the printer does not act on the cash drawer status, the application can interpret cash drawer status any way it wants.

- **Driver connector type (standard)** Single RJ12 connector (6 pin) with 24V sink drivers
- **Driver voltage** 24 volts (Refer to power supply specification)
- **Driver current** 1 amp maximum with current limit
- **Pulse duration** 250 msec maximum
- **Drawer status** Open/close drawer status provided to printer

The cash drawer interface can be configured for one of three configurations. The Communications Interface card Board has a 14-pin header with a 10-pin shunt installed on it. The shunt position defines the configuration of the Cash Drawer. There are three settings, Ithaca®, Epson, and Star. See "Configuring the Cash Drawer Interface" on page 22 .

The interface pin outs are as follows:

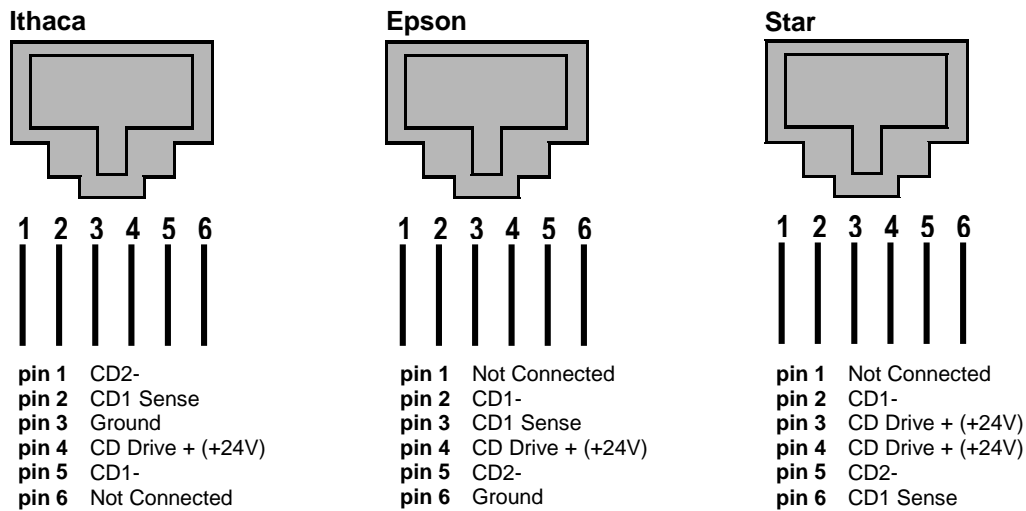


Figure 7 Cash Drawer Pin Assignment

Pin Number	Ithaca®	Epson			Star	
	Signal Name	Direction	Signal Name	Direction	Signal Name	Direction
1	Drawer kick out Drive Signal 2	Output sink Drive	Not Connected		Not Connected	
2	Drawer open/close Signal	Input	Drawer kick out Drive Signal 1	Output Sink Drive	Drawer kick out Drive Signal 1	Output Sink Drive
3	Signal Ground		Drawer open/close Signal	Input	+24V DC	
4	+24V DC		+24V DC		+24V DC	
5	Drawer kick-out Drive Signal 1	Output Sink Drive	Drawer kick out Drive Signal 2	Output Sink Drive	Drawer kick out Drive Signal 2	Output Sink Drive
6	Not Connected		Signal Ground		Drawer open/close Signal	Input

Table 10 Cash Drawer Connector

# Customer Support

## Service Information

TransAct Technologies Incorporated has a full service organization to meet your printer service and repair requirements. If your printer needs service, please contact your service provider first. If any problems persist, you can directly contact the Ithaca facility's Technical Support Department at (607) 257-8901 or (877) 7ITHACA for a return authorization. International customers should contact your distributor for services. TransAct offers the following service programs to meet your needs.

- Extended Warranty
- Depot Repair
- Maintenance Contract
- Internet Support

## Warranty Information

TransAct's POSjet™ 1000 Printers come with a standard 24-month warranty that commences upon shipment from factory, and covers parts and labor. An optional warranty, covering both parts and labor for an additional 12 months, may be purchased separately. Repairs are warranted for 90 days from the date of repair or for the balance of the original warranty period, whichever is greater.

## TransAct Product Support

Monday through Friday, 8 A.M. to 5 P.M. (excluding holidays). To obtain Technical Support, call TransAct's Ithaca Facility at (607) 257-8901, or (877) 7ITHACA. Have the following information at hand:

- The Model Number and Serial Number.
- A list of any other peripheral devices attached to the same port as the printer.
- The application software, operating system, and network you are using.
- A copy of your printer's Configuration Settings. See reverse side of this sheet for instructions on how to use Self-Test to printout your current settings.
- What happened and what you were doing when the problem occurred.
- How you tried to solve the problem.

## Return Materials Authorization and Return Policies

If the technical support person determines that the printer should be serviced at our facility, and you want to return the printer for repair, a Returned Materials Authorization (RMA) number must be issued before returning the printer. Prepare the printer being returned for repair as follows:

- Remove and discard ink cartridges.
- Pack the printer to be returned in the original packing material. Packing items may be purchased from TransAct's Ithaca Facility.
- Return only the accessories that a Support Technician asks you to include.
- Write the RMA number clearly on the outside of the box.

## Shipping Printers

Never ship a printer by any means with a print cartridge installed. Be sure to save the packing materials in the event that you need to send the printer in for servicing. TransAct Technologies is not responsible for damaged return items that are not packaged in original shipping material.

## Where Can You Find More Information?

### Our Internet Support and Sales Services

**Web address :** [www.transact-tech.com](http://www.transact-tech.com)

TransAct Technologies Incorporated maintains an Internet web site with content devoted to supporting our products. Within the Support Services section you can find documentation for the POSjet™ 1000 Printer, including a current copy of the Operator's Guide and Programmer's Guide.

### TransAct Product Support

After entering TransAct's web site, you will be brought to the "Welcome to TransAct" page. On this page you will find the Ithaca® Brand listed at the top right.

Click the Ithaca® logo; locate the category "Support Services" on the next page.

Click on the "POSjet™ 1000" sub-section on the lower half of the Ithaca® page.

Windows 95 Print Driver with Documentation	Part No. 100-9167
Windows NT 4.0 Print Driver with Documentation	Part No. 100-9170
OPOS Drivers with Documentation	Part No. 100-9732
Master Character Set Definitions	Part No. 100-9785

### Internet Support

TransAct Technologies Incorporated maintains an Internet web site. The address is <http://www.transact-tech.com>. The technical support page contains support information for our printers. The POSjet™ 1000 Printer support pages offer the latest information. The pages include the current version of this manual; program examples; test procedures; programming instructions; and supported print drivers.

### Operator's Guide

The Operator's Guide is intended for anyone who wishes to learn more about how to use the POSjet™ 1000. It contains specific information pertaining to installation and operation and also offers detailed explanations of the POSjet's operational controls including troubleshooting reference tables, indicator light blink tables, and connector pin-outs.

## Contacting TransAct's Ithaca Facility

Contact TransAct's Ithaca facility for information about the POSjet™ 1000 Printer and how it works with your system. For information on International distribution, visit our web site at [www.transact-tech.com](http://www.transact-tech.com). Contact the TransAct's Sales and Technical Support Departments at the following address and telephone or fax numbers.

### Technical Support

Receive technical support, order documentation, request additional information, or send in a printer for service.

### Sales

Order supplies, receive more product information, or order product brochures.

TransAct Technologies Incorporated  
Ithaca Facility  
20 Bomax Drive  
Ithaca, NY 14850 USA

Telephone	(877) 7ithaca or (607) 257-8901
Main fax	(607) 257-8922
Sales fax	(607) 257-3868
Technical Support fax	(607) 257-3911
Web site:	<a href="http://www.transact-tech.com">http://www.transact-tech.com</a>

## Setup Procedures

### Verifying the configuration

Before you install a POSjet™ 1000 Printer into your system, you should verify that the printer is configured as required by your system. There are four parts to this verification process.

1. Verify that the communications interface card is the correct one.
2. Verify that the Cash drawer interface is configured correctly
3. Verify that the Power connection is correct.
4. Verify that the firmware in the printer is configured correctly.

### Verify the communications interface card

There are three basic types of interface cards and each has variations. Make sure your printer has the correct interface card.

#### Parallel Interface

- Centronics 36-pin interface
- 25-pin D shell

#### Serial Interface

- 9-pin D shell interface
- 25-pin D shell interface

#### USB Interface

- Standard 4-pin

It is easy to distinguish most of the interface cards besides the 25-pin Serial and 25-pin Parallel interface cards. To determine what interface is installed refer to the configuration receipt shipped with the printer, or enter configuration mode and look at the verification print out. If a serial interface card is installed, the print out will refer to the RS-232 Serial Interface. If the parallel interface card is installed, the print out will refer to the Parallel interface.

### Changing Interface Cards

The interface card on the POSjet™ 1000 Printer can be changed in the field.

In most cases, interface cards are interchangeable without altering the printer firmware. However, you may have to load new firmware and/or boot loader before you change the interface cards. Check with Technical Support for firmware compatibility between interface cards before ordering.

### Removing the Old Interface Card

1. Turn over the printer. Take care not to allow the cover to open or the paper to fall.
2. Disconnect the current communications and cash drawer cables.
3. If equipped, unsnap the power supply retainer and slide out the power supply.
4. Disconnect the power supply from the interface card.
5. Remove the interface retaining screw.
6. Slide the interface card sideways-towards the power supply pocket-and remove it.

**MAKE SURE the cash drawer is configured correctly. (See the next page)**



**Install the new interface card**

1. Configure the cash drawer jumpers. See "Configuring the Cash Drawer Interface" on page 22 .
2. Slide the interface card into the printer. Make sure the interface card sits flush with the retaining screw mounting bracket. The retaining screw should also line up with the hole in the new interface card.
3. Install the retaining screw.
4. Reconnect the power supply to the new interface card.
5. Reinstall the power supply into the PowerPocket™ and reattach the retainer.
6. Connect the communications interface card and any cash drawer cables.
7. Turn over the printer, and reconnect the power.

**Verify the Cash Drawer Interface**

The printer is shipped from the factory with a cash drawer interface label on the bottom of the printer. You should always verify that the cash drawer you are using matches the printer's cash drawer interface label. If there is no cash drawer label, you should remove the communications interface card and verify the setting. See "Configuring the Cash Drawer Interface" on page 22 .

There are many vendors of cash drawers. If you are unsure what the cash drawer interface is, contact the cash drawer vendor for more information.

If you find that the cash drawer does not match the printer, you may change the printer's cash drawer interface configuration as shown on page 15. If the cash drawer interface no longer matches the label on the printer, please remove the label.

## Configuring the Cash Drawer Interface

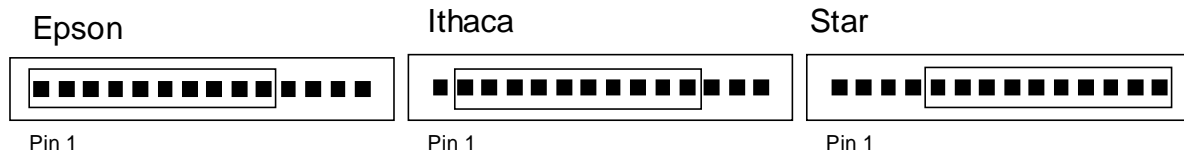


Figure 8 Cash Drawer Selection

The Cash drawer shunt setting is printed on the communications interface card. When you change the communications interface card, it is very important that the cash drawer configuration of the new interface card matches your cash drawer. Figure 9 Cash Drawer shows the location of the cash drawer shunt on the communications interface card.

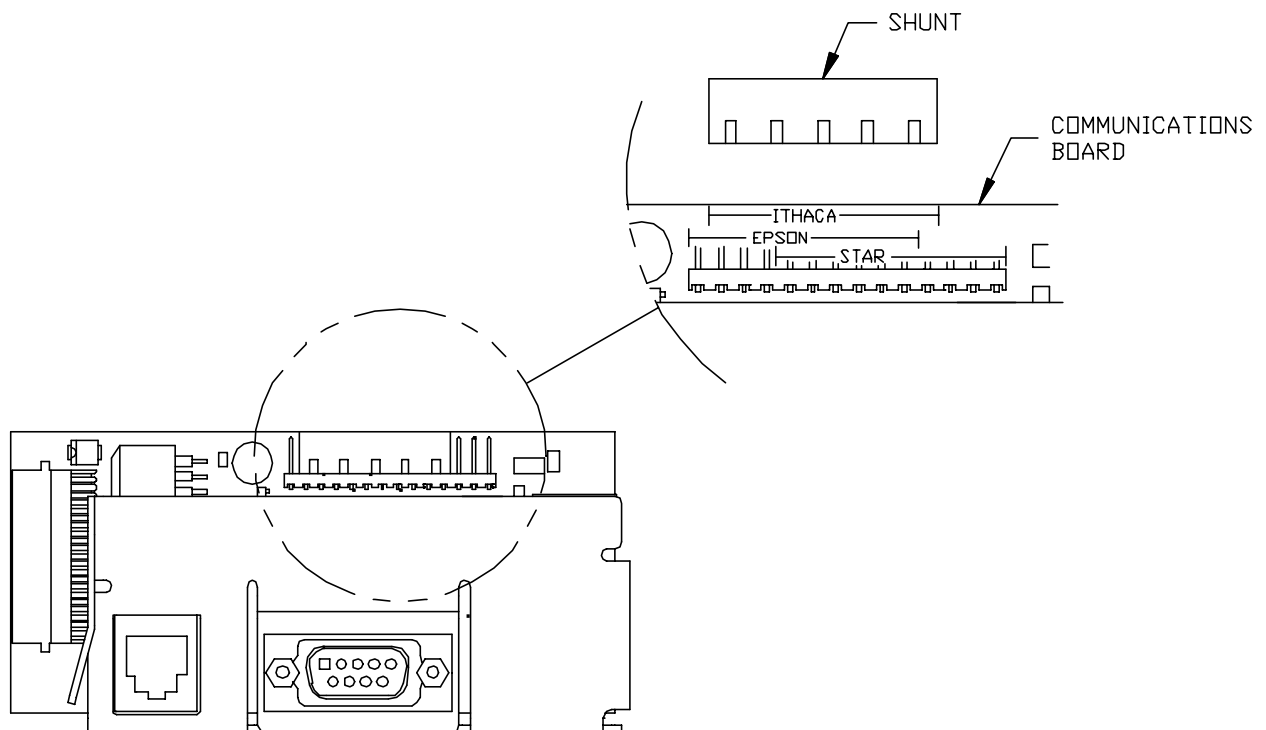


Figure 9 Cash Drawer Shunt

See “Cash Drawer interface descriptions”, on page 15 to help determine what interface you need.

To reconfigure the interface card, remove the 5-position shunt and reposition it to the position that corresponds to the cash drawer you have.

## Installing cables

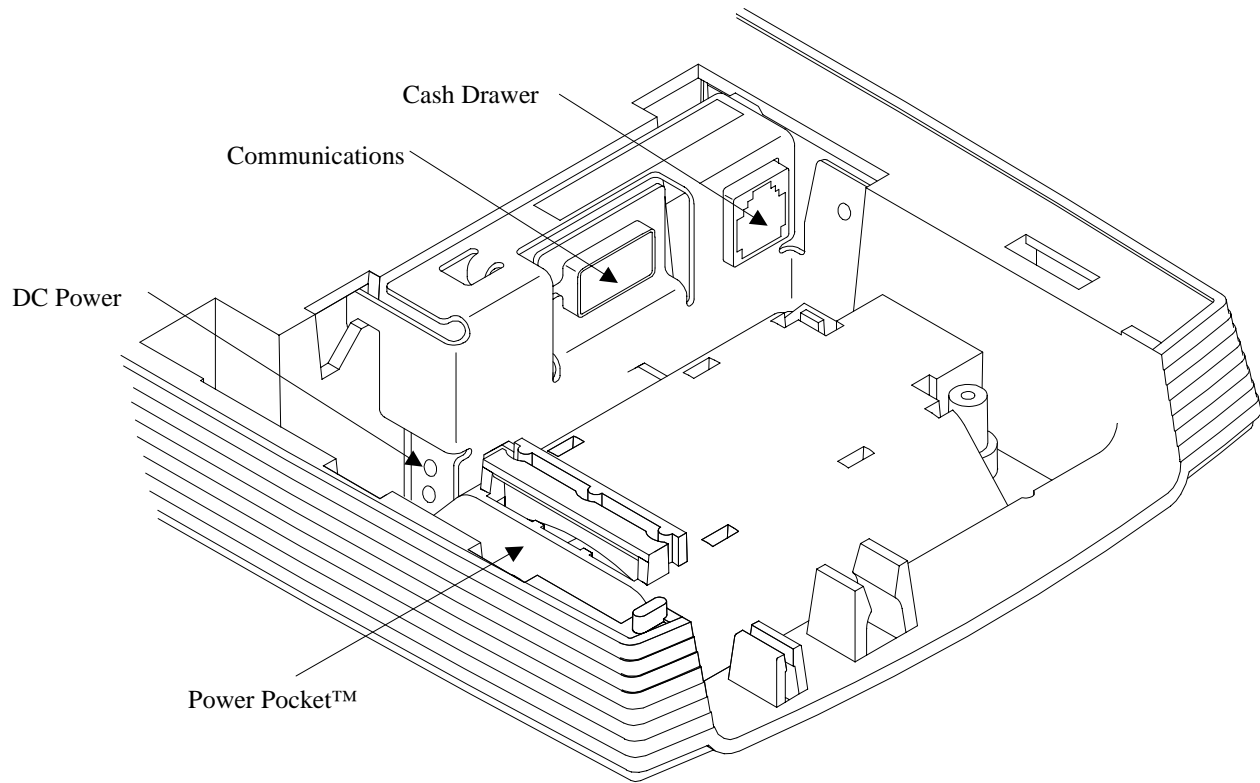


Figure 10 Power and Communications Ports

Three cables are required to be connected to the printer.

1. DC Power
2. Communications
3. Cash Drawer

### Connecting power

The POSjet™ 1000 Printer is supplied with a snap in PowerPocket™ power supply. This acts as an internal supply.

As an option, the printer is available without a power supply.

### Internal Supply

The internal supply is connected to the communication's interface card with a standard power adapter and then connects to an outside power source with a standard two wire power cord.

**External Supply**

If an external supply is used, it will have one of two interconnects:

1. POSjet™ 1000 standard power inter-connect. This connector is located as shown in Figure 10 Power and Communications Ports as shown.
2. 3-pin mini DIN plug

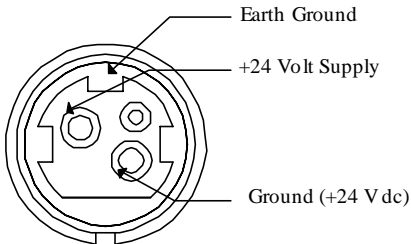


Figure 11 3-pin mini DIN plug

**Connecting Communications Cables**

The POSjet™ 1000 has a number of different communications interfaces.

**Serial**

The serial interface connector is either a 9-pin or 25-pin interface. The pin-out is shown on page 14. The connection on the printer is shown on page: 23.

**Parallel**

The Parallel interface connection is very similar to the Serial interface connection. It can be a 36-pin Centronics (IEEE 1284-B) or a 25-Pin D-Shell (IEEE 1284-A) connector. The pin-out of both connectors are shown on page 13. The connection on the printer is shown on page: 23.

**USB**

The USB connector can be one of two types. Standard Type B connector as in commonly used in the PC industry or a POS Powered USB connector. In the case of the Powered USB connector there are a number of different versions. Make sure you are using a 24 Volt DC version and the 24 Volt supply meets the requirements of the POSjet™ 1000 printer and any cash drawer that is connected to the printer.

**Verify the Firmware Configuration**

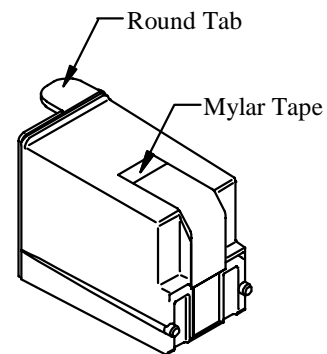
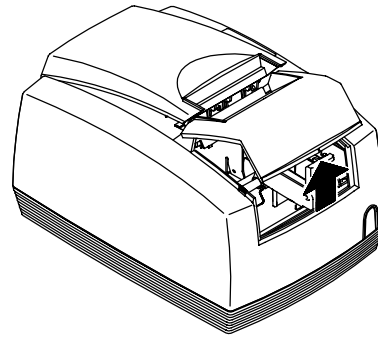
Included in the box your printer shipped in is an example receipt that will show how the printer was configured before it shipped from our Ithaca Facility. Compare this information to your system requirements. Pay attention to the Emulation and the communications link. If they are wrong, the printer may appear inoperative. If the configuration is not correct, refer to the section on changing the POSjet™ configuration. If there are a number of printers to be installed and you want the identical configuration in each, you can use the Universal configuration program to record the configuration on one printer, and replicate it over a group. The Configuration program is available from Transact technical support or from the Internet.

## Installing and Changing Ink Cartridges

The printer should be turned ON by using the  $\Phi$  button before you install ink cartridges. Confirm that the printer is ON by checking that the power indicator light is activated.

**Caution:** Do not touch ink cartridge's metallic connector surface with your fingers. Doing so will contaminate the connector and produce bad print quality.

1. Open the front cover of printer (Opening front cover automatically opens rear paper cover.)  
*(NOTE: If paper is present, ensure that receipt is torn off prior to opening front cover.)*
2. Pull down blue cartridge latch/latches
3. Remove new ink cartridge from sealed pouch.  
(Hold cartridge by round tab to avoid contamination.)
4. Remove Mylar Tape from face of new ink cartridge.
5. Place new ink cartridge(s) into carriage. Hold round tab to ensure clean installation. Black cartridges go into left carriage. Color cartridges go into right carriage. (Round tab faces to front of printer.) Refer to the drawings below to see how to install the ink cartridges into carriage.
6. Close blue latch/latches.
7. Press the NEW CARTRIDGE Button. Doing this initializes the ink status on the newly inserted ink cartridges.



**Note:** If you are installing the printer, an ink cartridge or cartridges can be found in the pouch that shipped with your printer.

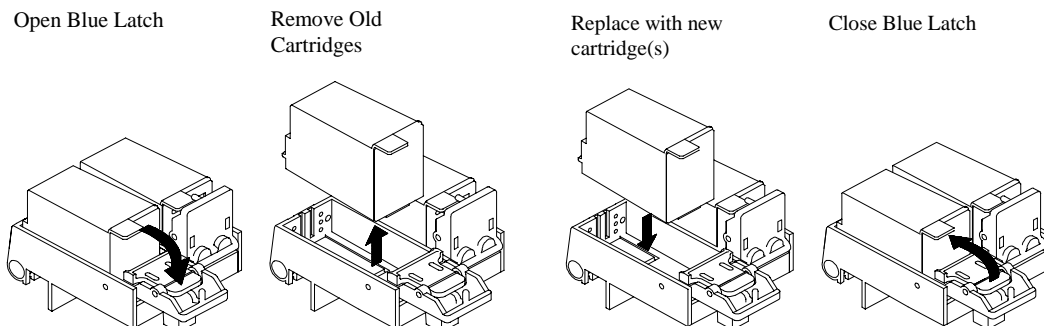


Figure 12 Installing Ink Cartridges

## Using Ink Cartridges

The POSjet™ 1000 is available in single or dual cartridge configurations. Several physical differences exist between the single and dual cartridge printers. The most obvious is the ability to install two ink cartridges in a dual cartridge printer. The second and less obvious is the dual wiper in a dual cartridge printer. For the printer to operate correctly, the firmware needs to know how many cartridges are installed and the color of the second cartridge.

Carriage Configuration	Left Pen	Right Pen	Wiper	Configurations
Single	Black	Not Used	Fixed	Black Only
Dual (Color Ready)	Black	Not Used	Dual	Black - None
Dual	Black	Red	Dual	Black - Red
Dual	Black	Green*	Dual	Black - Green
Dual	Black	Blue*	Dual	Black - Blue
Dual	Black	Custom*	Dual	Black - Red, Green, or Blue <sup>6</sup>

Table 11 Carriage Configurations

It is not possible to configure the printer to operate with two black cartridges. If a second black cartridge is installed, the printer will not maintain it, and the cartridge will dry out and become unusable. Do not store a spare cartridge in the second position. Once the seal is broken, the cartridge begins drying and should be placed in an operational printer.

## Care of Ink Cartridges

Ink cartridges should be stored in the sealed HP packaging. Once a print cartridge is unsealed, it should be placed in an operating printer. If a printer is taken out of service, the print cartridge should be removed and discarded. ***Never ship a printer by any means with a print cartridge installed.*** The pressure variations can cause the cartridge to become unprimed and/or purge. If you are going to ship a printer, remove and discard the print cartridge or cartridges.

<sup>6</sup> Custom second colors, when available, should select the closest primary color.

\* Not yet available.

## Paper Low Adjustment

All printers ship with a factory default, mid-position setting that can be adjusted up or down with 1 to 3 full turns of the adjustment screw. The amount of paper remaining after paper low detection is dependent on the adjustment.

### Adjusting the Paper-Low Sensor

1. Open the rear paper cover and locate the paper low adjustment access hole.
2. Refer to Table 2 on the following page for specific adjustment settings.
3. Turn screw to control the amount of paper that is remaining after paper low has occurred.

**CAUTION:** When the sensor touches the plastic of the Cabinetry Base (lower limit only), the sensor should not be adjusted any further. Over adjustment will cause stress in the sensor material and will decrease its longevity.

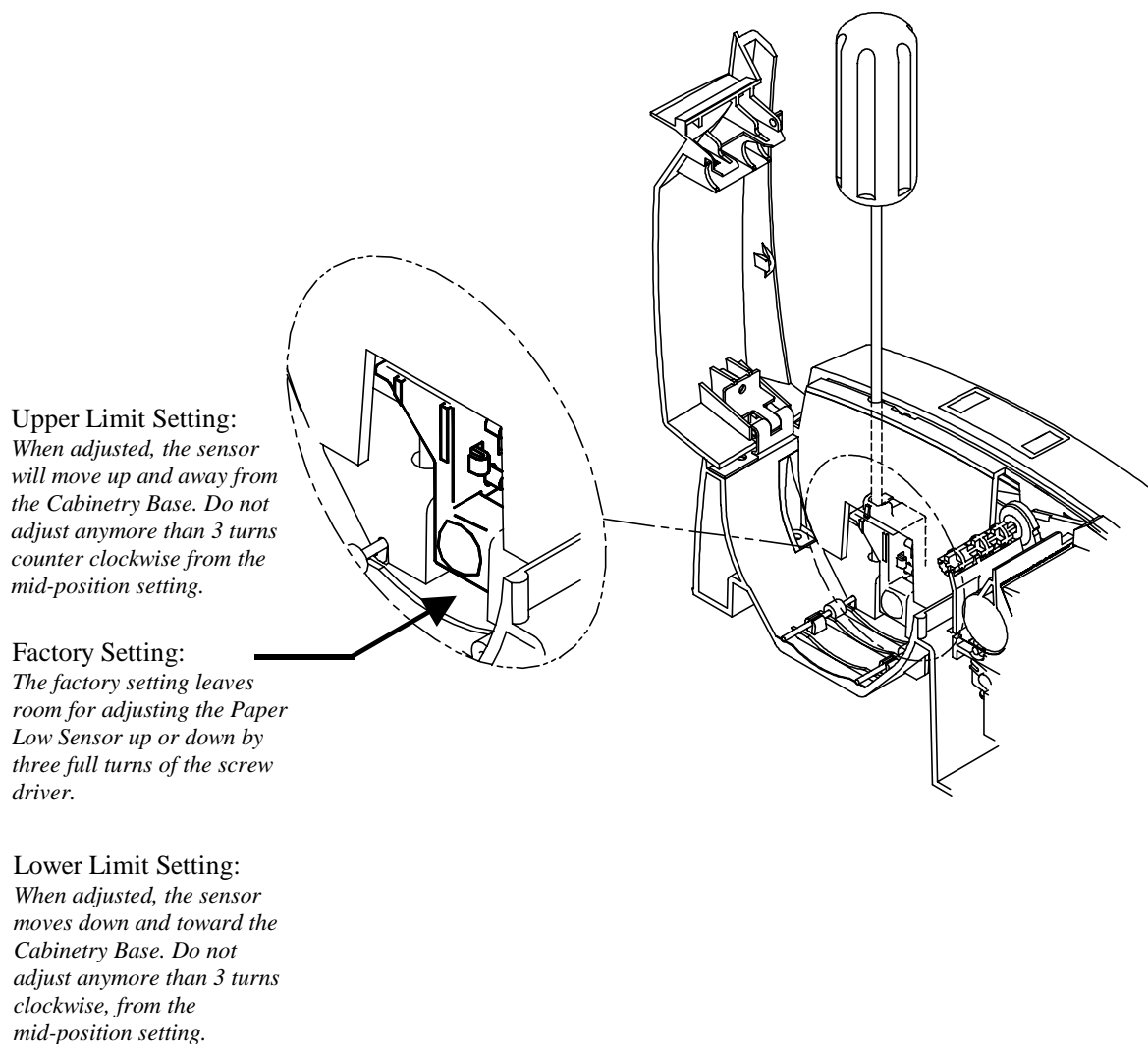


Figure 13 Paper Low Setup (adjusting the sensor)

## Paper Low Adjustment Requirements

Use the following table to decide how much paper you want to remain after paper low sensing has occurred. TransAct's specification for paper thickness is .0035" (.08mm)

Paper Low Adjustment Settings	Paper Remaining (in feet)	Paper/Core Diameter
<b>UPPER LIMIT: 3 turns (counter clockwise)</b>	<b>24'</b>	1.420" (36mm)
2 turns (counter clockwise)	22'	1.375" (34.9mm)
1 turn ()	16'	1.250" (31.7mm)
<b>FACTORY SETTING</b>	<b>12'</b>	1.175" (29.8mm)
1 turn (clockwise)	7'	1.050" (26.6mm)
2 turns (clockwise)	3.5'	.950" (24.1mm)
<b>LOW LIMIT: 3 turns (clockwise)</b>	<b>1.25'</b>	.885" (22.4mm)

Table 12 Paper Low Setup

- Use a paper roll with the measurements as defined on page 11.
- Always check that the core is aligned with the right edge of the paper roll, as installed.

## Paper and Core Diameters

To insure proper paper low detection, use paper rolls with a core outside diameter of **.82" to .85" (20.8mm to 21.6mm)**, and an inside diameter of **.45" to .50" (11.4mm to 12.7mm)**. Paper width is **3.0" ± .02" (76mm ± .5mm)**. Adjustment and operational results may vary if other thickness and width dimensions are used.

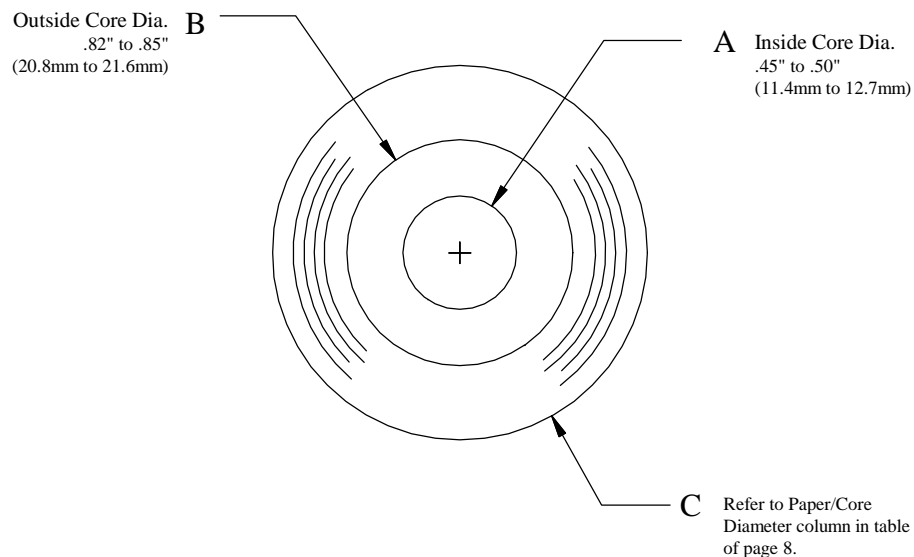


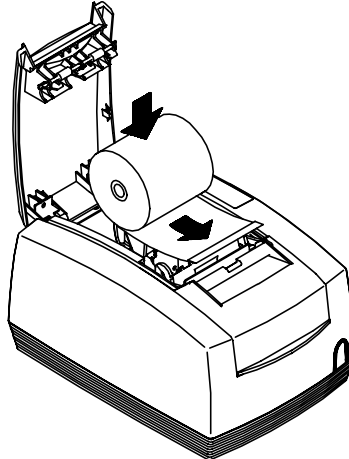
Figure 14 Core and Paper Diameters



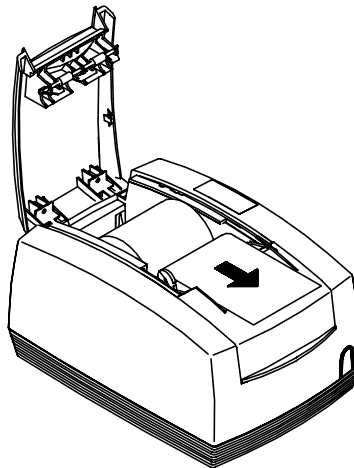
## Installing Paper

Before you attempt to load the paper roll, make sure that the printer is plugged in and that the printer is turned ON. **!IMPORTANT!: Paper cannot be loaded without first installing ink cartridges.** *If this is a new installation, a small receipt roll is supplied with the printer.*

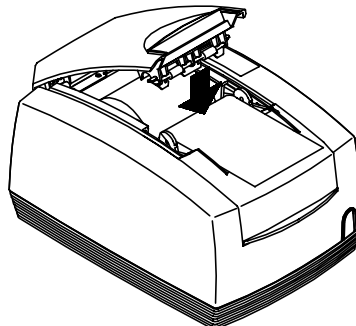
1. Open printer's rear paper cover. (First time installers will already have the cover open from installing the cartridge.)



2. Insert the paper roll so that the paper unwinds from the bottom and rests on the top of the front cover. Make sure paper is to the top front edge of the front cover. This is done to give the printer enough room to complete the automatic loading process and prepare for operation.



3. Close the rear paper cover. The printer will automatically load the paper through the feeding mechanism. If the paper does not feed, repeat the steps.



## Installing Windows™ Printer Drivers

### Printer Driver Installation Instructions for WIN95, 98, Me

1. Insert the “**Windows 98, 98, Me printer driver**” floppy disk into your diskette drive.
2. Click on “**Start**” menu -> “**Settings**” -> “**Printers**”.
3. Double Click on “**Add Printer**” Icon.
4. Select “**Next**”.
5. Select “**Local printer**” and “**Next**”.
6. Click on “**Have Disk**”, if your floppy is A: use A:\ and then “**OK**”.
7. Select the printer you have (ie. Series 1000) and then “**Next**”.
8. If you are asked “Keep existing driver” or “Replace existing driver”. Choose “**Replace existing driver**” and then “**Next**”.
9. Select the port the printer is connected to, and then “**Next**”.
10. Select “Yes” or No” for default printer, Printer name should not be altered, so choose “**Next**”.
11. If you wish, you can print a test page. Although, due to the narrow paper stock that this printer uses and the margins windows chooses, there will not be enough room to print all the images of the test page. Some of the large text will word wrap and be truncated.
12. Select “**Finish**”. The printer driver is now installed.
13. If you selected “Replace existing driver”, reboot your machine to ensure all components are installed.

### Printer Driver Installation Instructions for NT4.0, 2000

1. Insert the “**Windows NT, 2000 printer driver**” floppy disk into your diskette drive.
2. Click on “**Start**” menu -> “**Settings**” -> “**Printers**”.
3. Double Click on “**Add Printer**” Icon.
4. Select “**My Computer**” and “**Next**”.
5. Select the port the printer will be connected to, and then “**Next**”.
6. Click on “**Have Disk**”, if your floppy is A: use A:\ and then “**OK**”.
7. Select the printer you have (ie. Series 1000) and then “**Next**”.
8. If you are asked “Keep existing driver” or “Replace existing driver”. Choose “**Replace existing driver**” and then “**Next**”.
9. Printer name should not be altered, so choose “**Next**”.
10. Select “**Not Shared**” “**Next**”.
11. If you wish, you can print a test page. Although, due to the narrow paper stock that this printer uses and the margins windows chooses, there will not be enough room to print all the images of the test page. Some of the large text will word wrap and be truncated.
12. Select “**Finish**”. The printer driver is now installed.
13. If you selected “Replace existing driver”, reboot your machine to ensure all components are installed.

## OPOS drivers Installation Instructions

1. Run SetupOPOS.exe.
2. The communications will be defaulted to "COM2". If the communication port is not setup at installation, the first time the printer service object Open method is called, a Comm port setup dialog will be displayed.
3. After running Setup.exe there will be a OPOS setup utility in the OPOS program group/start menu and also in the control panel. Use this utility to setup the OPOS printer "driver" and cash drawer "driver".

## To Install the USB drivers

1. Ensure that USB is enabled in your system's BIOS. To verify that USB is enabled, Click on "Start", "Settings", "Control Panel". Double click "System" and select the "Device manager". If you see "Universal Serial Bus controllers" in the list, USB is enabled. Check you PC's documentation for more information about USB if needed.
2. Ensure that power is applied to the printer and plug in the USB cable to both the PC and printer.
3. Follow the on screen directions. Please note that several drivers are installed in this process. Therefore the "Found new hardware" prompt will appear several times. If the system needs, direct it to the location of the USB driver install disk (usually the floppy drive).

See "readme.txt" or "usbman.htm" on the install disk for more information.

## Operational Controls

### How to Operate the POSjet™ 1000 Printer

The POSjet™ 1000 Printer uses Hewlett Packard thermal ink jet print cartridges. The HP print cartridge is designed for point of sale applications, has a low ownership cost, and a long life. Like any ink jet printer, the POSjet™ 1000 Printer has features that extend the life and reliability of the print cartridge. Unlike consumer ink jet print cartridges, the HP print cartridge does not need to be capped when not in use. Consequently, the POSjet™ 1000 is ready to print at all times. Consumer ink jet printers cover and seal the print head to prevent drying when the printer is not in use. The HP cartridge does not need to be sealed. However, the cartridge is still an ink jet cartridge and must have periodic maintenance to keep it functional. Maintenance consists of cleaning the excess ink from the face of the cartridge (“wiping”) and firing ink into a reservoir to clean the print jets (“spitting”). The printer performs these functions as transparently to the host application as possible. However, the printer cannot perform these basic maintenance procedures if the AC power to the printer is removed.

### Keypad Overview

The keypad contains two buttons and five (LED) indicator lights. Although not located on the keypad, the third button is the  $\Phi$  button. The  $\Phi$  is located on the front-face of the printer’s cabinet.

### POSjet™ 1000 Buttons

Three buttons are located on the POSjet™ and can be used to perform functions like self-testing, configuration, and to monitor printer status. The three buttons are:

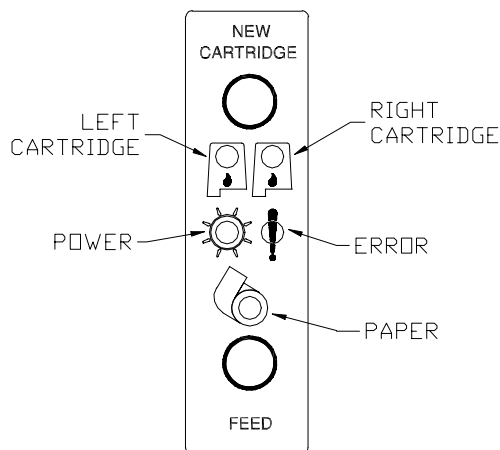


Figure 15 Keypad layout

**$\Phi$  BUTTON**  
**NEW CARTRIDGE**  
**FEED**

Located on front face of the printer’s cabinet  
 Located on top portion of printer’s keypad  
 Located on bottom portion of printer’s keypad

## ⏻ Button

The POSjet™ 1000 has been designed to remain connected to a power source at all times. The ⏻ button on the POSjet™ 1000 Printer does not completely remove power from the printer. Because of this, the ⏻ button is used to alternately switch the printer between OFF and ON modes. The ⏻ button does not disconnect power to the printer. The printer is truly off only when the AC power supply is disconnected. You will notice that none of the keypad's indicator lights will be on when the printer is in OFF. When the printer enters ON mode, the green power indicator light will be activated. The operational state of the POSjet™ can be determined by looking at the Power Indicator Light (LED).

When the ⏻ button is pressed or the power down command is received, the POSjet™ 1000 Printer enters a OFF low power mode. The printer is not completely off but is in OFF<sup>7</sup>. To keep the print cartridge from completely drying out, the printer must be periodically used. To assure periodic use, the printer occasionally wakes from OFF, performs head maintenance, and goes back into OFF. If the printer is completely powered off, head maintenance cannot occur, and overtime, will result in the ink cartridge drying to a state where they will become inoperative. Because of this, the printer should never be completely powered off for more than a few days.

OFF mode is remembered even if the power is removed. Whenever power is turned back on, the printer starts, performs Level 0 diagnostics, and re-enters OFF mode.

## FEED Button

The FEED Button feeds paper through the printer. By pressing the FEED Button momentarily, the paper will be fed one line at a time. Pressing and holding the FEED Button will make the printer feed paper continuously until the button is released.

## NEW CARTRIDGE Button

The NEW CARTRIDGE button has been designed to work with the *Left and Right Cartridge Indicator Lights (LED)*, in a way that allows an operator to monitor and replace cartridges as ink levels become low. Operator's will receive input from the indicator lights and will then use the NEW CARTRIDGE button to communicate to the printer when making the desired changes. Although the NEW CARTRIDGE button functions primarily as a means for an operator to communicate ink cartridge changes to the printer, it is also used to perform a variety of other functions.

## Cartridge Status Monitoring<sup>8</sup>

As ink is used from the cartridge(s) it is monitored by the printer. When ink is low, the indicator light for the left or right cartridge will blink. After replacing the low cartridge(s), pressing the NEW CARTRIDGE button will remove the ink low warning light on the indicators.

Pressing the NEW CARTRIDGE button without changing the cartridge will print the ink status. It will not remove the ink low warning unless the cartridge is removed and replaced while the low indication is being displayed. If the cartridge is replaced with a used cartridge, the NEW CARTRIDGE button should not be pressed.

The cartridge low indicator will continue to be displayed until the cartridge is removed, and a New Cartridge is installed and the NEW CARTRIDGE button is pressed.

---

<sup>7</sup> The printer draws about four watts of power in OFF.

<sup>8</sup> The printer cannot distinguish between a new, full cartridge and a used cartridge. If a low cartridge is removed and re-installed, the printer will reset the ink status to full if the NEW CARTRIDGE button is pressed. Used cartridges should be discarded to assure that they do not get re-installed into printers.

## Using the NEW CARTRIDGE Button in Self-Test Mode

The NEW CARTRIDGE button may be used to enter the POSjet's self-test mode. To place the POSjet™ in self-test mode first be sure that a paper roll is loaded and that the  $\Phi$  button is on. Next, press the  $\Phi$  button to turn the printer off. The power indicator light will be off. Press and hold the NEW CARTRIDGE button while pressing the  $\Phi$  button to turn power back on to the printer. Continue to hold until the red error indicator light blink. Let go of the NEW CARTRIDGE button. See "Testing the Printer Overview", on page 39 for an overview of self-test.

The following categories are a list of the tests available on the POSjet™ 1000 printer.

TEST-Receipt	TEST-Burn-in
TEST-Graphics	TEST-Bar-Codes
TEST-Print Specs	TEST-RollingASCII
TEST-Pyramid	

## Exiting Self-Test Mode

You can exit the self-test mode at anytime by pressing the  $\Phi$  button on the front of the printer.

## Remote Power Down

The POSjet™ Printer has a command that instructs it to turn the printer OFF. When the command is issued, the printer performs print cartridge maintenance and shuts OFF. Unlike pushing the  $\Phi$  button, remote power down mode leaves the communications active. All commands except the exit power down command are ignored.

If the  $\Phi$  button is pressed after the power down command is issued, the printer will reactivate. If power is lost after the power down command is issued, the printer will remember it is OFF, but will not reactivate the communications link. The  $\Phi$  button must be pressed to restart the printer.

## Indicator Lights (LED)

### The five POSjet™ indicator lights are:

- Power LED Indicates printer activity and non-recoverable errors
- Error LED Indicates problems and probability of recovery
- Paper LED Indicates paper status (paper low)
- Left Cartridge LED Indicates ink levels of left cartridge
- Right Cartridge LED Indicates ink levels of right ink cartridge

### Power Indicator (LED)

The power indicator lets the user know that the printer is ON. If the POWER indicator blinks in conjunction with the ERROR indicator, the printer is experiencing a non-recoverable error. See the fault indicators below. If the POWER indicator blinks, and there is no ERROR indicator blinking, the printer is being held in reset by the host.

### Error Indicator (LED)

The ERROR indicator lets the user know that the printer is experiencing a problem. If the POWER indicator is lit (not blinking), the error is generally recoverable without data loss. If the POWER indicator is blinking, a non-recoverable error has occurred. See fault indicators below. If the error is not operator recoverable, a power cycle may correct the problem. If a power cycle does not correct the fault, the printer must be serviced.

### Paper Indicator (LED)

The PAPER indicator signals the paper status. If the printer is equipped with a paper low option, the PAPER indicator will blink when the paper is low. The low sensor is adjustable, and the amount of paper remaining is dependent on the adjustment. If the PAPER indicator is lit with the ERROR indicator, the printer is out of paper. The printer stops printing and waits for the paper to be changed.

### Cartridge Indicators (LED-left and right)

The printer has two ink cartridge indicators that signal the ink cartridge status. The right indicator is for the right cartridge and the left indicator for the left cartridge. If the printer is a single color printer, the left cartridge indicator is used. In most cases, the left cartridge is black, and the right is a highlight color.

<b>Cartridge is low on ink</b>	(1 Blink, pause)	___ • _____ • _____
<b>Cartridge has been removed</b>	(Blinking, error)	___ • ___ • ___ • ___ • ___ • ___ • ___ • ___

**Note 1** If both heads are low, the NEW CARTRIDGE button only needs to be pressed once; however, both heads must be changed.

## Fault Indicators

The error indicator is the primary fault indicator. It is always on or blinking if a fault has occurred.

### Three types of faults exist

- **Fully-recoverable faults** Paper out or cover open
- **Semi-recoverable faults** Head Jam
- **Non-recoverable faults** Component failure

**Fully-recoverable and Status**

A fully-recoverable error will restart printing exactly where it stopped when the error occurred. Printing will resume after error has been properly addressed. A *status recoverable* error is very similar to a *fully-recoverable* error. Additionally, status is used to display when the printer consumables may need replacing.

**Semi-recoverable**

A semi-recoverable error is determined by whether or not the printer has to be shut off and turned back on while attending to the problem. The amount of information lost is dependent on the type of error and the state of the information being processed.

**Non-recoverable**

A non-recoverable error produces information loss.

If during normal operation, the **ERROR** indicator is lit and the **POWER** indicator is blinking, a minor error occurred. The **POWER** indicator shows the error by blinking a pattern. Pressing the  $\Phi$  button restarts the printer. Blink patterns are defined as follows.<sup>9</sup>

**1 Blink** (1 blink, pause)

— • ————— • —————

**2 Blink** (2 blinks, pause)

— • — • ————— • — • —

**3 Blink** (3 blinks pause)

— • — • — • ————— • — • — • —

---

<sup>9</sup> The blink rate is effected by the data received. The faster the data, the faster the printer blinks.



## Ink Cartridge Status

The POSjet™ 1000 has been designed to monitor ink consumption rates and report ink levels to the user via a printable ink status. To print out a ink status receipt press the **NEW CARTRIDGE** button.

The POSjet is designed to read only full cartridges. Using used cartridges will negate the printer's ability to monitor ink consumption rates effectively. If the **NEW CARTRIDGE** button is pressed with a newly inserted used cartridge in place, the printer will reset the ink level counter. Due to undetermined ink levels in the used cartridge, the printer's counter will not be able to define the amount that the cartridge is actually holding. TransAct does not recommend replacing a spent cartridge with anything but a new ink cartridge that is approved and compatible with the printer. TransAct recommends that used cartridges be discarded after they are removed from the printer.

## Determining Ink Cartridge Status

Refer to the following information as a guide for determining when ink cartridges need replacing.

Keypad Status	Indicator Light (LED)	Status and Sequence
Right Cartridge Low	Power LED	ON
	Error LED	OFF
	Paper LED	OFF
	Left Cartridge LED	OFF
	Right Cartridge LED	1 BLINK
Left Cartridge Low	Power LED	ON
	Error LED	OFF
	Paper LED	OFF
	Left Cartridge LED	1 BLINK
	Right Cartridge LED	OFF
Both Cartridges	Low Power LED	ON
	Error LED	OFF
	Paper LED	OFF
	Left Cartridge LED	1 BLINK
	Right Cartridge LED	1 BLINK
Right Cartridge Removed	Power LED	ON
	Error LED	ON
	Paper LED	OFF
	Left Cartridge LED	OFF
	Right Cartridge LED	ON
Left Cartridge Removed	Power LED	ON
	Error LED	ON
	Paper LED	OFF
	Left Cartridge LED	ON
	Right Cartridge LED	OFF

## Error Indicator Chart

The following information will assist you in determining specific problems and the respective error light sequences that have been integrated into the POSjet's keypad. These error messages have been built to help you see when the printer needs general maintenance as well as determine if the problem is one that may produce information loss. This table also displays the extent to which errors will affect the recoverability of information being processed at the time when printing was disrupted.

<b>General problems: Use this table to determine problem type.</b>						
<b>Error Type</b>	<b>Recovery</b>	<b>Power LED</b>	<b>Error LED</b>	<b>Paper LED</b>	<b>Left Cartridge</b>	<b>Right Cartridge</b>
Cover Open	Full	ON	ON	Off	Off	Off
Out of Paper	Full	ON	ON	ON	Off	Off
Paper Low	Status	ON	OFF	Blink	Off	Off
Right Cartridge Low	Status	ON	OFF	OFF	OFF	1 Blink
Left Cartridge Low	Status	ON	OFF	OFF	1 Blink	OFF
Both Cartridges Low	Status	ON	OFF	OFF	1 Blink	1 Blink
Left Cartridge Removed	Full	ON	ON	OFF	ON	OFF
Right Cartridge Removed	Full	ON	ON	OFF	OFF	ON

Table 13 Error Indicator Chart: General Problems

<b>Serious problems: <i>Contact Technical Support for assistance.</i> (877) 7ithaca or (607) 257-8901</b>						
<b>Error Type</b>	<b>Recovery</b>	<b>Power LED</b>	<b>Error LED</b>	<b>Paper LED</b>	<b>Left Cartridge</b>	<b>Right Cartridge</b>
Carriage Jam	Semi	1 Blink	ON	OFF	OFF	OFF
Configuration Error	Semi	2 Blinks	ON	OFF	OFF	OFF
Statistics Update Error	Semi	3 Blinks	ON	OFF	OFF	OFF
Internal Software Error	Semi	4 Blinks	ON	OFF	OFF	OFF
Knife Jam	Semi	5 Blinks	ON	OFF	OFF	OFF
User Store Defective	Semi	6 Blinks	ON	OFF	OFF	OFF
Flash Write Error	Semi	7 Blinks	ON	OFF	OFF	OFF

Table 14 Error Indicator Chart: Serious Problems

See page 210 for automated recovery from some errors.

## Testing the Printer Overview

### Using Self-Test Mode

Self-Test Mode allows you to perform a series of tests to show if the printer is functioning correctly. Self-Test also allows you to print a summary of how your POSjet is currently configured. Use this printout to compare your printer's settings to your system's requirements. Specific attention should be given to Emulation Settings, Baud Rate and other RS-232 Interface Settings (serial devices only). Configuration Mode changes any settings that are not compatible with your system requirements.

### Entering Self-Test Mode

It is important to insure that the printer will perform a self-test. This isolates printing problems to something other than the operation of the printer itself. If the printer fails to complete or enter into self-test mode it is best to disconnect it from the application system. Testing patterns vary depending on the printer model and the character set selected when the printer was ordered. Run the test after loading the paper, but before connecting it to a host system. If the characters do not print properly, or if ink is smudged on the paper, check to make sure that paper and ink cartridge(s) are installed correctly.

1. Press and release the  $\Phi$  button to turn the printer OFF. (The power indicator light will be off.)
2. Press and hold the NEW CARTRIDGE button.
3. While holding the NEW CARTRIDGE button, press and release the  $\Phi$  button.
4. When the red, error indicator light blinks, release the NEW CARTRIDGE button
5. Follow the directions printed on the receipt to cycle through and select the desired TEST option.

The POSjet has a total of eight Self-Test options with two designed to be useful when performing on-site evaluations. These two tests are the only options that should be used to test your printer. The other six testing options are used for printer demonstrations and factory setup by TransAct. Use the following two TEST options when trying to discover a printing problem.

#### TEST-Receipt

The receipt test is the primary test option to use when determining if the printer is functioning correctly.

The receipt test is mostly used during the early stages of troubleshooting to eliminate the possibility that the problem is occurring with the printer. If the printer experiences a failure, and the error indicator light is activated, call TransAct's Ithaca Facility's Technical Support Department.

#### TEST-Print Configuration

The print configuration test is a quick and easy way for you to see how your printer has been configured at the factory without actually entering into configuration mode. A large percentage of initial installation and setup problems can be attributed to the printer's configuration not matching the user's system settings. Using this test will show you exactly what your printer's current configuration settings are.

**Disregard the following options when cycling through the menu.** The following 6 Self-Test options do not need to be run in order to determine if the printer is running properly. These test options are only used for printer demonstrations and factory setup.

**TEST-Graphics**

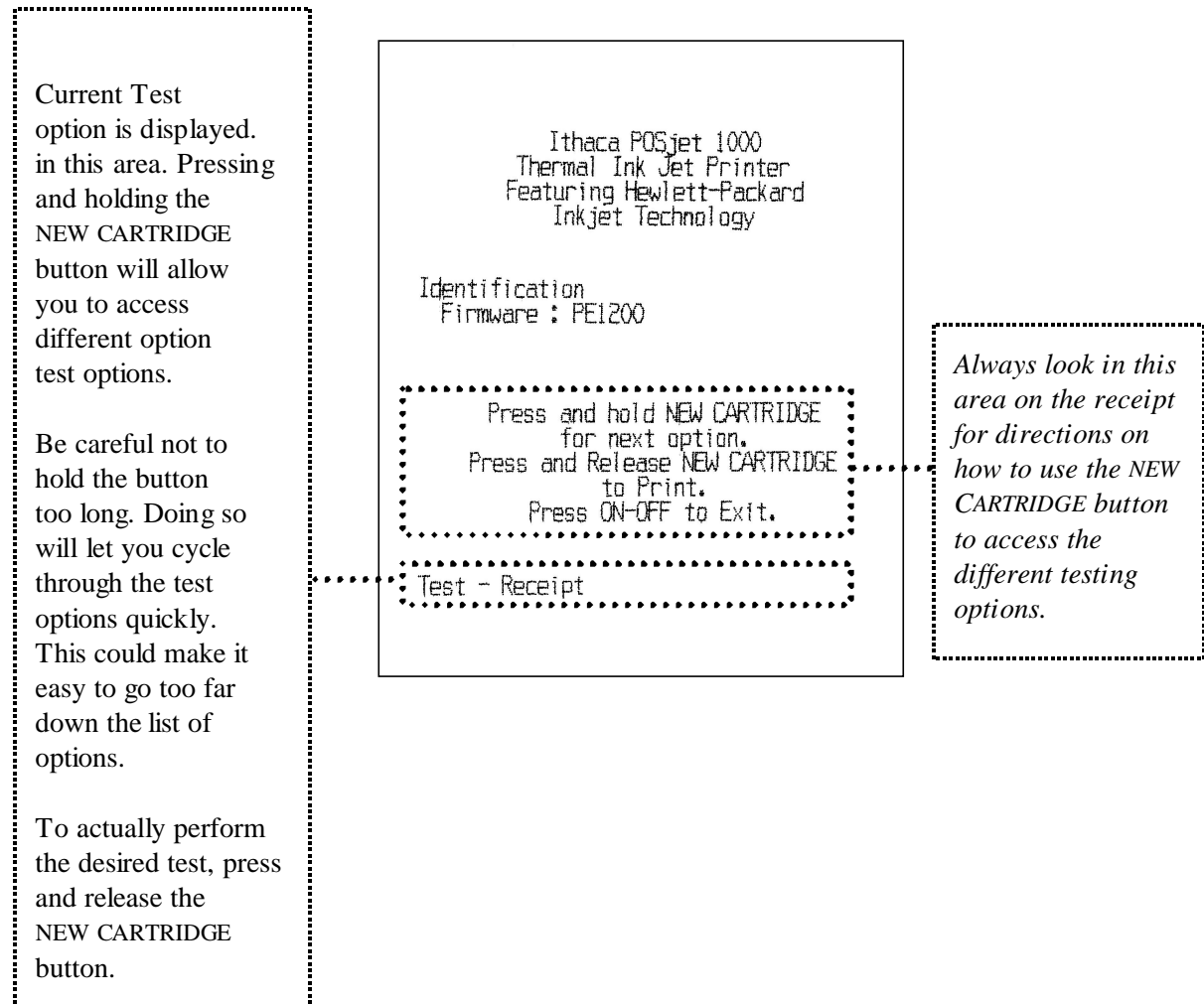
**TEST-Print Specs**

**TEST-Pyramid**

**TEST-Burn in**

**TEST-Bar Codes**

**TEST-Rolling ASCII**



#### TESTING at the Factory

These other testing options, are only extended functionality tests and do not need to be run in order to determine if the printer is operating properly. The POSjet™ 1000 Printer contains several levels of self-test features. At power on, the printer runs Level 0 diagnostics which check the printer's operation. After Level 0 diagnostics, the printer checks the keypad and enters normal operation or extended tests.

#### TEST-Pyramid

This test provides a worst case carriage move test for the printer.

#### TEST-Burn-in

This test is used during factory test to assure that the printer functions correctly.

#### TEST-Bar Codes

This test verifies that the barcodes are readable. (NOTE: Some paper does not allow readable barcodes to be generated.)

#### TEST-Rolling ASCII

This test is used for periodic printer quality testing.

## Level 0 Diagnostics

Level 0 diagnostics always and only run at power up. They are not run as part of OFF recovery.

### Level 0 diagnostics perform the following tasks:

#### Cold Power On

1. Basic System Integrity
2. Vector Integrity
3. RAM Test
4. Flash Boot Loader Integrity
5. Flash Firmware Integrity
6. Start Normal Firmware
7. Verify Configuration Integrity
8. Interface Card Configuration
9. User-store Integrity
10. Start Kernel, Verify Multitasking, Start Tasks

Once the kernel is running, the following tests must pass to allow operation. However, if any test fails (except the knife home test), the remaining tests will generate recoverable faults and normal operation will start as soon as the fault is cleared. These tests are also run when operation is resumed from OFF.

11. Cartridge Integrity
12. Cover Closed Check
13. Knife Home (if installed)
14. Carriage Home
15. Schedule Cartridge Maintenance
16. Paper Present
17. Place Printer On-line, Start Normal Operation

## Firmware Test

The flash test has two phases. The first phase determines that the boot loader is accurate, and the second verifies that the printer firmware is correct. All tests, up to and including the boot loader test, generate non-recoverable errors when they fail. The power must be removed from the printer, and the printer must be returned for service. If the boot loader is intact, but the main firmware is bad, the printer automatically enters boot loader mode. The firmware will be reloaded into the printer.

## Boot Loader Mode

The boot loader cannot be entered during normal operation. Boot loader mode can only be entered in one of two ways. One, when Level 0 Diagnostics finds that the firmware check CRC is bad, or two, manually. To manually enter the boot loader, hold the  $\Phi$  button during power up. The **ERROR** indicator comes on, and the **POWER** indicator blinks. At this time, the firmware boot file may be sent to the printer. Level 0 diagnostics are prevented from starting the firmware and boot load mode is forced to begin.

## Extended Diagnostics

Extended diagnostics are entered after Level 0 diagnostics, are part of the firmware, and are activated in one of two ways. The first is by holding **NEW CARTRIDGE** and/or **FEED** and applying power (Power On). The second is by holding **NEW CARTRIDGE** and/or **FEED** and activating the  $\Phi$  button from OFF or Soft Power On.

OFF	NEW CARTRIDGE	FEED	Test
Power On	Off	Off	Normal Operation
Power On	On	Off	Self Test Diagnostics
Power On	Off	On	Manual Configuration
Power On	On	On	Manual Emulation Set → Configuration
Soft Power On	Off	Off	Normal Operation
Soft Power On	On	Off	Color Alignment
Soft Power On	Off	On	Hex-dump Print
Soft Power On	On	On	Not Defined

Table 15 Extended Diagnostics

### Self-Test Diagnostics

Self-test mode allows the printer to be tested to assure that it is working correctly. A number of tests may be run. Self-test is entered by holding the **NEW CARTRIDGE** button during initial power on.

### Hex-dump Mode

To enter hex-dump mode, press and hold the **FEED** button when resuming operation from OFF mode. Enter OFF by pressing and releasing the  $\Phi$  button. Press and hold the **FEED** button while pressing and releasing the  $\Phi$  button. Be sure to release the **FEED** button as soon as the carriage starts to move to prevent paper feeds.

Hex-dump mode is used to diagnose communication problems with the printer. As information is received by the printer, the information is converted to a Hex/ASCII format and printed. No translation is made, which means no commands are interpreted. All information is converted to Hex/ASCII and printed on the receipt tape. If a carriage return is sent to the printer, it is translated to 0D in the hexadecimal field and "." in the ASCII field.

The format follows.

54	68	69	73	20	69	73	20	This is
61	20	74	65	73	74	0D	0A	a test..

Several indications of printer and host communication problems can be deduced from hex dump mode. If the printer is printing all 3F "?" symbols, the parity or the number of bits is wrong. If the printer is printing some Hex 3F "?" signs when it should be printing other characters, either the parity, baud rate, or bit length setting is wrong. If the printer prints incorrect characters (like Hex C1 instead of Hex 41 "A"), it is set for 8-bit data, and the host is set for 7-bit. In most cases, the print problem can be traced to the host and printer being configured differently.

# Changing the Configuration of the POSjet™

## Configuration Mode Overview

There are two ways to configure the POSjet™ 1000 printer. The first is to use the manual configuration sequence by using the keypad controls, and the second is to use TransAct's remote configuration software. Because the POSjet utilizes a small keypad with few keys, the printer's internal, self-configuration mode is complicated and slow. To provide a faster, easier way to configure or reconfigure the POSjet printer, a remote CONFIG program is available and typically used by System Integrators. To obtain more information, or the latest version of the CONFIG program, call our Sales Department or Tech Support.

## Manual Configuration

TransAct does not recommend that Manual Configurations be made by anybody but a trained service technician who has successfully completed training on the POSjet™ 1000. Please remember that these settings are only several of the complete list of configurable categories. If you continue to experience incompatibility issues after changing these settings to match your system, contact TransAct's Technical Support Department for assistance.

Hold the **FEED** switch while plugging in the power cord. The printer prints the current configurations and totals. Press **NEW CARTRIDGE** quickly to scroll through the options. Press and hold the **NEW CARTRIDGE** button to change the option. Press  $\Phi$  button to exit the configuration mode. The printer gives a configuration summary and asks if it is correct. Press **NEW CARTRIDGE** if it is correct or press the  $\Phi$  button if it is not.

## Most Frequent Configuration Incompatibilities

### Parallel Printer

Emulation

Carriage Return Options

### Serial Printer

Emulation

RS-232 Serial Interface (baud rate)

Carriage Return Options

## How to Change Configuration Settings

### Entering into Configuration Mode

Configuration mode can be accessed one of two ways. Both ways have been designed to make it difficult to enter into configuration mode. This has been done to prevent unintended entry into the mode and unintentional configuration changes. The mode that is used depends on how the printer is setup. If you do not have access to the power connection use the second procedure.

First procedure.

- 1) Unplug the printer.
- 2) Hold the **FEED** button while applying power.
- 3) When the **ERROR** indicator blinks (Indicating stuck key) release the **FEED** button
- 4) The printer is now in Manual Configuration mode.

Second Procedure.

- 1) Enter **OFF** by pressing the  $\Phi$  button.
- 2) Press and hold the **NEW CARTRIDGE** button while pressing and releasing the  $\Phi$  button.
- 3) When the error indicator blinks indicating stuck key, repress the  $\Phi$  button and release the **NEW CARTRIDGE** button. Then release the  $\Phi$  button.
- 4) You are now in configuration mode.

After you enter configuration mode, the printer will print the current configuration, the current totals, and an internal error log if any errors have been trapped. Save this print out as a guide to changing the configuration and in case you wish to return the printer to the previous configuration.

Each emulation can have different configurable features. If you are changing the emulation, the print out that was printed at the beginning of the configuration process is for the initial emulation. When you change the emulation, the configurable features may be different. If you are using this print out as a configuration guide, and you are changing the emulation, you may wish to save the new emulation, and then re-enter configuration mode to change other options. This will print all the available features for the new emulation.

## Viewing Current Configuration Settings

An example receipt will be printed and will show the current printer configurations. This receipt is very similar to the configuration information receipt that can be accessed through the Self-Test Mode. The reason you are able to print the configuration receipt from Self-Test Mode is so that you can see what your current settings are without having to enter Configuration Mode. Before changing the settings of your printer, we recommend that you print a Self-Test Configuration receipt as a reference in case you wish to return the printer to its previous configuration state.

## Using the NEW CARTRIDGE Button in Configuration Mode

The NEW CARTRIDGE button may be used to select configuration settings, change those settings, navigate through the configuration menu, and save your specific configuration changes. Repeatedly pressing the NEW CARTRIDGE button will allow you to select the desired configuration categories. When you arrive at the desired configuration category, press and hold the NEW CARTRIDGE button to select or update the specific settings.

What do you want to do?	Do this...
Enter into Configuration Mode	First, disconnect the AC power cord from the back of the printer. Next, press and hold the feed button while plugging the cord back into the printer.
Scroll through the Configuration menu	<b>Press</b> and quickly <b>release</b> the NEW CARTRIDGE Button.
Change specific settings	<b>Press</b> and <b>hold</b> the NEW CARTRIDGE Button
Exit Configuration Mode	<b>Press</b> and <b>release</b> the $\Phi$ button

Table 16 How to Change Configuration Settings

In some cases, features of the POSjet™ 1000 Printer can be deactivated through the configuration menu. For example, if a dual color printer is to be operated with only one print cartridge, turn off the dual color option, and all data will be sent to a single cartridge.



## Using Configuration Mode

The **NEW CARTRIDGE** button may be used to select configuration settings, change those settings, navigate through the configuration menu, and save your specific configuration changes. Repeatedly pressing the **NEW CARTRIDGE** button will allow you to select the desired configuration category. The categories will appear as shown on the initial print out. When you arrive at the desired configuration category, press and hold the **NEW CARTRIDGE** button to select the next available setting.

The diagram on page 46 provides a visual representation of how to navigate within the configuration menu system. In this example, the Emulation, Baud rate, Communications Mode, Carriage Return and Ink low settings are being changed.

- 1) Enter configuration mode.
- 2) Press and release the **NEW CARTRIDGE** button. This will display the current “**Baud Rate**”
- 3) Press and hold the **NEW CARTRIDGE** button. When the printer prints release the **NEW CARTRIDGE** button. This will display the next available setting.
- 4) Repeat step 3 until the proper setting is shown.
- 5) Press and release the **NEW CARTRIDGE** button. This will display the “**Mode**”
- 6) Repeat step 3 until the proper setting is shown.
- 7) Press and release the **NEW CARTRIDGE** button. Until “**Carriage Return**” is shown.
- 8) Repeat step 3 until the proper setting is shown.
- 9) Press and release the **NEW CARTRIDGE** button. Until “**Ink Low when at**” is shown.
- 10) Repeat step 3 until the proper setting is shown.
- 11) Press the  $\Phi$  button. This will print the current configuration.
- 12) Review the print out.
- 13) If the configuration is not correct press the  $\Phi$  button again and the new configuration will be discarded. You will have to reenter configuration mode and start over.
- 14) If the Configuration is correct press the **NEW CARTRIDGE** button and the configuration will be saved.

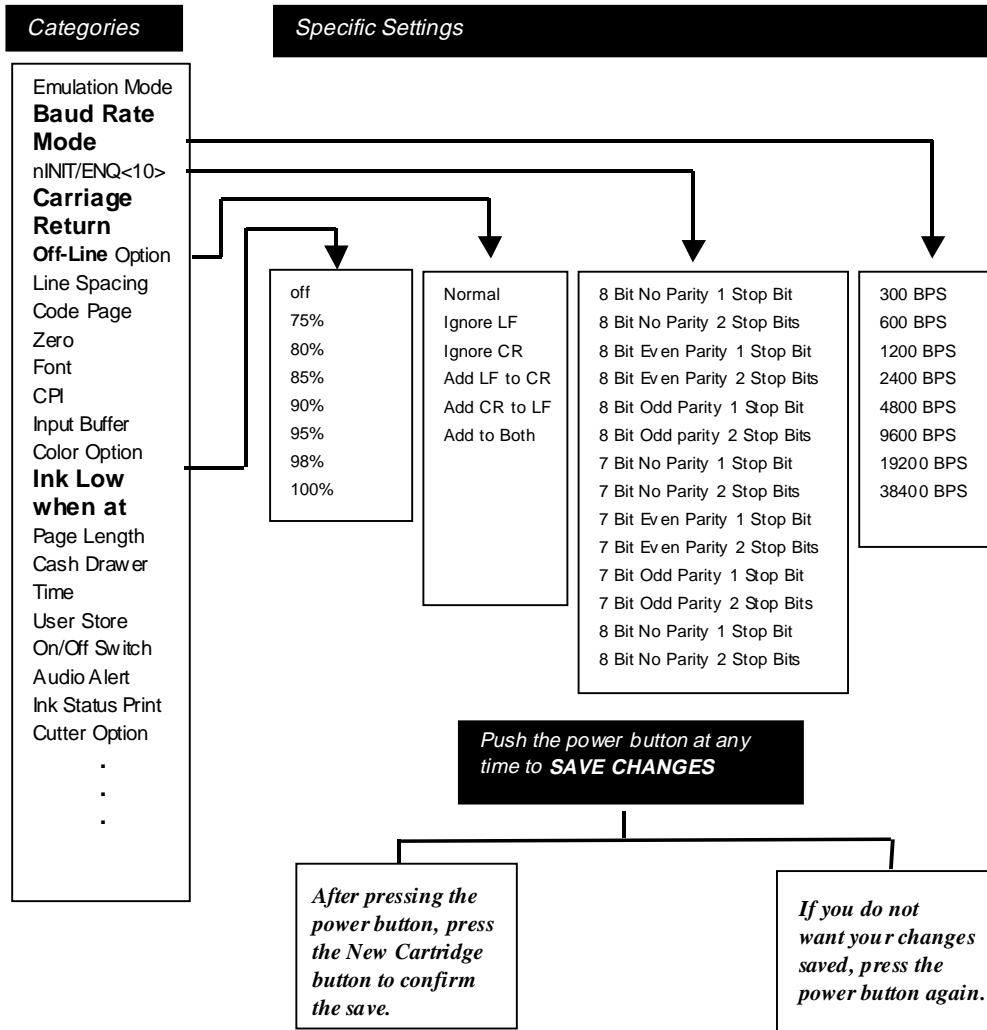


Figure 16 Configuration Example

## Manual Emulation Setup

To allow easy predefined configurations to be loaded, the printer contains an internal default configuration for each of the printer emulation's. The internal default configuration allows a starting point when changing the emulation. To activate the manual emulation set, hold the **NEW CARTRIDGE** and **FEED** switch at power up. Manual emulation set is the same as manual configuration only with more options. (Note that the additional options are only offered once.)

## Remote Configuration

Remote configuration is provided for all printers. It is accessed through a series of extended diagnostic and configuration commands. The universal configuration program will allow the configuration to be read, edited, and written back to the printer. It will also allow the configuration of one printer to be recorded and replicated over a number of printers. The program is available from Transact Technical support or by downloading it from the Internet.

## Color Configuration

All POSjet™ 1000 optional features are installed at the factory and must be selected when the printer is ordered. The majority of factory options do not need the user to perform any additional setup steps. However, if the Color Ready Option is ordered, users will be required to adhere to specific operational procedures.

### Color Ready Configuration

The POSjet™ 1000 printer is available with a Color Ready carriage but without the second cartridge installed. This printer is termed Color Ready. It is configured to handle single “black” printing and will not print with a second “color” cartridge in the right side of the carriage. There is an auto-sense feature that attempts to auto sense the presence of a second cartridge. This auto-sense will momentarily re-configure the printer for two cartridge operation. The auto-sense is performed when power is applied to the printer (not with the stand-by button). If the printer is power cycled without the second cartridge, the printer will revert back to single cartridge operation. When the printer has the second pen installed, it should be reconfigured through software, or with manual configuration to be a two-cartridge (color) printer.

### Single Cartridge Operation

Single Cartridge Operation is the standard (black and white) printing setup. With the printer configured for single cartridge operation, the second (right-hand) cartridge socket on the carriage should always have the orange, plastic carriage spacer in place.

### Single Cartridge Operation (Color-Ready Configuration)

Single Cartridge Operation with an optional Color-Ready configuration setup allows the POSjet to operate as a single cartridge printer, but with the option of having the printer able to be reconfigured for two color printing at a later time.

### Two Cartridge Operation

Two Cartridge Operation uses a black ink cartridge in the left carriage socket, and a color ink cartridge in the right carriage socket. Color ink cartridges do not work in the left carriage socket. Use only black ink cartridges in the left carriage socket. The color of the second cartridge is typically red, however, there are other colors. The color of the second cartridge should be configured into the POSjet™ 1000 printer. The printer should be set to Red, Green, or Blue. If the cartridge that is installed is not one of these primary colors, the nearest primary color should be selected. For example if the cartridge is Orange, the nearest primary color is Red.

## Configurable Features

The following table lists all the configurable features. Not all are available in all configurations. Not all features are available in all emulation's. Refer to the Notes column for availability of each feature. If not noted, it is available. Several emulation's have sub-emulations. For example, the TM U200 may be configured for 40 or 42 column mode. Take care to configure the exact emulation you want. The TM U200 emulation print out will list the corresponding dip switch settings on the Epson printer. This is intended to help make sure the POSjet™ 1000 printer is configured the same way the Epson printer is configured. The bullet marks (•) in the following table signify that the option is a POSjet default setting.

General	Description and options	Default	Notes
<b>Emulation Mode</b>	The POSjet™ 1000 printer supports six basic printer emulation modes.		Note: Not all emulations are available in all versions of the POSjet™ 1000.
	POSjet™ 1000 PcOS		
	Epson TM-U200		
	ESC/POS (Not model specific)		
	Star SP200 and SP2000		
	Citizen 3500 Series		
	Ithaca® M50 IBM		
	Microline M50, M50PLUS, ML192		
<b>Emulation Options</b>	The POSjet™ 1000 printer supports variations on several of the basic configurations		
<b>Posjet PcOS</b>	Print Zone: Normal 2.5 " or Simulated 2.8"	2.5	
	Block DC2 Control (AS400)	Off	
<b>TM-U200</b>	Print Zone		
	Wide 42/35 Character or Narrow 40/33	40	
<b>Esc/Pos</b>	ESC v Command is 2 or 3 characters	2	
<b>Star</b>			
<b>Citizen</b>	PrintZ one		
	23, 28, and 40 Characters	40	
<b>M50</b>	Block DC2 Control (AS400)	Off	
<b>Microline</b>	Print Zone: Normal 2.5 " or Simulated 2.8"	2.5	
	M50. M50PLUS or ML192 Emulation	M50	
	BEL or ESC + CD command	BEL	
	Select Sequence		
	DC1 Select      DC3 Deselect	•	
	DC3 Select      DC1 Deselect		
	Block DC2 Control (AS400)	Off	
	Print Zone: Normal 2.5 " or Simulated 2.8"	2.5	

<b>Input Buffer</b>	The input receive buffer can be configured to various sizes. The optimal size is dependent on the application. The options are from 40 bytes to 8K bytes.		In TM U200 mode this option also effects the commands available.
	40		TM U200
	256		
	1024		TM U200 Default
	2048		
	4096		
	8192	•	
<b>User Store Locked</b>	Graphic save lock configuration locks the user-store buffers, so they cannot be deleted by the application.		Not available in Star, Citizen, M50, or Microline
	Enabled	•	
	Locked		
<b>Lock On/Off Switch</b>	When the lock feature is functioning, the printer is prevented from being turned off by the On/Off switch.		
	Enabled	•	
	Locked On		
<b>Configuration Locked</b>	The configuration lock feature prevents the configuration from being altered manually. If enabled, the printer can only be configured with the configuration utility. (Note: locked configuration cannot be manually set.)		
	Enabled	•	
	Locked		
<b>Cash Drawers Time</b>	Several features of the cash drawer logic can be adjusted		Make sure the card is configured correctly.
	Cash drawer fire time can be adjusted from 10 to 250 mS	250 m5.	PcOS, M50, and Microline only.
	Invert Status (Normal or inverted sense)	N	
<b>Cash Drawer Sense</b>	Normal		
	Inverted		
<b>Print Ink Status</b>	When the NEW CARTRIDGE is pressed the ink status is normally printed.		
	Ink status is printed	•	
	Ink status is not printed		
<b>Audio Alert</b>	The initial signal time for the audio alert can be adjusted		If 0 the alert is off or not present.
	Time is adjustable from 100 mS to 1 Sec		
<b>Color Options</b>	The color and presence of the second pen can be configured.		Not available in M50 or Microline.

Left Cartridge Color	Cartridge Options		
	Black	•	Single Color Printers
	Red		Multi Color Printers
	Blue (not yet available)		
	Green (not yet available)		
Right Cartridge Color	Cartridge Options		
	Not Installed	•	Single Color Printers
	Color Ready		Multi Color Printers
	Red	•	
	Blue (not yet available)		
	Green (not yet available)		
Ink Low When At:	Signal ink low when x% of the ink has been used.		This sets the point when the printer reports ink low. The printer does not stop printing at ink low
	Ink Low is OFF (never signal ink low)		
	Ink Low when at 75%		
	Ink Low when at 80%		
	Ink Low when at 85%		
	Ink Low when at 90%		
	Ink Low when at 95%	•	
	Ink Low when at 100%		
Print Zone	Normal 2.5"		This is accomplished by shrinking the character spacing.
	Simulated 2.8"		
Vertical Control			
Line Spacing	The line spacing can be defaulted to 6 or 8 lines per inch (lpi).		This is not available in STAR and TM U200 mode
	6 lpi		This is the default for most Epson printers
	8 lpi	•	
Auto Line Feed/ Carriage Return	An auto line feed feature can be set as a default where all [CR]'s have a [LF] added. In addition, a CR is added to a LF, and the CR or LF can be configured to be ignored.		Setting Depends on emulation.
	Normal CR/LF actions. Both are processed.		
	Ignore all LF characters		
	Ignore all CR characters		Default for most Epson printers.
	Add a LF to all CR characters		
	Add a CR to all LF characters	•	
	Add a CR to all LF characters, and add a LF to all CR characters		
Page Length	The default page length can be set to various lengths from 2 to 60 lines. Page length configuration affects how the [FF] command operates.		Page length can be set in PcOS, M50, And Microline only.
	2 to 60 lines	40	

Fonts			
Font	The default print mode can be set to 12 x 12 draft, 12 x 14 large draft, or 24 x 32 NLQ modes.		This is not configurable in all emulations.
	12 x 12 draft	•	
	12 x 14 large draft		
	24 x 32 NLQ		
Pitch (CPI)	The default print pitch can be set to 8, 10, 12, 15, 17.1, 20, or 24 characters per inch.		
	8 cpi		
	10 cpi		
	12 cpi		
	15 cpi		
	17.1 cpi	PcOS	
	20 cpi		
	24 cpi		
Code Sets Code Pages	The POSjet™ 1000 Printer supports the following code sets. The setting defines only the default printer mode. IBM specifies code pages differently than Epson. Any set can be selected as a default regardless of emulation. However, the selections through software are restricted by the emulation.		
	IBM	Epson	Description
	64	-	ASCII (Slashed 0)
	65	-	ASCII (Unslashed 0)
	66	3	British
	67	2	German
	68	-	French
	69	5	Swedish I
	70	-	Danish
	71	-	Norwegian
	72	14	Dutch
	73	-	Italian
	74	13	French Canadian
	75	-	Spanish
	76	15	Swedish II
	77	16	Swedish III
	78	17	Swedish IV
	79	18	Turkish
	80	19	Swiss I
	81	20	Swiss II
	91	-	Welsh
	93	93	Arabic <sup>10</sup>
	437	0	USA
	774	74	Baltic_774
	850	26	Multilingual
	852	46	East Europe Latin II - 852

<sup>10</sup> Arabic available on special order only.

<b>Code Sets</b> <b>Code Pages</b>	855	44	Cyrillic I - 855		
	857	57	Turkey_857		
	858	-	Multilingual (Euro)		
	860	28	Portugal		
	861	73	Icelandic-861		
	862	60	Hebrew NC (862)		
	863	43	Canada French		
	865	27	Norway		
	866	21+45	Cyrillic II - 866		
	869	47	Greek_869		
	895	55	Kamenicky (MJK)		
	1008	38	Greek_437		
	1009	39	Greek_928		
	1011	41	Greek_437 CYPRUS		
	1012	29	Turkey		
	1013	21+45	Cyrillic II - 866		
	1014	22	Polska Mazovia		
	1015	23	ISO Latin 2		
	1016	24	Serbo Croatian I		
	1017	25	Serbo Croatian II		
	1018	42	ECMA-94		
	1019	49	Windows East Europe		
	1020	50	Windows Greek		
	1021	51	Latin 5 (Windows Turkey)		
	1022	52	Windows Cyrillic		
	1024	54	Hungarian CWI		
	1026	56	ISO Latin 4(8859/4)		
	1027	66	Ukrainian		
	1028	58	Roman-8		
	1029	67	ISO Latin 6 (8859/10)		
	1030	60	Hebrew NC (862)		
	1031	61	Hebrew OC		
	1032	62	Windows Hebrew		
	1033	63	KBL-Lithuanian		
	1034	68	Windows Baltic		
	1035	69	Cyrillic-Latvian		
	1072	72	Bulgarian		
	-	1	French		
	-	4	Danish I		
	-	6	Italian		
	-	7	Spanish I		
	-	8	Japanese		
	-	9	Norwegian		
	-	10	Danish II		
	-	11	Spanish II		
	-	12	Latin American		
	-	254	Space		
	-	255	Space		



<b>Zero Character</b>	The zero character can be configured to be unslashed or slashed in all character sets except IBM 64 and 65, which override the setting.		
	Unslashed		
	Slashed	•	
<b>Comm. Interface</b>	The POSjet™ 1000 auto configures the communication interface based on the card installed. A few options apply to both serial and parallel communication interfaces.		
<b>Off-line Mode</b>	Off-line mode defines when the printer informs the host that it is off line.		This effects the ASB for TM U200 and ESC/POS modes.
	Normal The printer goes off-line when the buffer is full or the printer cannot print.	•	ASB Defaults off.
	Buffer Full The printer goes off-line only when the buffer is full. This mode requires that the host request printer status from the printer.		This should be selected for Windows operation. ASB Defaults all on.
<b>Parallel Link Options</b>	The parallel option features define how the busy and acknowledge signals operate.		
	Ack-while-Busy		
	Ack-in-Busy	•	
	Ack-after-Busy		
<b>Parallel Port INIT Pin</b>	The parallel port INIT pin can be deactivated.		
	Active	•	
	Inactive		
<b>10 CPI (DC2)</b>	Normal		
	Disabled		
<b>Serial Interface Options</b>			
<b>Parity</b>	The serial mode parity can be set to none, odd, or even.		
	None	•	
	Odd		
	Even		
<b>Bit Data</b>	The serial bit format can be set to 8 or 7.		
	8	•	
	7		
<b>Error Character</b>	If a communications error occurs, an internal error is generated. The printer can be configured to ignore the data or print a "?"		
	Enabled prints "?"	•	
	Disabled ignores the data		
<b>Protocol</b>	The flow control protocol of the serial link can be set to Ready/Busy or XON/XOFF. Ready/Busy functions when XON/XOFF is selected.		
	Ready/Busy	•	
	XON/XOFF		

<b>Baud Rate</b>	The bit rate of the printer can be set. The same bit rate is used for send and receive.		
	38400 BPS		
	19200 BPS	•	
	9600 BPS		
	4800 BPS		
	2400 BPS		
	1200 BPS		
	600 BPS		
	300 BPS		
<b>DTR/RTS Signal</b>	The serial port DTR and/or RTS signal can be configured to provide flow control. If DTR is configured as the flow control signal, it toggles to false when the buffer is full. RTS does not. When the cover is opened, both signals always toggle to false.		
	Not Used (Not valid unless in XON/XOFF Mode)		
	DTR Flow		
	RTS Flow		
	RTS and DTR Flow	•	
<b>CTS Signal</b>	If active, a false CTS prevents the printer from sending any data to the host		
	Not Used	•	
	Active		
<b>Multidrop</b>	The multi-drop feature is activated at power up when set to an address.		This option is available in Star, PcOS, M50 and Microline only.
	Off	•	
	A Device		
	B Device		
	C Device		
<b>Options</b>			
<b>Cutter Option</b>	Specifies that the cutter option is attached.		
	Not present or disabled		
	Active		
<b>Knife Pre-Cut Feed</b>	The printer can be configured to feed from 0 to 26 mm of paper before the paper is cut.	0	Available in EPOS emulation only.

Table 17 Configurable Options

# Programming Controls

## Control Codes Overview

This programmer's guide is designed to help users of the POSjet™ 1000 printer develop applications. POSjet™ 1000 Printers are specialized point-of-sale printers that have several features not normally found on general-purpose printers. Because of these special features, POSjet™ 1000 Printers have unique control codes. This programmer's guide documents the control codes that are unique to the POSjet™ 1000 Printer.

## Nomenclature

When describing control codes, confusion often occurs as to whether the description is decimal, hexadecimal, or ASCII. To minimize the problem, this programmer's guide uses the following nomenclature when describing control code sequences.

[ ]	Encloses a control character. [ ] represents a single, 8-bit value as defined in the standard ASCII tables. The ASCII Code Table in Appendix B lists the control codes. An example would be [ESC], which would represent a 1BH or 27 decimal.
< >	Encloses an 8-bit value in decimal format. The value is from zero to 255. An example is <2>, which represents 02H or 2 decimal.
<n>	Indicates a variable parameter. The variable parameter, <n>, can have a value from zero to 255. The meaning of <n> is described and defined in the description of the command.
<n <sub>1</sub> > <n <sub>2</sub> >	Indicates that there are two parameters, <n <sub>1</sub> > and <n <sub>2</sub> >, where both can have values from zero to 255.
<m <sub>1</sub> > <m <sub>2</sub> >	Is an Ithaca® Printer Control Language (IPCL) parameter consisting of two digits where <m <sub>1</sub> > and <m <sub>2</sub> > are ASCII characters from zero to nine. The parameter is combined to form a value from zero to 99. If <m <sub>3</sub> > is included, the parameter is combined to be from zero to 999. If two values are specified, there must be two bytes added to the IPCL code. That is, if the command specifies <m <sub>1</sub> > <m <sub>2</sub> > and the desired value is five, it must be specified as 05.
x	All other characters in control strings represent ASCII characters. For example, [ESC] 1 represents 1BH followed by 31H.

In many cases, applications require that control sequences be specified in hexadecimal or decimal codes. In most cases, commands are specified in ASCII, hexadecimal, and decimal. The ASCII Code Table in Appendix B (page 213) lists ASCII, hexadecimal, and decimal equivalents.

## Standard Emulation

The standard control codes for the POSjet™ 1000 Printer are extensions and subsets of the PcOS IBM emulation provided on other Ithaca® products. In some cases, an application designed for a Series 50 Printer with IBM code sets will function with a POSjet™ 1000 Printer.

## IPCL Codes

Ithaca® Printer Control Language (IPCL) codes are part of PcOS and designed to control a printer without using control characters (i.e. characters less than 20H). Only the standard PcOS emulation supports IPCL.

In rare cases, an IPCL code will interfere with the text that is to be printed. The IPCL translator can be disabled with an [ESC] y <4> command.

## EPOS Emulation

ESC/POS<sup>11</sup> is referred to here as EPOS. The POSjet™ 1000 Printer supports two Epson emulations. One emulation is for the TM-U200, and the other is a general EPOS emulation that has extensions that do not match any Epson printer.

The TM-U200 emulation is designed to allow POSjet™ 1000 Printers to be used with applications that are designed for Seiko Epson TM-U200 printers.

The EPOS emulation is an extension of the TM-U200 emulation that removes some of the limitations imposed by the TM-U200 and allows fuller use of the POSjet™ 1000 features.

**It is intended that the standard Ithaca® PcOS emulation be used for new applications. Not all features of POSjet™ 1000 Printers are supported by EPOS. Specifically, the ability to print color horizontal graphics is not supported.**

## Citizen 3500 Emulation<sup>12</sup>

The POSjet™ 1000 Printer supports Citizen emulation modes.

## Star Emulation<sup>13</sup>

The POSjet™ 1000 Printer supports Star emulation modes.

## Ithaca® Microline Emulation<sup>14</sup>

The POSjet™ 1000 Printer supports several Microline emulations. These emulations allow the POSjet™ 1000 Printer to replace some older M50 printers with Microline commands. This emulation is not documented here. Refer to our Microline Emulation Programmer's Guide (12-03244) for more information.

## Application Development

To aid application development, several chapters in this manual are designed to help the programmer understand the POSjet™ 1000 Printer. The next chapter provides a detailed description of each of the commands. Subsequent chapters provide explanations of how the printer works including a description of the internal print buffer, communications link, and interaction between the host computer and printer.

---

<sup>11</sup> ESC/POS is a registered trademark of the Seiko Epson Corporation.

<sup>12</sup> Not all versions of the POSjet™ 1000 Printer support the Citizen Emulation.

<sup>13</sup> Not all versions of the POSjet™ 1000 Printer support the Star Emulation.

<sup>14</sup> Not all versions of the POSjet™ 1000 Printer support the Citizen Emulation.

## Ithaca Control Codes and Commands

Throughout this programmer's guide, charts and tables list commands and features. In most cases, the charts cross-reference the page that describes the command. Commands are grouped by function and may be difficult to find. To minimize the time it takes to find commands, code summary charts, arranged by code and function, are provided.

### PcOS Printer Control Codes

The following section defines the POSjet™ 1000 Ithaca® PcOS emulation. The native, Ithaca® PcOS emulation provides the most flexibility and control over the printer. It is consistent with most previous Ithaca® PcOS products and should be used when the printer is placed in a new application.

The new feature in the POSjet™ 1000 Printer is the ability to print color graphics. The control codes for color graphics are all new. Due to the complexity of color graphics, Ithaca® provides several drivers to integrate into your application. Ithaca® does not recommend that you generate drivers. In addition, Ithaca® has created several tools that can be used to generate and maintain graphic images and files for print on the POSjet™ 1000. Information about drivers and tools are available on the TransAct web site and on a *POSjet™ Software Developer's Toolkit*. For more information about either of these options, contact Technical Support.

**Quick PcOS Reference Chart**

Description	ASCII	Hex	IPCL equivalent code	Page
<b>Low Level paper Motion</b>				
Line feed.	[LF]	0AH	&%LF	63
Carriage return.	[CR]	0DH	&%CR	63
<b>Horizontal Motion</b>				
Back space.	[BS]	08H	&%BS	64
Horizontal tab.	[HT]	09H	&%HT	64
Set horizontal tab stops.	[ESC] D <n <sub>1</sub> > <n <sub>2</sub> > ... <n <sub>i</sub> > <0>	1BH,44H	none	64
Set horizontal position.	[ESC] n <n <sub>1</sub> > <n <sub>2</sub> >	1BH,6EH	&%HP<m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	65
Set justification. n=0 Left n=1 Center n=2 Right n=8 Left (No line feed) n=9 Center (No line feed) n=10 Right (No line feed)	[ESC] a <n>	1BH,61H	&%JR {n=2} &%JC {n=1} &%JL {n=0}	65
Reset horizontal and vertical tab stops.	[ESC] R	1BH,52H	&%HV	65
Set left/right print margins. n <sub>1</sub> = Left margin, n <sub>2</sub> = Right margin	[ESC] X <n <sub>1</sub> ><n <sub>2</sub> >	1BH,58H	none	108
<b>Vertical Motion</b>				
Perform a fine line feed.	[ESC] J <n>	1BH,4AH	&%FM <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	66
Set 1/8-inch line spacing.	[ESC] 0	1BH,30H	&%ST	66
Set 7/72-inch line spacing.	[ESC] 1	1BH,31H	&%SG	67
Begin variable line spacing. (Enable [ESC] A <n>).	[ESC] 2	1BH,32H	none	67
Set variable line spacing to n/216 inch.	[ESC] 3 <n>	1BH,33H	&%SV <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	66
Set variable line spacing to n/72 inch.	[ESC] A <n>	1BH,41H	none	67
Feed <n> lines at current spacing.	[ESC] d <n>	1BH,64H	&%FL <m <sub>1</sub> > <m <sub>2</sub> >	67
Set vertical tab stops.	[ESC] B <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> >...<n <sub>i</sub> > 0	1BH,42H	none	68
Vertical tab.	[VT]	0BH	&%VT	67
Form feed.	[FF]	0CH	&%FF	68
Set top of form.	[ESC] 4	1BH,34H	&%TF	68
Set form length in lines.	[ESC] C <n>	1BH,43H	&%SL <m <sub>1</sub> > <m <sub>2</sub> >	68
Begin Auto line feed. n=0 End n=1	[ESC] 5 <n>	1BH,35H	&%CA {n=0} &%MA {n=1}	69
Set form length in inches.	[ESC] C [NUL] <n>	1BH,43H	&%SI <m <sub>1</sub> > <m <sub>2</sub> >	69
Reverse line feed.	[ESC] ]	1BH,5DH	&%LR	69
<b>Character Pitch</b>				
Begin 10 CPI character pitch.	[DC2]	12H	&%F3	70
Begin 12 cpi character pitch.	[ESC] :	1BH,3AH	&%F2	70
Begin 17 CPI character pitch.	[SI]	0FH	&%F1	70

Set character pitch.	[ESC] [ P <n>	1BH,5BH, 50H	&%F<n>	71
Set inter-character spacing.	[ESC] V <n>	1BH,56H	none	72
Begin 24 CPI character Pitch	[ESC][SI]	1BH,0FH	&%F4	70
<b>Character Font</b>				
Begin 12 x 12 draft print.	[ESC] # <0>	1BH,23H, 00H	&%QT	73
Set print quality mode. n=0 Draft (12 x 12) n=1 Large draft (12 x 14) n=2 NLQ (24 x 16) n=3 NLQ (24 x 16) n=4-7 Repeats 0-3	[ESC] I <n>	1BH,49H	&%QT {n=0} &%QU {n=1} &%QL {n=2} &%QS {n=3}	73
Begin Rotated font. (See command description).	[ESC] P <n>	1BH,50H	&%RI &%RF &%RN	74
Select character code page.	[ESC] [ T <n <sub>h</sub> > <n <sub>i</sub> >	1BH,5BH, 54H	&%CP <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> > <m <sub>4</sub> >	76
Insert Euro character.	[ESC] [ C <n>	1BH,5BH, 43H	&%EU	78
Print control character.	[ESC] ^ <n>	1BH,5EH	&%CC <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	78
Redefine character set.	[ESC] [ S ...	1BH,5BH, 53H...		79
Define user-defined characters.	[ESC] = <y> <c <sub>1</sub> > <c <sub>2</sub> >...	1BH,3DH	none	80
Enable User-defined characters.	[ESC] > <n>	1BH,3EH	none	81
Enable OCR characters.	[ESC] y <11>	1BH,79H, 0BH	&%YX011	81
Disable OCR characters.	[ESC] y <12>	1BH,79H, 0CH	&%YX012	81
Cancel user-defined characters.	[ESC] \$	1BH,24H	none	81
<b>Character Attributes</b>				
Select color.	[ESC] c <n>	1BH,63H	&%CL <m <sub>1</sub> >	83
Begin one-line double-wide print.	[SO]	0EH	&%MW	83
Cancel one-line double-wide print.	[DC4]	14H	&%MN	83
Multi-line double-wide double-high mode. n=0 Standard mode n=1 Double-wide n=2 Double-high 3 = Both	[ESC] W <n>	1BH,57H	&%FS {n=0} &%FD {n=1} &%FH {n=3}	84
Enable/Disable overscore. n=0 End n=1 Begin	[ESC] _ <n>	1BH,5FH	&%CO {n=0} &%MO {n=1}	83
Begin Underline mode. n = 0 End n = 1 Begin	[ESC] - <n>	1BH,2DH	&%CU {n=0} &%MU {n=1}	85
Begin enhanced print.	[ESC] G	1BH,47H	&%ME	85
End enhanced print.	[ESC] H	1BH,48H	&%CE	85
Begin emphasized print.	[ESC] E	1BH,45H	&%MM	85
End emphasized print.	[ESC] F	1BH,46H	&%CM	85
Set print style. (See command description.)	[ESC] [ @ ...	1BH,5BH, 40H...	&%DH &%SH	84

Select superscript.	[ESC] S <0>	1BH,53H, 00H	&%SP	86
Select subscript.	[ESC] S <1>	1BH,53H, 01H	&%SB	86
End superscript or subscript.	[ESC] T	1BH,54H	&%SE	86
Begin italics.	[ESC] % G	1BH,25H, 47H	&%MI	86
End italics.	[ESC] % H	1BH,25H, 48H	&%CI	86
<b>Rotated Print</b>				
Begin rotated print. (See Rotated Print Summary on page 89.)	[ESC] r <n>	1BH,72H	&%RX	88
Set rotated print line length.	[ESC] s <n>	1BH,73H	&%RL <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	91
Set rotated print line spacing.	[ESC] u <n <sub>1</sub> > ...	1BH,75H	none	91
<b>APA Graphics</b>				
Print single-density graphics. <n <sub>1</sub> >=0...255 <n <sub>2</sub> >=0...3 len=<n <sub>1</sub> > + 256 * <n <sub>2</sub> >	[ESC] K <n <sub>1</sub> > <n <sub>2</sub> >	1BH,4BH	none	92
Print half-speed double-density graphics.	[ESC] L <n <sub>1</sub> > <n <sub>2</sub> >	1BH,4CH	none	92
Print full-speed double-density graphics.	[ESC] Y <n <sub>1</sub> > <n <sub>2</sub> >	1BH,59H	none	92
Print quad-density graphics.	[ESC] Z <n <sub>1</sub> > <n <sub>2</sub> >	1BH,5AH	none	93
Select bidirectional or unidirectional print. n=0 Bidirectional n=1 Unidirectional	[ESC] U <n>	1BH,55H	&%GU {n=1} &%GB {n=0}	94
Print graphics in mode <m>.	[ESC] * <m> <n <sub>1</sub> > <n <sub>2</sub> >	1BH,2AH	none	93
Reassign graphic mode.	[ESC] ? <m><n>	1BH,3FH	none	94
<b>Two Color Graphics</b>				
Process horizontal graphics data.	[ESC] h <color> <length> <format> <data>	1BH,68H	none	95
Set horizontal graphic mode.	[ESC] * <m> <0> <0>	1BH,2AH	none	96
<b>User Store</b>				
Begin named macro record.	[ESC] [US] b <Name..> <0>	1BH,1FH, 62H	&%UB <Name..> <0>	99
Save macro data in user store.	[ESC] [US] m <Name..> <0>	1BH,1FH, 6DH	&%UM <Name..> <0>	100
End named macro record.	[ESC] [US] e <Name..> <0>	1BH,1FH, 65H	&%UG <Name..> <0>	99
Load item from user store.	[ESC] [US] l <Name..> <0>	1BH,1FH, 6CH	&%UL <Name..> <0>	100
Save user-defined characters.	[ESC] [US] c <Name..> <0>	1BH,1FH, 63H	&%UC <Name..> <0>	100
Run macro data from user store.	[ESC] [US] r <Name..> <0>	1BH,1FH, 72H	&%UR <Name..> <0>	100



Flag item as a start-up macro.	[ESC] [US] s <Name..> <0>	1BH,1FH, 6DH	&%US <Name..> <0>	101
Delete item from user store.	[ESC] [US] d <Name..> <0>	1BH,1FH, 64H	&%UD <Name..> <0>	101
Flush information from user store.	[ESC] [US] f ALL <0>	1BH,1FH, 66H,00H	&%UF	101
Report on user store.	[ESC] [US] q <Name..> <0>	1BH,1FH, 72H	&%UQ <Name..> <0>	101
Process user macro.	[ESC] g <0>	1BH,67H, 00H	&%GP	103
Start macro record.	[ESC] g <1>	1BH,67H, 01H	&%GS	103
Stop macro record.	[ESC] g <2>	1BH,67H, 02H	&%GE	103
Stop macro record and save.	[ESC] g <3>	1BH, 67H, 03H	&%GW	103
<b>Bar Codes</b>				
Print bar code. n=0 Interleave 2 of 5 n=1 Code 39 n=2 Code 128 n=3 UPC A n=4 EAN-13 n=5 UPC E n=6 EAN-8 n= 7 Code 93 n = 8 Codabar	[ESC] b <n> ... [ETX]	1BH,62H	&%25 {n=0} &%39 {n=1} &%12 {n=2} &%UP {n=3} &%EA {n=4} &%UE {n=5} &%E8 {n=6} &%93 {n=7}	<b>Error ! Book mark not defin ed.</b>
Set bar code height. n=0 Restore defaults n=1 - 9 Number of passes (0.11 inch per pass)	[ESC] [EM] B <n>	1BH,19H, 42H	&%BH <m <sub>1</sub> ><m <sub>2</sub> >	107
Set bar code justification, HRI print mode, and print direction.	[ESC] [EM] J <n>	1BH,19H, 4AH	&%BJ<m <sub>1</sub> >< m <sub>2</sub> >	107
<b>Miscellaneous Commands</b>				
Disable paper out sensor.	[ESC] 8	1BH,38H	&%PF	108
Enable paper out sensor.	[ESC] 9	1BH,39H	&%PO	108
Set left/right margins. n <sub>1</sub> = Left margin n <sub>2</sub> = Right margin	[ESC] X <n <sub>1</sub> ><n <sub>2</sub> >	1BH,58H	none	108
Clear print buffer.	[CAN]	18H	&%RP	108
Query marker.	[ESC] q <n>	1BH,71H	none	109
Open cash drawer. n=1 Cash Drawer 1 n=2 Cash Drawer 2	[ESC] x <n>	1BH,78H	&%D1 {n=1} &%D2 {n=2}	109
Perform Auto Cut	[ESC] v	1BH,76H	&%FC	109
Audio alert.	[BEL]	07H	&%BL	110
Configure audio alert.	[ESC] [BEL] <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> >	1BH,07H	none	110
Print suppress and data pass through.	[ESC] < <n>	1BH,3CH	&%PT <n>	112
Initialize printer.	[ESC] @	1BH,40H	none	110
Enable paper error mode operation.	[ESC] p <n>	1BH,70H	&%PE <m <sub>1</sub> > <m <sub>2</sub> >	110
Enable dynamic response.	[ESC] w <n>	1BH,77H	none	115
Begin multi-drop control.	[SOH] <n>	01H	none	115
Inquire status. (Refer to command descriptions.)	[ENQ] <n>	05H	none	117

Inquire cash drawer 1 status	[ENQ] <1>	05H01H	none	117
<b>Extended Diagnostics</b>				
Set control feature commands.	[ESC] y <n>	1BH,79H	&%Y0 - 9 or &%YX<m1> <m2><m3> (for numbers >9)	113
Extended diagnostics.	[ESC] ~ <n>	1BH,7EH	none	190

## Low Level Paper Motion Control

### Print/Paper Motion

---

<b>Function</b>	<b>Carriage return</b>
<b>ASCII</b>	[CR]
<b>Hexadecimal</b>	0DH
<b>Decimal</b>	<13>
<b>IPCL</b>	&%CR
<b>EPOS</b>	0DH
<b>Description</b>	The [CR] command prints the contents of the print buffer (if any) and resets the next character print position to the left margin. A line feed is not performed unless auto-feed is active. The print rotation direction and the left margin command define the left margin.

---

<b>Function</b>	<b>Line feed</b>
<b>ASCII</b>	[LF]
<b>Hexadecimal</b>	0AH
<b>Decimal</b>	<10>
<b>IPCL</b>	&%LF
<b>EPOS</b>	0AH
<b>Description</b>	The [LF] command prints the contents of the buffer (if any) and advances paper one line at the current default line spacing. The next character print position is not reset to the left margin unless auto-CR is active.

## Horizontal Motion Control

Several commands can be used to control the horizontal position of characters. Many applications use space control to position fields. However, the POSjet™ 1000 Printer has the ability to control character position with horizontal tab stops. This is done using the horizontal tab [HT] to move to those tab stops.

Function	Horizontal tab
ASCII	[HT]
Hexadecimal	09H
Decimal	<9>
IPCL	&%HT
EPOS	[HT]
Description	The [HT] command inserts spaces in the print buffer up to the next tab stop. The default tab locations are every eight spaces.

Function	Back space
ASCII	[BS]
Hexadecimal	08H
Decimal	<8>
IPCL	&%BS
EPOS	[BS]
Description	The [BS] command moves the print buffer one character width to the left. The pointer position cannot be moved to the left of the left margin. [BS] does not cause the buffer to be printed, the following data is OR'ed with the previous data.

Function	Set horizontal tab stops
ASCII	[ESC] D <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > 0
Hexadecimal	1BH 44H <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > 00H
Decimal	<27> <68> <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > <0>
IPCL	none
EPOS	[ESC] D <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > 0
Description	The [ESC] D <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > 0 command sets tab stops at the character columns specified by <n>. The end of the settings is specified by a <0>. All previously set tabs will be cleared. The restore-default procedure other than to re-specify the tabs. Column sizes are in accordance with the current character pitch. Setting tabs that are beyond the station width is possible. A [CR] is inserted when the tab is used. Printing begins at the home position. The power up default is every eight spaces, i.e., 9, 17, 25, and so on.

---

<b>Function</b>	<b>Reset horizontal and vertical tab stops</b>
<b>ASCII</b>	[ESC] R
<b>Hexadecimal</b>	1BH 52H
<b>Decimal</b>	<27> <82>
<b>IPCL</b>	&%HV
<b>EPOS</b>	none
<b>Description</b>	The [ESC] R command resets horizontal and vertical tab stops to the power up configuration. The power up horizontal default is every eight spaces, i.e., 9, 17, 25, and so on. The vertical default is every line.

---

<b>Function</b>	<b>Set Justification</b>												
<b>ASCII</b>	[ESC] a <n>												
<b>Hexadecimal</b>	1BH 61H <n>												
<b>Decimal</b>	<27> <97> <n>												
<b>IPCL</b>	&%JL, &%JC, &%JR												
<b>EPOS</b>	[ESC] a <n>												
<b>Description</b>	The [ESC] a <n> command sets the horizontal justification.												
<b>Where &lt;n&gt;</b>	<table> <tr> <td>0 = Left justified</td><td>&amp;%JL</td></tr> <tr> <td>1 = Center justified</td><td>&amp;%JC</td></tr> <tr> <td>2 = Right justified</td><td>&amp;%JR</td></tr> <tr> <td>8 = Left justified (no line feed)</td><td>None</td></tr> <tr> <td>9 = Center justified (no line feed)</td><td>None</td></tr> <tr> <td>10 = Right justified (no line feed)</td><td>None</td></tr> </table> <p>The print format of the printer can be right, center, or left justified. The value of &lt;n&gt; specifies the justification. The power on default is left justified.</p>	0 = Left justified	&%JL	1 = Center justified	&%JC	2 = Right justified	&%JR	8 = Left justified (no line feed)	None	9 = Center justified (no line feed)	None	10 = Right justified (no line feed)	None
0 = Left justified	&%JL												
1 = Center justified	&%JC												
2 = Right justified	&%JR												
8 = Left justified (no line feed)	None												
9 = Center justified (no line feed)	None												
10 = Right justified (no line feed)	None												

**Note 1** The justify commands do not effect graphics.

---

<b>Function</b>	<b>Set horizontal position</b>
<b>ASCII</b>	[ESC] n <n <sub>1</sub> > <n <sub>2</sub> >
<b>Hexadecimal</b>	1BH 6EH <n <sub>1</sub> > <n <sub>2</sub> >
<b>Decimal</b>	<27> <110> <n <sub>1</sub> > <n <sub>2</sub> >
<b>IPCL</b>	&%HP <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >
<b>EPOS</b>	[ESC]\$ <n <sub>1</sub> > <n <sub>2</sub> >
<b>Description</b>	The [ESC] <n> <n <sub>1</sub> > <n <sub>2</sub> > command sets the print position to <n <sub>1</sub> > + <n <sub>2</sub> > * 256.

## Vertical Motion Control

<b>Function</b>	<b>Perform a fine line feed</b>
<b>ASCII</b>	[ESC] J <n>
<b>Hexadecimal</b>	1BH 4AH <n>
<b>Decimal</b>	<27> <74> <n>
<b>IPCL</b>	&%FM <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >
<b>EPOS</b>	[ESC] J <n>
<b>Description</b>	The [ESC] J <n> command prints the contents of the buffer and performs a line feed of n/216 inch. The default line spacing value is not changed. The next character print position is reset to the left margin if the Auto-CR mode is set.
<b>Note 1</b>	In EPOS mode, the command performs feeds in n/144-inch increments.
<b>Note 2</b>	Immediately after APA graphics, the command is adjusted for the difference between 72 dpi graphics and 96 dpi print.
<b>Function</b>	<b>Set variable line spacing to n/216 inch</b>
<b>ASCII</b>	[ESC] 3 <n>
<b>Hexadecimal</b>	1BH 33H <n>
<b>Decimal</b>	<27> <51> <n>
<b>IPCL</b>	&%SV <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >
<b>EPOS</b>	[ESC] 3 <n>
<b>Description</b>	The [ESC] 3 <n> command sets the default line spacing to n/216 inch. Set n = 1 to 255. The line feed spacing used by [LF] is set to values other than 1/8 or 7/72 inch. The command takes effect immediately. <b>Note 1</b> In EPOS mode, the command performs line feeds in n/144-inch increments.
<b>Function</b>	<b>Set line spacing to 1/8 inch</b>
<b>ASCII</b>	[ESC] 0
<b>Hexadecimal</b>	1BH 30H
<b>Decimal</b>	<27> <48>
<b>IPCL</b>	&%ST
<b>EPOS</b>	[ESC] 2
<b>Description</b>	The [ESC] 0 command sets the default line spacing to 1/8 inch (27/216 inch), which is the standard eight lines per inch line spacing at initial power-up.
<b>Note 1</b>	In EPOS mode, the command sets 1/6-inch spacing or six lines per inch.

<b>Function</b>	<b>Set line spacing to 21/216 inch or 7/72 inch</b>
<b>ASCII</b>	[ESC] 1
<b>Hexadecimal</b>	1BH 31H
<b>Decimal</b>	<27> <49>
<b>IPCL</b>	&%SG
<b>EPOS</b>	none
<b>Description</b>	The [ESC] 1 command sets the default line spacing to 21/216 inch. Use 21/216-inch line spacing for all-points-addressable (APA) graphics printing.
<b>Function</b>	<b>Set variable line spacing to n/72 inch</b>
<b>ASCII</b>	[ESC] A <n>
<b>Hexadecimal</b>	1BH 41H <n>
<b>Decimal</b>	<27> <65> <n>
<b>IPCL</b>	none
<b>EPOS</b>	none
<b>Description</b>	The [ESC] A <n> command sets the default line spacing to n/72. Set n = 1 to 85. Variable line spacing does not take effect until enabled by the [ESC] 2 command. The command is provided to maintain backward compatibility with the Ithaca® Series 50, OKIDATA, IBM, and other printers. It can also be used to print on preprinted forms.
<b>Function</b>	<b>Enable [ESC] A &lt;n&gt; variable line spacing</b>
<b>ASCII</b>	[ESC] 2
<b>Hexadecimal</b>	1BH 32H
<b>Decimal</b>	<27> <50>
<b>IPCL</b>	none
<b>EPOS</b>	none
<b>Description</b>	The [ESC] 2 command is a companion to the [ESC] A <n> command and puts the specified line spacing into effect. It remains in effect until another line spacing command is issued.
<b>Function</b>	<b>Feed &lt;n&gt; lines at the current spacing</b>
<b>ASCII</b>	[ESC] d <n>
<b>Hexadecimal</b>	1BH 64H <n>
<b>Decimal</b>	<27> <100> <n>
<b>IPCL</b>	&%FL <m1> <m2>
<b>EPOS</b>	[ESC] d
<b>Description</b>	The [ESC] d <n> command prints the contents of the buffer (if any) and performs <n> line feeds at the current line spacing. The command does not change the default line spacing value. The next character print position is reset to the left margin.
<b>Note 1</b>	The IPCL command prints from 00 to 99 lines. For example, if you wish to feed 12 lines, the IPCL command would be as follows: &%FL12.
<b>Function</b>	<b>Vertical tab</b>
<b>ASCII</b>	[VT]
<b>Hexadecimal</b>	0BH
<b>Decimal</b>	<11>
<b>IPCL</b>	&%VT
<b>EPOS</b>	(VT)
<b>Description</b>	The printer sets a line counter to the top of the form at reset and when a set top of form command is issued. By setting vertical tab stops, various form positions can be reached with a [VT] operation.

---

<b>Function</b>	<b>Set vertical tab stops</b>
<b>ASCII</b>	[ESC] B <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > 0
<b>Hexadecimal</b>	1BH 42H <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > 00H
<b>Decimal</b>	<27> <66> <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > <0>
<b>IPCL</b>	none
<b>EPOS</b>	[ESC] B <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > 0
<b>Description</b>	The [ESC] B <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > 0 command sets tab stops at line positions specified by <n>. The end of the setting is specified by a <0>. All previously set tabs will be cleared. If n <sub>n</sub> is less than n <sub>n-1</sub> , then the command is in error, and all of the following information is printed. In other words, tab stops must be entered sequentially in order to be accepted. A total of 64 tab stops can be specified. (The power on default is a vertical tab on every line).

---

<b>Function</b>	<b>Reset horizontal and vertical tab stops</b>
<b>ASCII</b>	[ESC] R
<b>Hexadecimal</b>	1BH 52H
<b>Decimal</b>	<27> <82>
<b>IPCL</b>	&%HV
<b>EPOS</b>	none
<b>Description</b>	The [ESC] R command resets horizontal and vertical tab stops to power up configuration. The power up horizontal default is every eight spaces, i.e., 9, 17, 25, etc. The vertical default is every line.

---

<b>Function</b>	<b>Form Feed</b>
<b>ASCII</b>	[FF]
<b>Hexadecimal</b>	0CH
<b>Decimal</b>	<12>
<b>IPCL</b>	&%FF
<b>EPOS</b>	none
<b>Description</b>	The [FF] command performs a form feed to the top of the form.
<b>Note 1</b>	The form feed command can be disabled. Set the form length to zero.

---

<b>Function</b>	<b>Set top of form</b>
<b>ASCII</b>	[ESC] 4
<b>Hexadecimal</b>	1BH 34H
<b>Decimal</b>	<27> <52>
<b>IPCL</b>	&%TF
<b>EPOS</b>	[ESC] L
<b>Description</b>	The [ESC] 4 command sets the top of form to the current position.

---

<b>Function</b>	<b>Set form length in lines</b>
<b>ASCII</b>	[ESC] C <n>
<b>Hexadecimal</b>	1BH 43H <n>
<b>Decimal</b>	<27> <67> <n>
<b>IPCL</b>	&%SL <m <sub>1</sub> > <m <sub>2</sub> >
<b>EPOS</b>	[ESC] C <n>
<b>Description</b>	The [ESC] C <n> command sets the form length to <n> lines at the current line spacing. If the current page position is greater than the new page length, the command also sets the current position as the top of the form.

---



<b>Function</b>	<b>Set form length in inches</b>
<b>ASCII</b>	[ESC] C [NUL] <n>
<b>Hexadecimal</b>	1BH 43H <0> <n>
<b>Decimal</b>	<27> <67> <0> <n>
<b>IPCL</b>	&%SI <m <sub>1</sub> > <m <sub>2</sub> >
<b>EPOS</b>	none
<b>Description</b>	The [ESC] C [NUL] <n> command sets the form length to <n> inches. If the current page position is greater than the new page length, the command also sets the current position as the top of form. If zero inches are specified, the form feed and vertical tab commands are ignored.
<b>Function</b>	<b>Begin auto line feed</b>
<b>ASCII</b>	[ESC] 5 <n>
<b>Hexadecimal</b>	1BH 35H <n>
<b>Decimal</b>	<27> <53> <n>
<b>IPCL</b>	&%MA (Begin)
<b>IPCL</b>	&%CA (End)
<b>EPOS</b>	none
<b>Description</b>	The [ESC] 5 <1> command sets auto line feed mode. [ESC] 5 <0> command ends auto line feed mode.
<b>Note 1</b>	The begin and end auto line feed command overrides the configuration setting.
<b>Function</b>	<b>Reverse line feed</b>
<b>ASCII</b>	[ESC] ]
<b>Hexadecimal</b>	1BH 5DH
<b>Decimal</b>	<27> <93>
<b>IPCL</b>	&%LR
<b>EPOS</b>	none
<b>Description</b>	The [ESC] ] command performs a reverse line feed at the current line spacing.
<b>Note 1</b>	The POSjet™ 1000 Printer can tolerate no more than 1/2 inch of reverse feed.

## Character Pitch

Character pitch commands that set specific characters per inch (cpi) disable any right-side spacing set by the [ESC] V <n> command. In addition, when font changes are made, the character pitch is maintained.

<b>Function</b>	<b>Begin 10 cpi character pitch</b>
<b>ASCII</b>	[DC2]
<b>Hexadecimal</b>	12H
<b>Decimal</b>	<18>
<b>IPCL</b>	&%F3
<b>EPOS</b>	[ESC][SP] <n>
<b>Description</b>	The [DC2] command sets 9.905 characters per inch print pitch.
<b>Function</b>	<b>Begin 12 cpi character pitch</b>
<b>ASCII</b>	[ESC] :
<b>Hexadecimal</b>	1BH 3AH
<b>Decimal</b>	<27> <58>
<b>IPCL</b>	&%F2
<b>EPOS</b>	[ESC] [SP] <n>
<b>Description</b>	The [ESC] : command sets 12.235 characters per inch print pitch.
<b>Function</b>	<b>Begin 17 cpi character pitch</b>
<b>ASCII</b>	[SI]
<b>Hexadecimal</b>	0FH
<b>Decimal</b>	<15>
<b>IPCL</b>	&%F1
<b>EPOS</b>	[ESC] [SP] <n>
<b>Description</b>	The [SI] command sets 17.333 characters per inch print pitch.
<b>Function</b>	<b>Begin 24 cpi character pitch</b>
<b>ASCII</b>	[ESC] [SI]
<b>Hexadecimal</b>	1BH 0FH
<b>Decimal</b>	<27> <15>
<b>IPCL</b>	&%F4
<b>EPOS</b>	[ESC] [SP] <n>
<b>Description</b>	The [ESC] [SP] command sets 23.111 characters per inch print pitch.

<b>Function</b>	<b>Set character pitch</b>
<b>ASCII</b>	[ESC] [ P <n>
<b>Hexadecimal</b>	1BH 5BH 50H <n>
<b>Decimal</b>	<27> <91> <80> <n>
<b>IPCL</b>	&%F1, &%F2, &%F3, &%F4, &%F5, &%F6, &%F7
<b>EPOS</b>	[ESC] [SP] <n>
<b>Description</b>	The [ESC] [ P <n> command sets character per inch print pitch to <n>. The printer resolution limits the exact print pitch. The following table lists the exact pitch for various values on <n>.

<n>	Resulting Characters per Inch	IPCL
1	1.00	
2	2.00	
3	3.01	
4	4.00	
5	4.95	
6	5.94	
7	6.93	
8	8.00	&%F7
9	9.04	
10	9.90	&%F3
11	10.95	
12	12.23	&%F2
13	13.00	
14	13.87	
15	14.86	&%F6
16	16.00	
17	17.33	&%F1
18	17.33	
19	18.91	
20	20.8	&%F5
21	20.8	
22	23.11	
23	23.11	
24	23.11	&%F4
25	23.11	
26	26	
27	26	
28	26	
29	29.71	
30	29.71	

Table 18 Character Pitch

This command disables any right-side spacing set by the [ESC] V <n> command. In addition when font changes are made, the character pitch is maintained.

<b>Function</b>	<b>Set inter-character spacing</b>
<b>Mode</b>	Global
<b>ASCII</b>	[ESC] V <n>
<b>Hexadecimal</b>	1BH 56H <n>
<b>Decimal</b>	<27> <86> <n>
<b>IPCL</b>	none
<b>EPOS</b>	[ESC] [SP] <n>
<b>Description</b>	The [ESC] V <n> command sets inter-character spacing by adding white space between characters. The value of <n> sets the spacing in 216 of an inch. The printer can only set the spacing in 208 of an inch and converts 216 to the nearest 208 of an inch. Each font has a basic size, and the inter-character spacing value is added to the basic size. Therefore, the affect of this command on characters per inch (cpi) will depend on the font selected.
<b>Note 1</b>	The [ESC] V <n> command disables any pitch settings established by pitch set commands that establish a cpi (like [ESC] [ P <n>). After a set right-side spacing command is issued, the pitch will vary with font selection. Font selections use the current, active, right-side spacing.
<b>Note 2</b>	With the inter-character spacing command, the pitch cannot be set less than the font size. Therefore, it is not as effective as the pitch command, [ESC] [ P <n>. The following table lists the cpi equivalent for several values of <n>.

<n>	Small Draft (cpi)	Large Draft (cpi)	NLQ (cpi)
0	17.33	14.86	13
1	16	13.9	12.24
2	14.86	13	11.6
3	13.9	12.24	10.9
4	13	11.6	10.4
5	12.24	10.9	9.90

Table 19 Inter-character Spacing

## Character Font

<b>Function</b>	<b>Begin 12 x 12 draft print mode</b>
<b>ASCII</b>	[ESC] # <0>
<b>Hexadecimal</b>	1BH 23H 00H
<b>Decimal</b>	<27> <35> <0>
<b>IPCL</b>	&%QT
<b>EPOS</b>	[ESC] ! <n>
<b>Description</b>	The [ESC] # <0> command begins 12 x 12 draft print mode. Draft print is provided to maintain compatibility with other Ithaca® products.
<b>Function</b>	<b>Set print quality mode</b>
<b>ASCII</b>	[ESC] I <n>
<b>Hexadecimal</b>	1BH 49H <n>
<b>Decimal</b>	<27> <73> <n>
<b>IPCL</b>	&%QT 12 x 12 draft mode &%QU 12 x 14 large draft mode &%QL 24 x 16 near letter quality (NLQ) mode &%QS 24 x 16 near letter quality (NLQ) mode
<b>EPOS</b>	[ESC] x <n> and/or [ESC] ! <n>
<b>Description</b>	The [ESC] I <n> command begins draft, large draft or near letter quality print mode.
<b>Where n</b>	0 = 12 x 12 draft 1 = 12 x 14 large draft 2 = 24 x 16 near letter quality (NLQ) 3 = 24 x 16 near letter quality (NLQ) 4 - 7 repeats 0 - 3  Draft print modes are high-speed print modes intended to provide quality print with minimal ink usage. The 12 x 12 draft font is the most efficient. The 12 x 14 large draft font produces a larger more readable character but with added ink usage. NLQ print mode is a two pass half-speed font. It provides what is generally regarded as near letter quality print at reduced speed with greater ink usage.
<b>Note 1</b>	In EPOS mode, [ESC] x <n> is similar to [ESC] I <n>. [ESC] ! <n> performs a similar function; however, NLQ is not available.
<b>Note 2</b>	NLQ fonts cannot be rotated 90° or 270°.
<b>Note 3</b>	Switching from draft to NLQ modes causes the printer to print all previously received information. Consequently, auto-center and right justify do not print mixed draft and NLQ font as expected.

<b>Function</b>	<b>Begin rotated font/Right to left entry</b>
<b>ASCII</b>	[ESC] P <n>
<b>Hexadecimal</b>	1BH 50H <n>
<b>Decimal</b>	<27> <80> <n>
<b>IPCL</b>	&%RI {n=2} &%RF {n=1} &%RN {n=0}
<b>EPOS</b>	[ESC] V <n>
<b>Description</b>	The [ESC] P <n> command sets the print font to a rotated 90° or 270° font.
<b>Where n</b>	n = 0    Normal n = 1    Rotate 90° (Single pass, 12 x 12 draft) n = 2    Rotate 270° (Single pass, 12 x 12 draft) n = 5    Rotate 90° (Two pass, 12 x 12 draft or 12 x 14 large draft) n = 6    Rotate 270° (Two pass, 12 x 12 draft or 12 x 14 large draft) n = 8    Enter Text right to left n = 9    Enter Text right to left and Rotate 90° (Single pass, 12 x 12 draft) n = 10   Enter Text right to left and Rotate 270° (Single pass, 12 x 12 draft) n = 11   Enter Text right to left and Rotate 90° (Two pass, 12 x 12 draft or 12 x 14 large draft) n = 12   Enter Text right to left and Rotate 270° (Two pass, 12 x 12 draft or 12 x 14 large draft)

In Modes 1 and 2, 12 x 12 draft font is rotated 90 or 270° and printed in a single pass. Double-wide and double-high fonts are available. However, because the font is rotated, double wide makes the characters taller and double high makes the characters wider. Modes 1 and 2 distort the font, but they produce the fastest rotated print.

Modes 5 and 6 rotate the 12 x 12 draft or 12 x 14 large draft and maintain the aspect ratio of the fonts. Modes 5 and 6 require two passes by the print cartridge, which slows the print time considerably. The font that is rotated by Mode 5 or 6 is selected by the [ESC] I <n> command. <n> may be zero or one.

NLQ fonts cannot be rotated 90° or 270°. The current pitch sets the spacing between lines. If eight characters per inch (cpi) is set, the printer produces the equivalent of eight lines per inch (lpi) rotated print.

Modes 8-12 allow right to left text entry. (Note: right to left text entry is not supported in formatted rotated print mode (See the [ESC]r command for formatted rotated print.)

### Character sets and Code Pages

The POSjet™ 1000 Printer supports 65 different international character sets. In IBM and EPOS printers, there are two ways of selecting a character set. One way substitutes international characters in the upper 128 characters of a standard character set. The substitution technique supports a few different countries. However, as more and more countries were added, too many characters were being replaced. It became a problem for the application to match the characters displayed and printed. To solve the problem, a second method of selecting a character set was developed - code pages. The printer and display use the same code page. The application displays and prints the same characters. IBM and EPOS defined new commands to select code pages and left the old commands in effect.

The POSjet™ 1000 Printer supports international character sets as well as code pages. To allow the most flexibility for the application programmer, both methods are extended in the POSjet™ 1000 Printer. In IBM mode, there are 19 character sets and 60 code pages. In EPOS mode, there are 57 character sets and five code pages.<sup>15</sup>

The POSjet™ 1000 Printer allows the IBM code page selection command to choose character sets as well as normal IBM code pages. The EPOS character set select command has been extended to allow additional character sets over and above the 11 defined by EPOS. The EPOS code page select command has not been extended because there is no EPOS definition beyond the first six ID's.

All characters in code pages as well as character sets are addressed as zero through 255. (Characters below 32 must be addressed with the [ESC] ^ <n> command.) Code pages may be changed at any time and are active for all features including rotated print. To allow other code pages to be created by an application, a redefine character set command is provided.

As discussed above, there are two commands for language selection in IBM mode. The first is [ESC] !, which selects one of 19 international character sets. The [ESC]! command does not allow all of the possible character sets to be selected, it is provided for compatibility with older programs only. The second is [ESC][ T, which selects any of the 58 code pages. In EPOS mode, the [ESC] R command has been expanded to select any of the 59 international character sets or code pages.

Function	Select international character set
ASCII	[ESC] ! <n>
Hexadecimal	1BH 21H <n>
Decimal	<27> <33> <n>
IPCL	&%CS <n>
EPOS	[ESC] R <n>
Description	The [ESC] ! <n> command selects international character set <n>. In standard mode, the value of <n> is as follows.

<n>	Language	<n>	Language
64- '@'	ASCII (slashed zero)	73- 'I'	Italian
65- 'A'	ASCII (unslashed zero)	74- 'J'	French Canadian
66- 'B'	British	75- 'K'	Spanish
67- 'C'	German	76- 'L'	Swedish II
68- 'D'	French	77- 'M'	Swedish III
69- 'E'	Swedish	78- 'N'	Swedish IV
70- 'F'	Danish	79- 'O'	Turkish
71- 'G'	Norwegian	80- 'P'	Swiss I
72- 'H'	Dutch	81- 'Q'	Swiss II

Table 20 Language Table ID's

<sup>15</sup> Epson provides limited code page support through ID to code page translation. Only six translations are defined.

**Function**      **Select character code page****ASCII**            [ESC] [ T <n<sub>h</sub>> <n<sub>l</sub>>**Hexadecimal**    1BH 5BH 54H <n<sub>h</sub>> <n<sub>l</sub>>**Decimal**            <27> <91> <84> <n<sub>h</sub>> <n<sub>l</sub>>**IPCL**              &%CP <m<sub>1</sub>> <m<sub>2</sub>> <m<sub>3</sub>> <m<sub>4</sub>>**EPOS**             [ESC] t <n>

**Description**      The [ESC] [ T <n<sub>h</sub>> <n<sub>l</sub>> command selects character code page <n<sub>h</sub>> <n<sub>l</sub>>. The POSjet™ 1000 Printer supports many code pages. The following code pages are supported.

Code Page	Country Code/Language Set	Decimal <n <sub>h</sub> > <n <sub>l</sub> >	Hex <n <sub>h</sub> > <n <sub>l</sub> >
64	USA (Slashed 0)	0,64	0H,040H
65	USA (Unslashed 0)	0,65	0H,041H
66	British	0,66	0H,042H
67	German	0,67	0H,043H
68	French	0,68	0H,044H
69	Swedish I	0,69	0H,045H
70	Danish	0,70	0H,046H
71	Norwegian	0,71	0H,047H
72	Dutch	0,72	0H,048H
73	Italian	0,73	0H,049H
74	French Canadian	0,74	0H,04AH
75	Spanish	0,75	0H,04BH
76	Swedish II	0,76	0H,04CH
77	Swedish III	0,77	0H,04DH
78	Swedish IV	0,78	0H,04EH
79	Turkish	0,79	0H,04FH
80	Swiss I	0,80	0H,050H
81	Swiss II	0,81	0H,051H
91	Welsh	0,91	0H,05BH
437	USA	1,181	1H,0B5H
774	Baltic 774	3,6	3H,006H
850	Multilingual	3,82	3H,052H
852	East Europe Latin II-852	3,84	3H,054H
855	Cyrillic I-855	3,87	3H,057H
857	Turkey 857	3,89	3H,059H
858	Multilingual Euro	3,90	3H,05AH
860	Portugal	3,92	3H,05CH
861	Icelandic-861	3,93	3H,05DH
862	Hebrew NC (862)	3,94	3H,05EH
863	Canada French	3,95	3H,05FH



Code Page	Country Code/Language Set	Decimal <n <sub>h</sub> > <n <sub>l</sub> >	Hex <n <sub>h</sub> > <n <sub>l</sub> >
865	Norway	3,97	3H,061H
866	Cyrillic II-866	3,98	3H,062H
869	Greek 869	3,101	3H,065H
895	Kamenicky (MJK)	3,127	3H,07FH
1008	Greek 437	3,240	3H,0F0H
1009	Greek 928	3,241	3H,0F1H
1011	Greek 437 Cyprus	3,243	3H,0F3H
1012	Turkey	3,244	3H,0F4H
1013	Cyrillic II-866	3,245	3H,0F5H
1014	Polska Mazovia	3,246	3H,0F6H
1015	ISO Latin 2	3,247	3H,0F7H
1016	Serbo Croatic I	3,248	3H,0F8H
1017	Serbo Croatic II	3,249	3H,0F9H
1018	ECMA-94	3,250	3H,0FAH
1019	Windows East Europe	3,251	3H,0FBH
1020	Windows Greek	3,252	3H,0FCH
1021	Latin 5 (Windows Turkey)	3,253	3H,0FDH
1022	Windows Cyrillic	3,254	3H,0FEH
1024	Hungarian CWI	4,0	4H,000H
1026	ISO Latin 4 (8859/4)	4,2	4H,002H
1027	Ukrainian	4,3	4H,003H
1028	Roman-8	4,4	4H,004H
1029	ISO Latin 6 (8859/10)	4,5	4H,005H
1030	Hebrew NC (862)	4,6	4H,006H
1031	Hebrew OC	4,7	4H,007H
1032	Windows Hebrew	4,8	4H,008H
1033	KBL- Lithuanian	4,9	4H,009H
1034	Windows Baltic	4,10	4H,00AH
1035	Cyrillic-Latvian	4,11	4H,00BH
1072	Bulgarian	4,48	4H,030H

Table 21 Code Page Definition Table

**Note 1** The code page field is a 16-bit field that is equivalent to the code page number. For example,  $1 * 256 + 181 = 437$ . For the IPCL command, the page is specified in ASCII as a 4-byte field.

<b>Function</b>	<b>Print control character</b>
<b>ASCII</b>	[ESC] ^ <n>
<b>Hexadecimal</b>	1BH 5EH <n>
<b>Decimal</b>	<27> <94> <n>
<b>IPCL</b>	&%CC <m1> <m2> <m3>
<b>EPOS</b>	[ESC] ^ <n>
<b>Description</b>	The [ESC] ^ <n> command allows characters from zero to 31 codes to be printed. During normal operation, characters from zero to 31 are control characters. The command turns off control code translation for the following character. <n> can be from zero to 255.

<b>Function</b>	<b>Insert Euro character</b>
<b>ASCII</b>	ESC] [ C <n>
<b>Hexadecimal</b>	1BH 5BH 43H <n>
<b>Decimal</b>	<27> <91> <67> <n>
<b>IPCL</b>	&%EU
<b>Description</b>	The [ESC] [ C <n> command allows an application to replace any character in the currently active character set with the Euro character. The character to be replaced is defined by <n>. For example, if the currently active character set is CP 850 (multi-lingual) and 0D5H character is to be the Euro character, "1BH 5BH 43H 0D5H" replaces the character at 0D5H with the Euro symbol.

Euro Character Substitution Matrix			
Name	Epson	IBM	Code Page Insertion Point (hex)
850	26	850	0xD5
Turkey 857	57	857	0xD5
Win Cyrillic	52	1022	0X88
Win Turkish	51	1021	0X80
Win Greek	50	1020	0X80
Win Hebrew	62	1032	0X80
Win Baltic	68	1034	0X80

Table 22 Euro Character Substitution Matrix

Function	Redefine character set
ASCII	[ESC] [ S <L <sub>L</sub> > <L <sub>H</sub> > <B <sub>C</sub> > <T <sub>1L</sub> ><T <sub>1H</sub> > <T <sub>2L</sub> ><T <sub>2H</sub> > <T <sub>3L</sub> ><T <sub>3H</sub> > ... <T <sub>nL</sub> ><T <sub>nH</sub> >
Hexadecimal	1BH 5BH 53H ...
Decimal	<27> <91> <83> ...
IPCL	none
Description	<p>The [ESC] [ S &lt;L<sub>L</sub>&gt; &lt;L<sub>H</sub>&gt; &lt;B<sub>C</sub>&gt; &lt;T<sub>1L</sub>&gt;&lt;T<sub>1H</sub>&gt; &lt;T<sub>2L</sub>&gt;&lt;T<sub>2H</sub>&gt; &lt;T<sub>3L</sub>&gt;&lt;T<sub>3H</sub>&gt; ... &lt;T<sub>nL</sub>&gt;&lt;T<sub>nH</sub>&gt; command allows an application to replace or redefine the active character set mapping in the printer. Where &lt;L<sub>L</sub>&gt; &lt;L<sub>H</sub>&gt; defines the total length of the following data: &lt;L<sub>L</sub>&gt; + 256 * &lt;L<sub>H</sub>&gt; = 1 + 2 * is the total number of characters to be replaced; &lt;B<sub>C</sub>&gt; is the first character in the active map to be replaced; and &lt;T<sub>1H</sub>&gt; &lt;T<sub>1L</sub>&gt;<sup>16</sup> is the internal address of the replacement character image. The mapping of a print pattern to each character address is referred to a code page or character set. At any given time, the printer character set is comprised of 256 characters. Each character is addressed by an 8-bit value generally referred to as a character code. For example, if you want to print an 'A', it would be addressed by sending a &lt;65&gt; decimal to the printer. Sixty-five predefined code pages or character maps assign characters to a particular address built into the printer. Occasionally, an application needs to redefine a character or group of characters in a code page. The POSjet™ 1000 Printer allows the map for any code page to be redefined or replaced. The define character set command allows any character or group of characters to be replaced with any other printable character. Over 500 printable master characters are defined in the printer. For example, to redefine the character map for the 35th character and replace it with internal master character 346, the redefine character set command is used as follows:</p>

```
[ESC] [ S <3> <0> <35> <90> <1>
```

```

      ^^^^^      ^^      ^^^^^
      |           |           +- 346th Character in the Master Set
      |           |           [(1 * 256) + 90]
      |           +----- 35th Character
      +----- 3 bytes to follow [(0 * 256) + 3]

```

The new map remains until the printer is power cycled or the character set is redefined. The code page and character set commands completely redefine the table.

**Note 1** The OCR character set disable command, [ESC] y <12>, also restores the character set to the original definition.

<sup>16</sup> The internal character map is provided in the *Master Character Set Definitions Guide*, PN 100-9785.

Function	Define user-defined characters
ASCII	[ESC] = <y> <c <sub>1</sub> > <c <sub>2</sub> > [<x <sub>1</sub> > <d <sub>1</sub> > ... d(y x x <sub>1</sub> )] ... [<x <sub>k</sub> > <d <sub>1</sub> > ... d (y x x <sub>k</sub> )]
Hexadecimal	1BH 3DH <y> ...
Decimal	<27> <51> <y> ...
Range	y = 2 or 3 $32 \leq c_1 \leq c_2 \leq 126$ $0 \leq x \leq 12$ (12 x 12 font) $0 \leq x \leq 14$ (12 x 14 font) $0 \leq x \leq 16$ (24 x 16 font) $0 \leq d_1 \dots d (y x x) \leq 255$
IPCL	none
Description	<p>The [ESC] = &lt;y&gt; &lt;c<sub>1</sub>&gt; &lt;c<sub>2</sub>&gt; [&lt;x<sub>1</sub>&gt; &lt;d<sub>1</sub>&gt; ... d(y x x<sub>1</sub>)] ... [&lt;x<sub>k</sub>&gt; &lt;d<sub>1</sub>&gt; ... d (y x x<sub>k</sub>)] command defines user-defined characters from character code &lt;c<sub>1</sub>&gt; to &lt;c<sub>2</sub>&gt;. &lt;y&gt; and &lt;x&gt; are the configurations of a user-defined character. &lt;y&gt; specifies the number of bytes in the vertical direction. &lt;x&gt; specifies the number of bytes in the horizontal direction. Character code ranges from zero to 255 (FFH) can be defined by &lt;c<sub>1</sub>&gt; and &lt;c<sub>2</sub>&gt;. Up to 32 user-defined characters can be defined. Data (&lt;d&gt;) specifies a bit printed to one and not printed to zero. At the default, user-defined characters are not defined and the internal character set is printed. Once the user-defined characters have been defined, they are available until [ESC] \$ is executed; the user-defined characters are redefined; the power is turned off; or the printer is reset.</p> <p>Each internal font, draft, large draft, and NLQ, has its own 32-character storage area. If possible, the currently selected font will be used to select which user-defined font is defined. If the font being defined is not suitable for the currently selected mode, a suitable font will be temporarily selected for the definition. If &lt;y&gt; = 2, the 12 x 12 draft font or the 12 x 14 large draft font can be defined. If &lt;y&gt; = 3, only the 16 x 24 NLQ font can be defined. If &lt;y&gt; = 2 and the NLQ font is active, the large draft user-defined font will be loaded. If &lt;y&gt; = 3 and a draft font is active, the NLQ user-defined font will be loaded. To aid in defining and generating user fonts, a font generation program is available from our web site or by contacting TransAct's Ithaca® facility.</p>

<b>Function</b>	<b>Cancel user-defined characters</b>
<b>ASCII</b>	[ESC] \$
<b>Hexadecimal</b>	1BH 24H
<b>Decimal</b>	<27> <36>
<b>IPCL</b>	none
<b>Description</b>	The [ESC] \$ command removes all user-defined characters from the printer's memory. After the user-defined characters are canceled, the internal character set is printed.
<b>Function</b>	<b>Enable user-defined characters</b>
<b>ASCII</b>	[ESC] > <n>
<b>Hexadecimal</b>	1BH 3EH <n>
<b>Decimal</b>	<27> <62> <n>
<b>Range</b>	<0>, <1>, 0, or 1 1 Enables the characters 0 Disables the characters
<b>IPCL</b>	none
<b>Description</b>	The [ESC] > <n> command enables or disables the user-defined characters. The internal character set is printed.
<b>Function</b>	<b>Enable OCR characters</b>
<b>ASCII</b>	[ESC] y <11>
<b>Hexadecimal</b>	1BH 79H 0BH
<b>Decimal</b>	<27> <121> <11>
<b>IPCL</b>	&%YX011
<b>EPOS</b>	[ESC] y <11>
<b>Description</b>	The [ESC] y <11> command replaces 30 characters in the currently selected character set with OCR-MA3 characters. OCR characters are only available in NLQ mode; NLQ mode is automatically selected when OCR is enabled.
<b>Note 1</b>	Do not switch out of NLQ mode until after the OCR characters are disabled. Other fonts do not contain these characters and will not print correctly.
<b>Note 2</b>	The characters printed by the POSjet™ 1000 Printer follow the format defined in the ANSI X3.111-1986 Standard. They should be printed in ten or 12 cpi. By enabling enhanced print, the characters have improved definition but print at a slower speed.
<b>Function</b>	<b>Disable OCR characters</b>
<b>ASCII</b>	[ESC] y <12>
<b>Hexadecimal</b>	1BH 79H 0CH
<b>Decimal</b>	<27> <121> <12>
<b>IPCL</b>	&%YX012
<b>EPOS</b>	[ESC] y <12>
<b>Description</b>	The [ESC] y <12> command returns the 30 OCR characters to the previously selected character set. It does not restore the print mode.
<b>Note</b>	Any character definitions defined by the redefine character set command are also replaced by the [ESC] y <12> command. Character Attribute Commands

**OCR Characters**

Character	Name	Location Hex, Dec	ASCII Equivalent
0	Number 0	30H,48	0
1	Number 1	31H,49	1
2	Number 2	32H,50	2
3	Number 3	33H,51	3
4	Number 4	34H,52	4
5	Number 5	35H,53	5
6	Number 6	36H,54	6
7	Number 7	37H,55	7
8	Number 8	38H,56	8
9	Number 9	39H,57	9
A	Letter A	41H,65	A
B	Letter B	42H, 66	B
C	Letter C	43H,67	C
D	Letter D	44H,68	D
E	Letter E	45H, 69	E
F	Letter F	46H, 70	F
G	Letter G	47H, 71	G
H	Letter H	48H, 72	H
I	Letter I	49H, 73	I
J	Letter J	4AH, 74	J
K	Letter K	4BH, 75	K
L	Letter L	4CH, 76	L
M	Letter M	4DH,77	M
N	Letter N	4EH,78	N
O	Letter O	4FH, 79	O
P	Letter P	50H,80	P
Q	Letter Q	51H, 81	Q
R	Letter R	52H,82	R
S	Letter S	53H, 83	S
T	Letter T	54H, 84	T
U	Letter U	55H,85	U
V	Letter V	56H, 86	V
W	Letter W	57H, 87	W
X	Letter X	58H,88	X
Y	Letter Y	59H,89	Y
Z	Letter Z	5AH, 90	Z
⌏	Symbol Hook	7EH,126	~
⌐	Symbol Chair	60H,96	`
⌑	Symbol Fork	5FH,95	_
+	Plus Sign	2BH,43	+
-	Minus Sign	2DH,45	-
.	Period	2EH,46	.
/	Slant	2FH,47	/
⌒	Dollar Sign	24H,36	\$
>	Greater Than Sign	3EH,62	>
“	Quotation Mark	22H,34	“

Table 23 OCR MA-3

**Character Attributes**

<b>Function</b>	<b>Select color</b>
<b>ASCII</b>	[ESC] c <n>
<b>Hexadecimal</b>	1BH 63H <n>
<b>Decimal</b>	<27> <99> <n>
<b>IPCL</b>	&%CL <m <sub>1</sub> >
<b>EPOS</b>	none
<b>Description</b>	The [ESC] c <n> command selects the print color and should match the color of the pen installed.
<b>Where &lt;n&gt;</b>	0 = Black 1 = Red 2 = Green 3 = Blue

---

<b>Function</b>	<b>Begin one-line double-wide print</b>
<b>ASCII</b>	[SO]
<b>Hexadecimal</b>	0EH
<b>Decimal</b>	<14>
<b>IPCL</b>	&%MW
<b>EPOS</b>	none
<b>Description</b>	The [SO] command causes subsequent characters to be printed at twice the currently selected character width. For example, ten cpi becomes five cpi, 17 cpi becomes 8.5 cpi, etc. The [SO] command remains in effect until: A valid line terminator is received ([CR], [LF], or [ESC] J <n> (fine line feed)); The command is canceled; or the maximum number of characters per line is reached and the printer performs an auto-print.

---

<b>Function</b>	<b>Cancel one-line double-wide print</b>
<b>ASCII</b>	[DC4]
<b>Hexadecimal</b>	14H
<b>Decimal</b>	<20>
<b>IPCL</b>	&%MN
<b>EPOS</b>	none
<b>Description</b>	The [DC4] command cancels one-line double-wide mode set by the [SO] command and allows single- and double-wide characters to be printed on the same line.

---

<b>Function</b>	<b>Enable/Disable overscore</b>
<b>ASCII</b>	[ESC] _ <n>
<b>Hexadecimal</b>	1BH 5FH 01H
<b>Decimal</b>	<27> <95> <n>
<b>IPCL</b>	&%MO (Begin)
<b>IPCL</b>	&%CO (End)
<b>EPOS</b>	[ESC] ! <n>
<b>Description</b>	The [ESC] _ <1> command begins overscore print mode. All subsequent text, leading spaces, and trailing spaces are overscored. [ESC] _ <0> ends the mode.
<b>Note 1</b>	In EPOS mode, [ESC] ! <n> performs a similar function; however, near letter quality (NLQ) is not available.

<b>Function</b>	<b>Multi-line double-wide and double-high mode</b>		
<b>ASCII</b>	[ESC] W <n>		
<b>Hexadecimal</b>	1BH 57H <n>		
<b>Decimal</b>	<27> <87> <n>		
<b>IPCL</b>	&%FD {n = 1} &%FS {n = 0} &%FHA {n = 3} (Note: Single-wide, double-high mode is not available in IPCL mode.)		
<b>EPOS</b>	[ESC] ! <n>		
<b>Description</b>	The [ESC] W <n> command controls multi-line double-wide or double-high mode. Where n specifies the mode:  n = 0 is standard single-wide and single-high; n = 1 begins double-wide; n = 2 begins double-high; and n = 3 begins double-wide double-high.		
<b>Note 1</b>	The [ESC] W <n> command does not affect line spacing.		
<b>Note 2</b>	In EPOS mode, [ESC] ! <n> performs a similar function; however, near letter quality (NLQ) is not available.		
<b>Where n Bits</b>	<b>76543210</b>	<b>Function</b>	
	1-----	Underline	
	--1-----	Double-wide	
	---1----	Double-high	
	-----X	Font: 0 = draft; 1 = large draft	
<b>Function</b>	<b>Set print style: double-wide, double-high, italic control</b>		
<b>ASCII</b>	[ESC] [ @ [EOT] [NUL] <k> [NUL] <n> <m>		
<b>Hexadecimal</b>	1BH 5BH 40H 04H 00H <k> 00H <n> <m>		
<b>Decimal</b>	<27> <91> <64> <04> <0> <K> <0> <n> <m>		
<b>IPCL</b>	&%DH Double-high, double-wide, and double-space &%SH Single-high, single-wide, and single-space Also, see [ESC] W above.		
<b>Description</b>	The [ESC] [ @ [EOT] [NUL] <k> [NUL] <n> <m> command sets double-wide, double-high, and italic print mode.		
<b>Where k bits</b>	<b>k</b>	<b>76543210</b>	
		----xxxx	Italic control
	0	----0000	No change
	1	----0001	Italics On
	2	----0010	Italics Off
<b>Where n bits</b>	<b>n</b>	<b>76543210</b>	
		----0nnn	Height multiplier (Maximum 4)
	0	----0000	No change
		xxxx----	Line spacing
	0	0000----	No change
<b>Where m bits</b>	<b>m</b>	<b>76543210</b>	
		----0nnn	Width multiplier (Maximum 4)
	0	----0000	No change
<b>Note 1</b>	The maximum height and width multiplier is four.		



<b>Function</b>	<b>Begin underline</b>
<b>ASCII</b>	[ESC] - <n>
<b>Hexadecimal</b>	1BH 2DH 01H
<b>Decimal</b>	<27> <45> <n>
<b>IPCL</b>	&%MU (Begin)
<b>IPCL</b>	&%CU (End)
<b>EPOS</b>	[ESC] ! <n>
<b>Description</b>	The [ESC] - <1> command begins underline print mode. All subsequent text, leading spaces, and trailing spaces are underlined. [ESC] - <0> ends the mode.
<b>Note 1</b>	In EPOS mode, [ESC] ! <n> performs a similar function; however, near letter quality (NLQ) is not available.

---

<b>Function</b>	<b>Begin enhanced print</b>
<b>ASCII</b>	[ESC] G
<b>Hexadecimal</b>	1BH 47H
<b>Decimal</b>	<27> <71>
<b>IPCL</b>	&%ME
<b>EPOS</b>	[ESC] G <1>
<b>Description</b>	All subsequent text is printed in enhanced print mode (two passes with a vertical offset). Enhanced printing provides a deeper resolution of each character and may enhance multiple part forms printing.

---

<b>Function</b>	<b>End enhanced print mode</b>
<b>ASCII</b>	[ESC] H
<b>Hexadecimal</b>	1BH 48H
<b>Decimal</b>	<27> <72>
<b>IPCL</b>	&%CE
<b>EPOS</b>	[ESC] G <0>
<b>Description</b>	The [ESC] H command cancels enhanced print mode and returns to the currently selected font.

---

<b>Function</b>	<b>Begin emphasized print mode</b>
<b>ASCII</b>	[ESC] E
<b>Hexadecimal</b>	1BH 45H
<b>Decimal</b>	<27> <69>
<b>IPCL</b>	&%MM
<b>EPOS</b>	[ESC] E <1>
<b>Description</b>	The [ESC] E command begins emphasized print mode (one pass with horizontal offset). Emphasized print is bolder than normal print.

---

<b>Function</b>	<b>End emphasized print mode</b>
<b>ASCII</b>	[ESC] F
<b>Hexadecimal</b>	1BH 46H
<b>Decimal</b>	<27> <70>
<b>IPCL</b>	&%CM
<b>EPOS</b>	[ESC] E <0>
<b>Description</b>	The [ESC] F command cancels emphasized print mode.

---

<b>Function</b>	<b>Select superscript</b>
<b>ASCII</b>	[ESC] S <0>
<b>Hexadecimal</b>	1BH 53H 00H
<b>Decimal</b>	<27> <83> <0>
<b>IPCL</b>	&%SP
<b>EPOS</b>	none
<b>Description</b>	The [ESC] S <0> command selects superscript. The following characters are printed half size on the upper side of the print line.
<b>Note 1</b>	Superscript is not available in all print modes.

---

<b>Function</b>	<b>Select subscript</b>
<b>ASCII</b>	[ESC] S <1>
<b>Hexadecimal</b>	1BH 53H 01H
<b>Decimal</b>	<27> <83> <1>
<b>IPCL</b>	&%SB
<b>EPOS</b>	none
<b>Description</b>	The [ESC] S <1> command selects subscript. The following characters are printed half size on the bottom side of the print line.
<b>Note</b>	Subscript is not available in all print modes.

---

<b>Function</b>	<b>End superscript or subscript</b>
<b>ASCII</b>	[ESC] T
<b>Hexadecimal</b>	1BH 54H
<b>Decimal</b>	<27> <84>
<b>IPCL</b>	&%SE
<b>EPOS</b>	none
<b>Description</b>	The [ESC] T command ends superscript or subscript.

---

<b>Function</b>	<b>Begin italics</b>
<b>ASCII</b>	[ESC] % G
<b>Hexadecimal</b>	1BH 25H 47H
<b>Decimal</b>	<27> <37> <71>
<b>IPCL</b>	&%MI
<b>EPOS</b>	[ESC] 4
<b>Description</b>	The [ESC] % G command begins italic print mode.
<b>Note</b>	Italics are not available in all print modes.

---

<b>Function</b>	<b>End italics</b>
<b>ASCII</b>	[ESC] % H
<b>Hexadecimal</b>	1BH 25H 48H
<b>Decimal</b>	<27> <37> <72>
<b>IPCL</b>	&%CI
<b>EPOS</b>	[ESC] 5
<b>Description</b>	The [ESC] % H command ends italic print mode.

---

## Print Rotation Commands

Rotated print capabilities are available. The print mode commands listed below rotate the print in any of three 90° orientations. In 90° and 270° rotated mode, the print data is first buffered by the printer, processed (rotated), and then printed in one of three fonts. Consequently, printing time is delayed. In 180° mode, the print is simply inverted and mirrored, and no delay occurs.

In rotated 90° and 270° mode, the printer can support up to 40 lines of rotated print with up to 128 characters per line. One single pass and two double pass fonts with emphasize and enhanced attributes are available.

In free format rotated 90° and 270° mode, the print length is determined by the length of the longest line entered. In line formatted mode, the line length is set not by the longest line entered but by the maximum line length specified by the set line length command.

A line spacing table controls the spacing between lines. The table is defined by the rotated print line spacing ([ESC] u ...) command or by inserting [LF] or [ESC] J <n> commands in the rotated data. The [ESC] u command specifies the number of dots to be added between each printed line. Each line has an entry in the table. There is space for 40 lines. The default spacing is 1/8 inch between lines.

If a [LF] is used to specify the line spacing, it overrides the default table and sets spacing to 1/8 inch or eight lines per inch. If [ESC] J <n> is used, <n> specifies the spacing in n/216.

<b>Function</b>	<b>Begin rotated print</b>												
<b>ASCII</b>	[ESC] r <n>												
<b>Hexadecimal</b>	1BH 72H <n>												
<b>Decimal</b>	<27> <114> <n>												
<b>IPCL</b>	&%RX												
<b>EPOS</b>	[ESC] T <3>												
<b>Description</b>	The [ESC] r <n> command starts rotated print mode where n defines the mode as follows:												
<b>Where:</b> n = x bits,													
	<table> <tr> <td>76543210</td><td>Function</td></tr> <tr> <td>----xx00</td><td>End rotated print</td></tr> <tr> <td>----xx01</td><td>Rotate 90°</td></tr> <tr> <td>----0010</td><td>Rotate 180°</td></tr> <tr> <td>----xx11</td><td>Rotate 270°</td></tr> <tr> <td>----x1xx</td><td>Use line formatting</td></tr> </table>	76543210	Function	----xx00	End rotated print	----xx01	Rotate 90°	----0010	Rotate 180°	----xx11	Rotate 270°	----x1xx	Use line formatting
76543210	Function												
----xx00	End rotated print												
----xx01	Rotate 90°												
----0010	Rotate 180°												
----xx11	Rotate 270°												
----x1xx	Use line formatting												
<b>When n =</b>	<p>1 or 9, the print mode is rotated 90°. Print data is entered normally from left to right, top to bottom. When an end rotated print ([ESC] r &lt;0&gt;) command is received, the printer formats and prints the data. When n = 5 or 13, the print mode is rotated by 90° with formatting. The command differs from the [ESC] r &lt;1&gt; command because the line length is determined not by the longest line entered but by the line length set by the [ESC] s command. If input extends past the end of a line, it wraps around to the next line. When n = 3 or 11, the print mode is rotated 270° according to the currently stored format parameters. When n = 7 or 15, the print mode is rotated 270° according to the currently stored format parameters. The [ESC] r &lt;7&gt; command differs from the [ESC] r &lt;3&gt; command by spacing out the lines to the line length specified by the [ESC] s command. If input extends past the end of a line, it wraps around to the following line. When n = 2, the print mode is rotated 180°. All subsequent lines are rotated 180° and positioned at the opposite margin. All normal fonts and modes are available in 180° rotated mode. Format and font bits are ignored, and the command remains in effect until rotation is cancelled with an end rotated print ([ESC] r &lt;0&gt;) or a station select command.</p>												
<b>Note 1</b>	The last line of print must end with a line terminator before the end rotated command is issued. Any characters in the buffer that have not printed are printed un-rotated when a line terminator is received.												
<b>Note 2</b>	In EPOS mode, the POSjet Printer does not fully implement page mode. The [ESC] T <n> command functions identically to normal mode, [ESC] r <n>, except the definition of <n> is different.												
<b>Note 3</b>	Use the [ESC] I <n> command to select two-pass rotated font. The font selection must be made before the rotate command.												
<b>Note 4</b>	Only enhanced and emphasized attributes are available for formatted, rotated print. These attributes are not available on a character basis. They affect all of the rotated text after the [ESC] r command. Enhanced and emphasized attributes must be set before the [ESC] r command is issued.												

## Rotated Print Summary

<b>Function</b>	<b>Begin 90° rotated print</b>
<b>ASCII</b>	[ESC] r <1>
<b>Hexadecimal</b>	1BH 72H 01H
<b>Decimal</b>	<27> <114> <1>
<b>IPCL</b>	&%R1
<b>Function</b>	<b>Begin 90° rotated print with line formatting</b>
<b>ASCII</b>	[ESC] r <5>
<b>Hexadecimal</b>	1BH 72H 05H
<b>Decimal</b>	<27> <114> <5>
<b>IPCL</b>	&%R5
<b>Function</b>	<b>Begin 270° rotated print</b>
<b>ASCII</b>	[ESC] r <3>
<b>Hexadecimal</b>	1BH 72H 03H
<b>Decimal</b>	<27> <114> <3>
<b>IPCL</b>	&%R3
<b>Function</b>	<b>Begin 270° rotated print with line formatting</b>
<b>ASCII</b>	[ESC] r <7>
<b>Hexadecimal</b>	1BH 72H 07H
<b>Decimal</b>	<27> <114> <7>
<b>IPCL</b>	&%R7
<b>EPOS</b>	[ESC] T <1>
<b>Function</b>	<b>Begin 90° rotated print with two pass font</b>
<b>ASCII</b>	[ESC] r <9>
<b>Hexadecimal</b>	1BH 72H 09H
<b>Decimal</b>	<27> <114> <2>
<b>IPCL</b>	&%R9 or &%RX09
<b>EPOS</b>	none
<b>Function</b>	<b>Begin 90° rotated print with two pass font and line formatting</b>
<b>ASCII</b>	[ESC] r <13>
<b>Hexadecimal</b>	1BH 72H 0BH
<b>Decimal</b>	<27> <114> <13>
<b>IPCL</b>	&%RX13
<b>EPOS</b>	none

---

<b>Function</b>	<b>Begin 270° rotated print with two pass font</b>
<b>ASCII</b>	[ESC] r <11>
<b>Hexadecimal</b>	1BH 72H 0BH
<b>Decimal</b>	<27> <114> <11>
<b>IPCL</b>	&%RX11
<b>EPOS</b>	none

---

<b>Function</b>	<b>Begin 270° rotated print with two pass font and line formatting</b>
<b>ASCII</b>	[ESC] r <15>
<b>Hexadecimal</b>	1BH 72H 0FH
<b>Decimal</b>	<27> <114> <15>
<b>IPCL</b>	&%RX15
<b>EPOS</b>	[ESC] T <1>

---

<b>Function</b>	<b>End rotated print</b>
<b>ASCII</b>	[ESC] r <0>
<b>Hexadecimal</b>	1BH 72H 00H
<b>Decimal</b>	<27> <114> <0>
<b>IPCL</b>	&%R0
<b>EPOS</b>	[ESC] { <0>
<b>Description</b>	The [ESC] r <0> command prints the contents of the rotated print buffer (when in 90° or 270° rotated mode) and returns to normal print orientation. In 180° rotated mode, the printer returns to normal mode. Characters in the print buffer that have not been printed are not printed.

---

<b>Function</b>	<b>Set rotated print line length</b>
<b>ASCII</b>	[ESC] s <n>
<b>Hexadecimal</b>	1BH 73H <n>
<b>Decimal</b>	<27> <115> <n>
<b>IPCL</b>	&%RL <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >
<b>EPOS</b>	none
<b>Description</b>	The [ESC] s <n> command sets the print line length used in autoformat rotated print mode. The maximum number of characters per line is 128. The power on default line length is 80 characters. To determine the number of available print lines, divide 1760 by the number of characters per line and round down to the nearest whole number. There must be a minimum of 80 characters per line, which allows up to 22 lines of print. A value less than 80 does not allow additional print lines. Values greater than 80 reduce the number of lines.

---

<b>Function</b>	<b>Set rotated print line spacing</b>
<b>ASCII</b>	[ESC] u <n <sub>1</sub> > <m <sub>1</sub> > <n <sub>2</sub> > <m <sub>2</sub> > ... <n <sub>i</sub> > <m <sub>i</sub> > <0>
<b>Hexadecimal</b>	1BH 75H <n <sub>1</sub> > <m <sub>1</sub> > <n <sub>2</sub> > <m <sub>2</sub> > ... <n <sub>i</sub> > <m <sub>i</sub> > 00H
<b>Decimal</b>	<27> <117> <n <sub>1</sub> > <m <sub>1</sub> > <n <sub>2</sub> > <m <sub>2</sub> > ... <n <sub>i</sub> > <m <sub>i</sub> > <0>
<b>IPCL</b>	none
<b>EPOS</b>	none
<b>Description</b>	The [ESC] u <n <sub>1</sub> > <m <sub>1</sub> > <n <sub>2</sub> > <m <sub>2</sub> > ... <n <sub>i</sub> > <m <sub>i</sub> > <0> command adjusts the line spacing for each rotated print line where n <sub>i</sub> is the line number and m <sub>i</sub> is the spacing, in 1/8-inch intervals, between lines. The n <sub>i</sub> value can be from one to 40 value; m <sub>i</sub> can be from one to 255. For the first print line, the distance is calculated from the left margin. If n <sub>i</sub> or m <sub>i</sub> is zero, the command is terminated. Any unspecified spacing is set to 1/8 inch. The values are used as a template for all subsequently rotated print. On power up, spacing is preset to 1/8 inch or eight lines per inch for all lines. The command is only effective during 90° and 270° rotated modes. It remains in effect until a new table is received or until the printer is power cycled. An [ESC] u <0> sets all lines to 1/8 inch. The table can be overridden by [LF] or [ESC] J <n> commands for rotated print data.

## Graphic Mode

The POSjet™ 1000 Printer conforms to the basic definition of IBM all-points-addressable (APA) graphic commands. It is not designed to print large quantities of graphical data. The printer only prints graphics that are 2.5 inches wide. At this time, there is not a graphics mode for Epson.

The POSjet™ 1000 Printer always prints in one of the native resolutions of 104 x 96, 208 x 96, 104 x 192, or 208 x 192 dpi. To provide compatibility with the standard IBM APA resolutions, the printer internally modifies the graphics to print as expected. The printer converts the vertical resolution by altering the [ESC] J command (which is typically used for vertical spacing) and adjusting it so that horizontal passes touch as expected. The requested horizontal resolution is converted by data scaling. Because the vertical dpi of the printer is always greater, the resulting APA graphics printed on the POSjet™ 1000 Printer are slightly smaller than the same graphic printed on an impact printer. All of this is done transparently to the application; however, loss of resolution may result in some modes. If desired the [ESC] \* <m> command can be used to select the native resolution.

**Note 1** If the POSjet™ 1000 Printer is used with programs that convert text to graphics, the printer is slower than if the printer is sent ASCII text. The POSjet™ 1000 Printer is supported by a Windows' print driver that allows applications to select supported fonts.

**Note 2** Generally, the horizontal graphic commands provide faster print than the APA graphic commands.

### Standard APA Graphics

<b>Function</b>	<b>Print single-density graphics (60h x 72v dpi)</b>
<b>ASCII</b>	[ESC] K <n <sub>1</sub> > <n <sub>2</sub> >
<b>Hexadecimal</b>	1BH 4BH <n <sub>1</sub> > <n <sub>2</sub> >
<b>Decimal</b>	<27> <75> <n <sub>1</sub> > <n <sub>2</sub> >
<b>IPCL</b>	none
<b>Description</b>	The [ESC] K <n <sub>1</sub> > <n <sub>2</sub> > command prints <n <sub>1</sub> > + 256 * <n <sub>2</sub> > bytes of single-density graphics (60 dpi).
<b>Function</b>	<b>Print half-speed double-density graphics (120h x 72v dpi)</b>
<b>ASCII</b>	[ESC] L <n <sub>1</sub> > <n <sub>2</sub> >
<b>Hexadecimal</b>	1BH 4CH <n <sub>1</sub> > <n <sub>2</sub> >
<b>Decimal</b>	<27> <76> <n <sub>1</sub> > <n <sub>2</sub> >
<b>IPCL</b>	none
<b>Description</b>	The [ESC] L <n <sub>1</sub> > <n <sub>2</sub> > command prints <n <sub>1</sub> > + 256 * <n <sub>2</sub> > bytes of double-density graphics (120 dpi) at half speed allowing full and half dots to be printed.
<b>Function</b>	<b>Print full-speed double-density graphics (120h x 72v dpi)</b>
<b>ASCII</b>	[ESC] Y <n <sub>1</sub> > <n <sub>2</sub> >
<b>Hexadecimal</b>	1BH 59H <n <sub>1</sub> > <n <sub>2</sub> >
<b>Decimal</b>	<27> <89> <n <sub>1</sub> > <n <sub>2</sub> >
<b>IPCL</b>	none
<b>Description</b>	The [ESC] Y <n <sub>1</sub> > <n <sub>2</sub> > command prints <n <sub>1</sub> > + 256 * <n <sub>2</sub> > bytes of double-density graphics (120 dpi) at full speed with no consecutive dots. (The mode is generally used to print 120h by 144v dpi resolutions in two passes).



<b>Function</b>	<b>Print quad-density graphics (240h x 72v dpi)</b>
<b>ASCII</b>	[ESC] Z <n <sub>1</sub> > <n <sub>2</sub> >
<b>Hexadecimal</b>	1BH 5AH <n <sub>1</sub> > <n <sub>2</sub> >
<b>Decimal</b>	<27> <90> <n <sub>1</sub> > <n <sub>2</sub> >
<b>IPCL</b>	none
<b>Description</b>	The [ESC] Z <n <sub>1</sub> > <n <sub>2</sub> > command prints <n <sub>1</sub> > + 256 * <n <sub>2</sub> > bytes of quad-density graphics (240 dpi) at half speed with no consecutive dots. (The mode is generally used to print 240h by 144v dpi resolutions in two passes).

### Extended APA Graphics

<b>Function</b>	<b>Print graphics in mode &lt;m&gt; (60h/ 120h/ 240h x 72v dpi)</b>			
<b>ASCII</b>	[ESC] * <m> <n <sub>1</sub> > <n <sub>2</sub> >			
<b>Hexadecimal</b>	1BH 2AH <m> <n <sub>1</sub> > <n <sub>2</sub> >			
<b>Decimal</b>	<27> <42> <m> <n <sub>1</sub> > <n <sub>2</sub> >			
<b>IPCL</b>	none			
<b>Description</b>	The [ESC] * <m> <n <sub>1</sub> > <n <sub>2</sub> > command selects one of three graphic modes as specified by <m>.			
<b>Where &lt;m&gt;</b>	0	60 dpi	Full speed	8-bit slices
	1	120 dpi	Half speed	8-bit slices
	2	120 dpi	Full speed	8-bit slices
	3	240 dpi	Full speed	8-bit slices
	4	80 dpi	Full speed	8-bit slices
	5	72 dpi	Full speed	8-bit slices
	6	90 dpi	Full speed	8-bit slices
	7	144 dpi	Full speed	8-bit slices
	8,9	Not supported		
	10	104 x 96 dpi		1 horizontal 1 vertical pass
	11	208 x 96 dpi		2 horizontal 1 vertical pass
	12	104 x 192 dpi		1 horizontal 2 vertical passes
	13	208 x 192 dpi		2 horizontal 2 vertical passes
	15,16	Not supported		

<b>Function</b>	<b>Reassign graphic mode</b>				
<b>ASCII</b>	[ESC] ? <m> <n>				
<b>Hexadecimal</b>	1BH 3FH <m> <n>				
<b>Decimal</b>	<27> <63> <m> <n>				
<b>IPCL</b>	none				
<b>Description</b>	The [ESC] ? <m> <n> command reassigns graphic mode <m> to resolution <n>. Possible values for <m> are K, L, Y, or Z. Resolutions, <n>, are zero to seven as follows:				
<b>Where &lt;m&gt;</b>	0	60 dpi	Full speed	8-bit slices	Default for K
	1	120 dpi	Half speed	8-bit slices	Default for L
	2	120 dpi	Full speed	8-bit slices	Default for Y
	3	240 dpi	Full speed	8-bit slices	Default for Z
	4	80 dpi	Full speed	8-bit slices	
	5	72 dpi	Full speed	8-bit slices	
	6	90 dpi	Full speed	8-bit slices	
	7	144 dpi	Full speed	8-bit slices	
	10	104 x 96 dpi		1 horizontal, 1 vertical pass	
	11	208 x 96 dpi		2 horizontal, 1 vertical pass	
	12	104 x 192 dpi		1 horizontal, 2 vertical passes	
	13	208 x 192 dpi		2 horizontal, 2 vertical passes	
<b>Note 1</b>	Modes 11 through 13 are designed to support horizontal graphics and not intended for APA graphics.				
<b>Function</b>	<b>Select unidirectional print</b>				
<b>ASCII</b>	[ESC] U <1>				
<b>Hexadecimal</b>	1BH 55H 01H				
<b>Decimal</b>	<27> <85> <1>				
<b>IPCL</b>	&%GU				
<b>EPOS</b>	ESC] U <1>				
<b>Description</b>	The [ESC] U <1> command prints all data in unidirectional print mode to improve line to line registration for graphical data.				
<b>Note 1</b>	Unidirectional print should be canceled before normal text is printed. Print time is slowed if it is not canceled.				
<b>Function</b>	<b>Select bidirectional print</b>				
<b>ASCII</b>	[ESC] U <0>				
<b>Hexadecimal</b>	1BH 55H 00H				
<b>Decimal</b>	<27> <85> <0>				
<b>IPCL</b>	&%GB				
<b>EPOS</b>	[ESC] U <0>				
<b>Description</b>	The [ESC] U <0> command prints all data in bidirectional, logic-seeking print mode.				

### Horizontal Graphics (Color Graphics)

The POSjet™ 1000 Printer supports graphics sent as horizontal scan lines. Individual scan lines of graphic data are sent to the printer one line at a time. Although the POSjet™ 1000 Printer only supports two colors, the horizontal graphic command interface gives full color support for printer graphics. Full color support is provided to establish a full color standard for future printers. Color data is sent in one of three color planes. Typically, a red plane or scan line is sent, then green and blue. The sequence of lines defines one row of dots that is printed on the paper.

The horizontal graphic commands do not include resolution information. Therefore, only once before sending graphics data, set the graphics resolution by sending the ESC \* command with a zero length (no data). The graphic resolution sets the internal graphic mode of the printer. The printer stays in graphic mode until it is changed by another command. Note: the bar code generation and other graphic commands change graphics mode. The format of the horizontal graphic command follows.

For additional Information on Color Graphics See “**Error! Reference source not found.**” on page **Error! Bookmark not defined.**

Function	Process horizontal graphics data
ASCII	[ESC] h <color> <length> <format> <data>
Hexadecimal	1BH 68H
Decimal	<27> <104>
IPCL	None
EPOS	None
Description	<p>The [ESC] h &lt;color&gt; &lt;length&gt; &lt;format&gt; &lt;data&gt; command processes horizontal graphic data. Where &lt;color&gt; is a byte that specifies the color of the data being sent.</p> <p>&lt;color&gt; =           0 Use Previously Selected Color  1 Red  2 Green  4 Blue  16 Single Color (Black/White)</p>
<b>Note 1</b>	<p>Red, green, and blue pixels set to one at the same location result in white dot. While red, green, and blue pixels set to zero form a black dot. For black print, one represents a black dot and zero represents a white dot.</p>
<b>Note 2</b>	<p>More than one color may be set at a time. Setting the color to six would set green and blue simultaneously. Where &lt;length&gt; is a byte specifying the length of the data including the format byte.</p> <p>&lt;length&gt; =           0 to 254 (255 is reserved for future use.)</p> <p>Where &lt;format&gt; is a byte specifying the format of the graphics data.</p> <p>&lt;format&gt; =           0 for raw data  1 for bit wise RLE compression  8 for byte wise RLE compression  254 for difference compression  255 for same as previous scan line data</p>

**Where <data>** is the data bytes that define the graphics to be printed.

<b>Function</b>	<b>Set horizontal graphic mode</b>		
<b>ASCII</b>	[ESC] * <m> <0> <0>		
<b>Hexadecimal</b>	1BH 2AH <m> <0> <0>		
<b>Decimal</b>	<27> <42> <m> <0> <0>		
<b>IPCL</b>	none		
<b>Description</b>	The [ESC] * <m> <0> <0> command selects one of the three graphic modes specified by <m>. The two bytes after the mode must be zero.		
<b>Where &lt;m&gt;</b>	0,2,3,4,5,6,7	Standard Graphic Modes (See above.)	
	8,9	Not supported	
	10	104 x 96 dpi	1 horizontal, 1 vertical pass
	11	208 x 96 dpi	2 horizontal, 1 vertical pass
	12	104 x 192 dpi	1 horizontal, 2 vertical passes
	13	208 x 192 dpi	2 horizontal, 2 vertical passes
	14,15,16	Not supported	
<b>Note 1</b>	Only modes 10 thorough 13 should be selected for horizontal graphics.		
<b>Example</b>	<b>Command</b>	<b>Comment</b>	
	ESC * <10> <0> <0>	Set resolution to 100 x 96 dpi.	
	ESC h <1> <9> <0> <eight data bytes>	Send 8-bytes red pixels.	
	ESC h <2> <9> <0> <eight data bytes>	Send 8-bytes green pixels.	
	ESC h <3> <9> <0> <eight data bytes>	Send 8-bytes blue pixels.	
	LF	Send line feed to force print of any buffered data not yet printed.	
<b>Note 2</b>	Graphic data is committed to paper when more than 12 dot rows have been transmitted to the printer. If less than 12 dot rows have been sent, they are not printed until the line is terminated (i.e. a line feed command is sent). To make graphics faster to send and smaller to store, several algorithms are included with the graphic command to compress the data.		

### Graphics Compression

Although the printer compression algorithms are documented, it is recommended that our Windows' printer driver be used to generate a graphic image. Our Windows' printer driver selects the best compression method to use on a scan line by scan line basis. The print driver can be directed to print to file, creating a .prn file. When creating a .prn file, it is recommended that the Start/End Doc settings be cleared in the Start/End Doc tab of the printer properties page. After the .prn file is created, it can be read and sent to the printer by the host application.

**Bit wise RLE** In bit wise RLE compression, the Most Significant Bit (MSB) Compression of each data byte denotes if the compressed data represents one or zero bits. Bits zero through six indicate how many bits are represented as a one or zero. A 34 Hex (34H) represents 34H bits set to zero. A 97H represents 17H bits set to one.

ESC h <1> <5> <1> <34H> <97H> <8fH> <09H> **Byte wise RLE** In byte wise RLE compression, data is represented in byte Compression pairs. The first byte is a count, and the second is the graphics data. The graphics data byte is repeated the number of times represented by the count byte. ESC h <1> <5> <8> <09H> <ffH> <02H> <55H> Where <09H> <ffH> means repeat ffH nine times and <02H> <55H> means repeat 55H two times.

**In difference compression**, data is represented in byte pairs. In compression, the first byte is an index into the byte stream, as it would exist if sent in an uncompressed format. The second byte is the data that is different in the new scan line data. Think of compression mode as, "The scan line is the same as the previous except for the byte at a specific position." ESC h <1> <5> <254> <03H> <d5H> <0bH> <51H> Where <03H> <d5H> means use the previously transmitted scan line data but change byte 3 to a d5H and change byte 11 (0bH) to a 51H. **Same-as-previous Compression** In same-as-previous compression, the

command does not contain any graphics data. The command specifies that the printer is to use the previous scan line data for the current scan line. ESC h <1> <1> <255>.

## User Store (Graphic Save)

The POSjet™ 1000 Printer maintains a 16K (16384 bytes) section of flash memory to save user information. The information can be either macros or user-defined characters. These groups of data are indexed by name and may be called up at any time after they are stored. See the sections on Macros and User-defined Characters for definitions of these functions. For additional Information on Color Graphics See “**Error! Reference source not found.**” on page **Error! Bookmark not defined.**

To allow the host application to maintain these groups of data, a series of user-store maintenance commands are available. As referenced earlier in this manual, the user can define a limited number of custom characters and define a macro. These character/macro definitions can also be saved in user store. However, only one character definition and one macro can be active at any time.

One macro and one user-defined character definition can be flagged to load and run at startup. If a flag is set, the printer will automatically process the macro and/or load the user-defined character set at initialization.

Because user store is intended to be loaded only a few times and then printed as part of normal operation, the programmer must take some care during the definition phase. The programmer must assume the responsibility to assure the 16K buffer size is not exceeded. User store can save macros and user-defined character sets.

## Defining Macros

Macros can be defined two ways. The first is by using the begin and end named macro commands. These commands start the recording process and automatically save the macro when it is complete. The macro data is not processed as it is sent to the printer.

<b>Function</b>	<b>Begin named macro record</b>
<b>ASCII</b>	[ESC] [US] b <Name..> <0>Then send the data to be recorded. The printer does not process the data. The terminating <0> may be redefined. See [ESC] [EM]T<n> or &%UT>n> on page 102.
<b>Function</b>	<b>End name macro record</b>
<b>ASCII</b>	[ESC] [US] e <Name..> <0>  The second way to define macros is to use [ESC] g commands to define the macro and then the save macro data command to save the data. The terminating <0> may be redefined. See [ESC] [EM]T<n> or &%UT>n> on page 102.
<b>Function</b>	<b>Start macro record</b>
<b>ASCII</b>	[ESC] g <1>Then send the data to be recorded. (The data is processed and printed).
<b>Function</b>	<b>Stop macro record</b>
<b>ASCII</b>	[ESC] g <2>Then save the macro.
<b>Function</b>	<b>Save macro data</b>
<b>ASCII</b>	[ESC] [US] m <Name..>Saving User-defined Characters. To save user-defined characters, first define the character set.
<b>Function</b>	<b>Define user-defined characters</b>
<b>ASCII</b>	[ESC] = <y> <c <sub>1</sub> > <c <sub>2</sub> > [x <sub>1</sub> d <sub>1</sub> ... d(y x x <sub>1</sub> )] ... [x <sub>k</sub> d <sub>1</sub> ... d(y x x <sub>k</sub> )] Second, save the definition in the nonvolatile flash memory with the appropriate command. Save the definition. Note the "Save user-defined characters" command saves all three character definitions.
<b>Function</b>	<b>Save user-defined characters</b>

**ASCII** [ESC] [US] c <Name..> <0>  
 Third, load the character set or load and run the macro.  
 To restore the character definitions, issue a load item command with the name of the character set to be loaded.  
 The terminating <0> may be redefined. See [ESC] [EM]T<n> or &%UT>n> on page 102.

---

**Function**      **Load item from user store**

**ASCII** [ESC] [US] l <Name..> <0>

If the item referenced is a user-defined character set, it is loaded into the current definition. If it is a macro, it is loaded into the macro buffer. It is not processed or printed.

To help maintain the user-store area, the following commands can be used.  
 The terminating <0> may be redefined.  
 See [ESC] [EM]T<n> or &%UT>n> on page 102.

---

**Function**      **Flag as a start-up macro**

**ASCII** [ESC] [US] s <Name..> <0>

The [ESC] [US] s <Name..> <0> command flags the referenced item to be processed at startup. No more than one user character definition and user data item may be flagged.  
 The terminating <0> may be redefined.  
 See [ESC] [EM]T<n> or &%UT>n> on page 102.

---

**Function**      **Remove item from user store**

**ASCII** [ESC] [US] e <Name..> <0> The [ESC] [US] e <Name..> <0> command removes an item from user store and frees up its space. The terminating <0> may be redefined. See [ESC] [EM]T<n> or &%UT>n> on page 102.

---

**Function**      **Flush information from user store**

**ASCII** [ESC] [US] f ALL <0>

**Description** The [ESC] [US] f ALL <0> command clears all of the information to the user store and frees the data space.

The terminating <0> may be redefined. See [ESC] [EM]T<n> or &%UT>n> on page 102.

---

<b>Function</b>	<b>Report on user store</b>
<b>ASCII</b>	ESC] [US] q <0>
<b>Description</b>	The [ESC] [US] q <0> prints or returns information about the contents of and available space in user store.
<b>Note 1</b>	<p>A configuration option is available that locks the user-store data. The configuration option prevents the occurrence of new user-store data operation until the lock is manually reset and accidental deletion of the saved information. The user-defined character buffer and/or user data buffer may be redefined and used but cannot be stored.</p> <p>The terminating &lt;0&gt; may be redefined. See [ESC] [EM]T&lt;n&gt; or &amp;%UT&gt;n&gt; on page 102.</p>

### User-Store Commands

---

<b>Function</b>	<b>Begin named macro record</b>
<b>ASCII</b>	[ESC] [US] b <Name..> <0>
<b>Hexadecimal</b>	1BH 1FH 62H
<b>Decimal</b>	<27> <31> <98>
<b>IPCL</b>	&%UB <Name..> <0>
<b>EPOS</b>	none
<b>Description</b>	<p>The [ESC] [US] b &lt;Name..&gt; &lt;0&gt; command erases the current macro, initializes the macro buffer structure, and redirects the following data to the macro buffer. It uses the &lt;Name..&gt; field as a reference. If the name already exists in the flash user store, the command is ignored. The command must be followed by the "End name macro record" command with the same name. If the data that follows is larger than the macro buffer (about 16K), the macro definition is terminated without saving any data.</p> <p>The terminating &lt;0&gt; may be redefined.</p> <p>See [ESC] [EM]T&lt;n&gt; or &amp;%UT&gt;n&gt; on page 102.</p>

---

<b>Function</b>	<b>End named macro record</b>
<b>ASCII</b>	[ESC] [US] e <Name..> <0>
<b>Hexadecimal</b>	1BH 1FH 65H
<b>Decimal</b>	<27> <31> <101>
<b>IPCL</b>	&%UG <Name..> <0>
<b>EPOS</b>	none
<b>Description</b>	<p>The [ESC] [US] e &lt;Name..&gt; &lt;0&gt; command ends the macro record operation and saves the macro to flash. It uses the &lt;Name..&gt; field to verify the command end and must match the "Begin named macro record" command. If the name already exists in the flash user store or the macro memory is exceeded, the command is valid, and the &lt;Name..&gt; field prints. If there is not enough room in the flash user store for the macro, the save is not performed, but the macro buffer is valid.</p> <p>The terminating &lt;0&gt; may be redefined.</p> <p>See [ESC] [EM]T&lt;n&gt; or &amp;%UT&gt;n&gt; on page 102.</p>

---

<b>Function</b>	<b>Save macro data in user store</b>
<b>ASCII</b>	[ESC] [US] m <Name..> <0>
<b>Hexadecimal</b>	1BH 1FH 6DH
<b>Decimal</b>	<27> <31> <109>
<b>IPCL</b>	&%UM <Name..> <0>
<b>EPOS</b>	[GS] -...<Name..> <0> is from one to 15 characters and must be null terminated.
<b>Description</b>	<p>The [ESC] [US] m &lt;Name..&gt; &lt;0&gt; command saves the current macro buffer structure into the flash user-store area. It uses the &lt;Name..&gt; field as a reference name. If the name already exists in the flash user store, the command does not store the data.</p> <p>The terminating &lt;0&gt; may be redefined.</p> <p>See [ESC] [EM]T&lt;n&gt; or &amp;%UT&gt;n&gt; on page 102.</p>

---

<b>Function</b>	<b>Save user-defined characters</b>
<b>ASCII</b>	[ESC] [US] c <Name..> <0>
<b>Hexadecimal</b>	1BH 1FH 63H
<b>Decimal</b>	<27> <31> <99>
<b>IPCL</b>	&%UC <Name..><0>
<b>EPOS</b>	[GS] 6<Name..> <0> is from one to 15 characters and must be null terminated.
<b>Description</b>	<p>The [ESC] [US] c &lt;Name..&gt; &lt;0&gt; command saves the current user-defined character structure in the flash user-save storage area. It uses the&lt;Name..&gt; field as a reference. If the name already exists in the flash user store, the command will not store the data.</p> <p>The terminating &lt;0&gt; may be redefined.</p> <p>See [ESC] [EM]T&lt;n&gt; or &amp;%UT&gt;n&gt; on page 102.</p>

---

<b>Function</b>	<b>Load item from user store</b>
<b>ASCII</b>	[ESC] [US] l <Name..> <0>
<b>Hexadecimal</b>	1BH 1FH 6CH
<b>Decimal</b>	<27> <31> <108>
<b>IPCL</b>	&%UL <Name..> <0>
<b>EPOS</b>	[GS] 0<Name..> <0> is from one to 15 characters and must be null terminated.
<b>Description</b>	<p>The [ESC] [US] l &lt;Name..&gt; &lt;0&gt; command loads the referenced item into the appropriate structure. If the item referenced is a user-defined character set, it is loaded into the current user-character definition, which does not affect the active state of user-defined characters. If it is a macro, it is loaded into the macro buffer, but it is not inserted into the data stream. [ESC] g &lt;0&gt; inserts the macro buffer into the data stream. If the named item does not exist, the command does nothing.</p> <p>The terminating &lt;0&gt; may be redefined. See [ESC] [EM]T&lt;n&gt; or &amp;%UT&gt;n&gt; on page 102.</p>

---

<b>Function</b>	<b>Run macro data from user store</b>
<b>ASCII</b>	[ESC] [US] r <Name..> <0>
<b>Hexadecimal</b>	1BH 1FH 72H
<b>Decimal</b>	<27> <31> <114>
<b>IPCL</b>	&%UR <Name..> <0>
<b>EPOS</b>	[GS] 0<Name..> <0> is from one to 15 characters and must be null terminated.
<b>Description</b>	<p>The [ESC] [US] r &lt;Name..&gt; &lt;0&gt; command loads the referenced macro into the macro buffer. The macro buffer is then inserted into the data stream. If the named item does not exist or is not a macro, nothing happens.</p> <p>The terminating &lt;0&gt; may be redefined.</p> <p>See [ESC] [EM]T&lt;n&gt; or &amp;%UT&gt;n&gt; on page 102.</p>

---



<b>Function</b>	<b>Flag item as a start-up macro</b>
<b>ASCII</b>	[ESC] [US] s <Name..> <0>
<b>Hexadecimal</b>	1BH 1FH 73H
<b>Decimal</b>	<27> <31> <115>
<b>IPCL</b>	&%US <Name..> <0>
<b>EPOS</b>	[GS] 0<Name..> <0> is from one to 15 characters and must be null terminated.
<b>Description</b>	The [ESC] [US] s <Name..> <0> command flags the referenced item to be processed at startup. Only one user character definition and one macro may be flagged to run at startup.
<b>Note</b>	<p>If a character definition is loaded at startup, it is automatically made active.</p> <p>The terminating &lt;0&gt; may be redefined.</p> <p>See [ESC] [EM]T&lt;n&gt; or &amp;%UT&gt;n&gt; on page 102</p>
<b>Function</b>	<b>Delete item from user store</b>
<b>ASCII</b>	[ESC] [US] d <Name..> <0>
<b>Hexadecimal</b>	1BH 1FH 64H
<b>Decimal</b>	<27> <31> <100>
<b>IPCL</b>	&%UD <Name..> <0>
<b>EPOS</b>	[GS] 1 <Name..> <0> is from one to 15 characters and must be null terminated.
<b>Description</b>	The [ESC] [US] d <Name..> <0> command removes an item from user store and frees up space. If the item does not exist, the command does nothing. The terminating <0> may be redefined. See [ESC] [EM]T<n> or &%UT>n> on page 102.
<b>Function</b>	<b>Flush information from user store</b>
<b>ASCII</b>	[ESC] [US] f ALL <0>
<b>Hexadecimal</b>	1BH 1FH 66H 00H
<b>Decimal</b>	<27> <31> <102> <0>
<b>IPCL</b>	&%UF
<b>EPOS</b>	[GS] 5
<b>Description</b>	The [ESC] [US] f ALL <0> command clears all entries in user store and frees the data space. It must have the name, "ALL" (in uppercase) attached. The terminating <0> may be redefined. See [ESC] [EM]T<n> or &%UT>n> on page 102.
<b>Function</b>	<b>Report on user store</b>
<b>ASCII</b>	[ESC] [US] q <Name..> <0>
<b>Hexadecimal</b>	1BH 1FH 71H
<b>Decimal</b>	<27> <31> <113>
<b>IPCL</b>	&%UQ <Name..> <0>
<b>EPOS</b>	[GS] 3
<b>Description</b>	The [ESC] [US] q <Name..> <0> command prints a status report. The file name is ignored and may be omitted. The NUL must be present. The intention of the command is to aid in macro development.
<b>Note 1</b>	The report is also printed as part of the configuration report. The terminating <0> may be redefined. See [ESC] [EM]T<n> or &%UT>n> on page 102.

Function	Redefine User Store Termination Character
ASCII	[ESC] [EM] T <n>
Hexadecimal	1BH 19H 54H <n>
Decimal	<27> <25> <84> <n>
IPCL	&%UT <n>
EPOS	None
Description	This command allows the terminator used to signal the end of the name field in User Store commands to be modified. The value of <n> is used (in addition to the <0>) for the terminator. The value of n may be from 0 to 255.
Example	If &%UT% were sent to the printer the User Store command to run macro "Demo" would be &%URDemo%.

## User Macros

The user macro feature works by inserting the macro data buffer into the printer data stream when the print user-store data command is encountered.

Macros can be any data normally sent to the printer including graphics. (Note: user-store maintenance and inquire commands may not be included in the macro definitions.) The printer stores macro data in a RAM-based storage buffer as it is received and processed. The storage buffer may then be saved to a flash-based user store or inserted into the print data stream. If a macro is recalled from user store, it is expanded into the macro buffer and replaces whatever is currently there.

### Programming Considerations

The flash (nonvolatile) memory has a limited number of write cycle operations. Consequently, the number of saves should be limited. The buffer should not be saved on a transaction by transaction basis. Once a day should be the limit.

The buffer is initially about 16K<sup>17</sup> bytes long. All commands<sup>18</sup> and print data are placed in the buffer and must be included in the size limits. The printer does not indicate when the buffer is full. The application must make sure that the buffer is not overfilled. The printer simply stops saving information when it is full. As the buffer fills, the input data is printed normally. The effect of the macro start command is to clear the buffer and to start to save the input data. The macro stop command stops saving data and initializes internal pointers for the next print. To store the data in the nonvolatile flash, it must be named and saved by one of the user-store save commands.

When the macro buffer is inserted into the data stream, configuration commands (like font or pitch changes) remain in effect after the macro is processed. Illegal commands are placed in the buffer and take up space.

Horizontal color graphics should be sent to the printer compressed. If the data is not compressed, it is saved in the macro buffer. If the buffer is saved into the user-store nonvolatile flash, there must be enough room in the user store for all of the data. As user-store space is used, the macro buffer will be larger than the available space in user store. Only the used space is saved, but it is possible to define a macro that does not fit in the remaining user-store space.

<sup>17</sup> The actual buffer is smaller because of the overhead.

<sup>18</sup> IPCL commands are converted by the printer into an equivalent [ESC] code and then placed in the save buffer. The equivalent [ESC] code should be used to calculate the size of the save buffer data.

<b>Function</b>	<b>Process user macro</b>
<b>ASCII</b>	[ESC] g <0>
<b>Hexadecimal</b>	1BH 67H 00H
<b>Decimal</b>	<27> <103> <0>
<b>IPCL</b>	&%GP
<b>EPOS</b>	[ESC] g <0>
<b>Description</b>	The [ESC] g <0> command prints the user-store data buffer.
<b>Function</b>	<b>Start macro record</b>
<b>ASCII</b>	[ESC] g <1>
<b>Hexadecimal</b>	1BH 67H 01H
<b>Decimal</b>	<27> <103> <1>
<b>IPCL</b>	&%GS
<b>EPOS</b>	[ESC] g <1>
<b>Description</b>	The [ESC] g <1> command clears the user-store data buffer and begins recording data. The next 2000 bytes (including characters and commands) are recorded.
<b>Function</b>	<b>Stop macro record</b>
<b>ASCII</b>	[ESC] g <2>
<b>Hexadecimal</b>	1BH 67H 02H
<b>Decimal</b>	<27> <103> <2>
<b>IPCL</b>	&%GE
<b>EPOS</b>	[ESC] g <2>
<b>Description</b>	The [ESC] g <2> command stops recording user-store data information. The buffer is not saved into the nonvolatile memory.
<b>Function</b>	<b>Stop macro record and save</b>
<b>ASCII</b>	[ESC] g <3>
<b>Hexadecimal</b>	1BH 67H 03H
<b>Decimal</b>	<27> <103> <3>
<b>IPCL</b>	&%GW
<b>EPOS</b>	[ESC] g <3>
<b>Description</b>	The [ESC] g <3> command stops recording graphic save information. The buffer is saved into the user-store nonvolatile memory under the name, "ESCg3_Save"
<b>Note 1</b>	The [ESC] g <3> command is supplied for compatibility with the Series 80PLUS and 90PLUS Printers.

## Bar Codes

The POSjet™ 1000 Printer supports the ability to print bar codes. The printer offers a number of formats as defined below. The host does not need to form the graphic image for these bar codes. The host need only send the printer the information to be bar coded and a graphic is generated by the printer. In some cases, a check character is required by the format. In most cases, the printer generates the check character and inserts it in the format. The printer uses internal graphic modes to form bar code images, and the images are adjusted for ink bleed. In general, the bar codes generated by sending graphic data to the printer are not as readable as the graphics the printer generates. Bar codes are printed at a 208 x 192 resolution.

Function	Print bar code																											
ASCII	[ESC] b <n> {information} [ETX]																											
Hexadecimal	1BH 62H <n> ... 03H																											
Decimal	<27> <98> <n> ... <3>																											
IPCL	&%25 ... [CR] Interleaved 2 of 5 &%39 ... [CR] Code 39 &%12 ... [CR] Code 128 &%28 .<m <sub>1</sub> > <m <sub>2</sub> > Code 128 (allows a two character length, preceding the information) &%UP ... [CR] UPC A &%UE ... [CR] UPC E &%EA .. [CR] EAN-13 &%E8 ... [CR] EAN-8 &%93 .. [CR] Code 93 &%CB .. [CR] Codabar																											
EPOS	[ESC] b <n> or [GS] k <n>																											
Description	The [ESC] b <n> {information} [ETX] command prints information as a bar code. The bar code is centered on the print zone.																											
Where n =	<table><tr><td>0</td><td>Interleaved 2 of 5</td><td>Numeric (0-9) only; must be even number of digits</td></tr><tr><td>1</td><td>Code 39</td><td>26 uppercase letters (A-Z); 10 digits (0-9)</td></tr><tr><td>2</td><td>Code 128</td><td>Three sets of 106 different characters</td></tr><tr><td>3</td><td>UPC A</td><td>Numeric (0-9) only; 11 digits</td></tr><tr><td>4</td><td>EAN-13</td><td>Numeric (0-9) only; 12 digits</td></tr><tr><td>5</td><td>UPC E</td><td>Numeric (0-9) only; 11 digits</td></tr><tr><td>6</td><td>EAN-8</td><td>Numeric (0-9) only; 7 digits</td></tr><tr><td>7</td><td>Code 93</td><td>26 letters; 10 digits (0-9); and 7 special characters</td></tr><tr><td>8</td><td>Codabar</td><td>10 digits (0-9); 4 start/stop characters, A, B, C, and D; and 6 special characters.</td></tr></table>	0	Interleaved 2 of 5	Numeric (0-9) only; must be even number of digits	1	Code 39	26 uppercase letters (A-Z); 10 digits (0-9)	2	Code 128	Three sets of 106 different characters	3	UPC A	Numeric (0-9) only; 11 digits	4	EAN-13	Numeric (0-9) only; 12 digits	5	UPC E	Numeric (0-9) only; 11 digits	6	EAN-8	Numeric (0-9) only; 7 digits	7	Code 93	26 letters; 10 digits (0-9); and 7 special characters	8	Codabar	10 digits (0-9); 4 start/stop characters, A, B, C, and D; and 6 special characters.
0	Interleaved 2 of 5	Numeric (0-9) only; must be even number of digits																										
1	Code 39	26 uppercase letters (A-Z); 10 digits (0-9)																										
2	Code 128	Three sets of 106 different characters																										
3	UPC A	Numeric (0-9) only; 11 digits																										
4	EAN-13	Numeric (0-9) only; 12 digits																										
5	UPC E	Numeric (0-9) only; 11 digits																										
6	EAN-8	Numeric (0-9) only; 7 digits																										
7	Code 93	26 letters; 10 digits (0-9); and 7 special characters																										
8	Codabar	10 digits (0-9); 4 start/stop characters, A, B, C, and D; and 6 special characters.																										

### Interleaved 2 of 5

Interleaved 2 of 5 is a high-density, self-checking, continuous, numeric bar code. It is mainly used where fixed-length numeric fields are required. The data field must be an even number of characters. If an odd data field is sent to the POSjet™ 1000 Printer, it will be zero padded. Due to space limitations, only 16 characters can be printed.

### Code 39

Code 39 is an alphanumeric bar code. It is a discrete, self-checking, variable-length code. The printer prints the complete data field. Due to space limitations, only eight characters can be printed. If illegal characters pass to the printer, they are converted to legal codes. (For example, a → A.)

**Code 128**

Code 128 is an alphanumeric bar code. It is a high-density, variable-length, continuous code that employs multiple element widths. Code 128 has three possible start codes. The start code defines the code set, Code A, B, or C that will be used to generate the barcode. The POSjet™ 1000 allows the Code Set to be specified or it can be select by the printer based on the information in the data field.

To specify code set:        [ESC] b <2> <Code>{information} [ETX]

If the first character in the data field <Code> can specify the Code set as follows:

Code Set A	<135>
Code Set B	<136>
Code Set C	<137>

The printer will print the complete data field from the selected set.. Due to space limitations, only ten characters can be printed. The check digit is generated and printed by the printer.

To have the printer selected code set:        [ESC] b <2> <Length>{information}

If the first character <Length> is from 1 to 31, the printer will automatically select Code A, B, or C depending on the data present. If the data is all numeric, the data can be printed as pairs. This effectively doubles the amount of data that can be printed. The check digit is generated and printed by the printer.

Note: If the first character is greater than <31> and not <135> through <137>, the printer will discard the first character and print the data from Code A.

Code 128 Note: The 'A' space is defined as a <0>, which makes programming difficult and causes control character conflicts for the printer. To solve the problem, the POSjet™ 1000 Printer subtracts 32 from all characters that are to be included in the bar code. In the Code 128 definition, an 'A' is <33>; however, the printer converts an ASCII 'A' (<65>) to a <33> internally. This sets Code 128C and the start codes off by 32.

**UPC A**

UPC A is a fixed-length, numeric, continuous code that employs four element widths. The printer supports Universal Product Code Version A, E, EAN-8, and EAN-13. Version A encodes 11 digits. Typically, the UPC A format starts with a number system digit, five-digit manufacturer's code, five-digit product code, and a check digit. The printer makes no assumptions about any of the codes except the check digit. The printer prints an UPC bar code with the 11 digits sent to it and generates the check digit. If fewer than 11 digits are sent, the remaining digits will be zeros. The printer prints an UPC that is about 130% the size of the UPC nominal standard, which provides optimal readability.

**UPC E**

UPC E is a zero suppression version of UPC. The printer requires that the first digit is zero for number system zero. If it is not zero, the bar code is not printed. The printer does the compression based on the compression rules for UPC E, prints an UPC bar code based on the 11 digits sent to it, and generates the check digit. If fewer than 11 digits are sent, the remaining digits will be zeros. The printer prints an UPC that is about 130% the size of the UPC nominal standard, which provides optimal readability.

**EAN-13**

EAN-13 is a fixed-length, numeric, continuous code that employs four element widths. The printer supports EAN-13, which is a superset of UPC that encodes 12 digits. Typically, the format starts with a number set digit, which defines how the next six digits are encoded. The next five digits have fixed encoding. The last is a check digit. The printer prints an EAN-13 bar code with the 12 digits sent to it and generates the check digit. If fewer than 12 digits are sent, the remaining digits will be zeros. The printer prints an EAN-13 bar code that is about 130% the size of the nominal standard, which provides optimal readability.

**EAN-8**

EAN-8 is a fixed-length, numeric, continuous code that employs four element widths. The printer supports EAN-8, which is a superset of UPC that encodes seven digits. The printer prints an EAN-8 bar code with the seven digits sent to it and generates the check digit. If fewer than seven digits are sent, the remaining digits will be zeros. The printer prints an EAN-8 bar code that is about 130% the size of the nominal standard, which provides optimal readability.

**Code 93**

Code 93 is a variable-length, alphanumeric bar code. The complete data field is printed by the printer. Due to space limitations, only 10 characters can be printed.

**Codabar**

Codabar is a variable-length format, primarily used for numeric symbols. It offers 16 data characters, including the numeric digits zero through nine, and -, \$, :, /, ., and +. Four unique start/stop characters, designated A, B, C, and D, are also available. Due to space limitations, only 12 characters can be printed.

**Note 1**            A [CR] may also be used in place of the [ETX] to end the bar code data field.

**Note 2**            Only information that is usable in a particular bar code will be printed.

<b>Function</b>	<b>Set bar code height</b>
<b>ASCII</b>	[ESC] [EM] B <n>
<b>Hexadecimal</b>	1BH 19H 42H <n> of digits
<b>Decimal</b>	<27> <25> <66> <n>
<b>IPCL</b>	&%BH <m <sub>1</sub> > <m <sub>2</sub> >
<b>EPOS</b>	[GS] h <n>
<b>Description</b>	<p>The [ESC] [EM] B &lt;n&gt; command sets the bar code height and speed where &lt;n&gt; is the number of print passes and &lt;m&gt; is the speed.</p> <p>Each pass is about 0.11 inch high. When n = &lt;0&gt;, the printer returns to the default value of four passes. For UPC, the default value is seven. Any value from zero to nine may be specified.</p>

<b>Function</b>	<b>Set bar code justification, human readable interpretation (HRI) character print mode, and print direction</b>
<b>ASCII</b>	[ESC] [EM] J <n>
<b>Hexadecimal</b>	1BH 19H 4AH <n>
<b>Decimal</b>	<27> <25> <74> <n>
<b>IPCL</b>	&%BJ <m <sub>1</sub> > <m <sub>2</sub> >
<b>EPOS</b>	none
<b>Description</b>	<p>The power on default is center justified with HRI characters not printed.</p> <p>The [ESC] [EM] J &lt;n&gt; command selects the operation of the bar code justification, HRI characters, and print direction.</p>

Where n bits	n	IPCL	76543210	
			-----xx	Justified
	0	00	-----00	Left
	1	01	-----01	Center
	2	02	-----10	Right
			--xx----	HRI characters
	0	00	--00----	Not printed
	16	16	--01----	Printed above the bar code
	32	32	--10----	Printed below the bar code
	48	48	--11----	Printed above and below the bar code
			-x-----	Vertical print mode
	0	00	-0-----	Bar code printed in horizontal direction (default)
	64	64	-100----	Bar code printed in vertical direction

**Note 1** The [ESC] [EM] J <n> command only affects bar code printing.

**Note 2** HRI is not available in vertical print mode.

## Miscellaneous Control

---

### Function      Disable paper out sensor

**ASCII**      [ESC] 8

**Hexadecimal**      1BH 38H

**Decimal**      <27> <56>

**IPCL**      &%PF

**EPOS**      none

**Description**      The [ESC] 8 command temporally disables the paper out sensor. The printer does not stop printing or go off-line when it senses it is out of paper. The inquire commands still return paper out status.

---

### Function      Enable paper out sensor

**ASCII**      [ESC] 9

**Hexadecimal**      1BH 39H

**Decimal**      <27> <57>

**IPCL**      &%PO

**EPOS**      none

**Description**      The [ESC] 9 command enables paper sensing and is intended to reverse the effect of the disable paper out sensor command. If the printer is out of paper when the command is issued, it goes off-line.

---

### Function      Set left/right print margins

**ASCII**      [ESC] X <n<sub>1</sub>> <n<sub>2</sub>>

**Hexadecimal**      1BH 58H <n<sub>1</sub>> <n<sub>2</sub>>

**Decimal**      <27> <88> <n<sub>1</sub>> <n<sub>2</sub>>

**IPCL**      none

**EPOS**      [ESC] I, [ESC] Q

**Description**      The [ESC] X <n<sub>1</sub>> <n<sub>2</sub>> command sets left and right print margins in characters from the home position. Where n<sub>1</sub> = left margin and n<sub>2</sub> = right margin, the absolute position depends on the current print pitch. If the left and right margins are set to the right of the current horizontal position, the new margins become valid in the same line. If the left margin is set to the left of the current horizontal position and the right margin set to the right of the current horizontal position, the right margin setting becomes valid in the same line, but the left margin setting becomes valid in the next line. When the left and right margins are set to the left of the current horizontal position, both left and right margin settings appear to become valid in the next line because an auto-CR is performed by the subsequent data.

---

### Function      Clear print buffer

**ASCII**      [CAN]

**Hexadecimal**      18H

**Decimal**      <24>

**IPCL**      &%RP

**EPOS**      [CAN]

**Description**      The [CAN] command clears the print buffer and any unprinted information in the printer received before it. If the input buffer is not being processed because the printer is out of paper or a form is not inserted, the [CAN] command will not be processed until after the error is cleared. The [CAN] command does not restore default conditions. It only clears the print buffer.



---

<b>Function</b>	<b>Query marker</b>
<b>ASCII</b>	[ESC] q <n>
<b>Hexadecimal</b>	1BH 71H <n>
<b>Decimal</b>	<27> <113> <n>
<b>IPCL</b>	none
<b>EPOS</b>	none
<b>Description</b>	The [ESC] q <n> command returns a status to the host when it is processed.
<b>Response</b>	[SOH] <n>  The [ESC] q <n> command may be placed in the print data and, when processed by the printer, will return a progress status marker. The value of <n> can be any 8-bit value. It is returned to the host unaltered. The intent is for it to be a sequence number. The command can be used to track the print progress of the printer or verify that data has been printed.
<b>Note 1</b>	The [ESC] q <n> command is a line terminator that causes the printer to print all previous data. If a normal line terminator like a [CR] is not supplied, right justify and auto-center do not function correctly. All data is left justified. [ESC] q does not perform a [CR] or [LF] function.

---

<b>Function</b>	<b>Open cash drawer</b>
<b>ASCII</b>	[ESC] x <n>
<b>Hexadecimal</b>	1BH 78H <n>
<b>Decimal</b>	<27> <120> <n>
<b>IPCL</b>	&%D1 (Cash Drawer 1) &%D2 (Cash Drawer 2)
<b>EPOS</b>	[ESC] p
<b>Description</b>	The [ESC] x <n> command charges the cash drawer, <n>, for 150 ms.
<b>Where &lt;n&gt; =</b>	<1> (01H) or 1 (31H) for Cash Drawer 1 <2> (02H) or 2 (32H) for Cash Drawer 2  The time period that drawer is activated can be changed in the configuration menu. Activation time ranges from 25 ms to 250 ms.
<b>Note 1</b>	Cash drawer open commands are processed as part of print data. They are not immediate commands and are not processed until found in the input buffer by the print processor.
<b>Note 2</b>	Cash Drawer 2 is factory configurable in one of two modes. Either pin 2 or 3 is active depending on an internal jumper setting. The factory default is pin 3. Cash Drawer 1 is always on pin 2. The cash drawer status is defined as an open circuit for drawer closed.

---

<b>Function</b>	<b>Perform Auto Cut</b>
<b>ASCII</b>	[ESC] v
<b>Hexadecimal</b>	1BH 76H <n>
<b>Decimal</b>	<27><118>
<b>IPCL</b>	&%FC &%PC
<b>EPOS</b>	[ESC] I or [ESC] m
<b>Description</b>	The [ESC] v command operated the auto cutter.
<b>Note 1</b>	The auto cutter is optional. If the auto cutter is not installed this command will be ignored.

<b>Function</b>	<b>Initialize the printer</b>
<b>ASCII</b>	[ESC] @
<b>Hexadecimal</b>	1BH 40H
<b>Decimal</b>	<27> <64>
<b>Description</b>	The [ESC] @ command initializes the printer. All settings, including character font and line spacing, are canceled.
<b>Function</b>	<b>Audio alert</b>
<b>ASCII</b>	[BEL]
<b>Hexadecimal</b>	07H
<b>Decimal</b>	<7>
<b>IPCL</b>	&%BL
<b>EPOS</b>	[BEL]
<b>Function</b>	When enabled, the [BEL] command starts the audio alert sequence.
<b>Description</b>	The default is a single sound, lasting the period of time defined by the audio alert setting. If the audio alert is off, it does not function.
<b>Function</b>	<b>Configure audio alert</b>
<b>ASCII</b>	[ESC] [BEL] <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> >
<b>Hexadecimal</b>	1BH 07H <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> >
<b>Decimal</b>	<27> <7> <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> >
<b>IPCL</b>	None
<b>EPOS</b>	None
<b>Description</b>	The [ESC] [BEL] <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > command alters the way the audio alert sounds.  The default is a single sound lasting the period of time defined by the audio alert setting. The [ESC] [BEL] <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > command allows the sound to be altered.
<b>Where</b>	<n <sub>1</sub> > is the number of alert cycles <n <sub>2</sub> > is the on time of the alert cycle in ten Ms intervals <n <sub>3</sub> > is the off time of the alert cycle in ten Ms intervals
<b>Function</b>	<b>Enable/disable paper feed</b>
<b>ASCII</b>	[ESC] p 5 <n>
<b>Hexadecimal</b>	1BH 70H 35H <n>
<b>Decimal</b>	<27> <112> <53> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] c 5 <n> command enables or disables the FEED button. When the least significant bit (LSB) of <n> = one, the FEED button is disabled; when it is zero, the button is enabled. To prevent problems caused by accidentally pressing the FEED button, use the command to disable it. The FEED button is temporarily enabled, regardless of how the command is set during the wait time set by the [GS] z 0 command for paper insertion and during the recovery confirmation time.
<b>Where &lt;n&gt;</b>	Bit 0 = 1 the FEED button is disabled  Bit 0 = 0 the button is enabled.

<b>Function</b>	<b>Select paper sensor(s) to stop printing</b>
<b>ASCII</b>	[ESC] p 4 <n>
<b>Hexadecimal</b>	1BH 70H 34H <n>
<b>Decimal</b>	<27> <112> <52> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] p 4 <n> command selects the sensors that tell the printer to stop printing. The default setting occurs when only the Paper out sensor stops printing. When the paper roll near-end sensor is enabled and the sensor detects a near-end condition during printing, the printer completes the current line and then automatically goes off-line. Replacing a new paper roll restarts the printing. When the paper roll near-end sensor is disabled and a paper near-end condition is detected during printing, the paper out LED comes on, but the printer continues to print.

**NOTE:** The POSjet™ does not allow the paper out sensor to be disabled. It is always on.  
 <n> is defined as follows:

Bit	On/Off	Hexadecimal	Decimal	Function
0,1	Off	00H	<0>	Paper roll near-end sensor disabled
	On	01H,02H,03H	<1>,<2>,<3>	Paper roll near-end sensor enabled
7	-	00H	<0>	Undefined

Table 24 Paper Sensor Commands

Function Select paper sensor(s) to output paper-end signals

<b>ASCII</b>	[ESC] p 3 <n>
<b>Hexadecimal</b>	1BH 70H 33H <n>
<b>Decimal</b>	<27> <112> <51> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] p 3 <n> command selects the paper sensor that outputs a paper-end signal to the parallel interface when a paper-end is detected. The default setting is when all sensors are enabled. (<n> = 15). It is possible to select multiple sensors to output signals. If any of the sensors detect a paper end, the paper end signal is output. The command is only available with a parallel interface. The paper-end sensor is an option. If the sensor is not equipped, the settings of bits 0 and 1 of the command are not effective.

Bit	On/Off	Hexadecimal	Decimal	Function
0	Off	00H	<0>	Paper roll near-end sensor disabled
	On	01H	<1>	Paper roll near-end sensor enabled
1	Off	00H	<0>	Paper roll near-end sensor disabled
	On	02H	<2>	Paper roll near-end sensor enabled
2	Off	00H	<0>	Paper roll end sensor disabled
	On	04H	<4>	Paper roll end sensor enabled
3	Off	00H	<0>	Paper roll end sensor disabled
	On	08H	<8>	Paper roll end sensor enabled
4-7	-	-	-	Undefined

Table 25 Paper Sensor Commands

Function	Enable print suppress and data pass through	
ASCII	[ESC] < <n>	
Hexadecimal	1BH 3CH <n>	
Decimal	<27> <60> <n>	
IPCL	&%PT <n>	
EPOS	[ESC] = <n>	
Description	The [ESC] < <n> command provides print suppress and data pass through features.	
Where	Bit 0	Printer select
	Bit 1	Pass through On
	Bits 2 - 7	Undefined
	If Bit 0 is clear, the printer stops processing data. If Bit 1 is set, the data is passed through the printer and sent out on the serial port.	
Note 1	The pass through command is processed as part of print data. It is not processed until it is found in the input buffer by the print processor. It is not an immediate command. The printer must be on-line and ready to activate the command.	
Note 2	If the printer is configured for parallel operation, the data is still pass through on the serial port. In most cases, the serial port, however, is not connected.	
Note 3	The operation of the command can be altered by the print suppress configuration and requires that the pass through and print suppress functions be enabled in the configuration menu.	
Note 4	When Series 50 Printer compatibility is being used, these commands do not function. Series 50 Printer pass through must be used.	
Note 5	Multi-drop is operational during suppress and pass through. If a multi-drop address is present in the pass through data, it is processed.	

Function	Set control feature commands
ASCII	[ESC] y <n>
Hexadecimal	1BH 79H <n>
Decimal	<27> <121> <n>
IPCL	&% Y0-9 or &% YX <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> > (for numbers greater than nine)
EPOS	[ESC] y <n>
Where n	0 Reinitializes the printer and forces Citizen mode 1 Reinitializes the printer and forces Star mode 2 Reinitializes the printer and forces POSjet™ 1000 mode 3 Reinitializes the printer and forces extended EPOS mode 4 Disables IPCL commands 5 Enables IPCL commands 6 Disables inquire processing (All command preprocessing is disabled.) 7 Enables inquire processing 8 Enables extended diagnostics 9 Print Current Configuration 10 Not used 11 Overlays the current character chart with Group 2 OCR MA Characters 12 Replaces the OCR characters with normal characters 13 Not used 14 Forces head maintenance 15 Print Current totals 16 Enable Test Font 17 Requests the printer to enter remote OFF. 18 Requests the printer to exit remote OFF. 20 Print alignment settings
Description	<p>The [ESC] y &lt;n&gt; command enables and disables command set features.</p> <p>It is possible that the IPCL commands will interfere with print data. If this occurs, the IPCL can be disabled with an [ESC] y &lt;4&gt; command.</p>
Note 1	Once IPCL commands are disabled, the Enable IPLC command will not be a valid IPCL code.
Note 2	[ESC] y <0>, <1>, <2>, and <3> allow the printer to switch between emulation modes. When the switch takes place, the current print buffer is printed, and the printer reinitializes. These commands do not permanently change the configuration. A power on reset restores the mode that was configured in menu mode. A reset by command or from the INIT pin does not restore the mode.
Note 3	[ESC] y <6> and <7> enable and disable the inquire process. These commands are not processed as they are received, but are buffered then processed. The buffering process allows inquire commands sent after a disable to be answered. In addition, inquires sent after an enable may not be answered. (See additional notes 3 and 4 on the next page).
Note 4	The printer has a resident OCR-MA font. It is defined and mapped per ANSI X3.111-1986. Once mapped into a code page, it can be removed by issuing an [ESC] y <12> command or a code-page select command.
Note 5	In EPOS mode, the [ESC] y command is active.

---

<b>Function</b>	<b>Extended Configuration and Control</b>
<b>ASCII</b>	[ESC] ~ <n>
<b>Hexadecimal</b>	1BH 7EH <n>
<b>Decimal</b>	<27> <126> <n>
<b>IPCL</b>	none
<b>EPOS</b>	[ESC] ~ <n>
<b>Description</b>	The [ESC] ~ <n> commands are extended diagnostics commands. They must all be preceded with an enabling command. These commands (in general) are not intended to be used by the end user.

## Remote Power Control

The POSjet™ 1000 Printer has a remote power control command that instructs it to enter OFF. When the command is issued, the printer performs print cartridge maintenance and enters OFF. Unlike pushing the  $\Phi$  button, remote power mode leaves the communications active. All commands except the exit power down command are ignored.

---

<b>Function</b>	<b>Remote Power Control</b>
<b>ASCII</b>	[ESC] y <n>
<b>Hexadecimal</b>	1BH 79H <n>
<b>Decimal</b>	<27> <121> <n>
<b>IPCL</b>	&% YX17 or &% YX18
<b>EPOS</b>	[ESC] y <n>
<b>Where n</b>	17 Requests the printer to enter remote OFF. 18 Requests the printer to exit remote OFF
<b>Description</b>	Inquiry (ENQ) commands are accepted and answered in remote power down mode. The printer reactivates if the $\Phi$ button is pressed or a power up command is received.
<b>Note 1:</b>	If power is lost after the power down command is issued, the printer remembers it is in power down mode but does not reactivate the communications link. The $\Phi$ button must be pushed to return the printer to full operation.
<b>Note 2:</b>	This command is not available in STAR mode.

## Documented Extended Control commands

The POSjet™ 1000 has a number of Extended control commands designed to make operation and maintenance of the printer easier for the host application refer to the POSjet™ Extended Control discussion on page 190.

---

<b>Function</b>	<b>Enable dynamic response</b>		
<b>ASCII</b>	[ESC] w <n>		
<b>Hexadecimal</b>	1BH 77H <n>		
<b>Decimal</b>	<27> <119> <n>		
<b>IPCL</b>	none		
<b>EPOS</b>	[GS] a <n>		
<b>Where n</b>	Defines the features that cause dynamic responses		
<b>Where Bit</b>	0	Cash Drawer 0	ACK/NAK <1>
	1	Cash Drawer 1	ACK/NAK <2>
	2	Paper low status	ACK/NAK <3>
	3	Paper out status	ACK/NAK <4>
	4	0	
	5	0	
	6	Mechanical Error Status	ACK/NAK <14>
	7	Cover status	ACK/NAK <8>
<b>Description</b>	Dynamic status can be used to allow the host to sense status changes without sending repeated inquire commands. The operation of the dynamic response varies depending on the configuration of the printer. If the printer is configured for serial or USB operation the status is automatically returned to the host. If the printer is configured for parallel, IEEE 1284 operation, the HOST must initiate a reverse channel request to return the status.		
<b>Note:</b>	For Mechanical Error Status to function, the "Buffer Full Only" off line option should be selected.		

---

<b>Function</b>	<b>Begin multi-drop control</b>		
<b>ASCII</b>	[SOH] <n>		
<b>Hexadecimal</b>	01H <n>		
<b>Decimal</b>	<1> <n>		
<b>IPCL</b>	none		
<b>Where &lt;n&gt;</b>	is the printer address. Addresses of A, B, or C are configurable.		
<b>Description</b>	The printer must be addressed in multi-drop mode. [SOH] <n> is the addressing command. If the printer is configured with an address of 'A,' it operates when addressed. When any other address is sent to the printer, it enters print suppress mode. An address of 'Z' is a universal address that activates the printer.		

## Printer Status

### Status Inquire

The POSjet™ 1000 Printer is designed for use as part of an automated system where the host computer makes every attempt to correct problems with the printer. In addition, the host application requires that it be able to obtain more information from the printer than is typical of normal computer printers. For example, a normal computer printer does not have cash drawers, such additional features require that the standard printer protocol be extended to deal with the added features of a point-of-sale (POS) printer.

All inquire commands are processed as they are received (preprocessed or real time) and require a response from the printer. Consequently, parallel, IEEE 1284 bidirectional communications, USB or bidirectional serial operation is required.

The POSjet™ 1000 Printer looks at and evaluates all commands as they are received and does not respond to Inquire commands that happen to be embedded in graphics or other commands. (Refer to the buffer and preprocessor descriptions in later sections.

In all cases, inquire commands are responded to by an acknowledged (ACK) or a not acknowledged (NAK) and then the command ID, which allows the host application to make multiple requests and receive identifiable responses. If the printer is configured for serial or USB operation the status is automatically returned to the host. If the printer is configured for parallel, IEEE 1284 operation, the HOST must initiate a reverse channel request to return the status.

### Serial and USB Mode Inquire

All inquire (ENQ) commands require a response from the printer. During serial operation, all inquire commands are responded to by an acknowledged (ACK) or not acknowledged (NAK), the command ID, and in some cases status. Most status responses sequences contain a length field to help decode and separate responses.

In general the printer should be configured for "Buffer Full Only" Off Line operation if Inquire commands are used. This prevents the printer from using flow control for anything but buffer full. The programmer must take on the responsibility for assuring that Inquire commands are used to maintain status of the printer.

The printer always accepts serial data even when it is off-line. The printer has reserve buffer space that allows additional information to be received even if the printer is signaling buffer full or off-line. Because inquire commands are processed before they go into the buffer, the printer responds even when it is busy printing.

In serial mode, it is desirable that the response to an inquiry be received by the host before another inquire command is issued to the printer. When the printer receives an inquiry, it generates a response. If inquiries are sent to the printer too quickly, the printer spends all of its time responding and does not have time to print.



**IEEE 1284 Mode Inquire**

In parallel, IEEE 1284 mode, status information can be returned to the host through the IEEE 1284 reverse channel. After the host makes an inquire request, it activates IEEE 1284 mode 0 reverse channel and waits for a response from the printer. The response to the inquire is identical to serial mode in format.

The printer always accepts IEEE 1284 reverse-channel requests but does not accept inquire commands when off-line. It is possible to obtain status when off-line by placing the printer in dynamic response mode before the printer goes off-line. The IEEE 1284 reverse channel responds to status changes even when the printer is off-line.

In general the printer should be configured for “Buffer Full Only” Off Line operation if Inquire commands are used. This prevents the printer from using flow control for anything but buffer full. The programmer must take on the responsibility for assuring that Inquire commands are used to maintain status of the printer.

**Dynamic Response Mode**

Dynamic status, [ESC] w <n>, can be used to allow the host to sense status changes without sending repeated inquire commands. The dynamic response operation varies depending on the configuration of the printer. If the printer is configured for serial, USB, or IEEE 1284 operation, more than one status can be sensed because the printer responds to status changes as if an inquire were issued. The response to dynamic status is the same as an inquire command. That is, if cash drawer status is to be sensed, the ACK/NAK is the same as for inquire commands.

**Inquire Commands**

<b>Function</b>	<b>Inquire printer status</b>	
<b>ASCII</b>	[ENQ] <n>	
<b>Hexadecimal</b>	05H <n>	
<b>Decimal</b>	<5> <n>	
<b>IPCL</b>	none	
<b>EPOS</b>	[GS] r or [DLE] [ENQ] or [DLE] [EOT]	
<b>Description</b>	The [ENQ] <n> command inquires about the printer's status and returns a result.	
<b>Note 1</b>	When the printer is off-line, inquires may not be accepted	
<b>Function</b>	<b>Inquire Cash Drawer 1 status</b>	
<b>ASCII</b>	[ENQ] <1>	
<b>Hexadecimal</b>	05H 01H	
<b>Decimal</b>	<5> <1>	
<b>Function</b>	Cash Drawer 1 Status	
<b>Response</b>	ACK <1> (06H 01H)	Cash Drawer 1 is closed.
	NAK <1> (15H 01H)	Cash Drawer 1 is open.
	Cash drawer status is defined as open circuit being drawer closed.	
<b>Function</b>	<b>Inquire receipt paper low status</b>	
<b>ASCII</b>	[ENQ] <3>	
<b>Hexadecimal</b>	05H 03H	
<b>Decimal</b>	<5> <3>	
<b>Function</b>	Receipt paper low	
<b>Response</b>	ACK <3> (06H 03H)	Receipt paper is present.
	NAK <3> (15H 03H)	Receipt paper is low.
<b>Function</b>	<b>Inquire receipt paper out status</b>	
<b>ASCII</b>	[ENQ] <4>	
<b>Hexadecimal</b>	05H 04H	

<b>Decimal</b>	<5> <4>	
<b>Function</b>	Receipt paper exhausted	
<b>Response</b>	ACK <4> (06H 04H)	Receipt paper is present
	NAK <4> (15H 04H)	Receipt paper is exhausted

---

**Function      Inquire cover open status**

<b>ASCII</b>	[ENQ] <8>	
<b>Hexadecimal</b>	05H 08H	
<b>Decimal</b>	<5> <8>	
<b>Function</b>	Cover open/closed status	
<b>Response</b>	ACK <8> (06H 08H)	The cover is closed
	NAK <8> (15H 08H)	The cover is open

---

**Function      Is the buffer empty? Clear the IEEE 1284 buffer.**

<b>ASCII</b>	[ENQ] <9>buffer, Clearing	
<b>Hexadecimal</b>	05H 09H	
<b>Decimal</b>	<5> <9>	
<b>Function</b>	The [ENQ] <9> command allows the host to know when the print buffer is empty. If IEEE 1284 is active, the command also clears the response buffer.	
<b>Response</b>	ACK <9> (06H 09H)	The buffer is empty.
	NAK <9> (15H 09H)	The buffer is not empty.

<b>Function</b>	<b>Request printer reset</b>
<b>ASCII</b>	[ENQ] <10>
<b>Hexadecimal</b>	05H 0AH
<b>Decimal</b>	<5> <10>
<b>Function</b>	Reset printer
<b>Response</b>	Serial                      Parallel ACK <10> (06H 0AH)      No response The command was accepted. NAK <10> (15H 0AH) The command was rejected.
<b>Description</b>	<p>The ENQ &lt;10&gt;, EPOS DLE ENQ &lt;n&gt; commands and the INIT pin all have the same effect and are referred to as reset commands. To prevent data loss, the printer tries to finish printing the buffered data. When operator intervention with the printer is required for any reason, data loss results. The reset operation is saved until the printer goes idle. In the case of a slip request command or any command that waits for the operator, the printer is idle. If the printer is idle and a reset command is received or pending, the printer resets, and the buffer clears. If the host resets an operator intervention operation, any remaining buffered data is cleared.</p> <p>When the printer receives a reset command, the printer goes off-line and/or busy until the reset completes. In serial mode, the printer may have information in its high-speed buffer that was received after the reset command but before the reset was processed. If the host application continues to send information to the printer after a reset command, some of that information may be processed before the reset is processed. In parallel mode, the printer goes busy after the reset is received but before the next byte is accepted. The printer accepts an [ENQ] &lt;10&gt; in parallel mode. It, however, is not acknowledged. If both the serial and parallel ports are active, the serial reset is not acknowledged either because the reset operation removes the parallel response. In IEEE 1284 mode, the response buffer is cleared by a reset command, which prevents responses in IEEE 1284 mode as well.</p>
<b>Note 1</b>	If reset inhibit is set in the configuration menu, the command is ignored.
<b>Function</b>	<b>Inquire power cycle status</b>
<b>ASCII</b>	[ENQ] <11>
<b>Hexadecimal</b>	05H 0BH
<b>Decimal</b>	<5> <11>
<b>Function</b>	Has the printer been power cycled since the last request?
<b>Response</b>	ACK <11> (06H 0BH) Printer has been power cycled since the last [ENQ] <11>  NAK <5> (15H 0BH) Printer has not power cycled since the last [ENQ] <11>
<b>Description</b>	The first time after a reset, the command returns [ACK] <11>, after that the command returns [NAK] <11>. The command allows the application to determine if the printer has been power cycled and needs to be reinitialized. The [ENQ] <10> command and the INIT signal on the parallel port both cause the printer to return power up status.

---

<b>Function</b>	<b>Inquire Mechanical error status</b>	
<b>ASCII</b>	[ENQ] <14>	
<b>Hexadecimal</b>	05H 0EH	
<b>Decimal</b>	<5> <14>	
<b>Function</b>	Error status	
<b>Response</b>	ACK <14> (06H 0EH)	No Mechanical Errors
	NAK <14> (15H 0EH)	Mechanical Error Has Occurred (Use [ENQ]<22> to identify the error)
<b>NOTE:</b>	For this status request to function, the "Buffer Full Only" off line option should be selected.	

---

<b>Function</b>	<b>Inquire printer state</b>	
<b>ASCII</b>	[ENQ] <15>	
<b>Hexadecimal</b>	05H 11H	
<b>Decimal</b>	<5> <15>	
<b>Function</b>	The [ENQ] <15> command returns the current printer state	
<b>Note</b>	[ENQ] <17> also returns the current printer state, but it should not be used as it conflicts with XON/XOFF flow control.	
<b>Response</b>	[ACK] <15> <n> <r <sub>1</sub> > <r <sub>2</sub> >...	
<b>Where</b>	<15> is the echo of the command ID.	
<b>&lt;n&gt;</b>	is the number of return bytes + 40 (28H) (to prevent confusion with XON/XOFF).	
<b>&lt;r<sub>1</sub>&gt;:</b>	bit 0 = 1 always bit 1 = Cover is closed. bit 2 = Receipt paper is out. bit 3 = 0 bit 4 = Printer is waiting in an error mode. Use [ENQ]<22> to identify the specific error and [ENQ]<10> to recover	
<b>&lt;r<sub>2</sub>&gt;:</b>	bit 5 = 0 bit 6 = 1 always bit 7 = 0 always bit 0 - 5 = 0 always bit 6 = 1 always bit 7 = 0 always	
<b>Note:</b>	For this status request to function, the "Buffer Full Only" off line option should be selected.	

---

<b>Function</b>	<b>Inquire all printer status</b>
<b>ASCII</b>	[ENQ] <20>
<b>Hexadecimal</b>	05H 14H
<b>Decimal</b>	<5> <20>
<b>Function</b>	The [ENQ] <20> command returns all status flags
<b>Response</b>	[ACK] <20> <n> <r <sub>1</sub> > <r <sub>2</sub> >...
<b>Where</b>	<20> is the echo of command ID.
<n>	is the number of return bytes + 40 (28H) (to prevent confusion with XON/XOFF).
<r <sub>1</sub> >:	bit 0 = Cash Drawer 1 is open. bit 1 = Cash Drawer 2 is open bit 2 = Receipt paper is out. bit 3 = 0 bit 4 = Receipt paper error occurred. (low or out) bit 5 = 0 bit 6 = 1 always bit 7 = 0 always
<r <sub>2</sub> >:	bit 0 = 1 always bit 1 = Cover is closed. bit 2 = Buffer is empty. bit 3 = Printer has been power cycled, Reading this does not affect the state of the power-cycled flag. (Use [ENQ] <11> to reset the power cycled bit.) bit 4 = Printer is waiting in an error mode. Use [ENQ]<22> to identify the specific error and [ENQ]<10> to recover bit 5 = 0 bit 6 = 1 always bit 7 = 0 always
<r <sub>3</sub> >:	bit 0 = 1 always (Receipt Station) bit 1 = 0 bit 2 = 0 bit 3 = 0 bit 4 = Undefined bit 5 = Printer is blocking print (Cover is open or out of paper.) bit 6 = 1 always bit 7 = 0 always
<r <sub>4</sub> >:	bit 0 = Printer supports receipts. bit 1 = Printer supports inserted forms. bit 2 = Printer supports multiple colors bit 3 = Printer supports cutter. bit 4 = Printer supports partial cuts. bit 5 = 0 bit 6 = 1 always bit 7 = 0 always
<r <sub>5</sub> >:	Percentage of ink remaining on Head 1 (0-100) + 40 (28H)
<r <sub>6</sub> >:	Percentage of ink remaining on Head 2 (0-100) + 40 (28H)
<r <sub>7</sub> >:	Current multi-head alignment (0-16, 8 = 0 offset)

---

<b>Function</b>	<b>Inquire printer ID</b>
<b>ASCII</b>	[ENQ] <21>
<b>Hexadecimal</b>	05H 15H
<b>Decimal</b>	<5> <21>
<b>Function</b>	The [ENQ] <21> command returns the printer IEEE 1284 ID string.
<b>Response</b>	[ACK] <21> <n> {ID string}
<b>Where &lt;21&gt;</b>	is the echo of the command ID and <n> is the number of return bytes in the ID string {ID string} is the IEEE ID return string, which follows:  MFG:Ithaca-Periph.; CMD:PJ1000CL,IPCL; CLS:PRINTER; MDL:1000 PcOS; DES:Ithaca-Peripherals POSjet™ 1000; REV:PE1200-01.16 OPTS:\$20xy  Where x is a bit field defined as follows: bit 0 = 1 Red pen support bit 1 = 1 Green pen support bit 2 = 1 Blue pen support bit 3 = Always 0 bit 4 = Always 1 bit 5 = Always 1 bit 6 = Always 0 bit 7 = Always 0  The y is a bit field defined as follows: bit 0 = 0 bit 1 = Knife is installed. bit 2 = 0 bit 3 = Always 0 bit 4 = Always 1 bit 5 = Always 1 bit 6 = Always 0 bit 7 = Always 0

<b>Function</b>	<b>Inquire Error status</b>
<b>ASCII</b>	[ENQ] <22>
<b>Hexadecimal</b>	05H 17H
<b>Decimal</b>	<5> <22>
<b>Function</b>	The [ENQ] <22> command reports on the error status.
<b>Response</b>	[ACK] <22> <n> <r>
<b>Where</b>	<22> is the echo of the command ID.
<n>	is the number of return bytes + 40 (28H) (to prevent confusion with XON/XOFF).
<r <sub>1</sub> >:	bit 0 = Cover is open. bit 1 = Receipt Paper is Low bit 2 = Receipt paper is out. bit 3 = Ink is Low (This is set if either cartridge is low) bit 4 = Either or Both Cartridges are removed. bit 5 = The Auto-Cutter has faulted. bit 6 = 1 always bit 7 = An serious error has occurred.
<b>Note 1:</b>	If bit 7 is set, a serious error has occurred. The printer is not able to recover from type of an error without operator intervention. If bit 7 is set without bit 5 (Auto-cutter fault) the print carriage has faulted. This is probably caused by a paper jam or a component failure. The host system may issue an [ENQ]<10> (Reset Request command) to attempt to recover. The Reset Request will reset the printer to an initial power up state. All data will be lost.
<b>Note 2:</b>	When a serious error occurs (bit 7 set) the printer enters a static state. Status responses will reflect the state of the printer when the error occurred.
<b>Note 3:</b>	For this status request to function during a serious error, the "Buffer Full Only" off line option should be selected.
<b>Function</b>	<b>Inquire user-store status</b>
<b>ASCII</b>	[ENQ] <23>
<b>Hexadecimal</b>	05H 17H
<b>Decimal</b>	<5> <23>
<b>Function</b>	The [ENQ] <23> command reports on the user-store status.
<b>Response</b>	[ACK] <23> <Report> <0>
<b>Where &lt;23&gt;</b>	is the echo of command ID. The report is a null terminated string with the following format:  12345[CR][LF] (Free user store) 12345 Type Name...[CR][LF] (First entry) etc. 12345 Type Name...[CR][LF] (Last entry) <0>
<b>Type</b>	The type field describes the type of information. M = macro C = character definition

---

<b>Function</b>	<b>Inquire Color status</b>
<b>ASCII</b>	[ENQ] <24>
<b>Hexadecimal</b>	05H 18H
<b>Decimal</b>	<5> <24>
<b>Function</b>	The [ENQ] <24> command reports Color Cartridge status.
<b>Response</b>	[ACK] <24> <Length+40><n <sub>1</sub> ><n <sub>2</sub> ><n <sub>3</sub> >
<b>Where &lt;24&gt;</b>	Is the echo of command
<b>&lt;n<sub>1</sub>&gt;</b>	Secondary Pen Color 0 = Not installed, 1 = Red, 2 = Green, 4 = Blue
<b>&lt;n<sub>2</sub>&gt;</b>	Primary Pen Color 1 = Red, 2 = Green, 4 = Blue 16 = Black
<b>&lt;n<sub>3</sub>&gt;</b>	Pen Status bit 0 = Not defined bit 1 = Not defined bit 2 = Secondary Cartridge not installed bit 3 = Primary Cartridge not installed bit 4 = Secondary Cartridge low on ink. bit 5 = Primary Cartridge low on ink. bit 6 = 1 always bit 7 = 0 always



**Series 50 Compatibility Commands<sup>19</sup>**

To allow the POSjet™ 1000 Printer to replace the Series 50 Printer without affecting the Series 50 application, the most popular Series 50 emulation modes are provided. The Series 50 modes should only be used if you are replacing a Series 50 Printer and cannot modify the application to use the standard POSjet™ 1000 commands.

A number of items are different with the POSjet™ 1000 emulation, including the processing of IPCL commands. The Series 50 IPCL processor did not deal with command parameters by translating ASCII digits into binary field. When a POSjet™ 1000 Printer is in Series 50 mode, it behaves as the Series 50 Printer does.

The primary changes to the standard POSjet™ 1000 emulation are the removal of commands not present on the Series 50 Printer and the addition of the following commands which are only present on the Series 50 Printer. Refer to the Series 50 Programmer's Guide for documentation and additional commands.

<b>Function</b>	<b>Set extended Series 50 cash drawer command</b>
<b>ASCII</b>	[BS]
<b>Hexadecimal</b>	08H
<b>Decimal</b>	<8>
<b>Description</b>	The [BS] command opens Cash Drawer 2
<b>Function</b>	<b>Set extended Series 50 cash drawer command</b>
<b>ASCII</b>	[BEL]
<b>Hexadecimal</b>	07H
<b>Decimal</b>	<7>
<b>Description</b>	The [BEL] command opens Cash Drawer 1
<b>Function</b>	<b>Set extended Series 50 cash drawer command</b>
<b>ASCII</b>	[ESC] +
<b>Hexadecimal</b>	1BH 2BH
<b>Decimal</b>	<27> <43>
<b>Description</b>	The [ESC] + command opens Cash Drawer 1
<b>Function</b>	<b>Set extended Series 50 pass through</b>
<b>ASCII</b>	[ESC] # or [ESC] d or [ESC] [RS] and [ESC] ”
<b>Hexadecimal</b>	1BH 23H or 1BH 64H or 1BH 1EH and 1BH 22H
<b>Decimal</b>	<27> <35> or <27> <100> or <27> <30> and <27> <34>
<b>Description</b>	[ESC] # or [ESC] d turn on pass through, and [ESC] [RS] or [ESC] ” turn off pass through. These commands require that the pass through function be enabled in the configuration menu.

<sup>19</sup> Some Versions of the POSjet™ 1000 printer do not support the M50 emulation.

**Control Codes Summary by Code**

ASCII	Hex	IPCL equivalent code	Description	Page
[NUL]	00		Null's are ignored	
[SOH] <n>	01H	none	Begin multi-drop control.	115
[ENQ] <n>	05H	none	Inquire printer status. (Refer to command descriptions.)	117
[BEL]	07H	&%BL	Audio alert.	110
[BS]	08H	&%BS	Back space.	151
[HT]	09H	&%HT	Horizontal tab.	64
[LF]	0AH	&%LF	Line feed.	63
[VT]	0BH	&%VT	Vertical tab.	67
[FF]	0CH	&%FF	Form feed.	68
[CR]	0DH	&%CR	Carriage return.	63
[SO]	0EH	&%MW	Begin one-line double-wide print.	83
[SI]	0FH	&%F1	Begin 17 CPI character pitch.	70
[DC2]	12H	&%F3	Begin 10 CPI character pitch.	70
[DC4]	14H	&%MN	Cancel one-line double-wide print.	83
[CAN]	18H	&%RP	Clear print buffer.	108
[ESC] [BEL] <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> >	1BH,07H	none	Configure audio alert.	110
[ESC][SI]	1BH,0FH	&%F4	Begin 24 CPI character Pitch	70
[ESC] [EM] B <n>	1BH,19H, 42H	&%BH <m <sub>1</sub> ><m <sub>2</sub> >	Set bar code height. n=0 Restore defaults n=1 - 9 Number of passes (0.11 inch per pass)	107
[ESC] [EM] J <n>	1BH,19H, 4AH	&%BJ<m <sub>1</sub> ><m <sub>2</sub> >	Set bar code justification, HRI print mode, and print direction.	107
[ESC] [US] b <Name..> <0>	1BH,1FH, 62H	&%UB <Name..> <0>	Begin named macro record.	99
[ESC] [US] c <Name..> <0>	1BH,1FH, 63H	&%UC <Name..> <0>	Save user-defined characters.	100
[ESC] [US] d <Name..> <0>	1BH,1FH, 64H	&%UD <Name..> <0>	Delete item from user store.	101
[ESC] [US] e <Name..> <0>	1BH,1FH, 65H	&%UG <Name..> <0>	End named macro record.	99
[ESC] [US] f ALL <0>	1BH,1FH, 66H,00H	&%UF	Flush information from user store.	101
[ESC] [US] l <Name..> <0>	1BH,1FH, 6CH	&%UL <Name..> <0>	Load item from user store.	100
[ESC] [US] m <Name..> <0>	1BH,1FH, 6DH	&%UM <Name..> <0>	Save macro data in user store.	100

ASCII Command	Hex	IPCL Equivalent Code	Description	Page
[ESC] [US] q <Name..> <0>	1BH,1FH, 72H	&%UQ <Name..> <0>	Report on user store.	101
[ESC] [US] r <Name..> <0>	1BH,1FH, 72H	&%UR <Name..> <0>	Run macro data from user store.	100
[ESC] [US] s <Name..> <0>	1BH,1FH, 6DH	&%US <Name..> <0>	Flag item as a start-up macro.	101
[ESC] ! <n>	1BH,21H	&%CS <n>	Select international character set.	72
[ESC] # <0>	1BH,23H, 00H	&%QT	Begin 12 x 12 draft print.	73
[ESC] \$	1BH,24H	none	Cancel user-defined characters.	81
[ESC] % G	1BH,25H, 47H	&%MI	Begin italics.	86
[ESC] % H	1BH,25H, 48H	&%CI	End italics.	86
[ESC] * <m> <0>	1BH,2AH	none	Set horizontal graphic mode.	96
[ESC] * <m> <n <sub>1</sub> > <n <sub>2</sub> >	1BH,2AH	none	Print graphics in mode <m>.	93
[ESC] - <n>	1BH,2DH	&%CU {n=0} &%MU {n=1}	Underline mode. n = 0 End n = 1 Begin	147
[ESC] 0	1BH,30H	&%ST	Set 1/8-inch line spacing.	66
[ESC] 1	1BH,31H	&%SG	Set 7/72-inch line spacing.	67
[ESC] 2	1BH,32H	none	Begin variable line spacing. (Enable [ESC] A <n>).	67
[ESC] 3 <n>	1BH,33H	&%SV <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	Set variable line spacing to n/216 inch.	67
[ESC] 4	1BH,34H	&%TF	Set top of form.	68
[ESC] 5 <n>	1BH,35H	&%CA {n=0} &%MA {n=1}	Auto line feed. n=0 End n=1 Begin	69
[ESC] 8	1BH,38H	&%PF	Disable paper out sensor.	108
[ESC] 9	1BH,39H	&%PO	Enable paper out sensor.	108
[ESC] :	1BH,3AH	&%F2	Begin 12 cpi character pitch.	70
[ESC] < <n>	1BH,3CH	&%PT <n>	Print suppress and data pass through.	112
[ESC] = <y> <c <sub>1</sub> > <c <sub>2</sub> >...	1BH,3DH	none	Define user-defined characters.	80
[ESC] > <n>	1BH,3EH	none	User-defined characters.	81
[ESC] ? <m><n>	1BH,3FH	none	Reassign graphic mode.	94
[ESC] @	1BH,40H	none	Initialize printer.	110

ASCII Command	Hex	IPCL Equivalent Code	Description	Page
[ESC] A <n>	1BH,41H	none	Set variable line spacing to n/72 inch.	67
[ESC] B <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> >...<n <sub>i</sub> > 0	1BH,42H	none	Set vertical tab stops.	68
[ESC] C <n>	1BH,43H	&%SL <m <sub>1</sub> > <m <sub>2</sub> >	Set form length in lines.	68
[ESC] C [NUL] <n>	1BH,43H	&%SI <m <sub>1</sub> > <m <sub>2</sub> >	Set form length in inches.	69
[ESC] D <n <sub>1</sub> > <n <sub>2</sub> > ... <n <sub>i</sub> > <0>	1BH,44H	none	Set horizontal tab stops.	64
[ESC] E	1BH,45H	&%MM	Begin emphasized print.	85
[ESC] F	1BH,46H	&%CM	End emphasized print.	85
[ESC] G	1BH,47H	&%ME	Begin enhanced print.	85
[ESC] H	1BH,48H	&%CE	End enhanced print.	85
[ESC] I <n>	1BH,49H	&%QT {n=0} &%QU {n=1} &%QL {n=2} &%QS {n=3}	Select print quality mode. n=0 Draft (12 x 12) n=1 Large draft (12 x 14) n=2 NLQ (24 x 16) n=3 NLQ (24 x 16) n=4-7 Repeats 0-3	73
[ESC] J <n>	1BH,4AH	&%FM <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	Perform a fine line feed.	66
[ESC] K <n <sub>1</sub> > <n <sub>2</sub> >	1BH,4BH	none	Print single-density graphics. <n <sub>1</sub> >=0...255 <n <sub>2</sub> >=0...3 len=<n <sub>1</sub> > + 256 * <n <sub>2</sub> >	92
[ESC] L <n <sub>1</sub> > <n <sub>2</sub> >	1BH,4CH	none	Print half-speed double-density graphics.	92
[ESC] P <n>	1BH,50H	&%RI &%RF &%RN	Begin Rotated font. (See command description).	74
[ESC] R	1BH,52H	&%HV	Reset horizontal and vertical tab stops.	65
[ESC] S <0>	1BH,53H, 00H	&%SP	Select superscript.	86
[ESC] S <1>	1BH,53H, 01H	&%SB	Select subscript.	86

ASCII Command	Hex	IPCL Equivalent Code	Description	Page
[ESC] T	1BH,54H	&%SE	End superscript or subscript.	86
[ESC] U <n>	1BH,55H	&%GU {n=1} &%GB {n=0}	Select bidirectional or unidirectional print. n=0 Bidirectional n=1 Unidirectional	94
[ESC] V <n>	1BH,56H	none	Set inter-character spacing.	72
[ESC] W <n>	1BH,57H	&%FS {n=0} &%FD {n=1} &%FH {n=3}	Multi-line double-wide double-high mode. n=0 Standard mode n=1 Double-wide n=2 Double-high 3 = Both	84
[ESC] X <n <sub>1</sub> ><n <sub>2</sub> >	1BH,58H	none	Set left/right print margins. n <sub>1</sub> = Left margin n <sub>2</sub> = Right margin	108
[ESC] Y <n <sub>1</sub> > <n <sub>2</sub> >	1BH,59H	none	Print full-speed double-density graphics.	92
[ESC] Z <n <sub>1</sub> > <n <sub>2</sub> >	1BH,5AH	none	Print quad-density graphics.	93
[ESC] [ @ ...	1BH,5BH, 40H...	&%DH &%SH	Set print style. (See command description.)	84
[ESC] [ C <n>	1BH,5BH, 43H	&%EU	Insert Euro character.	78
[ESC] [ P <n>	1BH,5BH, 50H	&%F<n>	Set character pitch.	71
[ESC] [ S ...	1BH,5BH, 53H...		Redefine character set.	79
[ESC] [ T <n <sub>h</sub> > <n <sub>i</sub> >	1BH,5BH, 54H	&%CP <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> > <m <sub>4</sub> >	Select character code page.	76
[ESC] ]	1BH,5DH	&%LR	Reverse line feed.	69
[ESC] ^ <n>	1BH,5EH	&%CC <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	Print control character.	78
[ESC] _ <n>	1BH,5FH	&%CO {n=0} &%MO {n=1}	Enable/Disable over-score. n=0 End n=1 Begin	83

ASCII Command	Hex	IPCL Equivalent Code	Description	Page
[ESC] a <n>	1BH,61H	&%JR {n=2} &%JC {n=1} &%JL {n=0}	Set justification. n=0 Left n=1 Center n=2 Right n=8 Left (No line feed) n=9 Center (No line feed) n=10 Right (No line feed)	65
[ESC] b <n> ... [ETX]	1BH,62H	&%25 {n=0} &%39 {n=1} &%12 {n=2} &%UP {n=3} &%EA {n=4} &%UE {n=5} &%E8 {n=6} &%93 {n=7}	Print bar code. n=0 Interleave 2 of 5 n=1 Code 39 n=2 Code 128 n=3 UPC A n=4 EAN-13 n=5 UPC E n=6 EAN-8 n= 7 Code 93 n = 8 Codabar	<b>Error ! Book mark not defin ed.</b>
[ESC] c <n>	1BH,63H	&%CL <m <sub>1</sub> >	Select color.	83
[ESC] d <n>	1BH,64H	&%FL <m <sub>1</sub> > <m <sub>2</sub> >	Feed <n> lines at current spacing.	67
[ESC] g <0>	1BH,67H, 00H	&%GP	Process user macro.	103
[ESC] g <1>	1BH,67H, 01H	&%GS	Start macro record.	103
[ESC] g <2>	1BH,67H, 02H	&%GE	Stop macro record.	103
[ESC] g <3>	1BH, 67H, 03H	&%GW	Stop macro record and save.	103
[ESC] h <color> <length> <format> <data>	1BH,68H	none	Process horizontal graphics data.	95
[ESC] n <n <sub>1</sub> > <n <sub>2</sub> >	1BH,6EH	&%HP<m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	Set horizontal position.	65
[ESC] p <n>	1BH,70H	&%PE <m <sub>1</sub> > <m <sub>2</sub> >	Enable paper error mode operation.	110
[ESC] q <n>	1BH,71H	none	Query marker.	109
[ESC] r <n>	1BH,72H	&%RX	Begin rotated print. (See Rotated Print Summary on page 89.)	88
[ESC] s <n>	1BH,73H	&%RL <m <sub>1</sub> > <m <sub>2</sub> > <m <sub>3</sub> >	Set rotated print line length.	91
[ESC] u <n <sub>1</sub> > ...	1BH,75H	none	Set rotated print line spacing.	91
[ESC] v	1BH,76H	&%FC	Cycle receipt cutter.	109

ASCII Command	Hex Code	IPCL Equivalent Code	Description	Page
[ESC] w <n>	1BH,77H	none	Enable dynamic response.	115
[ESC] x <n>	1BH,78H	&%D1 {n=1} &%D2 {n=2}	Open cash drawer. n=1 Cash Drawer 1 n=2 Cash Drawer 2	109
[ESC] y <11>	1BH,79H, 0BH	&%YX011	Enable OCR characters.	81
[ESC] y <12>	1BH,79H, 0CH	&%YX012	Disable OCR characters.	81
[ESC] y <n>	1BH,79H	&%Y0 - 9 or &%YX<m1> <m2><m3> (for numbers >9)	Set control feature commands. (See command description.)	113
[ESC] ~ <n>	1BH,7EH	none	Enable extended diagnostics.	190

## ESC/POS™ Codes

The EPOS codes that are supported by the POSjet™ 1000 Printer are listed in this section. TransAct Technologies, Inc. has no control over how Epson extends or changes these control codes. TransAct Technologies, Inc. makes no guarantees as to the operation of our printer when it replaces an Epson printer. The TM-U200 and EPOS emulations are intended to make it as easy as possible to replace an Epson printer with a POSjet™ 1000 Printer.

The POSjet™ 1000 Printer provides two Epson emulations. The first emulation is as close as possible to the TM-U200 Printer and tries to make the POSjet™ 1000 Printer a drop in replacement. However, when the POSjet™ 1000 Printer is in Epson TM-U200 emulation mode, it is subject to the same limitations as a TM-U200 Printer.

The second Epson emulation is EPOS mode. It extends and enhances the TM-U200 emulation to remove some of the restrictions and give access to some of the POSjet™ 1000 Printer features not addressed by the TM-U200. It is intended that the standard Ithaca® PcOS emulation be used for new applications.

The following section lists all TM-U200 and EPOS commands that are processed. They are as close as possible to Epson's definitions. The user must remember that the POSjet™ 1000 EPOS emulation, unlike the TM-U200 emulation, is not designed as a drop in replacement for an Epson printer. The POSjet™ 1000 Printer is designed to bring new and unique features and functionalities to a point-of-sale receipt printer. These features are not always compatible with Epson printers. Not all features of POSjet™ 1000 Printers can be supported by EPOS. In particular, the ability to print color graphics is not supported. Epson has not yet defined any way to print color graphics.

## EPOS Deviations

Several differences exist between the POSjet™ 1000 and Epson printers. The POSjet™ 1000 Printer and TM-U200 have fundamentally different print technology. The dot pitch and cell size of the printers also vary. The POSjet™ 1000 Printer tries to duplicate the TM-U200 functionality, but it is not always possible. For example, the downloaded characters print smaller on a POSjet™ 1000 Printer than a TM-U200.

## Undocumented Epson Commands

There are a number of undocumented commands in Epson printers. Where Transact is aware of these commands, they have been duplicated in the POSjet™ 1000 Printer. The TM U200 printer has a number of commands that make it more compatible with the TM-U300. Transact can not guarantee that we have found all of these commands. If your application does not function correctly, it is possible that you are using some of these commands. If you find a command that we do not have, please contact Transact Customer support and we will try to give you a work around or we may implement the command for you.

## Real-time Status

The POSjet™ 1000 Printer is available in serial and parallel versions. Epson supports parallel operation but does it through a parallel to serial interface. Consequently, the response times for the POSjet™ 1000 Printer are generally faster. The POSjet™ 1000 Printer implements the IEEE 1284 nibble-mode standard. If an application requires real-time status from the printer, the IEEE 1284 bidirectional protocol must be used. Epson supports the IEEE 1284 byte-mode standard but seems to have errors in the nibble mode. The POSjet™ 1000 Printer does not support byte mode. If the POSjet™ 1000 Printer is used in an IEEE 1284 compliant system, byte mode should be an extension and the default should be nibble mode.

The POSjet™ 1000 Printer supports the EPOS real-time status commands [DLE] [ENQ] and [DLE] [EOT] and are preprocessed by the printer. The printer supports all the response bit fields as defined by the TM-U200 Printer. See the descriptions below. The POSjet™ 1000 Printer looks at and evaluates all commands as they are received and does not respond to [DLE] [ENQ] or [DLE] [EOT] commands that happen to be embedded in graphics or other commands. (Refer to the buffer and preprocessor descriptions in later sections.)



**Supported TM-200 Commands**

<b>Print and Feed Commands</b>			
<b>Command</b>		<b>Name</b>	<b>Page</b>
LF	0AH	Print and line feed.	139
CR	0DH	Print and carriage return.	139
ESC d	1BH,64H	Print and feed <n> lines.	139
ESC e	1BH,65H	Print and reverse feed <n> lines.	139
ESC J	1BH,4AH	Print and feed paper <n> vertical units.	140
ESC K	1BH,4BH	Print and reverse feed [<n> x (1/144)] inches.	140
<b>Line Spacing Commands</b>			
<b>Command</b>		<b>Name</b>	<b>Page</b>
ESC 2	1BH,32H	Select default line spacing, 1/6 lpi.	141
ESC 3	1BH,33H	Set line spacing.	141
<b>Character Commands</b>			
<b>Command</b>		<b>Name</b>	<b>Page</b>
ESC SP	1BH,20H	Set right-side character spacing.	141
ESC %	1BH,25H	Select/cancel user-defined character sets.	141
ESC &	1BH,26H	Define user-defined characters.	142
ESC ?	1BH,3FH	Cancel user-defined characters.	142
ESC R	1BH,52H	Select an international character set.	
ESC [ T	1BH,5BH, 54H	Select character code table.	144
ESC r	1BH,72H	Select color.	146
ESC t	1BH,74H	Select character code table.	146
ESC !	1BH,21H	Select print mode(s).	147
ESC -	1BH,2DH	Turn underline mode on/off.	147
ESC E	1BH,45H	Turn emphasized mode on/off.	147
ESC G	1BH,47H	Turn double-strike mode on/off.	148
ESC {	1BH,7BH	Turn upside-down printing mode on/off.	148
<b>Panel Button Commands</b>			
<b>Command</b>		<b>Name</b>	<b>Page</b>
ESC c 5	1BH,63H, 35H	Enable/disable panel buttons.	149

## Supported TM-200 Commands

Paper Sensor Commands			
Command		Name	Page
ESC c 4	1BH,63H,34H	Select paper sensor(s) to stop printing.	150
ESC c 3	1BH,63H,33H	Select paper sensor(s) to output paper end signals.	150
Print Position Commands			
Command		Name	Page
ESC a	1BH,61H	Select justification.	151
HT	09H	Set horizontal tab positions.	151
ESC D	1BH,44H	Set horizontal tab positions.	151
ESC U	1BH,55H	Turn unidirectional printing mode on/off.	152
ESC <	1BH,3CH	Return home.	153
Bit-image Command			
Command		Name	Page
ESC *	1BH,2AH	Select bit-image mode.	153
Status Command			
Command		Name	Page
GS a	1DH,61H	Enable/disable Automatic Status Back (ASB).	154
GS r	1DH,72H	Transmit status.	156
DLE EOT	10H,04H	Transmit real-time status.	157
Mechanism Control Commands			
Command		Name	Page
GS V	1DH,56H	Select cut mode and cut paper.	163
Miscellaneous Commands			
Command		Name	Page
ESC @	1BH,40H	Initialize printer.	164
GS I	1DH,49H	Transmit printer ID.	164
ESC p	1BH,70H	Generate pulse.	165
ESC =	1BH,3DH	Select peripheral device status.	165
DLE ENQ	10H,05H	Query real-time request to printer.	165
GS z	1DH,7AH	Set on-line recovery wait time.	166
ESC ‘	1BH,27H	Copy user-defined storage buffers.	166

Table 26 Supported TM-200 Commands

## TM-U200 Restrictions

The following commands are effective only when 40 bytes is selected as the received buffer size. The size of the receive buffer is selected by the DIP switches.

Command	Name
HT	Set horizontal tab.
ESC %	Select/cancel user-defined character set.
ESC &	Define user-defined characters.
ESC ?	Cancel user-defined characters.
ESC D	Set horizontal tab positions.

Table 27 TM-U200 Restrictions

The functions of the following commands are different, depending on the Epson printer model. O indicates supported commands, and X indicates unsupported (ignored) commands.

Model	TM-U200B	TM-U200PB	TM-U200D	TM-U200PD
ESC c 3	X	O	X	O
GS V (1)	O	O	X	X
GS V (2)	O	O	Only paper feed is executed.	Only paper feed is executed.

Table 28 Command Support for Various Epson Printers

The POSjet™ 1000 processes these commands based on the printer options installed.

## Undocumented TM U200 Commands

Command	Name	
ESC i	Auto-Cut	163
ESC m	Auto Cut	163
ESC u	Transmit Peripheral Device Status	158
ESC v	Transmit Paper status	159
GS ( A	Enter Test Mode	166

Table 29 Undocumented TM U200 Commands

**Supported EPOS Commands**

<b>Print and Feed Commands</b>			
<b>Command</b>		<b>Name</b>	<b>Page</b>
LF	0AH	Print and line feed.	139
CR	0DH	Print and carriage return.	139
ESC d	1BH,64H	Print and feed <n> lines.	139
ESC e	1BH,65H	Print and reverse feed <n> lines.	139
ESC J	1BH,4AH	Print and feed paper <n> vertical units.	140
ESC K	1BH,4BH	Print and reverse feed [<n> x (1/144)] inches.	140
ESC j	1BH,6AH	Print and reverse feed.	140
<b>Line Spacing Command</b>			
<b>Command</b>		<b>Name</b>	<b>Page</b>
ESC 2	1BH,32H	Select default line spacing, 1/6 lpi.	141
ESC 3	1BH,33H	Set line spacing.	141
<b>Character Commands</b>			
<b>Command</b>		<b>Name</b>	<b>Page</b>
ESC SP	1BH,20H	Set right-side character spacing.	141
ESC %	1BH,25H	Select/cancel user-defined character sets.	141
ESC &	1BH,26H	Define user-defined characters.	142
ESC ?	1BH,3FH	Cancel user-defined characters.	142
ESC R	1BH,52H	Select an international character set.	142
ESC [ T	1BH,5BH, 54H	Select character code table.	144
ESC ^	1BH,5EH	Print control character.	146
GS #	1DH,23H	Insert Euro character.	146
ESC r	1BH,72H	Select color.	146
ESC t	1BH,74H	Select character code table.	146
ESC !	1BH,21H	Select print mode(s).	147
ESC -	1BH,2DH	Turn on/off underline mode.	147
ESC G	1BH,47H	Turn on/off double-strike mode.	148
ESC {	1BH,7BH	Turn on/off upside-down printing mode.	148
ESC V	1BH,56H	Turn on/off 90° rotation mode.	148
GS !	1DH,21H	Set character size.	149
ESC 4	1BH,34H	Set italics mode.	149
ESC 5	1BH,35H	Reset italics mode.	149
<b>Panel Button Commands</b>			
<b>Command</b>		<b>Name</b>	<b>Page</b>
ESC c 5	1BH,63H, 35H	Enable/disable panel buttons.	149

Table 30 Supported EPOS Commands

## Supported EPOS Commands

Paper Sensor Commands			
Command		Name	Page
ESC c 4	1BH,63H, 34H	Select paper sensor(s) to stop printing.	150
ESC c 3	1BH,63H, 33H	Select paper sensor(s) to output paper end signals.	150
Print Position Commands			
Command		Name	Page
ESC \$	1BH,24H	Set absolute print position.	151
ESC \	1BH,5CH	Set relative print position.	151
ESC a	1BH,61H	Select justification.	151
BS	08H	Set back space.	151
HT	09H	Set horizontal tab positions.	151
ESC D	1BH,44H	Set horizontal tab positions.	151
GS L	1DH,4CH	Set left margin.	152
GS W	1DH,57H	Set printing width.	152
ESC U	1BH,55H	Turn on/off unidirectional printing mode.	152
ESC l	1DH,6CH	Set left margin.	152
ESC Q	1BH,51H	Set right margin in characters.	153
ESC <	1BH,3CH	Return home.	153
Bit-image Commands			
Command		Name	Page
ESC *	1BH,2AH	Select bit-image mode.	153
Status Commands			
Command		Name	Page
GS a	1DH,61H	Enable/Disable Automatic Status Back (ASB).	154
GS r	1DH,72H	Transmit status.	156
DLE EOT	10H,04H	Transmit real-time status.	157

## Supported EPOS Commands

Bar Code Commands			
Command		Name	Page
GS h	1DH,68H	Set bar code height.	160
GS k	1DH,6BH	Print bar code.	160
GS H	1DH,48H	Select printing position of HRI characters.	161
GS f	1DH,66H	Select font HRI characters.	162
Mechanism Control Commands			
Command		Name	Page
GS V	1DH,56H	Select cut mode and cut paper.	163
ESC i	1BH,69H	Set partial knife cut.	163
ESC m	1BH,69H	Set partial knife cut.	163
BEL	07H	Sound buzzer.	163
ESC BEL	1BH,07H	Sound buzzer.	163
Miscellaneous Commands			
Command		Name	Page
GS P	1DH,50H	Set horizontal and vertical motion units.	164
ESC @	1BH,40H	Initialize printer.	164
GS I	1DH,49H	Transmit printer ID.	164
ESC p	1BH,70H	Generate pulse.	165
ESC =	1BH,3DH	Select peripheral device status.	165
DLE ENQ	10H,05H	Send real-time request to printer.	165
ESC ‘	1BH,27H	Copy user-defined storage buffers.	166
ESC u	1BH, 75H	Transmit Peripheral Status	158
ESC v	1BH, 76H	Transmit Paper Status	159
GS ( A	1DH, 28H,41H	Enter Test Mode	166
Macro Function Commands			
Command		Name	Page
GS :	1DH,3AH	Start/end macro definition.	167
GS ^ r t m	1DH,5EH	Execute macro.	167
GS _	1DH,5FH	Delete start-up macro definition.	168
User-defined Memory Commands			
Command		Name	Page
GS - <Name> ...	1DH,2DH, <Name> ...	Define user-defined bit image.	169
GS 0 <Name> ...	1DH,30H, <Name> ...	Print user-defined bit image.	170
GS 1 <Name> ...	1DH,31H, <Name> ...	Erase single entry from nonvolatile memory.	170
GS 5	1DH,35H	Erase all entries from nonvolatile memory.	170
GS *	1DH,2AH	Define single user-defined bit-image.	171
GS /	1DH,2FH	Print single user-defined bit-image.	172
GS 6	1DH,36H	Save user-defined character set.	172
GS 7	1DH,37H	Select user-defined character set.	172
GS 3	1DH,33H	Query nonvolatile memory pool information.	172

## TM-U200 and EPOS Command Descriptions

The TM-U200 and EPOS emulations are grouped together. The TM-U200 emulation is a subset of the EPOS emulation. The EPOS only commands are noted.

### Print and Feed Commands

<b>Function</b>	<b>Print and line feed</b>
<b>ASCII</b>	[LF]
<b>Hexadecimal</b>	0AH
<b>Decimal</b>	<10>
<b>Description</b>	The [LF] command prints the data in the print buffer and feeds one line. The amount of paper fed per line is based on the value set using the line spacing command. The default setting is 1/6 inch.
<b>Function</b>	<b>Print and carriage return</b>
<b>ASCII</b>	[CR]
<b>Hexadecimal</b>	0DH
<b>Decimal</b>	<13>
<b>Description</b>	When auto line feed is enabled, [CR] functions in the same way as [LF]. When auto line feed is disabled, [CR] prints the data in the print buffer and does not feed the paper.
<b>Function</b>	<b>Print and feed &lt;n&gt; lines</b>
<b>ASCII</b>	[ESC] d <n>
<b>Hexadecimal</b>	1BH 64H <n>
<b>Decimal</b>	<27> <100> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] d <n> command prints the data in the print buffer and feeds <n> lines. The amount of paper fed per line is based on the value set using the line spacing command. The maximum paper feed amount is 40 inches. The default setting of the paper feed amount is 1/6 inch.
<b>Function</b>	<b>Print and reverse feed&lt;n&gt; lines</b>
<b>ASCII</b>	[ESC] e <n>
<b>Hexadecimal</b>	1BH 65H <n>
<b>Decimal</b>	<27> <101> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] e <n> command prints the data in the print buffer and feeds <n> lines in the reverse direction. The amount of paper fed per line is based on the value set using the line spacing command. The maximum reverse paper feed amount is 48/144 inch. The default setting of the paper feed amount is 1/6 inch.

<b>Function</b>	<b>Print and feed paper</b>	
<b>ASCII</b>	[ESC] J <n>	
<b>Hexadecimal</b>	1BH 4AH <n>	
<b>Decimal</b>	<27> <74> <n>	
<b>Range</b>	$0 \leq n \leq 255$	
<b>Description</b>	The [ESC] J <n> command prints the data in the print buffer and feeds the paper [ $n \times (1/144)$ ] inches, which means that the printer can feed the paper in half-dot units. The command is used to temporarily feed a specific length without changing the line spacing set by other commands.	
<b>Function</b>	<b>Print and reverse feed &lt;n&gt; lines</b>	
<b>ASCII</b>	[ESC] K <n>	
<b>Hexadecimal</b>	1BH 4BH <n>	
<b>Decimal</b>	<27> <75> <n>	
<b>Range</b>	$0 \leq n \leq 48$	
<b>Description</b>	The [ESC] K <n> command prints the data in the print buffer and feeds the paper [ $\langle n \rangle \times (1/144)$ ] inches in the reverse direction. Consequently, the printer can feed the paper in half-dot units in the reverse direction. The command is used to temporarily feed a specific length without changing the line spacing set by other commands.	
<b>Function</b>	<b>Print and reverse feed</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	[ESC] j	
<b>Hexadecimal</b>	1BH 6AH	
<b>Decimal</b>	<27> <106>	
<b>Range</b>	$0 \leq n \leq 48$	
<b>Description</b>	The [ESC] j command prints the data in the print buffer and feeds the paper one line in reverse.	



## Line Spacing Commands

<b>Function</b>	<b>Select default line spacing</b>
<b>ASCII</b>	[ESC] 2
<b>Hexadecimal</b>	1BH 32H
<b>Decimal</b>	<27> <50>
<b>Description</b>	The [ESC] 2 command sets the line spacing to 1/6 inch, which is equivalent to 12 dots.

---

<b>Function</b>	<b>Set line spacing</b>
<b>ASCII</b>	[ESC] 3 <n>
<b>Hexadecimal</b>	1BH 33H <n>
<b>Decimal</b>	<27> <51> <n>
<b>Range</b>	$0 \leq n \leq 255$
<b>Description</b>	The [ESC] 3 <n> command sets the line spacing to [ $\text{<n>} \times (1/144)$ ] inches. The default setting of the paper feed amount is 1/6 inch (<n> = 24). The line spacing can be set in half-dot units.

## Character Commands

<b>Function</b>	<b>Set right-side character spacing</b>
<b>ASCII</b>	[ESC] SP <n>
<b>Hexadecimal</b>	1BH 20H <n>
<b>Decimal</b>	<27> <32> <n>
<b>Range</b>	$0 \leq n \leq 255$
<b>Description</b>	The [ESC] SP <n> sets the right-side character spacing in [ $\text{<n>} \times (1/160)$ ] inches. It is used to change the spacing between characters. The default right-side character spacing is set to zero. (<n> = 0). Right-side character spacing can be set in half-dot units.

---

<b>Function</b>	<b>Select/cancel user-defined character set</b>
<b>ASCII</b>	[ESC] % <n>
<b>Hexadecimal</b>	1BH 25H <n>
<b>Decimal</b>	<27> <37> <n>
<b>Range</b>	$0 \leq n \leq 255$
<b>Description</b>	The [ESC] % <n> command selects or cancels the user-defined character set. When the least significant bit (LSB) of <n> is one, the user-defined character set is selected. When <n> is zero, the internal character set is selected, which is the default setting.

**Note 1** In TM-U200 mode, the command only functions if the buffer is set to 40 characters.

<b>Function</b>	<b>Define user-defined characters</b>
<b>ASCII</b>	[ESC] & <y> <c1> <c2> [x1 d1 ... d(y x x1)] ... [xk d1 ... d(y x xk)]
<b>Hexadecimal</b>	1BH 26H y c1 c2 [x1 d1 ... d(y x x1)] ... [xk d1 ... d(y x xk)]
<b>Decimal</b>	<27> <38> y c1 c2 [x1 d1 ... d(y x x1)] ... [xk d1 ... d(y x xk)]
<b>Range</b>	y = 2 $32 \leq c_1 \leq c_2 \leq 126$ $0 \leq x \leq 12$ (9 x 9 font) $0 \leq x \leq 9$ (7 x 9 font) $0 \leq d_1 \dots d(y \ x \ x) \leq 255$
<b>Description</b>	The [ESC] & <y> <c1> <c2> [x1 d1 ... d(y x x1)] ... [xk d1 ... d(y x xk)] command defines user-defined characters from character code <c1> to <c2>. <y> and <x> are the configurations of user-defined characters. <y> specifies the number of bytes in the vertical direction. <x> specifies the number of bytes in the horizontal direction. Character codes ranging from ASCII code 20H (32) to 7EH (126) can be defined by <c1> and <c2>. Up to 19 user-defined characters can be defined. Data (<d>) specifies a bit printed to one and not printed to zero. At the default, user-defined characters are not defined, and the internal character set is printed. Once the user-defined characters have been defined, they are available until [ESC] @ or [ESC] ? is executed; the user-defined characters are redefined; the power is turned off; or the printer is reset.
<b>Note 1</b>	In TM-U200 mode, the buffer must be set to 40 characters or the command will not function.

---

<b>Function</b>	<b>Cancel user-defined characters</b>
<b>ASCII</b>	[ESC] ? <n>
<b>Hexadecimal</b>	1BH 3FH <n>
<b>Decimal</b>	<27> <63> <n>
<b>Range</b>	$32 \leq n \leq 126$
<b>Description</b>	The [ESC] ? <n> command cancels the user-defined characters defined for character code <n>. After the user-defined characters are canceled, the internal character set is printed.
<b>Note 1</b>	In TM-U200 mode, the buffer must be set to 40 characters or the command will not function.

---

<b>Function</b>	<b>Select an international character set</b>
<b>ASCII</b>	ESC R <n>
<b>Hexadecimal</b>	1BH 52H <n>
<b>Decimal</b>	<27> <82> <n>
<b>Range</b>	$0 \leq n \leq 74$
<b>Default</b>	<n> = 0
<b>Description</b>	The ESC R <n> command selects an international character set, <n>, from the following table.

**International Character Sets**

Country	Epson ID	Country	Epson ID
ASCII	0	Greek 437	38
French	1	Greek 928	39
German	2	Greek 437 CYPRUS	41
British	3	ECMA-94	42
Danish I	4	Canada French	43
Swedish I	5	Cyrillic I-855	44
Italian	6	Cyrillic II-866	45
Spanish I	7	East Europe Latin II-852	46
Japanese	8	Greek 869	47
Norwegian	9	Windows East Europe	49
Danish II	10	Windows Greek	50
Spanish II	11	Latin 5 (Windows Turkey)	51
Latin American	12	Windows Cyrillic	52
French Canadian	13	Hungarian CWI	54
Dutch	14	Kamenicky (MJK)	55
Swedish II	15	ISO Latin 4 (8859/4)	56
Swedish III	16	Turkey_857	57
Swedish IV	17	Roman-8	58
Turkish	18	Hebrew NC (862)	60
Swiss I	19	Hebrew OC	61
Swiss II	20	Windows Hebrew	62
Cyrillic II-866	21	KBL- Lithuanian	63
Polska Mazovia	22	Ukrainian	66
ISO Latin 2	23	ISO Latin 6 (8859/10)	67
Serbo Croatic I	24	Windows Baltic	68
Serbo Croatic II	25	Cyrillic-Latvian	69
Multilingual	26	Bulgarian	72
Norway	27	Icelandic-861	73
Portugal	28	Baltic 774	74
Turkey	29	Arabic <sup>20</sup>	93

Table 31 International Character Sets

<sup>20</sup> Arabic is supported by special order

Function	Select character code table	EPOS ONLY
ASCII	ESC [ T <n <sub>h</sub> > <n <sub>l</sub> >	
Hexadecimal	1BH 5BH 54H <n <sub>h</sub> > <n <sub>l</sub> >	
Decimal	<27> <91> <84> <n <sub>h</sub> > <n <sub>l</sub> >	
Default	<n <sub>h</sub> > = 1	
<n <sub>l</sub> > =	181 (Code Page 437)	
Description	The ESC [ T <n <sub>h</sub> > <n <sub>l</sub> > command selects a code page, <n>, from the character code table.	

Code Page	Country	Decimal <nh> <nl>	Hex <nh> <nl>
64	USA (Slashed 0)	64	0H,040H
65	USA (Unslashed 0)	0,65	0H,041H
66	British	0,66	0H,042H
67	German	0,67	0H,043H
68	French	0,68	0H,044H
69	Swedish I	0,69	0H,045H
70	Danish	0,70	0H,046H
71	Norwegian	0,71	0H,047H
72	Dutch	0,72	0H,048H
73	Italian	0,73	0H,049H
74	French Canadian	0,74	0H,04AH
75	Spanish	0,75	0H,04BH
76	Swedish II	0,76	0H,04CH
77	Swedish III	0,77	0H,04DH
78	Swedish IV	0,78	0H,04EH
79	Turkish	0,79	0H,04FH
80	Swiss I	0,80	0H,050H
81	Swiss II	0,81	0H,051H
91	Welsh	0,91	0H,05BH
93	Arabic <sup>21</sup>	0,93	0H,05DH
437	USA	1,181	1H,0B5H
774	Baltic 774	3,6	3H,006H
850	Multilingual	3,82	3H,052H
852	East Europe Latin II-852	3,84	3H,054H
855	Cyrillic I-855	3,87	3H,057H
857	Turkey 857	3,89	3H,059H
858	Multilingual Euro	3,90	3H,05AH
860	Portugal	3,92	3H,05CH
861	Icelandic-861	3,93	3H,05DH
862	Hebrew NC (862)	3,94	3H,05EH
863	Canada French	3,95	3H,05FH
865	Norway	3,97	3H,061H

<sup>21</sup> Arabic is supported by special order.

Code Page	Country	Decimal <n <sub>h</sub> > <n <sub>i</sub> >	Hex <n <sub>h</sub> > <n <sub>i</sub> >
866	Cyrillic II-866	3,98	3H,062H
869	Greek 869	3,101	3H,065H
895	Kamenicky (MJK)	3,127	3H,07FH
1008	Greek 437	3,240	3H,0F0H
1009	Greek 928	3,241	3H,0F1H
1011	Greek 437 CYPRUS	3,243	3H,0F3H
1012	Turkey	3,244	3H,0F4H
1013	Cyrillic II-866	3,245	3H,0F5H
1014	Polska Mazovia	3,246	3H,0F6H
1015	ISO Latin 2	3,247	3H,0F7H
1016	Serbo Croatian I	3,248	3H,0F8H
1017	Serbo Croatian II	3,249	3H,0F9H
1018	ECMA-94	3,250	3H,0FAH
1019	Windows East Europe	3,251	3H,0FBH
1020	Windows Greek	3,252	3H,0FCH
1021	Latin 5 (Windows Turkey)	3,253	3H,0FDH
1022	Windows Cyrillic	3,254	3H,0FEH
1024	Hungarian CWI	4,0	4H,000H
1026	ISO Latin 4 (8859/4)	4,2	4H,002H
1027	Ukrainian	4,3	4H,003H
1028	Roman-8	4,4	4H,004H
1029	ISO Latin 6 (8859/10)	4,5	4H,005H
1030	Hebrew NC (862)	4,6	4H,006H
1031	Hebrew OC	4,7	4H,007H
1032	Windows Hebrew	4,8	4H,008H
1033	KBL- Lithuanian	4,9	4H,009H
1034	Windows Baltic	4,10	4H,00AH
1035	Cyrillic-Latvian	4,11	4H,00BH
1072	Bulgarian	4,48	4H,030H

Table 32 Character Code Pages

Function	Print control character	EPOS ONLY
ASCII	[ESC] ^ <n>	
Hexadecimal	1BH 5EH <n>	
Decimal	<27> <94> <n>	
Range	$0 \leq n \leq 255$	
Description	The [ESC] ^ <n> command allows characters from zero to 31 codes to be printed. During normal operation, characters from zero to 31 are control characters. Control code translation is turned off for the following character.	

Function	Insert Euro character	EPOS ONLY
ASCII	GS # <n>	
Hexadecimal	1DH 23H <n>	
Decimal	<29> <35> <n>	
Description	The GS # <n> command allows an application to replace any character in the currently active character set with the Euro character. The character to be replaced is defined by <n>. For example, if the currently active character set is CP 850 (multilingual) and the 0D5H character is to be the Euro character, 1DH 23H replaces the character at 0D5H with the Euro symbol.	

Function	Turn color mode on/off
ASCII	[ESC] r <n>
Hexadecimal	1BH 72H <n>
Decimal	<27> <114> <n>
Range	<n> = 0, 1, 48, 49
Description	The [ESC] r <n> command turns on or off color mode. When <n> = 1 or 49, color mode is turned on, and when <n> = 0 or 48, color mode is turned off. The default setting is <n> = 0.

Function	Select character code table
ASCII	[ESC] t <n>
Hexadecimal	1BH 74H <n>
Decimal	<27> <116> <n>
Range	$0 \leq n \leq 5$ ; <n> = 254, 255
Description	The [ESC] t <n> command selects a page, <n>, from the character code table as follows. The alphanumeric characters (20H to 7FH) are the same for each page. The graphic characters (80H to FFH) are different for each page. The default setting is page 0.

<n>	Character Code Table
0	Page 0 [PC437 (U.S.A. and Standard Europe)]
1	Page 1 [PC850 (Multilingual)]
2	Page 2 [PC850 (Multilingual)]
3	Page 3 [PC860 (Portuguese)]
4	Page 4 [PC863 (Canadian-French)]
5	Page 5 [PC865 (Nordic)]
255	Page 255 [Space page]

Table 33 Character Code Table

<b>Function</b>	<b>Select print mode(s)</b>
<b>ASCII</b>	[ESC] ! <n>
<b>Hexadecimal</b>	1BH 21H <n>
<b>Decimal</b>	<27> <33> <n>
<b>Range</b>	$0 \leq n \leq 255$
<b>Description</b>	The [ESC] ! <n> command selects print modes using <n> as follows. The default character font is 7 x 9. The defaults for the other print modes are set to <n> = 1.

Bit	Off/On	Hexadecimal	Decimal	Function
0	Off	00H	<0>	Select 9 x 9 character font.
	On	01H	<1>	Select 7 x 9 character font.
1,2	-	-	-	Undefined
3	Off	00H	<0>	Emphasized mode is not selected.
	On	08H	<8>	Emphasized mode is selected.
4	Off	00H	<0>	Double-height mode is not selected.
	On	10H	<16>	Double-height mode is selected.
5	Off	00H	<0>	Double-wide mode is not selected.
	On	20H	<32>	Double-wide mode is selected.
6	-	-	-	Undefined
7	Off	00H	<0>	Underline mode is not selected.
	On	80H	<128>	Underline mode is selected.

Table 34 Print Modes

<b>Function</b>	<b>Turn on/off underline mode</b>
<b>ASCII</b>	[ESC] - <n>
<b>Hexadecimal</b>	1BH 2DH <n>
<b>Decimal</b>	<27> <45> <n>
<b>Range</b>	<n> = 0, 1, 48, 49
<b>Description</b>	The [ESC] - <n> command turns on or off underline mode. When <n> = 1 or 49, underline mode is turned on, and when <n> = 0 or 48, underline mode is turned off. The default setting is <n> = 0.

<b>Function</b>	<b>Turn on/off emphasized mode</b>
<b>ASCII</b>	[ESC] E <n>
<b>Hexadecimal</b>	1BH 45H <n>
<b>Decimal</b>	<27> <69> <n>
<b>Range</b>	$0 \leq n \leq 255$
<b>Description</b>	The [ESC] E <n> command turns on or off emphasized mode. When the least significant bit (LSB) of <n> = 1, emphasized mode is turned on; when it is 0, emphasized mode is turned off. The default setting is <n> = 0. Emphasized and double-strike printing appear the same.

<b>Function</b>	<b>Turn on/off double-strike mode</b>
<b>ASCII</b>	[ESC] G <n>
<b>Hexadecimal</b>	1BH 47H <n>
<b>Decimal</b>	<27> <71> <n>
<b>Range</b>	$0 \leq n \leq 255$
<b>Description</b>	The [ESC] G <n> command turns on or off double-strike mode. When the least significant bit (LSB) of <n> = 1, double-strike mode is turned on; when it is 0, double-strike mode is turned off. The default setting is <n> = 0. Double-strike and emphasized printing appear the same.

<b>Function</b>	<b>Turn on/off upside-down print mode</b>
<b>ASCII</b>	[ESC] { <n>
<b>Hexadecimal</b>	1BH 7BH <n>
<b>Decimal</b>	<27> <123> <n>
<b>Range</b>	$0 \leq n \leq 255$
<b>Description</b>	The [ESC] { <n> turns on or off upside-down printing mode. When the least significant bit of <n> = 1, upside-down printing mode is turned on; when it is 0, upside-down printing mode is turned off. The default setting is <n> = 0. When upside-down mode is turned on, the printer prints 180° rotated characters from right to left. The line printing order is not reversed, so the order of the data transmitted is important. The command is enabled only when input at the beginning of a line.

<b>Function</b>	<b>Turn on/off 90° rotation mode</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	ESC V <n>	
<b>Hexadecimal</b>	1BH 56H <n>	
<b>Decimal</b>	<27> <86> <n>	
<b>Range</b>	<n> = 0, 1, 2, 48, 49, 50	
<b>Description</b>	The ESC V <n> command turns on/off 90° clockwise rotation mode. The command is only enabled in standard mode. In page mode, an internal flag is activated, and the command is enabled when the printer returns to standard mode.	

<n>	Function
0, 48	Turns off all rotation modes
1, 49	Turns on 90° clockwise rotation mode
2, 50	Turns on 90° counterclockwise rotation mode

Table 35 Rotation Modes



Function	Set character size	EPOS ONLY
ASCII	GS ! <n>	
Hexadecimal	1DH 21H <n>	
Decimal	<29> <33> <n>	
Description	The GS ! <n> command sets the horizontal and vertical scaling. The upper nibble is the horizontal scale, and the lower nibble is the vertical scale. The minimum size is x1, and the maximum size is x8.	
Where <n> =	xxxx0000	Vertical scale 1
	xxxx0001	Vertical scale 2
	xxxx0111	Vertical scale 8
	0000xxxx	Horizontal scale 1
	0001xxxx	Horizontal scale 2
	0111xxxx	Horizontal scale 8

Function	Begin italics	EPOS ONLY
ASCII	[ESC] 4	
Hexadecimal	1BH 34H	
Decimal	<27> <52>	
Description	The [ESC] 4 command begins italics print mode.	
Note 1	Italics are not available in all print modes.	

Function	End italics	EPOS ONLY
ASCII	[ESC] 5	
Hexadecimal	1BH 35H	
Decimal	<27> <53>	
Description	The [ESC] 5 command ends italics print mode.	

## Panel Button Commands

Function	Enable/disable paper feed
ASCII	[ESC] c 5 <n>
Hexadecimal	1BH 63H 35H <n>
Decimal	<27> <99> <53> <n>
Range	0 ≤ n ≤ 255
Description	The [ESC] c 5 <n> command enables or disables the <b>FEED</b> button. When the least significant bit (LSB) of <n> = one, the <b>FEED</b> button is disabled; when it is zero, the button is enabled. To prevent problems caused by accidentally pressing the <b>FEED</b> button, use the command to disable it. The <b>FEED</b> button is temporarily enabled, regardless of how the command is set during the wait time set by the [GS] z 0 command for paper insertion and during the recovery confirmation time.
Where <n>	Bit 0 = 1 the <b>FEED</b> button is disabled Bit 0 = 0 the button is enabled.

## Paper Sensor Commands

<b>Function</b>	<b>Select paper sensor(s) to stop printing</b>
<b>ASCII</b>	[ESC] c 4 <n>
<b>Hexadecimal</b>	1BH 63H 34H <n>
<b>Decimal</b>	<27> <99> <52> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] c 4 <n> command selects the sensors that tell the printer to stop printing. The default setting occurs when only the Paper out sensor stops printing. When the paper roll near-end sensor is enabled and the sensor detects a near-end condition during printing, the printer completes the current line and then automatically goes off-line. Replacing a new paper roll restarts the printing. When the paper roll near-end sensor is disabled and a paper near-end condition is detected during printing, the paper out LED comes on, but the printer continues to print.

**NOTE:** The POSjet™ does not allow the paper out sensor to be disabled. It is always on.  
 <n> is defined as follows:

Bit	On/Off	Hexadecimal	Decimal	Function
0,1	Off	00H	<0>	Paper roll near-end sensor disabled
	On	01H,02H,03H	<1>,<2>,<3>	Paper roll near-end sensor enabled
7	-	00H	<0>	Undefined

Table 36 Paper Sensor Commands

<b>Function</b>	<b>Select paper sensor(s) to output paper-end signals</b>
<b>ASCII</b>	[ESC] c 3 <n>
<b>Hexadecimal</b>	1BH 63H 33H <n>
<b>Decimal</b>	<27> <99> <51> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] c 3 <n> command selects the paper sensor that outputs a paper-end signal to the parallel interface when a paper-end is detected. The default setting is when all sensors are enabled. (<n> = 15). It is possible to select multiple sensors to output signals. If any of the sensors detect a paper end, the paper end signal is output. The command is only available with a parallel interface. The paper-end sensor is an option. If the sensor is not equipped, the settings of bits 0 and 1 of the command are not effective.

Bit	On/Off	Hexadecimal	Decimal	Function
0	Off	00H	<0>	Paper roll near-end sensor disabled
	On	01H	<1>	Paper roll near-end sensor enabled
1	Off	00H	<0>	Paper roll near-end sensor disabled
	On	02H	<2>	Paper roll near-end sensor enabled
2	Off	00H	<0>	Paper roll end sensor disabled
	On	04H	<4>	Paper roll end sensor enabled
3	Off	00H	<0>	Paper roll end sensor disabled
	On	08H	<8>	Paper roll end sensor enabled
4-7	-	-	-	Undefined

Table 37 Paper Sensor Commands

## Print Position Commands

Function	Set absolute print position	EPOS ONLY
ASCII	[ESC] \$ <n <sub>i</sub> > <n <sub>h</sub> >	
Hexadecimal	1BH 24H <n <sub>i</sub> > <n <sub>h</sub> >	
Decimal	<27> <36> <n <sub>i</sub> > <n <sub>h</sub> >	
Range	0 ≤ n <sub>i</sub> ≤ 255 0 ≤ n <sub>h</sub> ≤ 255	
Description	The ESC \$ <n <sub>i</sub> > <n <sub>h</sub> > command sets the print starting position from the beginning of the line.	

Function	Set relative print position	EPOS ONLY
ASCII	[ESC] \ <n <sub>i</sub> > <n <sub>h</sub> >	
Hexadecimal	1BH 5CH <n <sub>i</sub> > <n <sub>h</sub> >	
Decimal	<27> <92> <n <sub>i</sub> > <n <sub>h</sub> >	
Range	0 ≤ n <sub>i</sub> ≤ 255 0 ≤ n <sub>h</sub> ≤ 255	
Description	The [ESC] \ <n <sub>i</sub> > <n <sub>h</sub> > command sets the print starting position based on the current position and the distance from the current position to [(n <sub>i</sub> + n <sub>h</sub> × 256) × horizontal unit]. When standard mode is selected, the horizontal motion unit set by GS P is used. When page mode is selected, the horizontal or vertical motion unit set by GS P is used for the print direction set by ESC T.	

Function	Select justification	
ASCII	[ESC] a <n>	
Hexadecimal	1BH 61H <n>	
Decimal	<27> <97> <n>	
Range	0 ≤ n ≤ 2 48 ≤ n ≤ 50	
Description	The [ESC] a <n> command aligns all the data in one line to a specified position. Left justification is selected when <n> = 0 or 48, centering is selected when <n> = 2 or 50. The default setting is left justification. (<n> = 0). The command is enabled only when input at the beginning of a line.	

Function	Set back space	EPOS ONLY
ASCII	[BS]	
Hexadecimal	08H	
Decimal	<8>	
Description	The [BS] command moves the print buffer one character width to the left. The pointer position cannot be moved to the left of the left margin. [BS] does not cause the buffer to be printed; the following data is OR'ed with the previous data.	

Function	Set horizontal tab	
ASCII	[HT]	
Hexadecimal	9H	
Decimal	<10>	
Description	The [HT] command moves the print position to the next horizontal tab position. The command is used to align character columns. The command is ignored unless another horizontal tab position has been set.	
Note 1	In TM-U200 mode, the buffer must be set to 40 characters.	

Function	Set horizontal tab positions	
ASCII	[ESC] D <n <sub>1</sub> > ... <n <sub>k</sub> > NUL	

<b>Hexadecimal</b>	1BH 44H <n <sub>1</sub> > ... <n <sub>k</sub> > 00
<b>Decimal</b>	<27> <68> <n <sub>1</sub> > ... <n <sub>k</sub> > <0>
<b>Range</b>	1 ≤ n ≤ 255 0 ≤ k ≤ 32
<b>Description</b>	The [ESC] D <n <sub>1</sub> > ... <n <sub>k</sub> > NUL command sets the horizontal tab positions. <n> specifies the column number for setting a horizontal tab position. The command deletes any previously set horizontal tab positions. Up to 32 tab positions can be set. The default tab positions are at intervals of eight characters for 7 x 9 font.

**Note 1** In TM-U200 mode, the buffer must be set to 40 characters.

---

<b>Function</b>	<b>Set left margin</b>	<b>EPOS ONLY</b>
-----------------	------------------------	------------------

---

<b>ASCII</b>	GS L <n <sub>l</sub> > <n <sub>h</sub> >
<b>Hexadecimal</b>	1DH 4CH <n <sub>l</sub> > <n <sub>h</sub> >
<b>Decimal</b>	<29> <76> <n <sub>l</sub> > <n <sub>h</sub> >
<b>Range</b>	0 ≤ n <sub>l</sub> ≤ 255 0 ≤ n <sub>h</sub> ≤ 255
<b>Description</b>	The GS L <n <sub>l</sub> > <n <sub>h</sub> > command sets the left margin using n <sub>l</sub> and n <sub>h</sub> . The left margin is set to [(n <sub>l</sub> + n <sub>h</sub> × 256) × horizontal motion unit)] from the beginning of the line. In standard mode, the command is enabled only when input at the beginning of a line. In page mode, an internal flag is activated, and the command is enabled when the printer returns to standard mode.

---

<b>Function</b>	<b>Set printing area width</b>	<b>EPOS ONLY</b>
-----------------	--------------------------------	------------------

---

<b>ASCII</b>	GS W <n <sub>l</sub> > <n <sub>h</sub> >
<b>Hexadecimal</b>	1DH 57H <n <sub>l</sub> > <n <sub>h</sub> >
<b>Decimal</b>	<29> <87> <n <sub>l</sub> > <n <sub>h</sub> >
<b>Range</b>	0 ≤ n <sub>l</sub> ≤ 255 0 ≤ n <sub>h</sub> ≤ 255
<b>Description</b>	The printing area width is set to [(n <sub>l</sub> + n <sub>h</sub> × 256) × horizontal motion unit)] from the left margin. In standard mode, the command is enabled only when input at the beginning of a line. In page mode, an internal flag is activated, and the command is enabled when the printer returns to standard mode.

---

<b>Function</b>	<b>Turn on/off unidirectional printing mode</b>
-----------------	---

---

<b>ASCII</b>	[ESC] U <n>
<b>Hexadecimal</b>	1BH 55H <n>
<b>Decimal</b>	<27> <85> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] U <n> command turns on/off unidirectional printing mode. When the least significant bit (LSB) of <n> = 1, unidirectional printing is turned on. When LSB = 0, unidirectional printing is turned off, and bidirectional printing is turned on. Unidirectional printing can be turned on when printing double-high characters to ensure that the top and bottom of the characters are aligned. <n> = 0 is the default setting.

---

<b>Function</b>	<b>Set left margin</b>	<b>EPOS ONLY</b>
-----------------	------------------------	------------------

---

<b>ASCII</b>	[ESC] l <n>
<b>Hexadecimal</b>	1DH 6CH <n>
<b>Decimal</b>	<29> <108> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] l <n> command sets the left margin using <n>. The left margin is set to <n> characters from the beginning of the line.

---

<b>Function</b>	<b>Set right margin</b>	<b>EPOS ONLY</b>
-----------------	-------------------------	------------------

---

<b>ASCII</b>	[ESC] Q <n>
<b>Hexadecimal</b>	1BH 51H <n>
<b>Decimal</b>	<29> <81> <n>
<b>Range</b>	$0 \leq n \leq 255$
<b>Description</b>	The [ESC] Q <n> command sets the right margin using <n>. The right margin is set to <n> characters from the beginning of the line.

---

<b>Function</b>	<b>Return home</b>
<b>ASCII</b>	[ESC] <
<b>Hexadecimal</b>	1BH 3CH
<b>Decimal</b>	<27> <60>
<b>Description</b>	The [ESC] < command moves the print head to the home position.

## Bit-Image Commands

---

<b>Function</b>	<b>Select bit-image mode</b>
<b>ASCII</b>	[ESC] * <m> <nl> <nh> <dl> ... <dk>
<b>Hexadecimal</b>	1BH 2AH <m> <nl> <nh> <dl> ... <dk>
<b>Decimal</b>	<27> <42> <m> <nl> <nh> <dl> ... <dk>
<b>Range</b>	<m> = 0, 1 in TM U200    0, 1, 32, 33 in EPOS mode $0 \leq nl \leq 255$ $0 \leq nh \leq 3$ $0 \leq d \leq 255$ $k = nl + nh \times 256$ for <m> = 0 or 1 $k = (nl + nh \times 256) \times 3$ for <m> = 32 or 33
<b>Description</b>	[ESC] * <m> <n <sub>lhlkl</sub> + n <sub>h</sub> x 256) in mode 0 or 1 and (n <sub>l</sub> + n <sub>h</sub> x 256)*3 in mode 32 or 33 and <d> indicates the bit image data. Set a bit to one to print a dot, or set a bit to zero to not print a dot. Use the command to print a predefined picture or logo. The modes selectable by <m> are listed below.

<m>	Mode	Vertical Direction		Horizontal Direction	
		Dot Density	Number of Dots	Dot Density	Number of Dots
0	8-dot single density	96 dpi	8	80 dpi	200
1	8-dot double density	96 dpi	8	160 dpi	400
32	24 dot single density	96 dpi	24	120 dpi	300
33	24 dot double density	192 dpi	24	240 dpi	600

Table 38 Print Density Selection

## Status Commands

Function	Enable/disable Automatic Status Back (ASB)
ASCII	[GS] a <n>
Hexadecimal	1DH 61H <n>
Decimal	<29> <97> <n>
Range	0 ≤ n ≤ 255
Description	<p>The [GS] a &lt;n&gt; command selects a status for ASB transmission. ASB is enabled if any status item is selected. The printer automatically transmits a 4-byte status message whenever the status changes. Multiple status items can be enabled or disabled. When &lt;n&gt; = 0, ASB is disabled.</p> <p>The default depends on the DIP switch settings (&lt;n&gt; = 0 or 2). When the printer is disabled by the [ESC] = command and ASB is enabled, the printer transmits a 4-byte status message every time the status changes. If the printer goes off-line due to a paper-end condition, bit 0 of the second byte (waiting for on-line recovery) is on from the time the paper roll is inserted until the time the printer goes on-line. See the [GS] z 0 command for details of on-line recovery wait time.</p> <p>The paper roll near-end sensor is an option. If the printer is not equipped with the paper near-end sensor, bits 0 and 1 of the third byte are always on, with paper adequate status. Bit 3 of the second byte is always, "No error." The status items are selected using &lt;n&gt; as follows:</p>

Bit	Off/On	Hex	Decimal	Status for Automatic Status Back (ASB)
0	Off	00H	<0>	Drawer kick-out connector pin 3 status disabled
	On	01H	<1>	Drawer kick-out connector pin 3 status enabled
1	Off	00H	<0>	On-line/off-line disabled
	On	02H	<2>	On-line/off-line enabled
2	Off	00H	<0>	Error status disabled
	On	04H	<4>	Error status enabled
3	Off	00H	<0>	Paper roll sensor status disabled
	On	08H	<8>	Paper roll sensor status enabled
-	-	-	-	Undefined

Table 39 Automatic Status Back (ASB) Values for <n>

Bit	Off/On	Hex	Decimal	Status for Automatic Status Back (ASB)
0	Off	00H	<0>	Not used; fixed to Off
1	Off	00H	<0>	Not used; fixed to Off
2	Off	00H	<0>	Drawer kick-out connector pin 3 low
	On	04H	<4>	Drawer kick-out connector pin 3 high
3	Off	00H	<0>	On-line
	On	08H	<8>	Off-line
4	On	10H	<16>	Not used; fixed to On
5	-	-	-	Undefined
6	Off	00H	<0>	Paper is not being fed by the <b>FEED</b> button.
	On	40H	<64>	Paper is being fed by the <b>FEED</b> button.
	Off	00H	<0>	Not used; fixed to Off

Table 40 Automatic Status Back (ASB) First Byte (Printer Information)

Bit	Off/On	Hex	Decimal	Status for Automatic Status Back (ASB)
0	Off	00H	<0>	Not waiting for on-line recovery
	On	01H	<1>	Waiting for on-line recovery
1	-	-	-	Undefined
2	Off	00H	<0>	No mechanical error
	On	04H	<4>	Mechanical error occurred
3	Off	00H	<0>	No Auto-cutter error
	On	08H	<8>	Auto-cutter error occurred
4	Off	00H	<0>	Not used; fixed to off
5	Off	00H	<0>	No unrecoverable error <sup>22</sup>
	On	20H	<32>	Unrecoverable error occurred
6	Off	00H	<0>	No temporary abnormality of the print head temperature (high temperature)
	On	40H	<64>	Temporary abnormality of the print head temperature (high temperature) occurred
	Off	00H	<0>	Not used; fixed to Off

Table 41 Automatic Status Back (ASB) Second Byte (Error Information)

<sup>22</sup> The POSjet™ can not recover from mechanical errors without flushing the input buffer. All print data will be lost if a mechanical error occurs.

Bit	Off/On	Hex	Decimal	Status for Automatic Status Back (ASB)
0,1	Off	00H	<0>	Paper near-end sensor: paper adequate
	On	(03H)	(3)	Paper near-end sensor: paper near end
2,3	Off	00H	<0>	Paper end sensor: paper present
	On	0CH	<12>	Paper end sensor: paper not present
4	Off	00H	<0>	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00H	<0>	Not used; fixed to Off

Table 42 Automatic Status Back (ASB) Third Byte (Paper Sensor Information)

Bit	Off/On	Hex	Decimal	Status for Automatic Status Back (ASB)
0-3	-	-	-	Undefined
4	Off	00H	<0>	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00H	<0>	Not used; fixed to Off

Table 43 Automatic Status Back (ASB) Fourth Byte (Paper Sensor Information)

Function	Transmit status
ASCII	[GS] r <n>
Hexadecimal	1DH 72H <n>
Decimal	<29> <114> <n>
Range	1 ≤ n ≤ 2 49 ≤ n ≤ 50
Description	The [GS] r <n> command transmits the status specified by <n> as follows: paper sensor status as one byte of data when <n> = 1 or 49, and drawer kick-out connector status when <n> = 2 or 50. The paper present status of bits 2 and 3 for the paper sensor status is not transmitted because the printer goes off-line when a paper-end is detected by the paper-end sensor. The paper roll near-end sensor is an option. If the sensor is not installed, bits 0 and 1 for the paper sensor status are always in the "Paper adequate" status.

Bit	Off/On	Hex	Decimal	Status
0,1	Off	00H	<0>	Paper near-end sensor: paper adequate
	On	(03H)	(3)	Paper near-end sensor: paper near end
2,3	Off	00H	<0>	Paper end sensor: paper present
	On	0CH	<12>	Paper end sensor: paper not present
4	Off	00H	<0>	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00H	<0>	Not used; fixed to Off

Table 44 Paper Sensor Status (&lt;n&gt; = 1, 49)

Bit	Off/On	Hex	Decimal	Status
0	Off	00H	<0>	Drawer kick-out connector pin 3 low
	On	01H	<1>	Drawer kick-out connector pin 3 high
1-3	-	-	-	Undefined
4	Off	00H	<0>	Not used; fixed to Off
5,6	-	-	-	Undefined
7	Off	00H	<0>	Not used; fixed to Off

Table 45 Drawer Kick-out Connector Status (&lt;n&gt; = 2, 50)



<b>Function</b>	<b>Transmit real-time status</b>
<b>ASCII</b>	[DLE] [EOT] <n>
<b>Hexadecimal</b>	10H 04H <n>
<b>Decimal</b>	<16> <4> <n>
<b>Range</b>	1 ≤ n ≤ 4
<b>Description</b>	The [DLE] EOT <n> command transmits the specified status in real time. The command is executed if the printer is off-line, the print buffer is full, or an error occurs. If the printer goes off-line due to a paper-end condition, bit 5 of the printer status (waiting for on-line recovery) is on from the time the paper roll is inserted to the time the printer goes on-line. See the [GS] z 0 command for details of the on-line recovery wait time. The paper roll near-end sensor is an option. If the printer does not have a paper near-end sensor, bits 2 and 3 of the paper roll sensor status will always be "Paper adequate." Bit 3 of the second byte is always "No error occurred."

<n>	Function
1	Transmit printer status
2	Transmit off-line status
3	Transmit error status
4	Transmit paper roll sensor status

Table 46 Values for the Status Function, &lt;n&gt;

Bit	Off/On	Hexl	Decimal	Status
0	Off	00H	<0>	Not used; fixed to off
1	On	02H	<2>	Not used; fixed to on
2	Off	00H	<0>	Drawer kick-out connector pin 3 low
	On	04H	<4>	Drawer kick out connector pin 3 high
3	Off	00H	<0>	On-line
	On	08H	<8>	Off-line
4	On	10H	<16>	Not used; fixed to on
5	Off	00H	<0>	Not waiting for on-line recovery
	On	20H	<32>	Waiting for on-line recovery <sup>23</sup>
6	-	-	-	Undefined
7	Off	00H	<0>	Not used; fixed to off

Table 47 Printer Status (&lt;n&gt; = 1)

Bit	Off/On	Hexl	Decimal	Status
0	Off	00H	<0>	Not used; fixed to off
1	On	02H	<2>	Not used; fixed to on
2	-	-	-	Undefined
3	Off	00H	<0>	Paper is not being fed by the <b>FEED</b> button.
	On	08H	<8>	Paper is being fed by the <b>FEED</b> button.
4	On	10H	<16>	Not used; fixed to on
5	Off	00H	<0>	No paper-end stop
	On	20H	<32>	Printing stops due to paper-end
6	Off	00H	<0>	No error
	On	40H	<64>	Error occurs
7	Off	00H	<0>	Not used; fixed to off

Table 48 Off-line Status (&lt;n&gt; = 2)

<sup>23</sup> The POSjet™ 1000 does not require any operator intervention to recover from on-line recovery. The Insta-Load™ feature will automatically restore the printer to the on line state.

Bit	Off/On	Hex	Decimal	Status
0	Off	00H	<0>	Not used; fixed to off
1	On	02H	<2>	Not used; fixed to on
2	Off	00H	<0>	No mechanical error
	On	04H	<4>	Mechanical error occurred
3	Off	00H	<0>	No Auto-cutter error
	On	08H	<8>	Auto-cutter error occurred
4	On	10H	<16>	Not used; fixed to on
5	Off	00H	<0>	Unrecoverable error occurred
	On	20H	<32>	Recoverable error occurred
6	Off	00H	<0>	No temporary abnormality of the print head temperature (high temperature)
	On	40H	<64>	Temporary abnormality of the print head temperature (high temperature) occurred
7	Off	00H	<0>	Not used; fixed to off

Table 49 Error Status (&lt;n&gt; = 3)

Bit	Off/On	Hex	Decimal	Status
0	Off	00H	<0>	Not used; fixed to off
1	On	02H	<2>	Not used; fixed to on
2,3	Off	00H	<0>	Paper near-end sensor: paper adequate
	On	(0CH)	(<12>)	Paper near-end sensor: paper near end
4	On	10H	<16>	Not used; fixed to on
5,6	Off	00H	<0>	Paper end sensor: paper adequate
	On	60H	<96>	Paper end sensor: paper not present
7	Off	00H	<0>	Not used; fixed to off

Table 50 Paper Roll Sensor Status (&lt;n&gt; = 4)

Function	Transmit Peripheral status
ASCII	[ESC] u <n>
Hexadecimal	1BH 75H <n>
Decimal	<27> <117> <n>
Range	n = 0
Description	The [ESC] r <n> command transmits peripheral status has been replaced by the [GS] r command. The POSjet™ 1000 return cash drawer status as specified below.

Bit	Off/On	Hex	Decimal	Status
0	Off	00H	<0>	Pin 3 is Low
	On	(03H)	(3)	Pin 3 is High
1 - 7	Off	00H	<0>	Not used; fixed to Off

Table 51 Peripheral Status (&lt;n&gt; = 0, 48)

**Function**      **Transmit Paper Sensor status****ASCII**      [ESC] v**Hexadecimal**      1BH 76H**Decimal**      <27> <118>

**Description**      The [ESC] v command has been replaced by the [GS] r command. The [ESC] v command transmits paper status has been replaced by the [GS] r command. The POSjet™ 1000 return paper status as specified below.

Bit	Off/On	Hex	Decimal	Status
0,1	Off	00H	<0>	Paper adequate
	On	(03H)	(3)	Paper Near End
2,3	Off	00	<0>	Paper Present
	On	(0CH)	<12>	Paper Not Present
5-7	Off	00	<0>	Not used, Fixed Off

Table 52 Paper Status

## Bar Code Commands

Function	Set bar code height	EPOS ONLY
ASCII	GS h <n>	
Hexadecimal	1DH 68H <n>	
Decimal	<29> <104> <n>	
Range	$1 \leq n \leq 255$	
Default	0.90 inch high	
Description	The GS h <n> command sets the height of the bar code. The bar code height is set to n/180 inch.	

Function	Print bar code	EPOS ONLY
<sup>1</sup> ASCII	GS k <m> <d <sub>1</sub> > ... <d <sub>k</sub> > NUL	
Hexadecimal	1DH 6BH <m> <d <sub>1</sub> > ... <d <sub>k</sub> > 00	
Decimal	<29> <107> <m> <d <sub>1</sub> > ... <d <sub>k</sub> > 0	
<sup>2</sup> ASCII	GS k <m> <n> <d <sub>1</sub> > ... <d <sub>n</sub> >	
Hexadecimal	1DH 6BH <m> <n> <d <sub>1</sub> > ... <d <sub>n</sub> >	
Decimal	<29> <107> <m> <n> <d <sub>1</sub> > ... <d <sub>n</sub> >	
Range	<sup>1</sup> $0 \leq m \leq 6$ (k and d depend on the bar code system used.) <sup>2</sup> $65 \leq m \leq 73$ (n and d depend on the bar code system used.)	
Description	The GS k <m> <d <sub>1</sub> > ... <d <sub>k</sub> > NUL command selects a bar code system and prints the bar code.	

<m>		Bar Code System	Number of Characters	Remarks
1	0	UPC A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
1	1	UPC E	$11 \leq k \leq 12$	$48 \leq d \leq 57$
1	2	JAN-13 (EAN-13)	$12 \leq k \leq 13$	$48 \leq d \leq 57$
1	3	JAN-8 (EAN-8)	$7 \leq k \leq 8$	$48 \leq d \leq 57$
1	4	Code 39	$1 \leq k$	$48 \leq d \leq 57$ , $65 \leq d \leq 90$ d = 32, 36, 37, 43, 45, 46, 47
1	5	ITF	$1 \leq k$ (even number)	$48 \leq d \leq 57$
1	6	Codabar	$1 \leq k$	$48 \leq d \leq 57$ , $65 \leq d \leq 68$ d = 32, 36, 37, 43, 45, 46, 47, 58
2	65	UPC A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
2	66	UPC E	$11 \leq k \leq 12$	$48 \leq d \leq 57$
2	67	JAN-13 (EAN-13)	$12 \leq k \leq 13$	$48 \leq d \leq 57$
2	68	JAN-8 (EAN-8)	$7 \leq k \leq 8$	$48 \leq d \leq 57$
2	69	Code 39	$1 \leq n \leq 255$	$48 \leq d \leq 57$ , $65 \leq d \leq 90$ d = 32, 36, 37, 43, 45, 46, 47
2	70	ITF	$1 \leq n \leq 255$ (even number)	$48 \leq d \leq 57$

Table 53 Bar Code System Based on &lt;m&gt;

<m>		Bar Code System	Number of Characters	Remarks
2	71	Codabar	$1 \leq n \leq 255$	$48 \leq d \leq 57$ , $65 \leq d \leq 68$ $d = 32, 36, 37, 43, 45, 46, 47, 58$
2	72	Code 93	$1 \leq n \leq 255$	$0 \leq d \leq 127$
2	73	Code 128	$2 \leq n \leq 255$	$0 \leq d \leq 127$

Table 54 Bar Code System Based on &lt;m&gt;

**[Description for <sup>1</sup>]**

&lt;d&gt; indicates the character code to be printed.

A null (00 Hex) character ends the bar code definition.

**[Description for <sup>2</sup>]**

&lt;n&gt; indicates the number of bytes of bar code data to be processed immediately following &lt;n&gt;. &lt;d&gt; indicates the character code to be printed.

**The following apply to both****GS k <m> <d<sub>1</sub>> ... <d<sub>k</sub>> NUL****GS k <m> <n> <d<sub>1</sub>> ... <d<sub>n</sub>>:**

If the horizontal width exceeds the printing area, the printer only feeds the paper.

These commands feed as much paper as necessary to print the bar code according to the GS h command.

These commands are enabled only when no data exists in the print buffer. When data does exist in the print buffer, the printer processes the data following &lt;m&gt; as normal data.

After printing a bar code, the print position is set at the beginning of the line.

These commands are not effected by print modes (emphasized, underline, character size, etc.), except for upside-down mode.

Function	Select printing position of HRI characters	EPOS ONLY
ASCII	GS H <n>	
Hexadecimal	1DH 48H <n>	
Decimal	<29> <72> <n>	
Range	$0 \leq n \leq 3$ , $48 \leq n \leq 51$	
Description	The GS H <n> command selects the printing position of HRI (Human Readable Interpretation) characters when printing a bar code. <n> selects the printing position as follows.	

<n>	Printing position
0, 48	Not printed
1, 49	Above bar code
2, 50	Below bar code
3, 51	Both above and below the bar code

Table 55 Printing Position of HRI Characters

Function	Select font for HRI characters	EPOS ONLY
ASCII	GS f <n>	
Hexadecimal	1DH 66H <n>	
Decimal	<29> <102> <n>	
Range	<n> = 0, 1, 48, 49	
Description	The GS f <n> command selects a font for the HRI (Human Readable Interpretation) characters used when printing a bar code. <n> selects a font from the following table.	

<n>	Font
0, 48	Font A (14 x 12)
1, 49	Font B (12 x 12)

Table 56 Font for Human Readable Interpretation (HRI) Characters

## Mechanism Control Commands

<b>Function</b>	<b>Select cut mode and cut paper</b>	
<b>ASCII</b>	[GS] V <m> <n>	
<b>Hexadecimal</b>	1DH 56H <m> <n>	
<b>Decimal</b>	<29> <86> <m> <n>	
<b>Description</b>	When <m> = 1 or 49, <n> is not used and a partial cut is performed. When <m> = 66, [GS] V <m> <n> executes a partial cut (one point left uncut) after paper is fed [cutting position (<n> x approximately 1/144 inch)]. When using the command, there is a gap between the auto-cutter position and the print position. The [GS] V <m> <n> command is only effective when input at the beginning of a line. The [GS] V <m> <n> command executes paper feeding to the manual cutting position.	
<b>Function</b>	<b>Partial knife cut</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	[ESC] i	
<b>Hexadecimal</b>	1BH 69H	
<b>Decimal</b>	<27> <105>	
<b>Description</b>	The [ESC] i command performs a partial knife cut.	
<b>Function</b>	<b>Perform a partial knife cut</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	[ESC] m	
<b>Hexadecimal</b>	1BH 6DH	
<b>Decimal</b>	<27> <109>	
<b>Description</b>	The [ESC] m command performs a partial knife cut.	
<b>Function</b>	<b>Sound buzzer</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	[BEL]	
<b>Hexadecimal</b>	07H	
<b>Decimal</b>	<07>	
<b>Description</b>	The [BEL] command sounds the internal buzzer, if equipped.	
<b>Function</b>	<b>Sound buzzer</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	[ESC] BEL	
<b>Hexadecimal</b>	1BH 07H	
<b>Decimal</b>	<27> <07>	
<b>Description</b>	The [ESC] BEL command sounds the internal buzzer, if equipped.	

## Miscellaneous Commands

Function	Set horizontal and vertical motion units	EPOS ONLY
ASCII	[GS] P x y	
Hexadecimal	1DH 50H x y	
Decimal	<29> <80> x y	
Range	$0 \leq x \leq 255$	
Default	x = 180, y = 360	
Description	The GS P x y command sets the horizontal and vertical motion units to 1/x inches and 1/y inches, respectively. When x and y are set to zero, the default setting of each value is used.	

Function	Initialize the printer
ASCII	[ESC] @
Hexadecimal	1BH 40H
Decimal	<27> <64>
Description	The [ESC] @ command initializes the printer. All settings, including character font and line spacing, are canceled.

Function	Transmit printer ID
ASCII	[GS] I <n>
Hexadecimal	1DH 49H <n>
Decimal	<29> <73> <n>
Range	$1 \leq n \leq 3$ $49 \leq n \leq 51$
Description	The [GS] I <n> command transmits the printer ID specified by <n> below. Each printer ID consists of one byte of data.

<n>	Printer ID	Hex ID
1,49	Printer model ID	0DH
2,50	Type ID	00H or 02H
3,51	ROM version ID	Refer to current ROM version.

Table 57 Printer ID

Bit	Off/On	Hex	Decimal	Function
0	Off	00H	<0>	No two-byte character code
1	Off	00H	<0>	Not Auto-cutter equipped
	On	02H	<2>	Auto-cutter equipped
2,3	-	-	-	Undefined
4	Off	00H	<0>	Not used; fixed to off
5,6	-	-	-	Undefined
7	Off	00H	<0>	Not used; fixed to off

Table 58 Type ID (&lt;n&gt; = 2 or 50)



<b>Function</b>	<b>Generate pulse</b>
<b>ASCII</b>	[ESC] p <m> <t <sub>1</sub> > <t <sub>2</sub> >
<b>Hexadecimal</b>	1BH 70H <m> <t <sub>1</sub> > <t <sub>2</sub> >
<b>Decimal</b>	<27> <112> <m> <t <sub>1</sub> > <t <sub>2</sub> >
<b>Range</b>	<m> = 0, 1, 48, 49 0 ≤ t <sub>1</sub> ≤ 255 0 ≤ t <sub>2</sub> ≤ 255
<b>Description</b>	The [ESC] p <m> <t <sub>1</sub> > <t <sub>2</sub> > command sends a pulse (on time = <t <sub>1</sub> > x 2 msec) to the specified connector pin. When <m> = 1 or 48, the pulse is sent to drawer-kick-out connector pin 2. When <m> = 0 or 48, the pulse is sent to drawer-kick-out connector pin 2; when <m> = 1 or 49, the pulse is sent to drawer-kick-out connector pin 5.

<b>Function</b>	<b>Select peripheral device status</b>
<b>ASCII</b>	[ESC] = <n>
<b>Hexadecimal</b>	1BH 3DH <n>
<b>Decimal</b>	<27> <61> <n>
<b>Range</b>	1 ≤ n ≤ 3
<b>Description</b>	The [ESC] = <n> command selects the device to which the host computer sends data, based on the value of <n> listed below.

Bit	Off/On	Hex	Decimal	Function
0	Off	00H	<0>	Printer disabled
	On	01H	<1>	Printer enabled
1	Off	00H	<0>	Customer display disabled
	On	02H	<2>	Customer display enabled
2-7	-	-	-	Undefined

Table 59 Peripheral Device Bit Definitions

**Note 1** In TM-U200 mode, the value of <n> must be <2> to enable the display, and <1> to enable the printer. This does not match the Epson documentation, but is how the TM-U200 works. The POSjet™ 1000 Printer matches the TM-U200 in TM-U200 mode. In EPOS mode, you may do both.

<b>Function</b>	<b>Real-time request to printer</b>
<b>ASCII</b>	[DLE] [ENQ] <n>
<b>Hexadecimal</b>	10H 05H <n>
<b>Decimal</b>	<16> <5> <n>
<b>Range</b>	<n> = 0, 2
<b>Description</b>	The [DLE] ENQ <n> command responds to a request from the host computer specified by <n> as shown below. The command is also executed when the printer is disabled. When the printer stops printing due to a paper-end condition, <n> = 0 is only effective when the printer is waiting for on-line recovery from the time the paper roll is inserted to the time the printer goes on-line. The on-line recovery wait time is confirmed by the printer status of ASB or the [DLE] EOT command. <n> = 2 is only effective when a recoverable error occurs. The printer can recover from an error without turning off the power. Whether an error occurs or not can be confirmed by the ASB status or the error status of the [DLE] EOT command.
<b>Where &lt;n&gt;</b>	0 Recovers to on-line 2 Recovers from an error after clearing the receive and print buffers

<b>Function</b>	<b>Set on-line recovery wait time</b>	<b>TM-U200 ONLY</b>
<b>ASCII</b>	[GS] z 0 <t <sub>1</sub> > <t <sub>2</sub> >	
<b>Hexadecimal</b>	1DH 7AH 30H <t <sub>1</sub> > <t <sub>2</sub> >	
<b>Decimal</b>	<29> <122> <48> <t <sub>1</sub> > <t <sub>2</sub> >	
<b>Range</b>	0 ≤ t <sub>1</sub> ≤ 255 0 ≤ t <sub>2</sub> ≤ 255	
<b>Description</b>	The [GS] z 0 <t <sub>1</sub> > <t <sub>2</sub> > command is not used by the POSjet™ 1000 Printer. When the cover is closed, the printer returns to full operation immediately. The <b>FEED</b> button does not need to be pressed to resume operation after a paper change. The application may send the [GS] z 0 <t <sub>1</sub> > <t <sub>2</sub> > command to the printer, but it will be ignored.	
<b>Function</b>	<b>Copy user-defined storage buffers</b>	
<b>ASCII</b>	[ESC] ' <n>	
<b>Hexadecimal</b>	1BH 27H <n>	
<b>Decimal</b>	<27> <39> <n>	
<b>Description</b>	The [ESC] ' <n> command copies data between the user-defined RAM buffer and the nonvolatile flash buffer. If <n> = 0, the command saves user-defined characters and graphics to predefined user-store locations. If <n> = 1, the command retrieves both user-defined characters and graphics from user store.	
<b>Function</b>	<b>Enter Test Mode</b>	
<b>ASCII</b>	[GS] ( A <2> <0> <n> <m>	
<b>Hexadecimal</b>	1DH 28H 41H <2> <0> <n> <m>	
<b>Decimal</b>	<29> <40> <65> <2> <0> <n> <m>	
<b>Description</b>	This command places the printer into test mode based on the parameters <n> and <m>.	
<b>Where &lt;n&gt;</b>	may be 0, 1, 2, 48, 49, or 50. It is intended to select the print station. The POSjet™ will accept any of these values	
<b>Where &lt;m&gt;</b>	1 or 49 Selects Hex Dump mode. You must press the Φ button to exit this mode 2 or 50 Selects Printer configuration print out. 3 or 51 Selects Rolling ASCII test pattern. You must press Φ button to exit this mode	

## Macro Function Commands

Function	Start/end macro definition	EPOS ONLY
ASCII	[GS] :	
Hexadecimal	1DH 3AH	
Decimal	<29> <58>	
Description	The [GS] : command starts or ends macro definition. Macro definition starts when the command is received during normal operation and ends when it is received during the macro definition. The macro definition can contain up to 2048 bytes. If the definition exceeds 2048 bytes, the excess data will not be stored.	
Function	Execute macro	EPOS ONLY
ASCII	GS ^ r t m	
Hexadecimal	1DH 5EH r t m	
Decimal	<29> <94> r t m	
Range	0 ≤ r ≤ 255 0 ≤ t ≤ 255 m = See below	
Description	The GS ^ r t m command executes a macro definition. The r specifies the number of times to execute the macro. When Bit 1 of m is set, r is ignored, and the macro is executed infinitely. t specifies the waiting time for executing the macro; it is t × 100 msec for every macro execution. m specifies macro executing mode. When the LSB of m = 0, the macro executes r times continuously with the interval specified by t. When the LSB of m = 1, the printer remains idle and waits for the <b>FEED</b> button to be pressed (after waiting for the period specified by t). After the button is pressed, the printer executes the macro once. The printer repeats the operation r times. When Bit 5 of m is set, the current macro definition is saved into the printer's nonvolatile flash memory as a start-up macro without executing it. The macro definition is executed upon power-up using the parameters specified by the GS ^ r t m command. If the printer is powered-up into self-test mode, the macro definition will not be executed. A saved macro definition can be deleted with the GS _ command.	

Bit	Off/On	Hexl	Decimal	Function
0	Off	00	0	Macro executes r times continuously with the interval specified by t.
	On	01	1	<b>FEED</b> button controlled operation with time interval t
1-4	-	-	-	Undefined
5	On	20	32	Value given by r is ignored and macro is run infinitely.
6	On	40	64	Save start-up macro definition to flash memory without executing
7	-	-	-	Undefined

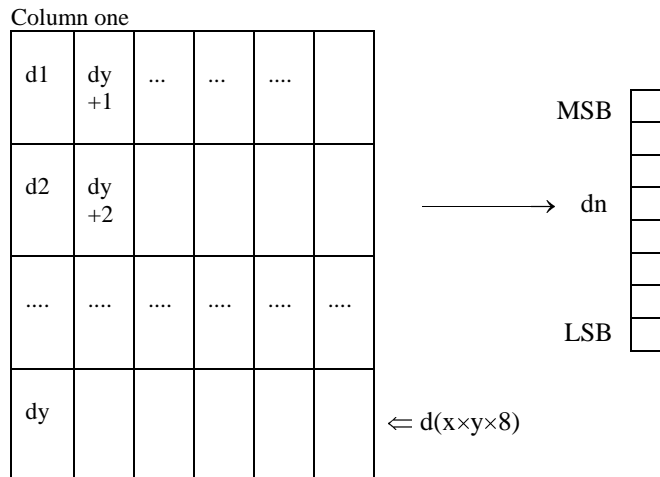
Table 60 Macro Control Bit Definitions

Function	Delete start-up macro definition	EPOS ONLY
<b>ASCII</b>	GS _	
<b>Hexadecimal</b>	1DH 5FH	
<b>Decimal</b>	<29> <95>	
<b>Description</b>	The GS _ command deletes a start-up macro definition previously created by the GS ^ command. If a start-up macro was not previously defined, the command will be ignored.	

## User-defined Memory Commands

Function	Define user-defined bit image	EPOS ONLY
ASCII	GS - <Name..> <0> x y d <sub>1</sub> ... d(x x y x 8)	
Hexadecimal	1DH 2DH <Name..> <0> x y d <sub>1</sub> ... d(x x y x 8)	
Decimal	<29> <45> <Name..> <0> x y d <sub>1</sub> ... d(x x y x 8)	
Range	1 ≤ x ≤ 255 1 ≤ y ≤ 255 0 ≤ d ≤ 255 <Name> = a 15-byte maximum length name to identify the image	
Description	GS - defines a bit-image for storage in the nonvolatile memory pool. The printer maintains an area of flash memory specifically designated for multiple bit-image storage. The area can contain as many bit-images as its size permits. (A printout of the amount of nonvolatile memory remaining can be obtained by performing a printer self test.) Each image is uniquely identified by the name given to it by the <Name> parameter. The name of the bit-image can be from one to 15 bytes long and contain any alphanumeric characters as well as spaces. The format of the bit-image is identical to that defined by the GS * command. The GS-command must be entered in standard mode only at the beginning of a print line. Any image may be up to 2048 bytes long. If the size of the image is larger than the space remaining in the nonvolatile buffer, the image will not be saved. When the last byte of bit-image data is received and there is ample space in the nonvolatile buffer for the bit-image, the bit image will be saved.	

The following basic example demonstrates how to define an 8-bit x 8-bit block with the name "MY IMAGE": A representation of the format of a downloaded bit-image is depicted below.

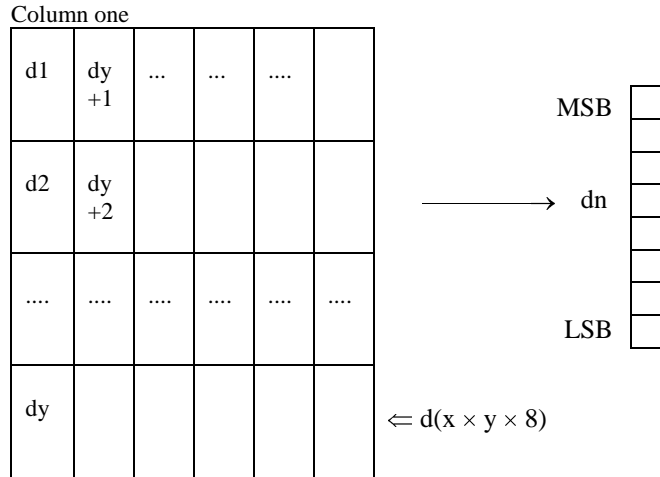


```
PRINT #1, CHR$(29),CHR$(45),
PRINT #1, "MY IMAGE",CHR$(0);
PRINT #1, CHR$(1),CHR$(1);
PRINT #1, CHR$(255),CHR$(255),CHR$(255),CHR$(255);
PRINT #1, CHR$(255),CHR$(255),CHR$(255),CHR$(255)
```

```
REM Enter the GS command
REM Define the image name
REM Image size (8 x 8 bits)
REM Send 8 bytes of image
REM data
```

<b>Function</b>	<b>Print user-defined bit image</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	GS 0 <Name..> <0>	
<b>Hexadecimal</b>	1DH 30H <Name..> 0H	
<b>Decimal</b>	<29> <48> <Name..> <0>	
<b>Range</b>	<Name..> = a 15-byte maximum length name to identify the image.	
<b>Description</b>	GS 0 prints a bit-image from storage in the nonvolatile memory pool. The name of the bit-image can be from one to 15 bytes long and contain any alphanumeric characters as well as spaces. GS searches the nonvolatile memory pool for the first occurrence of the image identified by <Name..>. If the image is found, it will be printed. If the image cannot be found, the command will be ignored. The following basic example demonstrates how to print the stored bit-image named "MY IMAGE":	
	PRINT #1            CHR\$(29), CHR\$(48)            REM Enter the GS 0 command	
	PRINT #1            "MY IMAGE", CHR\$(0)            REM Enter the image name	
<b>Function</b>	<b>Erase single entry from nonvolatile memory</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	GS 1 <Name..> <0>	
<b>Hexadecimal</b>	1DH 31H <Name..> 0H	
<b>Decimal</b>	<29> <49> <Name..> <0>	
<b>Range</b>	<Name> = a 15-byte maximum alphanumeric name to identify the image	
<b>Description</b>	GS 1 deletes a single entry (bit-image or character set) from storage in the nonvolatile memory pool.	
<b>Function</b>	<b>Erase all entries from nonvolatile memory</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	GS 5	
<b>Hexadecimal</b>	1DH 35H	
<b>Decimal</b>	<29> <53>	
<b>Description</b>	GS 5 erases the entire contents of the nonvolatile memory pool and frees up the memory for new entries.	
<b>Note 1</b>	No protection for the GS 5 command exists. All user store will be erased!	

Function	Define single user-defined bit-image	EPOS ONLY
ASCII	GS * x y d <sub>1</sub> ... d(x x y x 8)	
Hexadecimal	1DH 2AH x y d <sub>1</sub> ... d(x x y x 8)	
Decimal	<29> <42> x y d <sub>1</sub> ... d(x x y x 8)	
Range	1 ≤ x ≤ 255 1 ≤ y ≤ 48 0 ≤ d ≤ 255	
Description	<p>The GS * x y d<sub>1</sub> ... d(x x y x 8) command defines a single downloaded bit-image using the number of dots specified by x and y in the RAM buffer area (volatile memory). The number of dots in the horizontal direction is x x 8. The number of dots in the vertical direction is y x 8. If (x x y x 8) exceeds the size of the buffer, the image is truncated. d indicates bit-image data and specifies a bit printed to one and not printed to zero. After a downloaded bit-image is defined, it may be saved to the nonvolatile flash storage buffer using the ESC ' command where it remains indefinitely. Otherwise, the image remains in the RAM buffer where it is available until ESC @ or ESC &amp; is executed; the power is turned off; or the printer is reset. A representation of the format of a downloaded bit-image is depicted below.</p>	



<b>Function</b>	<b>Print single user-defined bit-image</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	GS / <m>	
<b>Hexadecimal</b>	1DH 2FH <m>	
<b>Decimal</b>	<29> <47> <m>	
<b>Description</b>	The GS / <m> command prints a downloaded or stored bit-image using the mode specified by <m>. <m> selects a mode from the table below.	

Hex	Decimal	Mode	Vertical Dot Density (dpi)	Horizontal Dot Density (dpi)
00	0	Normal	203	203
01	1	Double-wide	203	101
02	2	Double-high	101	203
03	3	Quadruple	101	101

Table 61 User-defined Bit-image Resolutions

<b>Function</b>	<b>Save user-defined character set</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	GS 6 <Name..> <0>	
<b>Hexadecimal</b>	1DH 36H <Name..> 0H	
<b>Decimal</b>	<29> <54> <Name..> <0>	
<b>Range</b>	<Name> = a 15-byte maximum alphanumeric name to identify the image.	
<b>Description</b>	GS 6 <Name..> <0> saves the current character set created by the [ESC] & command to the nonvolatile memory pool. If no character set has been defined, the command stores an empty definition structure.	

<b>Function</b>	<b>Select user-defined character set</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	GS 7 <Name..> <0>	
<b>Hexadecimal</b>	1DH 37H <Name..> 0H	
<b>Decimal</b>	<29> <55> <Name..> <0>	
<b>Range</b>	<Name..> = a 15-byte maximum alphanumeric name to identify the image.	
<b>Description</b>	GS 7 <Name..> <0> selects a previously saved user-defined character set. If the character set does not exist, the command is ignored.	

<b>Function</b>	<b>Query nonvolatile memory pool information</b>	<b>EPOS ONLY</b>
<b>ASCII</b>	GS 3	
<b>Hexadecimal</b>	1DH 33H	
<b>Decimal</b>	<29> <51>	

**Description** The GS 3 command prints a summary of the user-store usage. It is intended to help with the generation and maintenance of user store.

**Note 1** The report is printed as part of the configuration report.



## Ithaca® Specific POSjet™ Commands

The POSjet™ 1000 has a number of Extended control commands designed to make operation and maintenance of the printer easier for the host application refer to the POSjet™ Extended Control discussion on page 190.

### Panel Button Commands

---

<b>Function</b>	<b>Enable/disable paper feed</b>
<b>ASCII</b>	[ESC] p 5 <n>
<b>Hexadecimal</b>	1BH 70H 35H <n>
<b>Decimal</b>	<27> <112> <53> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] c 5 <n> command enables or disables the <b>FEED</b> button.
<b>Where &lt;n&gt;</b>	Bit 0 = 1 the <b>FEED</b> button is disabled Bit 0 = 0 the button is enabled.

### Paper Out/Low Sensor Commands

---

<b>Function</b>	<b>Paper low sensor</b>
<b>ASCII</b>	[ESC] p 4 <n>
<b>Hexadecimal</b>	1BH 70H 34H <n>
<b>Decimal</b>	<27> <112> <52> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] c 4 <n> command determines if the printer stops printing when paper low is detected.
<b>Where &lt;n&gt;</b>	0 Printer continues to print with paper low. 1 Printer stops printing when paper low is detected.

---

<b>Function</b>	<b>Paper Error Signal Control</b>
<b>ASCII</b>	[ESC] p 3 <n>
<b>Hexadecimal</b>	1BH 70H 33H <n>
<b>Decimal</b>	<27> <112> <51> <n>
<b>Range</b>	0 ≤ n ≤ 255
<b>Description</b>	The [ESC] c 3 <n> command controls how the Paper Error pin on the parallel interface operates.
<b>Where &lt;n&gt;</b>	Bit 0 controls paper low operation. If Bit 0 = 1 Paper low will set the Paper Error pin. If Bit 0 = 0 Paper low will not effect the Paper Error pin. Bit 2 controls how paper out effects the Paper Error pin. If Bit 0 = 1 Paper out will set the Paper Error pin. If Bit 0 = 0 Paper out will not effect the Paper Error pin.

**Note:** The paper out sensor will all ways stop printing.  
The default setting allows only Paper out to control the Paper Error pin.  
The Epson section has the following description of the Enable/disable paper feed command.

**Description** The [ESC] c 5 <n> command enables or disables the **FEED** button. When the least significant bit (LSB) of <n> = one, the **FEED** button is disabled; when it is zero, the button is enabled.

## Star Control Codes<sup>24</sup>

The following section lists the Star codes that are supported by the POSjet™ 1000 Printer. They are as close as possible to a Star printer. TransAct Technologies, Inc. has no control over how Star extends or changes these control codes and makes no guarantees as to the operation of its printer when it replaces a Star printer. The Star emulation is intended to make it as easy as possible to replace a Star printer with a POSjet™ 1000 Printer, but the user must remember that the POSjet™ 1000 Printer is not designed as a drop in replacement for a Star printer. If possible, the application should be changed to take advantage of the additional features in the standard POSjet™ 1000 emulation.

### Star Command Summary

For field definitions, please refer to the Star Dot Matrix Printer Programmer's Manual. The following is a list of supported Star commands.

Control Codes Used for Character Setting		
ASCII Command	Hex Code	Description
[ESC] R <n>	1BH,52H	Select international character set.
[ESC] 6	1BH,36H	Select IBM character set #2.
[ESC] 7	1BH,37H	Select IBM character set #1.
[ESC] M	1BH,4DH	Select 7 x 9 half-dot font.
[ESC] P	1BH,50H	Select 5 x 9 (2 pulses + 1 dot) font.
[ESC] :	1BH,3AH	Select 5 x 9 (3 pulses + 1 dot) font.
[SO]	0EH	Select expanded character mode.
[DC4]	14H	Cancel expanded character mode.
[ESC] W <1>	1BH,57H,31H	Select expanded character mode.
[ESC] W <0>	1BH,57H,30H	Cancel expanded character mode.
[ESC] E	1BH,45H	Select emphasized print mode.
[ESC] F	1BH,46H	Cancel emphasized print mode.
[ESC] - 1	1BH,2DH,31H	Select underline mode.
[ESC] - <1>	1BH,2DH,01H	Select underline mode.
[ESC] - 0	1BH,2DH,30H	Cancel underline mode.
[ESC] - <0>	1BH,2DH,00H	Cancel underline mode.
[ESC] _ 1	1BH,5FH,31H	Select over score mode.
[ESC] _ <1>	1BH,5FH,01H	Select over score mode.
[ESC] _ 0	1BH,5FH,30H	Cancel over score mode.
[ESC] _ <0>	1BH,5FH,00H	Cancel over score mode.
[ESC] 4	1BH,34H	Select highlighted print mode.
[ESC] 5	1BH,35H	Cancel highlighted print mode.
[SI]	0FH	Select inverted print mode.
[DC2]	12H	Cancel inverted print mode.

<sup>24</sup> Some versions of the POSjet™ 1000 do not support the Star Emulation.

Control Codes Used for Line Spacing		
ASCII Command	Hex Code	Description
[LF]	0AH	Set line feed.
[CR]	0DH	Set line feed (same as LF).
[ESC] z 1	1BH,7AH,31H	Set 1/6-inch line feed.
[ESC] z <1>	1BH,7AH,01H	Set 1/6-inch line feed.
[ESC] 0	1BH,30H	Set 1/8-inch line feed.
[ESC] a <n>	1BH,61H	Feed paper <n> lines.
Control Codes Used for Page Layout		
ASCII Command	Hex Code	Description
[FF]	0CH	Set page feed (form feed).
[ESC] C <n>	1BH,43H	Set page length at <n> lines.
[ESC] C <0> <n>	1BH,43H,00H	Set page length at <n> inches.
[ESC] B <n <sub>1</sub> > <n <sub>2</sub> >	1BH,42H	Set vertical tab positions.
[VT]	0BH	Execute vertical tab.
[ESC] N <n>	1BH,4EH	Set bottom margin.
[ESC] O	1BH,4FH	Cancel bottom margin.
[ESC] l <n>	1BH,6CH	Set left margin.
[ESC] Q <n>	1BH,51H	Set right margin.
[ESC] D <n <sub>1</sub> > <n <sub>2</sub> >	1BH,44H,<n <sub>1</sub> >,<n <sub>2</sub> >	Set horizontal tab position.
[HT]	09H	Execute horizontal tab.
Control Codes Used for Graphic Printing		
ASCII Command	Hex Code	Description
[ESC] 1	1BH,31H	Set 7/72-inch line feed.
[ESC] A <n>	1BH,41H	Define n/72-inch line feed.
[ESC] 2	1BH,32H	Set n/72-inch line feed.
[ESC] J <n>	1BH,4AH	Set one time line feed of n/72 inch.
[ESC] z 0	1BH,7AH,30H	Set 1/12-inch line feed.
[ESC] z <0>	1BH,7AH,00H	Set 1/12-inch line feed.
[ESC] 3 <n>	1BH,33H	Set n/216-inch line feed simulation.
[ESC] y <n>	1BH,79H	Set n/144-inch line feed.
[ESC] K <n <sub>1</sub> > <0>	1BH,4BH,<n <sub>1</sub> >,00H	8-dot single density bit image.
[ESC] L <n <sub>1</sub> > <n <sub>2</sub> >	1BH,4CH,<n <sub>1</sub> >,<n <sub>2</sub> >	8-dot double density bit image.
[ESC] h 1	1BH,68H,31H	Select vertical expanded character mode.
[ESC] h <1>	1BH,68H,01H	Select vertical expanded character mode.
[ESC] h 0	1BH,68H,30H	Cancel vertical expanded character mode.
[ESC] h <0>	1BH,68H,00H	Cancel vertical expanded character mode.

Control Codes Used for Download Characters		
ASCII Command	Hex Code	Description
[ESC] & <n₁> <n₂>	1BH,26H,00H, <n₁>,<n₂>	Define download characters
[ESC] % 1	1BH,25H,31H	Enable the download character set
[ESC] % <1>	1BH,25H,01H	Enable the download character set
[ESC] % 0	1BH,25H,30H	Disable the download character set
[ESC] % <0>	1BH,25H,00H	Disable the download character set
Control Codes Used for Peripheral Units		
ASCII Command	Hex Code	Description
[ESC] [BEL] <n₁> <n₂>	1BH,07H,<n₁>,<n₂>	Adjust drive pulse width for peripheral unit 1
[BEL]	07H	Defer drive command for peripheral unit 1
[FS]	1CH	Immediate drive for peripheral unit 1
[SUB]	1AH	Immediate drive for peripheral unit 2
[EM]	19H	Immediate drive for peripheral unit 1
Other Control Codes		
ASCII Command	Hex Code	Description
[RS]	1EH	Sound buzzer
[CAN]	18H	Cancel print data in buffer and initialize printer
[DC3]	13H	Set deselect mode
[DC1]	11H	Set select mode
[ESC] U 1	1BH,55H,31H	Select unidirectional print mode
[ESC] U <1>	1BH,55H,01H	Select unidirectional print mode
[ESC] U 0	1BH,55H,30H	Select bi-directional print mode
[ESC] U <0>	1BH,55H,00H	Select bi-directional print mode
[ESC] @	1BH,40H	Initialize printer
[ENQ]	05H	Inquire printer status
[STX]	02H	Enter STX-ETX mode
[ETX]	03H	Terminate STX-ETX mode
[ESC] b <n₁> <n₂> <n₃><n₄> d 1 ... [RS]	1BH,62H,n₁,n₂,n₃,n₄,d 1...1EH	Select bar code printing
[ESC] d 0	1BH,64H,30H	Trigger auto-cutter drive
[ESC] d <0>	1BH,64H,00H	Trigger auto-cutter drive
[ESC] d 1	1BH,64H,31H	Trigger auto-cutter drive
[ESC] d <1>	1BH,64H,01H	Trigger auto-cutter drive
[GS] ...[LF]	1DH...0AH	Select character validation

Table 62 Star Commands

## Citizen Codes<sup>25</sup>

The following section lists the Citizen codes that are supported by the POSjet™ 1000 Printer. They are as close as possible to a Citizen printer. TransAct Technologies, Inc. has no control over how Citizen extends or changes these control codes and makes no guarantees as to the operation of its printer when it replaces a Citizen printer. The Citizen emulation is intended to make it as easy as possible to replace a Citizen printer with a POSjet™ 1000 Printer, but the user must remember that the POSjet™ 1000 Printer is not designed as a drop in replacement for a Citizen printer. If possible, the application should be changed to take advantage of the additional features in the standard POSjet™ 1000 emulation.

<sup>25</sup> Some versions of the POSjet™ 1000 do not support the Citizen Emulation.

## Citizen Command Summary

For field definitions, please refer to the *Citizen User's Manual for Mini Dot Matrix Printer*. The following is a list of the supported Citizen commands.

ASCII Command	Hex Code	Description
[FF] <n>	0CH,<n>	Set <n> lines paper feed.
[SO]	0EH	Set enlarged character.
[SI]	0FH	Set normal character.
[LF]	0AH	Set paper feed.
[CR]	0DH	Set print.
[DC1]	11H	Enter initial set command.
[DC2]	12H	Set inverted character(s).
[DC3]	13H	Set print color to red.
[CAN]	18H	Cancel print data in buffer and initialize printer.
[ESC] P 0	1BH,50H,00H	Trigger a full paper cut.
[ESC] P 1	1BH,50H,01H	Trigger a partial paper cut.
[ESC] - <n>	1BH,2DH,<n>	Select underline mode.
[ESC] * <n <sub>1</sub> > <n <sub>2</sub> >	1BH,2AH,<n <sub>1</sub> >,<n <sub>2</sub> >	Select a graphic command.
[ESC] 1	1BH,31H	Set 1/9-inch paper feed.
[ESC] 2	1BH,32H	Set 2/9-inch paper feed.
[ESC] C <n>	1BH,43H,<n>	Set page length.
[ESC] f 1	1BH,66H,01H	Set form feed.
[ESC] N <n>	1BH,4EH,<n>	Set <n> line skip perforation.
[ESC] O	1BH,4FH	Skip perforation cancel command.
[RS]	1EH	Sound the buzzer.
[SUB]	1AH	Trigger second drawer drive.
[FS]	1CH	Trigger first drawer quick drive.
[ESC] [BEL] <n <sub>1</sub> > <n <sub>2</sub> >	1BH,07H,<n <sub>1</sub> >,<n <sub>2</sub> >	Set drive pulse setting for the first drawer.
[BEL]	7H	Trigger first drawer drive.

Table 63 Supported Citizen Commands

## POSjet™ Color Graphics

### Printing Graphics

The POSjet™ 1000 Printer has bit-image graphic capability and a full PC-compatible graphic character set. The bit image format is similar to that used on other personal computer printers. Three modes of operation are available. Single-density is the fastest mode. It makes a single unidirectional 60 dpi print pass. Full-speed double-density mode makes two passes with a half-dot offset. Full-speed double-density mode is half the speed of single-density mode, but it prints at 120 dpi. Half-speed double-density mode is half the speed of full-speed double-density; however, the print quality is enhanced.

### Character Graphics

Character graphics is the term for joining individual characters together to produce a mosaic of characters that form a graphic image. The simplest method uses an \* (or any other character) to form an image. For example, ITHACA® might be formed as follows.

```

***  ***  *   *   **   ***   **
*    *   *   *   *   *   *   *
*    *   ***** ***** *   *****

```

```
  *      *      *      *      *      *      *      *      *      *
***      *      *      *      *      *      *      *      *      *
```

Figure 17 Example of Character Graphics

The extended character set of the printer supports line graphic characters that can be combined to form windows and other shapes. For the shapes to join from line to line, the spacing must be set properly.

All characters are in a nine-dot-high character cell. The dots are 1/60 inch apart. Therefore, the line spacing should be 10/60 or 1/6 inch. The set fine line space command can be used to set the line spacing. If possible, the spacing should be reduced slightly to overlap the rows, which prevents any white spacing from appearing between the lines. The following example illustrates the use of extended character graphics.

```

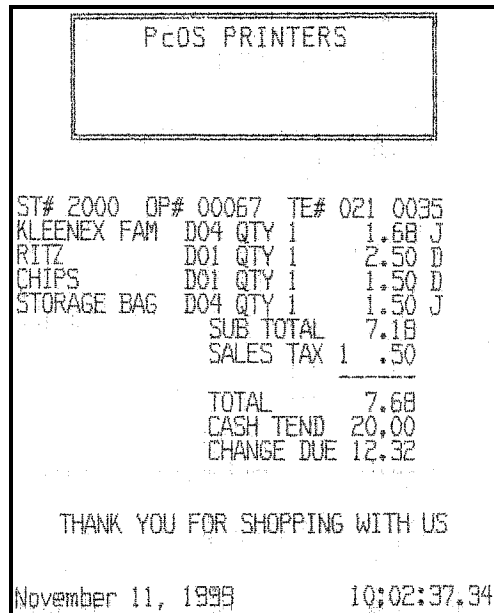
[ESC]:
[ESC]3<27>
[ESC]a<1>
<201>
<205><205><205><205><205><205><205><205><205>
<205><205><205><205><205><205><205><205><205>
<205><205><205><205>
<187>[CR][LF]
<186>      PcOS PRINTERS      <186>[CR][LF]
<186>      <186>[CR][LF]
<186>      MADE TO ORDER      <186>[CR][LF]
<186>      BUILT TO LAST      <186>[CR][LF]
<200>
<205><205><205><205><205><205><205><205><205>
<205><205><205><205><205><205><205><205><205>
<205><205><205><205>
<188>[CR][LF]
[ESC]a<0>
[ESC]0
[ESC][P<15>
[CR][LF]

ST# 2000  OP# 00067  TE# 021 0035[CR][LF]
KLEENEX FAM  D04 QTY 1      1.68 J[CR][LF]
RITZ          D01 QTY 1      2.50 D[CR][LF]
CHIPS          D01 QTY 1      1.50 D[CR][LF]
STORAGE BAG   D04 QTY 1      1.50 J[CR][LF]
              SUB TOTAL    7.18[CR][LF]
              SALES TAX 1   .50[CR][LF]
              -----[CR][LF]
              TOTAL        7.68[CR][LF]
              CASH TEND    20.00[CR][LF]
              CHANGE DUE   12.23[CR][LF]

[CR][LF]
[ESC]a<1>
THANK YOU FOR SHOPPING WITH US[CR][LF]
[ESC]a<0>
[CR][LF]
{DATE:0}          {TIME:0}[CR][LF]
[ESC]d<10>

```

Figure 18 Example Commands for a Sample Receipt



PCOS PRINTERS

ST# 2000 OP# 00067 TE# 021 0035  
KLEENEX FAM D04 QTY 1 1.68 J  
RITZ D01 QTY 1 2.50 D  
CHIPS D01 QTY 1 1.50 D  
STORAGE BAG D04 QTY 1 1.50 J  
SUB TOTAL 7.18  
SALES TAX 1 .50  
TOTAL 7.68  
CASH TEND 20.00  
CHANGE DUE 12.32

THANK YOU FOR SHOPPING WITH US

November 11, 1999 10:02:37.34

Figure 19 Sample Receipt

When printing line graphics, the data path to the printer must be eight bits. Seven-bit serial protocols do not access the extended characters. The extended characters require that the form be reverse fed. Consequently, printing line graphics on the receipt may be less than acceptable.



## APA Graphics

The printer is capable of all-points-addressable (APA) or horizontal graphics. Generating a graphic image by hand is time consuming and tedious. It is recommended that a graphic package be used to create a graphic image. The following procedure will help with the setup.

### Procedure for APA graphics:

1. Generate the graphic image in the program of your choice. APA graphics only support monochrome images.
2. Make sure the paper size chosen fits the printer (3 inches wide with 0.25-inch margins). If the paper size cannot be set, print a portion of the page.
3. Print the graphic to a file using a generic, IBM, graphic, 9-pin driver. The standard IBM resolutions are 240 x 216 dpi, 120 x 72 dpi, and 60 x 72 dpi. The POSjet™ 1000 Printer supports all three resolutions. For good resolution with reasonable speed, use 120 x 72 dpi.
4. Print the graphic image to a file.
5. Edit the resulting file to remove any unwanted form control, and insert the POSjet™ 1000 form control.
6. Make the resulting file available to your application, so it can be sent to the printer when required.

### Color Graphics

The POSjet™ 1000 is a two-color printer as rather than a full color printer. A full color printer forms the various colors of an image by mixing inks of different colors on the paper. The amount of each color determines the hue. Typically the paper is white and no ink produces a white. Mixing yellow and cyan produces a red and mixing cyan, magenta, and yellow in equal amounts produces a black or gray. If the printer has a forth cartridge, it will be black and conserves the color cartridges ink.

The POSjet™ 1000 is a two-color printer. It has white (the paper), and two premixed colors. Typically one of the colors is black and a highlight color. The high light color is primarily used in text printing to highlight a line and typically is red.

When the POSjet™ 1000 generates graphics, both cartridges are used to generate the image. Because the program that generates the graphic image data should not need to be aware of the cartridges installed in the printer, three color plains are sent to the printer. The printer is aware of what colors the cartridges are that will generate the image. The printer will converts the full color image information into a two color image.

If the POSjet™ 1000 printer is configured with a black cartridge and a highlight color, there is no point in the printers mixing the highlight color with black. If however, the POSjet™ 1000 printer is configured with two colored cartridges, the printer attempts to mix the colors to generate black. (Note that in text mode the cartridges are not mixed.) This requires that there be two basic modes of color graphic generation.

If the POSjet™ 1000 printer is configured with a black cartridge it must be in the left print cartridge position. In this mode, the printer will not mix colors and the resulting image will be composed of black dots or highlight color dots.

If the POSjet™ 1000 printer is configured with two color cartridges, the printer will mix the two installed inks on the paper. In this case, the left cartridge is assigned to the primary color and the right cartridge to the secondary color. Because there are three primary colors, the printer is unable to print full color. The printer follows the rules for mixing colors and it if the result is ambiguous (because of the missing color), the printer will print with the primary (left) cartridge. This results in a image made up of primary color dots, secondary color dots and mixed dots. The mixed dots color may not be black but a mixture of whatever colors are installed.

In text mode, the Primary cartridge (Left) is assigned as the default color and the Secondary cartridge (Right) is assigned as the alternate highlight color. In most cases the darkest color should be placed in the primary cartridge (Left) position.

The Ithaca® Windows print driver provides the translation from Windows color to the three color plains. When a graphic is created for the POSjet™ 1000 Printer, the colors used must take into account that colors other than the pen color will print black. The Ithaca® Windows driver helps adjust the color content and generates the desired print from a full color image. (*Ithaca® Windows print driver patent pending.*)

**Procedure for color horizontal graphics:**

Note: See the section on Universal Color Graphics for more options.

1. Generate the graphic image in the program of your choice. Use colors consistent with the two colors installed in the printer.
2. Optionally, process the color image with the Ithaca® color image processor. The program can print the image or generate a printable file.
3. Make sure the paper size you pick fits the printer (3 inches wide with 0.25-inch margins).
4. The POSjet™ 1000 print driver should be installed (even if the printer is not connected).
5. Set up the print driver to print the graphic to a file using whatever resolution required.
6. Print the graphic image to a file.
7. When you want to print the graphic, simply copy the file to the printer.
8. You may copy the graphic to the graphic save buffer and then request the printer to retrieve and print it without re-sending the graphic data.

(Ithaca® Color Image Processor is patent pending.)

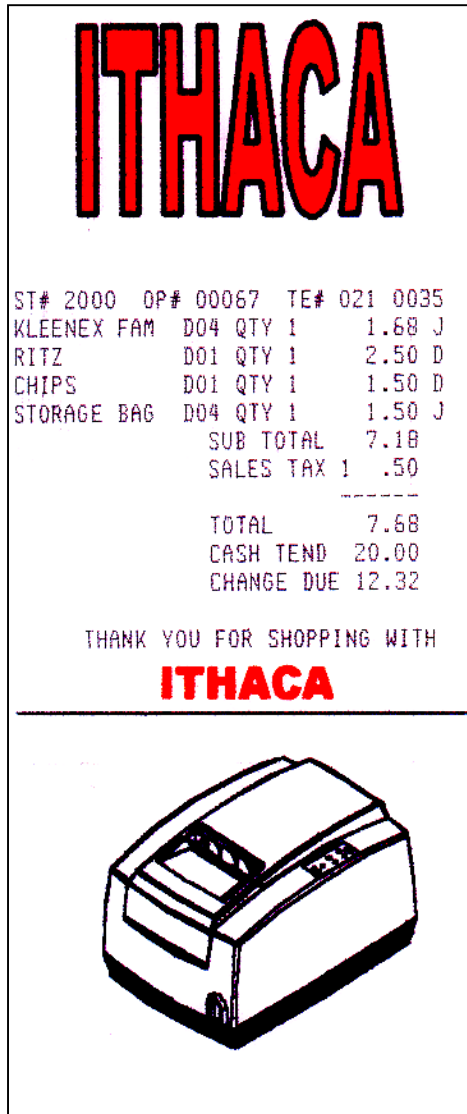


Figure 20 Receipt with graphics

As with all graphics, the data path to the printer must be eight bits. Seven-bit protocols do not work.

## POSjet™ Universal Color Graphics

Starting with Version 1.88 of the POSjet™ 1000 Printer firmware supports the ability to print two color graphics in all emulations. This support is an enhancement to the original TM-U200, ESC/POS, Star, Citizen and the Ithaca M50 and Microline printer emulations.

The intent of Universal Color Graphic support is to allow the POSjet™ 1000 color graphics capability to be used in existing applications that do not support color graphics.

There are several ways to add color graphics to an existing application. The easiest for you will depend on how much control you have over your application. At a minimum, you should be able to change the name printed on the top of a receipt. With the PJColor II<sup>26</sup> program you can store a named graphic into the printer and print it by changing the text name to match the stored graphic. For example, if your receipt has a name like "Joe's Market", you can save a graphic in the printer named "Joe's" and then change the "Joe's Market" to "&%Joe's&". When the POSjet™ 1000 finds "&%Joe's&", it is replaced with the stored graphic.

Some applications allow a graphic file to be sent to the printer. In this case PJColor II can generate the graphic file and then your application can send it to the printer. This file will support two color print.

PJColor II also has a feature that will allow you to generate a file that will define the graphic to be stored into the printer. You can then use this file to setup any number of printers with the same graphic.

If you are using a windows print driver (other than the Transact POSjet™ 1000 driver) to support your printer, you will not be able to send color graphics to the printer through the print driver. The print driver will not support universal color graphics. You can however, store the graphic in the printer and use IPCL commands to print the stored graphic. (You must select a printer resident font for this to work.)

The following is a short summary and how to description of these features.

### Print File Graphics

PJColor II can generate a print file that may be sent to the printer in any emulation and produce a two color print graphic.

#### To generate a print file.

- 1) Start PJColor II
- 2) Under Settings, Select the POSJet 1000 printer. Then select the emulation that matches the printer.
- 3) Select the Resolution you would like to have the printer use to print the graphics. Low resolutions are faster, high resolutions produce better graphics.
- 4) Load the graphics Image you wish to print.
- 5) Select the Communications port and configuration.
- 6) Adjust the image to produce the effect you would like. The lower graphic window displays an approximation of the printed image.
- 7) When you are satisfied with the graphic, press the "Print to a File" button. PJColor II will ask what file you would like to receive the print data.
- 8) This file can be sent to the printer and the graphic will be printed.

### Store Graphics in the printer:

---

<sup>26</sup> The PJColor II program has been enhanced to provide several ways to create color Logos and Coupons and make them available to the POSJet 1000 printer.

PJColor II can store a graphic in the POSjet™ 1000 Printer or generate a file that will store a graphic in the printer.

### To Store a graphic in the printer

- 1) Start PJColor II
- 2) Under Settings, Select the POSJet 1000 printer. Then select the emulation that you will be setting the printer to.
- 3) Select the Resolution you would like to have the printer use to print the graphics. Low resolutions are faster, high resolutions produce better graphics.
- 4) Select the communications port and protocol that is to be used to communicate to the printer.
- 5) Load the graphics Image you wish to print.
- 6) Adjust the image to produce the effect you would like. The lower graphic window displays an approximation of the printed image.
- 7) When you are satisfied with the graphic, press the "Store in Printer" button. PJColor II will attempt to interrogate the printer and will display the graphics currently in the printer if any. (Note: If PJColor II cannot communicate with the printer, only the "Save to File" option will be allowed.)
- 8) Make sure there is enough room in the printer for the graphic.
- 9) Insert a name in the "Macro Name" box. Keep it simple, this name will be used later to print the graphic.
- 10) Record the graphic in the printer.

### Print a stored graphic.

In the data stream to the printer enter "&%Name&" and the graphic will print in place of the "&%Name&" data. The "Name" must be identical to the name entered earlier.

### Generate a file to store graphics into a printer

To generate a file that will store a graphic into a printer, follow the same procedure to store a graphic in a printer up through step 8. Then:

- 9) Insert a name in the "Macro Name" box. Keep it simple, this name will be used later to print the graphic
- 10) Press the "Save to File" button. This will allow you to select a file where the stored universal graphic information is saved.
- 11) This file contains an "erase any previous graphic with the same name" command, "a save new graphic with this name" command and the graphics information.
- 12) This file can then be sent to the printer and the graphic will be saved in the printer. Note: If the target printer does not have enough room for the graphic information to be stored, the graphic will not be stored.

### How universal graphics is done

The printer extends all the emulations to support two additional escape sequences and adds limited IPCL support.

IPCL (Ithaca Printer Control Language) is an ASCII method of sending printer commands to the printer. In Ithaca PcOS emulation, IPCL command support is extensive. In other emulations, IPCL support is limited to the following commands.

&%CR	Insert a [CR]
&%LF	Insert a [LF]
&%CLx	Select Color where x = 0 for the Left Pen or 1,2,3 for the Right Pen
&%UBName&	Begin defining universal graphic "Name"
&%UGName&	End the definition of "Name"
&%URName&	Run (print) universal graphic "Name"
&%UDName&	Remove universal graphic "Name" from nonvolatile memory

&%USName&    Flag universal graphic "Name" to be run when the printer is turned on    &%UFALL&  
Erase all stored universal graphics. (Erases all User Store)  
&%UQ&        Prints a directory of the universal graphics currently stored in the printer  
&%UTx        Changes the Name termination character from "&" to "x". "x" may range from  
              21H to 255H

The extended Escape sequences are [ESC][US]... and [ESC][FS]...

The [ESC][US] commands are the same as the PcOS emulation. The [ESC][FS] commands are not intended to be used by the customer. They provide the universal graphics support. Because graphics would be very difficult to generate and are not supported by any graphics drives other than PJColor II.

### How to use IPCL commands in text strings

If your software allows you to pass text strings to the printer, you should be able to use the universal graphics commands. Most POS software allows user customization of the text message printed at the beginning and the end of the receipt.

To use the Universal IPCL commands simply place them in a text string like the following example.

Note: Your results may vary depending on the operation system, software and the ability to pass ASCII Characters.

#### Load and store named graphic image

First you must create the graphic image using the PJColorII Color Image Converter and save the image to a file. See **“Generate a file to store graphics into a printer”** section above

Send the following text strings to the printer using whatever means is available to you.

&%UBLogo&    Begin defining macro "Logo"  
&%UGLogo&    End the Definition of "Logo"  
&%UMLogo&    Save Macro "Logo" to nonvolatile memory

A graphic image named “Logo” should now be stored in the nonvolatile memory.

To verify the image is present, use the “&%UQ&” IPCL command or the PJColorII Color Image Converter to print the name and size of the stored images.

#### Recall and print stored named graphic image

Send the following text string to the printer using whatever means is available to you.

&%URLogo&    Run Macro "Logo" (Print the macro)

### Cautions

Universal graphics information is stored in the same place as user defined characters and user defined macros. If you are using an emulation such as ESC/POS that supports macros and/or user defined characters, universal graphics will compete for space with these functions. In addition, the "&%UFALL&" (Erase universal graphics) will also erase any user defined graphics and macros.

If you are using the Ithaca PcOS emulation, these commands are identical with the User Store commands except for the terminator character. You may change the NUL terminator to "&" with "&%UT&" if you find the "&" easier.

## Universal Color Command Descriptions

<b>Function</b>	<b>Begin named universal graphic record</b>
<b>IPCL</b>	&%UB <Name..>&
<b>Description</b>	The &%UB <Name..>& command initializes the universal graphic buffer structure, and redirects the following data to the universal graphic buffer. It uses the <Name..> field as a reference. If the name already exists in the flash user store, the command is ignored. The command must be followed by the "End named universal graphic record" command with the same name. If the data that follows is larger than the universal graphic buffer (about 16K), the universal graphic definition is terminated without saving any data.
<b>Function</b>	<b>End named universal graphic record</b>
<b>IPCL</b>	&%UG <Name..>&
<b>Description</b>	The &%UG <Name..>& command ends the universal graphic record operation and saves the universal graphic to flash. It uses the <Name..> field to verify the command end and must match the "Begin named universal graphic record" command. If the name already exists in the flash user store or the universal graphic memory is exceeded, the command is invalid, and the <Name..> field prints.
<b>Function</b>	<b>Run universal graphic data from user store</b>
<b>IPCL</b>	&%UR <Name..>&
<b>Description</b>	The &%UR <Name..>& command loads the referenced universal graphic into the universal graphic buffer. The universal graphic buffer is then inserted into the data stream. If the named item does not exist or is not a universal graphic, the POSJet 1000 ignores the command.
<b>Function</b>	<b>Flag item as a start-up universal graphic</b>
<b>IPCL</b>	&%US <Name..>&
<b>Description</b>	The &%US <Name..>& command flags the referenced item to be processed at startup. Only one user character definition and one universal graphic may be flagged to run at startup.
<b>Function</b>	<b>Delete item from user store</b>
<b>IPCL</b>	&%UD <Name..>&
<b>Description</b>	The &%UD <Name..>& command removes an item from user store and frees up space. If the item does not exist, the POSJet 1000 ignores the command.
<b>Function</b>	<b>Flush information from user store</b>
<b>IPCL</b>	&%UFALL&
<b>Description</b>	The &%UFALL& command clears all entries in user store and frees the data space. It must have the name, "ALL" (in uppercase) attached.



---

<b>Function</b>	<b>Report on user store</b>
<b>IPCL</b>	&%UQ&
<b>Description</b>	The &%UQ& command prints a status report. The intention of the command is to aid in universal graphic development.

---

<b>Function</b>	<b>Redefine User Store Termination Character</b>
<b>IPCL</b>	&%UT<n>
<b>Description</b>	This command allows the terminator used to signal the end of the name field in User Store commands to be modified. The value of <n> is used for the terminator. The value of n may be from 0 to 255.
<b>Example</b>	If &%UT% were sent to the printer the User Store command to run universal graphic "Demo" would be &%URDemo%.

---

<b>Function</b>	<b>Set Print Color</b>
<b>IPCL</b>	&%CL <n>
<b>Description</b>	This command allows various colors to be selected on printer emulations that do not support color text.
<b>Where n:</b>	0        Print with the Left cartridge (Typically Black) 1, 2, 3    Print with the Right cartridge (Typically Red, Blue, or Green)

## POSjet™ Extended Printer Control

The POSjet™1000 printer has a number of Extended Control commands that allow an application to better track and maintain the printer. These commands are in all emulations<sup>27</sup>.

The printer maintains a log of printer activity. This activity may be returned to the host with the [ESC]~ T command. This command returns a ~T followed by four binary bits that make up a 32 bit unsigned integer. The description of the command below describes the format in full.

The printer also contains a number of commands that will force the printer to perform specific functions to help maintain the printer or print information about the printer. The functions available are:

- 1) Reset Cartridge Ink Status
- 2) Print Current Configuration
- 3) Print current log totals
- 4) Print current alignment values

NOTE: all of these commands follow the ESC~ or ESCy format. Other functions are performed by these basic commands. Do not attempt to use any undocumented version of these commands. The extended diagnostics commands may affect the print quality and performance of the printer. In some cases, the commands may degrade the performance of the print cartridge or mechanism.

Function	Reset Cartridge Ink Status
ASCII	[ESC] ~ H <n>
Hexadecimal	1BH 7EH 48H <n>
Decimal	<27> <126> <72> <n>
Description	This command allows the host system to operate the Cartridge Changed operation under program control. This command will unconditionally inform the printer that the cartridge has been changed. If <n> = 1 or <1> The black or left cartridge is reset. In <n> = 2 or <2> the color or right cartridge is reset.
Note	It must be noted that this command will reset the ink status even if the cartridge has not been replaced. If this occurs the Ink low warning will not be accurate.

<sup>27</sup> The Star emulation does not allow the use of ESC y commands for extended diagnostics. The ESC y commands are not available.

<b>Function</b>	<b>Read and return totals</b>		
<b>ASCII</b>	[ESC] ~ T <n>		
<b>Hexadecimal</b>	1BH 7EH 54H <n>		
<b>Decimal</b>	<27> <126> <84> <n>		
<b>Description</b>	This command returns the current statistics for parameter n. The value returned will be ~T<n> with the next 4 bytes being an unsigned int . For example:  [ESC]~T<1> <b>Request Cover open count</b>		
<b>Returns:</b>	~T<1><0><0><1><100>   or 256 + 100 or 356 cover opens		
<b>Values of n</b>	<b>Request:</b>		
0	Total Cartridges used	9	Monitor Resets
1	Cover Opens	10	Head Index Errors
2	Paper Outs	11	Auto Cutter Cycles
3	Line Feed	12	Host Initialization Requests
4	Characters Printed	13	Error Vectors taken
5	Cash Drawer 1 Opens	14	Auto Cutter Faults
6	Cash Drawer 2 Opens	15	Power On Time (Min.)
7	OFF Power Cycles	16	System Active Time (Min.)
8	Power Ups from reset		
<b>Function</b>	<b>Print Current Configuration and totals</b>		
<b>ASCII</b>	[ESC] y <9>		
<b>Hexadecimal</b>	1BH 79H 09H		
<b>Decimal</b>	<27> <121> <9>		
<b>Description</b>	This command forces the printer to print the current configuration. To function correctly it must be issued with the printer in the proper mode. It is intended to be printed in the default Ithaca® configuration but will print in any configuration.		
<b>NOTE:</b>	<b>This command must be preceded with an ESC y &lt;8&gt;</b>		
<b>Function</b>	<b>Print Current totals</b>		
<b>ASCII</b>	[ESC] y <15>		
<b>Hexadecimal</b>	1BH 79H 0FH		
<b>Decimal</b>	<27> <121> <15>		
<b>Description</b>	This command forces the printer to print the current totals log.		
<b>NOTE:</b>	<b>This command must be preceded with an ESC y &lt;8&gt;</b>		
<b>Function</b>	<b>Print Current Alignment values</b>		
<b>ASCII</b>	[ESC] y <20>		
<b>Hexadecimal</b>	1BH 79H 14H		
<b>Decimal</b>	<27> <121> <20>		
<b>Description</b>	This command forces the printer to print the current alignment values.		
<b>NOTE:</b>	<b>This command must be preceded with an ESC y &lt;8&gt;</b>		
<b>Function</b>	<b>Overlay the Small Draft font with Cartridge test characters</b>		
<b>ASCII</b>	[ESC] y <16>		
<b>Hexadecimal</b>	1BH 79H 10H		
<b>Decimal</b>	<27> <121> <16>		
<b>Description</b>	This command forces the printer to replace characters 224 through 255 with test characters. Once installed these characters can be removed by reselecting the code page. Only the Small draft font is effected.		

## Communications

### Protocol and Print Buffers

The following figure illustrates the communication flow from host computer to printer and from printer to cash drawer.

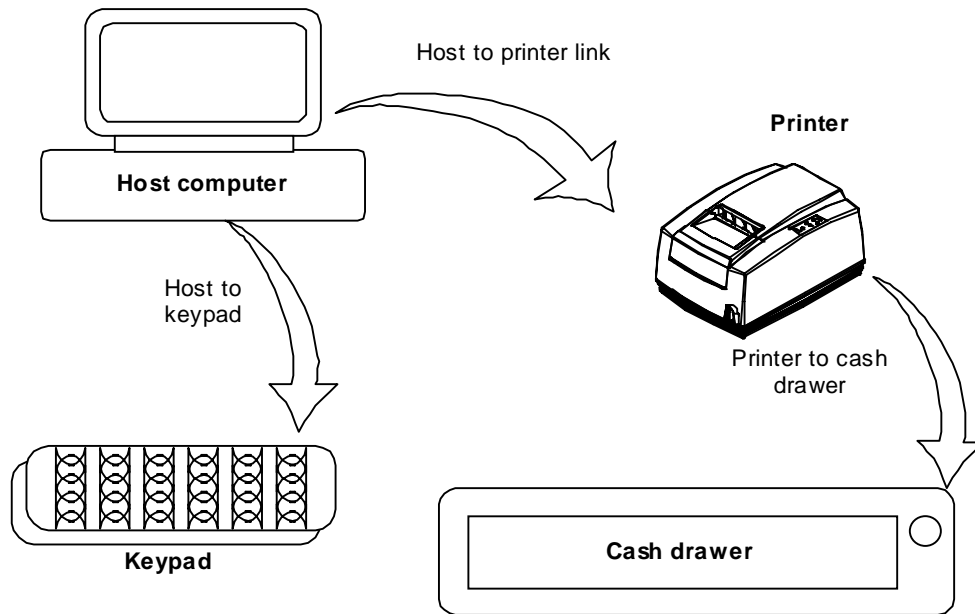


Figure 21 Typical POS System

For the host to printer communication link, the POSjet™ 1000 Printer supports serial or parallel communications. The serial and parallel ports both follow standards developed for the personal computer environment.

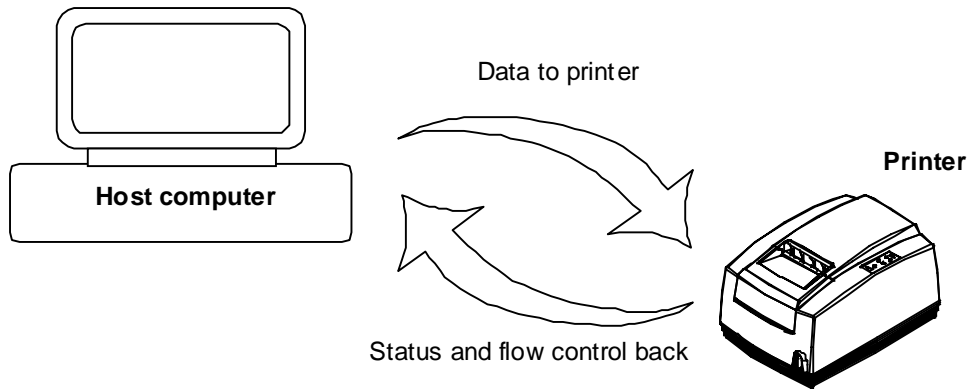


Figure 22 Host to Printer Link

In most cases, the host computer is capable of sending information to the printer much faster than the printer can print it. To prevent information from being lost, a flow control mechanism is provided. The mechanism is called the flow control protocol. The goal of the flow control protocol is to exchange as much information as possible as fast as possible without losing any data. The POSjet™ 1000 Printer supports three flow control protocols, two in serial mode and one in parallel.

From the printer's point of view, four basic functions are required of communications. All four are common to all three flow control protocols. There must be a communication driver, status inquire procedure, storage buffer, and print control mechanism that is using the data.

The communication port is either the serial port hardware or the parallel port hardware and the associated communication software driver.

A means for the host to bypass the buffer for status information, referred to here as an inquirer processor, is also required because the buffer offsets the printer in time from the host. (The printer is generally behind the host).

The storage print buffer is a software implemented, first-in first-out (FIFO) circular buffer. It stores information in an asynchronous fashion where information can be placed in it at any rate and retrieved from it at any rate, but the information order is not altered. All buffers have a finite size, and if information is put in faster than it is removed, the buffer will overflow. To avoid overflow, a flow control mechanism is required.

The print control mechanism is the remainder of the printer hardware and control software. It interprets control codes and operates the control panel, print head, and cash drawer interface.

The following figure illustrates the four basic parts of printer flow control.

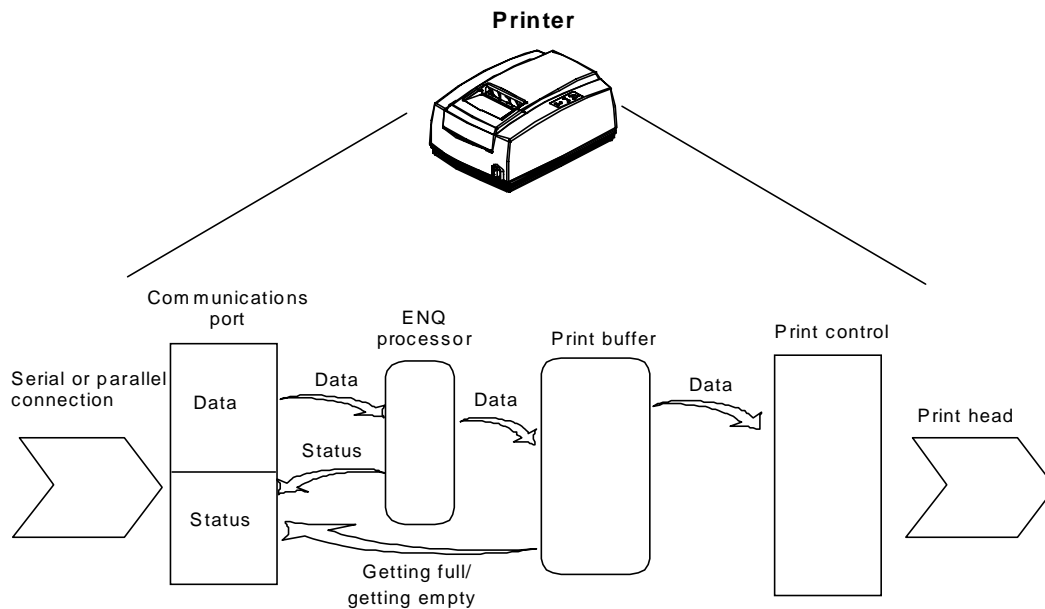


Figure 23 Printer Communications Buffer Flow

The communication port is either serial or parallel and is controlled by a software communication driver. The driver receives data and returns requested status. As information is received from the host, data is taken from the communication port hardware by the driver, preprocessed to look for status inquire commands, and placed in the buffer. When the buffer input function finds that the buffer is getting full, it notifies the communication driver to implement flow control. Flow control attempts to stop further information from being sent from the host.

The print control software takes information from the buffer, as it needs it and can use it. When the buffer output function finds that the buffer is getting low, it notifies the communication driver that the information flow can be resumed (if it was stopped) and allows more information to be placed in the buffer.

The POSjet™ 1000 Printer has a configurable input buffer. The printer can be configured to allow from 40 to 8196 bytes of input buffer. Consequently, up to 8196 characters (or control codes) can be sent to the printer before they are interpreted and printed. In effect, the host computer can get 8196 characters ahead of the printer. In all cases, the buffer resumes communications when it is half empty. For example, if the buffer is configured to be 2048, the printer will signal stop when 2048 bytes are in the buffer; resume will be signaled when 1024 bytes remain. Inquire commands are preprocessed, which means they are found in the input data stream and acted upon as they are received. The status returned is valid as of the time the command is received. This is termed real-time status even though inquire commands are preprocessed and still placed in the buffer. Real-time status assures that data is not lost when the inquire sequence is part of another command. However, the buffer may also be filled by inquire commands if the printer is waiting for some activity.

## USB

USB stands for Universal Serial Bus. It was originally conceived in the early 90's and officially recognized by Compaq, Intel, Microsoft and NEC. The development of USB has been slow, however, with the release of Windows 95 SR2 development accelerated. Windows 2000 now fully supports USB as do Windows 98 SE, and Windows Me. A technical discussion of USB is beyond the scope of this document. If you would like more information about USB, visit the USB web site at [www.usb.org](http://www.usb.org).

## USB Support

POS printers are different from typical Windows printers in several ways. Microsoft has recognized these differences and has been working with the USB Device Working Group to generate a set of standards that would abstract all point-of-sale devices at the application level. At this time a workable standard for POS is years away. So while Microsoft is interested in POS in the long term, Microsoft's immediate goal is to enable POS USB devices a way that is compatible with existing service objects.

In order to support USB POS devices under the existing software architecture, Microsoft is providing the POSUSB driver model to allow USB POS devices to interface as serial COM ports to service object DLLs.

The Transact USB Printer interface is based on this Microsoft POSUSB driver model. It provides full bi-directional interface to the printer and allows most existing applications to interface to the USB Ithaca® POSjet™ 1000 as if it were on a serial COM port. In addition we have allowed the printer to register as a composite device. This allows the printer to appear in the system as a USB print device as well as a COM port. If you are using a windows printer driver (ours or the Generic driver) you can assign the printer to the USB port.

We hope that supporting the USB Ithaca POSjet™ 1000 as a composite device provides the best of both worlds to our customer.

The USB interface card that is used with the POSjet™ 1000 is designed with the Cypress Anchor Chips EZ-USB chip. The Anchor Chips EZ-USB is a compact integrated circuit that provides a highly integrated solution for implementing a USB peripheral device.

### **Two key EZ-USB features that are important to the end user are:**

1. The EZ-USB family provides a "soft" (RAM-based) solution that allows unlimited configuration and upgrades.
2. The EZ-USB family delivers full USB throughput. Designs that use EZ-USB are not limited by number of endpoints, buffer sizes or transfer speeds.

Because the USB interface card is RAM based it must have firmware loaded into it every time it is turned on. The POSjet™ 1000 interface card can be configured with firmware in an EEPROM on the interface card or down loaded from the windows USB driver. Transact will support firmware on the interface card upon request but supports the driver down load by default. (The driver down load takes less than a second!). We are doing this to allow easy USB updates and to assure compatibility between the host driver and the firmware on the USB Interface card.

The USB Driver is available from customer support and by download from our web site.

Transact has written a POSPrinter.OCX ActiveX that will allow you to easily interface to our printers. It is used by all of our demonstration programs. This OCX is available for use with customer applications. It works with printers installed on Serial COM ports, LPT ports and USB. A USB compatible Beta version is available from customer support or from our web site.

## Parallel Port

### Parallel Port Protocol

The POSjet™ 1000 parallel port behaves just as any printer connected to a personal computer. The parallel interface accepts 8-bits of data from the host. The strobe signal from the host is used to indicate that data is available. When the printer sees the strobe signal and accepts the data, it asserts a busy signal. The busy signal indicates to the host that the printer has accepted the data and is working on it. After the printer absorbs the data and is ready to accept another byte, the printer asserts acknowledged (ACK), negates busy, and then finally negates ACK.

The host computer should meet the following parallel-port specifications and timing. In a standard personal computer, the strobe signal is generated by software writes to the parallel-port control port, which is typically done in the bios or some parallel-port driver. As personal computers become faster, it is up to the software to assure that the strobe signal does not get too narrow. One microsecond is the minimum pulse width that should be sent down a cable. Shorter pulse widths (500 nanoseconds) will be accepted by the printer. The cable can introduce significant signal degeneration and skew.

The data must be valid before the strobe signal is asserted and remain so until the strobe is removed. A 500 nanosecond setup and hold time is required by the printer.

The following chart illustrates parallel-port timing.

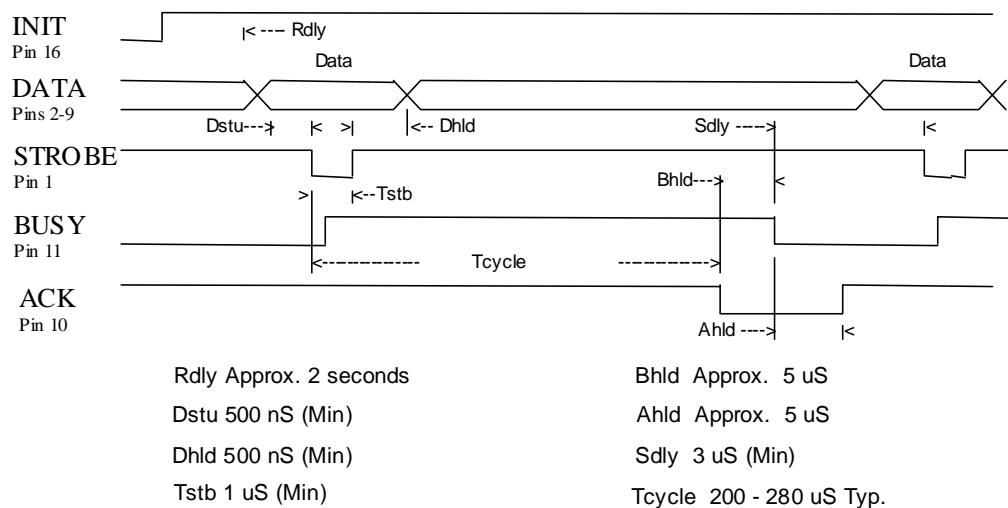


Figure 24 Parallel-port Data Timing

To implement flow control, the busy signal is asserted by the printer outside the normal data-transfer sequence. The busy signal has several uses, but it always indicates that the printer cannot accept information. The busy signal may happen at any time and may not adhere to the above timing chart in all cases. It is up to the host's parallel-port driver to handle all possible busy states. It is important that the host driver does not hang up if it takes some time for an acknowledged (ACK) response to a strobe signal. Standard personal computer parallel-port hardware implements an interrupt on the ACK signal to make flow control easier.



Some systems may wish to change the details of how the strobe, busy, and acknowledged signals interact. The parallel-port option features define how the strobe, busy, and acknowledged signals operate. In normal mode, the printer follows the standard (Centronics) parallel-port conventions. With Options 1 and 3, the acknowledged and busy signals change simultaneously, which is sometimes referred to as ack-after-busy. Options 2 and 3 force busy high on the rising edge of the strobe, which is sometimes referred to as busy-while-strobe timing. In all cases, the data is latched on the rising edge of the strobe. In most cases, the normal timing mode gives the best results.

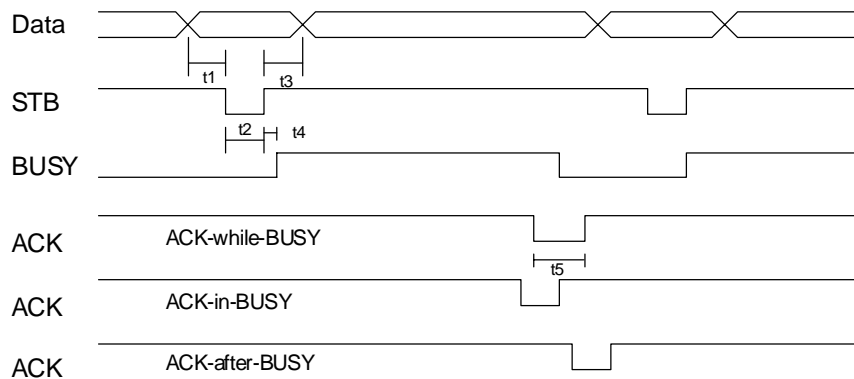


Figure 25 Parallel Port ACK Timing Options

Legend	Time Interval	Minimum	Maximum
t1	DATA Setup to STB	0.5 uS	
t2	STB Width	0.5 uS	500 uS
t3	DATA Hold after STB	0.5 uS	
t4	BUSY Delay after STB	0	0.5 uS
t5	ACK Pulse Width	2.5 uS	

Table 64 Parallel-port Timing

Note: Altered STB timing to take data on the falling edge of STB can be generated as a factory option.

## Printer Buffer Size

The POSjet™ 1000 Printer has a configurable buffer size. It can be set from 40 to 8192 bytes. The configurable buffer allows an application to control how far ahead the buffer gets from the printer. The smaller the buffer, the tighter the control will be. It is up to the application developer to select the optimal buffer size.

## Parallel Port Inquire and IEEE 1284

The POSjet™ 1000 Printer supports the IEEE 1284 bidirectional parallel peripheral interface standard. The IEEE 1284 standard provides for a bidirectional link on the parallel port. The POSjet™ 1000 Printer only supports Modes 0 and 4, which provide a nibble mode reverse channel for printer identification and status inquire commands. It is beyond the scope of this guide to describe the IEEE 1284 protocol. The complete specification is available from the Institute of Electrical and Electronic Engineers, Inc, 345 East 47th Street, New York, NY 10017, USA.

### IEEE 1284 Response Buffer

The POSjet™ 1000 Printer has a 256-byte buffer that contains information to be returned by the IEEE 1284 reverse link. Information is placed in the buffer in the same format as RS-232 serial information is returned.

Inquire commands sent to the printer in IEEE 1284 mode place responses to the commands in the IEEE 1284 reverse-channel buffer. The buffer is then transmitted to the host when it requests the reverse channel.

**Mode 4**

Mode 4 allows the printer to return identification information to the host system. The POSjet™ 1000 Printer returns:

xx,yy    length of following data, 2 bytes with MSB first

MANUFACTURER	TransAct Technologies
COMMAND SET	IPCL
MODEL	1000
COMMENT	Rev. x.xx
ACTIVE COMMAND SET	IPCL

When a Mode 4 request is made, the IEEE 1284 buffer is cleared before the ID is sent.

**Mode 0**

Mode 0 provides a reverse channel for information from the printer. Normal responses to inquire commands are placed in the IEEE 1284 reverse-channel buffer. The Mode 0 reverse-channel request begins returning information to the host. The host may terminate the transmission at any time. If the link is terminated between nibbles, the last nibble is retransmitted on the next request. If a complete byte is transmitted, it is deleted from the IEEE 1284 reverse-channel buffer.

An inquire command can clear the reverse-channel buffer before placing its response in the buffer.

The IEEE 1284 buffer is limited to 1000 characters. If the buffer is not emptied by reverse-channel requests, the buffer overflows. The buffer is a first-in first-out (FIFO) buffer, and the last data placed in the buffer is lost.

**Time-outs**

IEEE 1284 specifies time-outs for various phases of the protocol. The POSjet™ 1000 Printer treats time-outs as minimums. The printer time outs at the specified period only if it is idle during the complete phase.

**Active State**

The IEEE 1284 reverse channel may be activated at any time as long as the printer is not busy with data. If the printer is off-line or the cover is open, the reverse channel may be activated. If the printer is placed back on-line while the reverse channel is active, the printer will not exit the reverse-channel mode.

**Inquire Responses**

In general, inquire commands place two-byte responses in the IEEE 1284 reverse-channel buffer. The two bytes are the same as the serial mode responses. In IEEE 1284 mode, the printer remains busy until the inquire command is processed, assuring responses in real time. To receive the response, the host must ask for it. It is possible for the host to make a number of requests and wait for the responses; however, the status returned is valid at the time the request was made.

It is also possible for the dynamic response mode to be activated and the reverse-channel mode to be opened. The reverse channel then changes from reverse-idle to reverse-data available as the status changes. The application must be careful in dynamic response mode that the dynamic responses are not left active when the reverse channel is closed. If the dynamic responses are active when the reverse channel closes, the output buffer overflows. If data is in the buffer when dynamic responses are activated, it will not be replaced by the current status. If dynamic response is off and a buffer-clear command is issued followed by activation of dynamic responses, the buffer will contain fresh data. If the buffer-clear command is issued after the dynamic response is activated, the buffer will be cleared and any unread responses will be lost.

**Parallel Port Plug and Play**

Microsoft Windows implements Plug and Play (PnP) by doing a special parallel, IEEE 1284 inquire during boot. The POSjet™ 1000 Printer responds to the inquiry if IEEE 1284 is active.

If the Windows PnP configuration flag is set in the printer, IEEE 1284 will be active for all parallel-port modes. For example, PnP in parallel mode forces IEEE 1284. For PnP to work, the host must have an IEEE 1284-compatible port adapter, and the cable used to connect to the printer must support all of the interface signals.

**The Plug and Play response follows.****Device ID string:**

**Manufacturer:** TransAct;  
 CMD:PJ1000CL,IPCL;  
 CLS:PRINTER;MDL S1000 PcOS;  
 DES:TransAct POSjet™ 1000;  
 REV:02.00;OPTS;\$9xyz

**PnP ID:** LPTENUM\TransAct.S1000\_PcECB3

**Device:** Ithaca® POSjet™ 1000

**Device** Class: Printer

**The OPTS field is always:** OPTS;\$2XYZ

Where X is a model definition, X and Y are bit fields that designate the options attached to the printer.

Y		X	
Bit 0	Print zone	Bit 0	0
Bit 1	Undefined	Bit 1	Knife module attached
Bit 2	Undefined	Bit 2	0
Bit 3	0	Bit 3	0
Bits 4-5	1	Bits 4-5	1
Bits 6-7	0	Bits 6-7	0

## Serial Port

### Serial Port Protocol

The serial port supports two flow control standards, XON/XOFF and Ready/Busy (sometimes called Data Terminal Ready (DTR) or hardware handshake).

When Ready/Busy flow control is selected, the printer can be configured to use DTR, Request to Send (RTS), or both for flow control. If only DTR is selected for flow control, RTS will indicate the cover is open or the printer has faulted. The following discussion assumes the DTR is being used for flow control.

The Ready/Busy protocol generally uses the DTR signal to indicate to the host computer that the printer is not ready to accept data. The host should stop sending data to the printer as soon as possible. Because the host may not notice the DTR signal until it has transmitted several bytes of data to the printer, the printer continues to except up to 255<sup>28</sup> bytes of data after it indicates that it is not ready. Figure 26 Serial Port Flow Control Using DTR illustrates how the Ready/Busy protocol works, and Figure 27 XON/XOFF Serial Port Flow Control illustrates how the XON/XOFF protocol works.

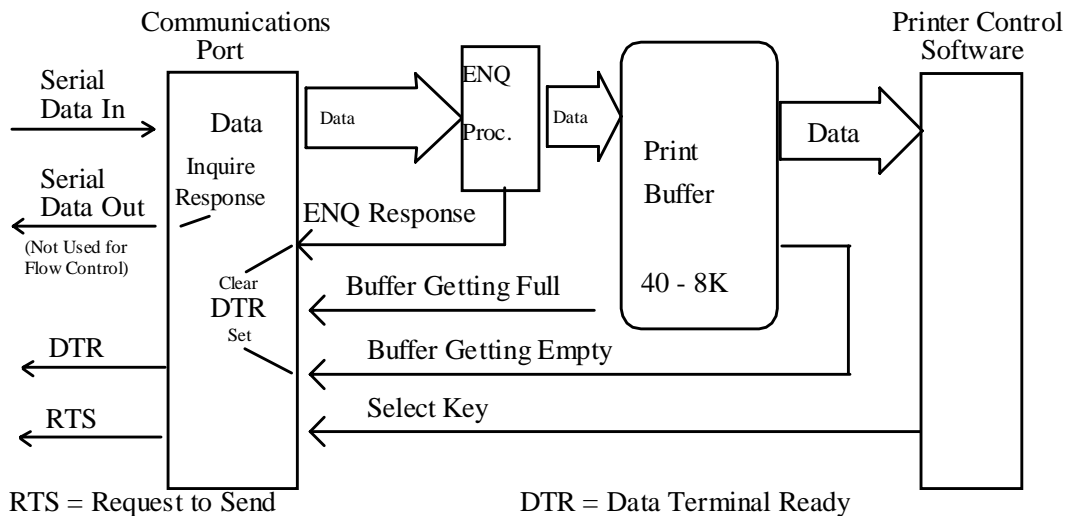
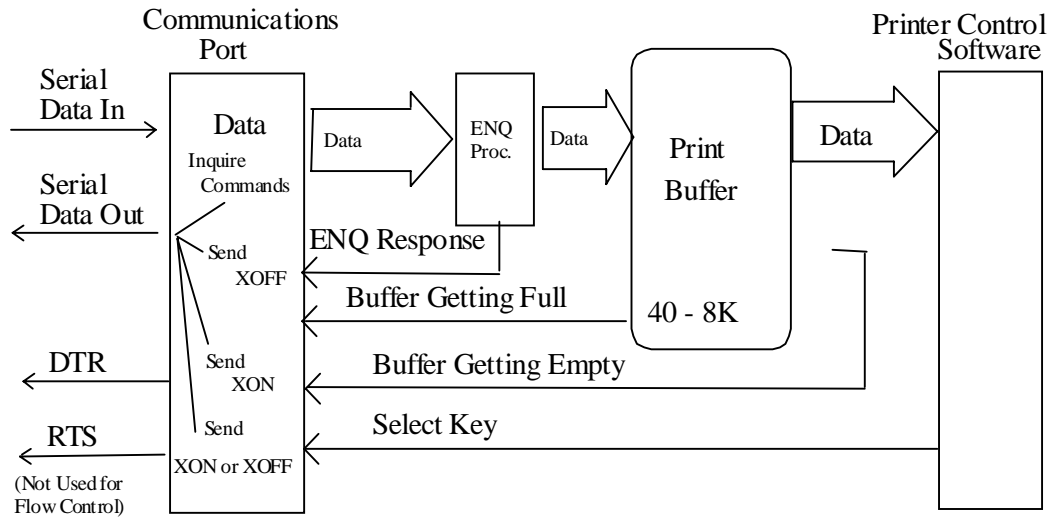


Figure 26 Serial Port Flow Control Using DTR

<sup>28</sup> The buffer always signals it is full before it overflows. The size of the reserve depends on the buffer size selected. It is always at least 255 bytes.



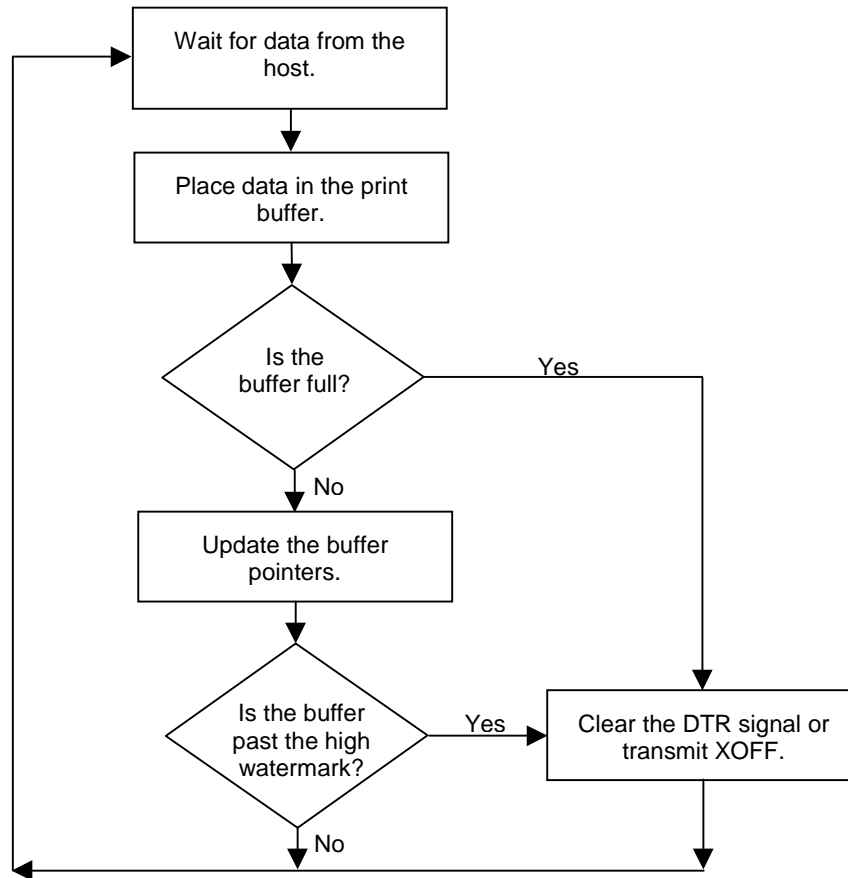
RTS = Request to Send

DTR = Data Terminal Ready

Figure 27 XON/XOFF Serial Port Flow Control

## Print Buffer Flow

Flow Chart 1 illustrates how the communications driver acquires data from the serial port and places it in the buffer using Ready/Busy or XON/XOFF flow control.



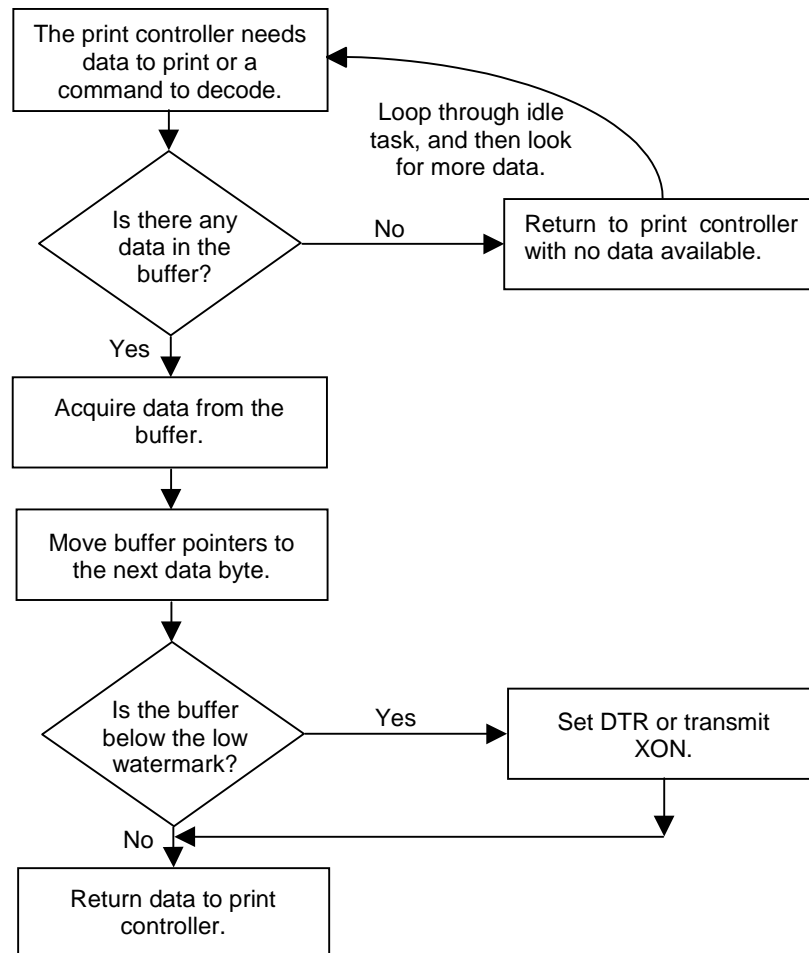
Flow Chart 1 Serial Buffer Operation

At the top of

Flow Chart 1, the driver is waiting for data. When data is received from the host, the printer checks to see if it is an inquire command. If the data is an inquire, it is responded to and placed in the buffer. If not, the data is placed in the buffer without response. The buffer is then checked to see if it is full before the internal pointer is incremented. If it is not full, the pointer is incremented in preparation for the next data byte. The buffer is checked by looking to see if it has passed a high watermark. If the buffer has, the communication driver is notified, and it resets DTR to indicate to the host that no more data should be sent.

Flow Chart 2 illustrates how the print control software takes data from the buffer and controls flow. At the top of the chart, the print control software asks for data. If there is no data in the buffer, a “no data flag” is returned. The print software must then wait for data. If there is data in the buffer, it is read, and the pointers are updated. The buffer is then checked to see how much information is left. If the buffer is below a low watermark (about 100 bytes left), the communication driver is notified, and DTR is reasserted.

When XON/XOFF flow control is used, the flow is similar to DTR flow except that DTR is not used and XON/XOFF control characters are transmitted back to the host on the serial link. The XON/XOFF advantage is that only three wires are required to interconnect to a printer. The disadvantage is that a serial-port receiver driver must be written for the host.



Flow Chart 2 Print Controller Using Data

When the printer is on, the print controller looks for data. If there is data, it processes it. Flow control is done when the data is taken from the buffer and the amount of data in the buffer is less than a prescribed amount. The low watermark is set based on the expected environment. The POSjet™ 1000 Printer sets the low watermark at half the buffer size or 1024 characters whichever is smaller. The low watermark gives the host application time to get more data to the printer before the printer uses up what it has.

When XON/XOFF protocol is implemented, it is possible for the host to miss an XON or an XOFF. To prevent this from causing a communication lockup, the printer sends an XOFF for every character received after the high watermark is reached. If the printer detects that the serial data link is inactive, it sends out an XON about every two seconds. When the printer cover is opened, an XOFF is sent. An XOFF is sent even when the internal data buffer is past the high watermark and is done to allow the host to know that the printer is not ready.

## Printer Buffer Size

The size of the POSjet™ 1000 buffer is configurable, which allows an application to control how far ahead of the printer it can get before being asked to wait. The buffer size can be set from 256 to 6144 bytes (not including the 64-character high-speed buffer). The smaller the buffer, the tighter the control will be. It is up to the developer to select the optimal buffer size for an application.

## Serial Mode Plug and Play

Microsoft has defined a Plug and Play (PnP) protocol to identify devices on serial links. The enumeration process is designed to find and automatically configure a device driver for the printer. It is done by toggling the control lines in a specific sequence that is recognized by the printer. The peripheral then responds such that Windows can identify the device.

To allow the printer to look for and respond to the sequence, EISA PnP must be enabled. When enabled in serial mode, the flow control is forced to Request to Send (RTS) with Data Terminal Ready (DTR) static.

## Using DSR

Windows uses the host's Data Set Ready (DSR) line (the printer's DTR line) on the serial port to determine whether a device is attached to the port. When Windows is booted (or does PnP), the system sets the host's DTR and RTS to zero and waits approximately 200 milliseconds. It then sets the DTR to one and waits another 200 milliseconds. After 200 milliseconds, the system checks to see whether the DSR line is high. This indicates that a serial device is attached to the serial port. The system responds by setting RTS high and waits to receive the device identification string.

In some devices, such as the serial mouse, the DSR line can be held high by tying it directly to the DTR line. When the mouse is connected to the serial port on the personal computer, the power supplied through the DTR line also raises DSR high.

For Plug and Play compatibility, RTS flow control is used at the printer because DSR must stay high as long as the device is attached to the serial port.



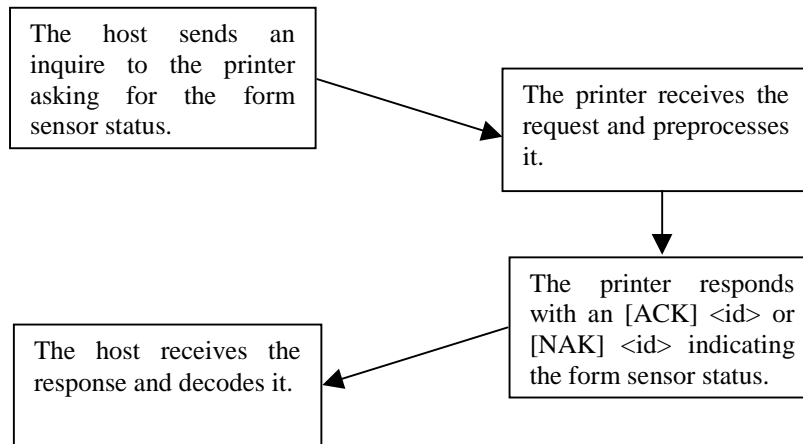
**Serial Device Identification**

The serial device must report its identification to the system using an identification string at 1200 baud. The identification string consists of 18 fields that identify the device, class of the device, and other compatible devices. Only five of the fields are required by all serial devices; all others are optional. The identification string used by the POSjet™ 1000 Printer follows.

<b>028H</b>	<b>Start of ASCII response</b>	
	<b>0,1</b>	<b>PnP Rev</b>
	<b>'IPR0210'</b>	<b>Unique ID (IPR plus revision level)</b>
	<b>\PRINTER</b>	<b>Printer</b>
	<b>\S1000 PcOS</b>	<b>Model</b>
	<b>\SC:</b>	<b>9600,N,8,1</b>
	<b>Serial Configuration:</b>	<b>Baud, Parity, Bits, Stop Bits</b>
	<b>xxH</b>	<b>Check-sum</b>
	<b>029H</b>	<b>End PnP</b>
<b>Note 1</b>	The model field may be altered to generate PnP ID's other than "S1000 PcOS" by special order.	
	When the identification is complete, the printer returns to the baud rate specified in the configuration.	

## Serial Port Inquire

The serial port inquire is more straightforward than parallel mode. The serial acknowledged (ACK) or not acknowledged (NAK) responses follow a uniform format, the ACK or NAK is always followed by the command ID that requested it. This makes the design of the host application easier because the response can be identified and always follows the same format.



Flow Chart 3 Inquire Flow

The host sends an [ENQ] <id> (form sensor status) request to the printer. The printer responds with an [ACK] <id> indicating that the request was identified, status true.

Inquire commands affect the printer's performance. Communication is a high priority for the printer. Inquire commands take processing time away from the print tasks. It is possible to ask for so much status that the printer slows. In serial mode, it is important that the response to an inquiry is received by the host before another command is issued. When an inquiry is received by the printer, it is buffered in a high-speed processing queue. When the printer has time, it empties the queue and processes the inquiries. The printer responds to the command as soon as the second byte of the command is taken from the high-speed buffer. If the host is looking for a form to be inserted, it should not send status requests as fast as it can. The host will receive a response to all of them. If the host did not wait for a response to each, there would be unnecessary responses.

In IEEE 1284 mode, inquire responses are placed in an IEEE 1284 transmit queue. When the IEEE 1284 reverse channel is open, the responses are returned to the host. It is important that after each request the reverse channel be opened. Inquire responses remain in the queue until read. If the [ENQ] <9> command is sent to the printer, the IEEE 1284 buffer will be cleared, and only the response to the [ENQ] <9> will remain.

## Display Pass Through

The display pass through feature allows a pole display to be interconnected with the printer. The printer is connected to a host system with a special serial cable. The host sends serial data to the printer and the printer sends serial data to the pole display. The printer does not provide power to the display. During normal printer operation, no data is passed to the display. In pass through mode, all received data is passed on to the display.

## The Restrictions and Considerations for Pass through

1. Pass through only works on serial printers with DTR flow control.
2. XON/XOFF mode does not work correctly.
3. All inquire ([ENQ]) commands are active when not in actual pass through mode. If, for example, an [ENQ] command for cash drawer status is received by the printer, the response is transmitted. When pass through is active, all data except the [ENQ] is passed. The printer does not look for or act on any commands other than inquires.
4. If pass through data is sent to the printer in continuous mode (i.e. as fast as possible), each [ENQ] character in the sequence delays the transmit data by one byte. The printer buffer size is limited. If the buffer overruns, data will be lost.
5. Modem handshake signals from the printer are not controlled during pass through. Their state is set by printer status. Opening the cover toggles the control lines. When the printer cover is open, it accepts data, including all [ENQ] commands. If an [ENQ] # is received when off-line, pass through is entered.
6. Previously buffered data is processed by the printer in pass through mode. Printer performance is degraded by the processing of pass through data.
7. In 8-bit, no parity mode, data is passed through unaltered. In all other modes, the parity is checked, stripped, and then regenerated by the printer.
8. Pass through has no affect on a printer in parallel mode.

## Remote Power Control

The POSjet™ 1000 Printer has a remote power control command that instructs it to enter OFF. When the command is issued, the printer performs print cartridge maintenance and enters OFF. Unlike pushing the  $\Phi$  button, remote power mode leaves the communications active. All commands except the exit power down command are ignored.

Function	Remote Power Control
ASCII	[ESC] y <n>
Hexadecimal	1BH 79H <n>
Decimal	<27> <121> <n>
IPCL	&%YX17 or &%YX18
EPOS	[ESC] y <n>
Where n	17 Requests the printer to enter remote OFF 18 Requests the printer to exit remote OFF
Description	Inquiry (ENQ) commands are accepted and answered in remote power down mode. The printer reactivates if the $\Phi$ button is pressed or a power up command is received.
Note:	If power is lost after the power down command is issued, the printer remembers it is in power down mode but does not reactivate the communications link. The $\Phi$ button must be pushed to return the printer to full operation.
Note:	This command is not available in STAR mode.

## Remote Printer Reset

### Reset in Serial Mode

It is possible to generate a software printer reset in serial mode. The [ENQ] <10> command requests that the printer reset. (This is not a hardware reset). The reset completely initializes the hardware and software, but the printer does not recover from a loss of software control.

Note: If the printer mode was changed by the [ESC] y <2> or <3> command, a soft reset will not return to the power on default.

#### The command flow follows

The [ENQ] <10> is acknowledged. During cleanup and initialization, the printer is placed off-line. Before the printer initializes, it tries to clean up its input buffer and other internal processes.

The printer's software is reinitialized.

The power-cycled flag is set.

The print head is homed and re-calibrated.

The printer goes back on-line.

### Reset in Parallel Mode

In parallel mode, driving the INIT signal on the parallel port for 100 milliseconds generates a software reset. It takes about two seconds for the printer to recover from a reset. The [ENQ] <10> command has the same effect, but it is not acknowledged.

## Miscellaneous Communication Features

### Power-cycle Recovery

Sometimes the host needs to know if the printer was power cycled. An example would be after the receipt tape was changed. It is not necessary to turn off the printer to change the receipt. However, if the operator does, any information sent to the printer before the power cycle will be lost.

The POSjet™ 1000 Printer has a flag that is set after a reset. The flag stays set until the host requests a reset. The [ENQ] <11> command reads the flag. If the command returns power-cycled status, the power has been reset or power cycled since the last request. All unprinted information has been lost.

If the print operation is critical, it is a good idea to check the power-cycle flag before and after all transactions. An alternate approach is to check the flag after every off-line to on-line transition.

Note: If the printer mode was changed by the [ESC] y <2> or <3> command, a power-cycle reset will return to the initial configuration.

### Data Pass-through

The POSjet™ 1000 Printer supports data pass-through (sometimes referred to as display pass-through). Data pass-through is activated by the print-suppress command with the pass-through bit set. In pass-through mode, the printer can be requested to transmit any data that it receives. When this is the case, the printer's inquire commands are active but of little use. Typically, the printer's transmit data is connected to the next device in line. Inquire commands have no data path back to the host. If pass-through is to be used, it is a good idea to deactivate the inquire commands. (Use [ESC] y <6>).

Before pass-through data can be used, it must be activated in the configuration menu, which is the third selection in the print-suppress/pass option.

All data after, but not including, the print-suppress command is pass through. When deactivated, the print-suppress command is again not pass through. During pass through the multi-drop commands are active (if configured).

The printer will act upon a multi-drop control command found in the pass-through data. If the printer is deselected during pass-through, it stops passing on the data. When the printer is re-addressed, data pass-through is active.

### Multi-drop Configuration

The POSjet™ 1000 Printer supports a multi-drop configuration where up to three printers can be connected in parallel. Each printer has a different address A, B, or C. The printer does not accept any print information unless it is addressed. Multi-drop configuration is only available in serial mode, as parallel printers cannot be connected together.

### Off-line Active

A configuration flag that prevents the printer from going off-line (in most cases) is available. Off-line mode allows the application to query the printer for status rather than assume a status from the control signals. The feature allows the host application to query the printer at all times except when there is no power; a full input buffer; or a hard failure. For example, when the printer's cover is open, the printer stops printing but still accepts data and inquiries. The inquire cover status command returns, "Cover open."

Hard failures result when there is no power or a printer fault occurs. If the printer is off-line, either the input buffer is full or a hard fault has occurred. The host application should not allow the input buffer to fill.

## Recovery from Mechanical Errors

The Ithaca Inquire commands and the Epson [DLE][ENQ] and [DLE][EOT] commands allow most printer error status to be read and in some cases recovery attempted. Paper jams and auto-cutter faults can be recovered, however, any data not previously printed will be lost.

If the application is to support Error Recovery, the application should use the appropriate status request commands to query the printer periodically. If an error response is such that the fault is recoverable, the host application should interact with the operator and request that the fault be corrected. (IE. Clear Paper Jam) When the operator indicates that the problem has been corrected, the host can issue a reset request.

If a serious error occurs, the printer will halt and enter fault error mode. If the fault is such that the printer can maintain communications with the host, the print status request and response system will remain active. The status of the system will however remain static. That is the status responses will reflect the state of the system when the fault occurred.

There are errors that cannot be reported to the host system. These errors are such that the integrity of the printer do not allow continued operation. That is there is no way to report the error. These errors occur (for the most part) during power up diagnostics. They are as follows:

- EEPROM READ ERROR**                      Power up only  
The Internal EEPROM is not readable or the check sum is bad.  
Pressing the Power Button will attempt to rewrite the configuration information. This may leave the printer configured incorrectly.
- EEPROM WRITE ERROR**                      Power up/down and Configuration only  
The Internal EEPROM is defective. There is no recovery.
- SOFTWARE ERROR VECTOR**                      Can occur at any time.  
These errors can occur during operation. They signal a serious problem with the system. In most cases this error will also generate a Watch Dog reset. A power cycle will generally recover normal printer operation. An ESD event or a firmware bug generally causes these errors. The printer maintains an error log, this log contains additional information about the fault and is printed during manual configuration. The information in this log should be reported to Transact to identify the exact cause of the fault.
- USERSTORE FORMAT ERROR**                      Power up or User Store Write Operations  
The User Store data in FLASH has an invalid format. Pressing the Power Button will erase the user store and reformat it. This can be caused by a firmware update.
- FLASH WRITE ERROR**                      Power up or User Store Write Operation.  
The Program Flash has failed. There is no recovery from this error.
- COM ADAPTER ERROR**                      Power up only  
The communications interface card is not supported by the firmware or is missing. There is no recovery.

## Programmer's Notes

When the serial port is used, it is important that the output lines from the printer not be shorted or back driven. If the signals are not to be used, they should be left open.

Pins 3, 4, and 7 (of the 9 pin connector) are outputs from the printer. If any one of these signals is grounded or back driven, the other two outputs will be degraded.

The best time to configure the printer by the host with remote configuration is during system setup or software update.

## Appendix A

### Code Page Definition Table

Code Page	Country Code/ Language Set	Decimal <n <sub>1</sub> ><n <sub>2</sub> >	Hex <n <sub>1</sub> ><n <sub>2</sub> >	ASCII <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> >	Epson ID
64	USA (Slashed 0)	0,64	0H,040H	0,0,6,4	NA
65	USA (Unslashed 0)	0,65	0H,041H	0,0,6,5	NA
66	British	0,66	0H,042H	0,0,6,6	3
67	German	0,67	0H,043H	0,0,6,7	2
68	French	0,68	0H,044H	0,0,6,8	NA
69	Swedish I	0,69	0H,045H	0,0,6,9	5
70	Danish I	0,70	0H,046H	0,0,7,0	NA
71	Norwegian	0,71	0H,047H	0,0,7,1	NA
72	Dutch	0,72	0H,048H	0,0,7,2	14
73	Italian	0,73	0H,049H	0,0,7,3	NA
74	French Canadian	0,74	0H,04AH	0,0,7,4	13
75	Spanish I	0,75	0H,04BH	0,0,7,5	NA
76	Swedish II	0,76	0H,04CH	0,0,7,6	15
77	Swedish III	0,77	0H,04DH	0,0,7,7	16
78	Swedish IV	0,78	0H,04EH	0,0,7,8	17
79	Turkish	0,79	0H,04FH	0,0,7,9	18
80	Swiss I	0,80	0H,050H	0,0,8,0	19
81	Swiss II	0,81	0H,051H	0,0,8,1	20
91	Welsh	0,91	0H,05BH	0,0,9,1	NA
93	Arabic	0,93	0H,05DH	0,0,9,3	93
437	USA	1,181	1H,0B5H	0,4,3,7	0
774	Baltic	3,6	3H,006H	0,7,7,4	74
850	Multilingual	3,82	3H,052H	0,8,5,0	26
852	East European Latin II	3,84	3H,054H	0,8,5,2	46
855	Cyrillic I	3,87	3H,057H	0,8,5,5	44
857	Turkey	3,89	3H,059H	0,8,5,7	57
860	Portugal	3,92	3H,05CH	0,8,6,0	28
861	Icelandic	3,93	3H,05DH	0,8,6,1	73
862	Hebrew NC	3,94	3H,05EH	0,8,6,2	60
863	Canada French	3,95	3H,05FH	0,8,6,3	43
865	Norway	3,97	3H,061H	0,8,6,5	27
866	Cyrillic II	3,98	3H,062H	0,8,6,6	45
869	Greek_869	3,101	3H,065H	0,8,6,9	47
895	Kamenicky (MJK)	3,127	3H,07FH	0,8,9,5	55

Code Page	Country Code/ Language Set	Decimal <n <sub>1</sub> ><n <sub>2</sub> >	Hex <n <sub>1</sub> ><n <sub>2</sub> >	ASCII <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> >	Epson ID
1008	Greek 437	3,240	3H,0F0H	1,0,0,8	38
1009	Greek 928	3,241	3H,0F1H	1,0,0,9	39
1011	Greek 437 Cyprus	3,243	3H,0F3H	1,0,1,1	41
1012	Turkey	3,244	3H,0F4H	1,0,1,2	29
1014	Polska Mazovia	3,246	3H,0F6H	1,0,1,4	22
1015	ISO Latin 2	3,247	3H,0F7H	1,0,1,5	23
1016	Serbo Croatian I	3,248	3H,0F8H	1,0,1,6	24
1017	Serbo Croatian II	3,249	3H,0F9H	1,0,1,7	25
1018	ECMA-94	3,250	3H,0FAH	1,0,1,8	42
1019	Windows East Europe	3,251	3H,0FBH	1,0,1,9	49
1020	Windows Greek	3,252	3H,0FCH	1,0,2,1	50
1021	Latin 5 Windows Turkey	3,253	3H,0FDH	1,0,2,2	51
1022	Windows Cyrillic	3,254	3H,0FEH	1,0,2,4	52
1024	Hungarian CWI	4,0	4H,000H	1,0,2,5	54
1026	ISO Latin 4	4,2	4H,002H	1,0,2,6	56
1027	Ukrainian	4,3	4H,003H	1,0,2,7	66
1028	Roman-8	4,4	4H,004H	1,0,2,8	58
1029	ISO Latin 6	4,5	4H,005H	1,0,2,9	67
1031	Hebrew OC	4,7	4H,007H	1,0,3,0	61
1032	Windows Hebrew	4,8	4H,008H	1,0,3,2	62
1033	KBL-Lithuanian	4,9	4H,009H	1,0,3,3	63
1034	Windows Baltic	4,10	4H,00AH	1,0,3,4	68
1035	Cyrillic-Latvian	4,11	4H,00BH	1,0,3,5	69
1072	Bulgarian	4,48	4H,030H	1,0,7,2	72
NA	French				1
NA	Danish I				4
NA	Italian				6
NA	Spanish I				7
NA	Japanese				8
NA	Norwegian				9
NA	Danish II				10
NA	Spanish II				11
NA	Latin American				12



## Appendix B

### ASCII Code Table

Hex	Decimal	ASCII	Hex	Decimal	ASCII	Hex	Decimal	ASCII	Hex	Decimal	ASCII
00	0	NULL	20	32	(SP)	40	64	@	60	96	`
01	1	SOH	21	33	!	41	65	A	61	97	a
02	2	STX	22	34	"	42	66	B	62	98	b
03	3	ETX	23	35	#	43	67	C	63	99	c
04	4	EOT	24	36	\$	44	68	D	64	100	d
05	5	ENQ	25	37	%	45	69	E	65	101	e
06	6	ACK	26	38	&	46	70	F	66	102	f
07	7	BEL	27	39	'	47	71	G	67	103	g
08	8	BS	28	40	(	48	72	H	68	104	h
09	9	HT	29	41	)	49	73	I	69	105	i
0A	10	LF	2A	42	*	4A	74	J	6A	106	j
0B	11	VT	2B	43	+	4B	75	K	6B	107	k
0C	12	FF	2C	44	,	4C	76	L	6C	108	l
0D	13	CR	2D	45	-	4D	77	M	6D	109	m
0E	14	SO	2E	46	.	4E	78	N	6E	110	n
0F	15	SI	2F	47	/	4F	79	O	6F	111	o
10	16	DLE	30	48	0	50	80	P	70	112	p
11	17	DC1	31	49	1	51	81	Q	71	113	q
12	18	DC2	32	50	2	52	82	R	72	114	r
13	19	DC3	33	51	3	53	83	S	73	115	s
14	20	DC4	34	52	4	54	84	T	74	116	t
15	21	NAK	35	53	5	55	85	U	75	117	u
16	22	SYN	36	54	6	56	86	V	76	118	v
17	23	ETB	37	55	7	57	87	W	77	119	w
18	24	CAN	38	56	8	58	88	X	78	120	x
19	25	EM	39	57	9	59	89	Y	79	121	y
1A	26	SUB	3A	58	:	5A	90	Z	7A	122	z
1B	27	ESC	3B	59	;	5B	91	[	7B	123	{
1C	28	FS	3C	60	<	5C	92	\	7C	124	
1D	29	GS	3D	61	=	5D	93	]	7D	125	}
1E	30	RS	3E	62	>	5E	94	^	7E	126	~
1F	31	US	3F	63	?	5F	95	_	7F	127	(sp)

# Index

[

[BEL] Audio alert .....	109, 110
[BEL] Sound buzzer.....	163
[BS] Insert back space.....	64
[BS] Set back space.....	151
[CAN] Clear print buffer .....	108
[CR] Print and carriage return .....	139
[CR] Set carriage return .....	63
[DC2] Begin 10 cpi .....	70
[DC4] End one-line double-wide print.....	83
[DLE] ENQ <n> Real-time request to printer .....	165
[DLE] EOT <n> Transmit real-time status.....	157
[ENQ] <1> Inquire Cash Drawer 1 status .....	117
[ENQ] <10> Request printer reset.....	119
[ENQ] <11> Request printer power cycle status .....	119
[ENQ] <14> Inquire mechanical error status .....	120
[ENQ] <15> Inquire printer state .....	120
[ENQ] <20> Inquire all printer status .....	121
[ENQ] <21> Inquire printer ID .....	122
[ENQ] <22> Inquire Error Status .....	123
[ENQ] <23> Inquire user-store status .....	123, 124
[ENQ] <3> Inquire receipt paper low status.....	117
[ENQ] <4> Inquire receipt paper out status .....	117
[ENQ] <8> Inquire cover open status .....	118
[ENQ] <9> Inquire buffer status .....	118
[ENQ] <n> Inquire printer status .....	117
[ESC] - <1> Begin underline.....	83, 85
[ESC] - <n> Turn on/off underline mode.....	147
[ESC] \ <n <sub>1</sub> > <n <sub>2</sub> > Set relative print position.....	151
[ESC] ! <n> Select international character set .....	75
[ESC] ! <n> Select print mode(s) .....	147
[ESC] # <0> Begin 12 x 12 draft print .....	73
[ESC] \$ <n <sub>1</sub> > <n <sub>2</sub> > Set absolute print position .....	151
[ESC] \$ Cancel user-defined characters .....	81
[ESC] % <n> Select/cancel user-defined character set .....	141
[ESC] % G Begin italics.....	86
[ESC] % H End italics.....	86
[ESC] & <y> <c1> <c2> ... Define user-defined characters .....	142
[ESC] * <m> <0> <0> Set horizontal graphics mode .....	96
[ESC] * <m> <n <sub>1</sub> > <n <sub>2</sub> > Print graphics in mode <m> .....	93
[ESC] * <m> <n <sub>l</sub> > <n <sub>h</sub> > <d <sub>l</sub> > ... <d <sub>k</sub> > Select bit-image mode.....	153
[ESC] ? <m> <n> Reassign graphic mode .....	94
[ESC] ? <n> Cancel user-defined characters.....	142
[ESC] @ Initialize the printer.....	110, 164
[ESC] [ @ ... Double-wide, double-high italics.....	84
[ESC] [ C <n> Insert Euro character .....	78
[ESC] [ P <n> Set character pitch .....	71
[ESC] [ S... Redefine character set .....	79
[ESC] [ T <n <sub>h</sub> > <n <sub>l</sub> > Select character code page .....	76
[ESC] [BEL] <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > Audio alert control .	110
[ESC] [EM] B <n> Set bar code height.....	107

[ESC] [EM] J <n> Set bar code justification and HRI modes .....	107
[ESC] [SI] Begin 24 cpi.....	70
[ESC] [US] l <Name..> <0> Load item process .....	98
[ESC] [US] b <Name..> <0> Begin named macro record .....	97, 99
[ESC] [US] c <Name..> <0> Save user-defined characters.....	98, 100
[ESC] [US] d <Name..> <0> Delete item from user store.....	101
[ESC] [US] e <Name..> <0> End name macro record .....	99
[ESC] [US] e <Name..> <0> Remove item from user store.....	98
[ESC] [US] e <Name..> <0> Stop name macro record .....	97
[ESC] [US] f ALL <0> Flush information from user store.....	98
[ESC] [US] f ALL <0> Flush user store .....	101
[ESC] [US] l <Name> <0> Load macro/character .	100
[ESC] [US] m <Name..> <0> Save macro data.....	100
[ESC] [US] m <Name..> Save macro data .....	97
[ESC] [US] q <Name..> <0> Query user store .....	101
[ESC] [US] r <Name> <0> Run macro data.....	100
[ESC] [US] s <Name..> <0> Flag as a start-up macro .....	98
[ESC] [US] s <Name..> <0> Flag start-up macro...	101
[ESC] ] Reverse line feed .....	69
[ESC] ^ <n> Print control character .....	78, 146
[ESC] { <n> Turn on/off upside-down print mode.	148
[ESC] ' <n> Copy user-defined storage buffers .....	166
[ESC] < <n> Enable data pass through.....	112
[ESC] < <n> Enable print suppress .....	112
[ESC] < Return home .....	153
[ESC] <n> <n <sub>1</sub> > <n <sub>2</sub> > Set horizontal position .....	65
[ESC] = <n> Select peripheral device status .....	165
[ESC] = <y> <c <sub>1</sub> > <c <sub>2</sub> > ... Define user-defined characters.....	80
[ESC] = y c <sub>1</sub> c <sub>2</sub> ... Define user-defined characters .....	97
[ESC] > <n> Enable user-defined characters.....	81
[ESC] 0 Set line spacing to 27/216 inch .....	66
[ESC] 1 <n> Set left margin .....	152
[ESC] 1 Set line spacing to 7/72 inch .....	67
[ESC] 2 Enable variable line spacing .....	67
[ESC] 2 Select default line spacing .....	141
[ESC] 3 <n> Set line spacing.....	141
[ESC] 3 <n> Set line spacing to n/216 inch.....	66
[ESC] 4 Begin italics .....	149
[ESC] 4 Set top of form.....	68
[ESC] 5 <01> Begin auto line feed.....	69
[ESC] 5 End italics .....	149
[ESC] 8 Disable paper out sensor .....	108
[ESC] 9 Enable paper out sensor .....	108
[ESC] a <n> Select justification .....	151
[ESC] a <n> Set justification.....	65
[ESC] A <n> Set variable line spacing to n/72 inch .	67
[ESC] b <n> ... Print bar code .....	104
[ESC] B <n <sub>1</sub> > <n <sub>2</sub> > ... <n <sub>3</sub> > 0 Set vertical tab stops	68
[ESC] Begin 12 cpi.....	70
[ESC] BEL Sound buzzer.....	163

[ESC] C [NUL] <n> Set form length in inches .....	69	[ESC] R Reset horizontal and vertical tab stops .....	65, 68
[ESC] c <n> Select color .....	83	[ESC] S <0> Select superscript .....	86
[ESC] C <n> Set form length in lines .....	68	[ESC] S <1> Select subscript .....	86
[ESC] c 3 <n> Select paper sensor(s) to output paper-end signals .....	150, 173	[ESC] s <n> Set rotated print line length .....	91
[ESC] c 4 <n> Select paper sensor(s) to stop printing .....	150, 173	[ESC] SP <n> Set right-side character spacing .....	141
[ESC] c 5 <n> Enable/disable paper feed .....	149, 173	[ESC] t <n> Select character code table .....	146
[ESC] d <n> Feed <n> lines at current spacing .....	67	[ESC] T End superscript or subscript .....	86
[ESC] d <n> Print and feed <n> lines .....	139	[ESC] U <0> Begin bidirectional print .....	94
[ESC] D <n <sub>1</sub> > <n <sub>2</sub> > <n <sub>3</sub> > ... <n <sub>i</sub> > 0 Set horizontal tab stops .....	64	[ESC] U <1> Begin unidirectional print .....	94
[ESC] D <n <sub>1</sub> > ... <n <sub>k</sub> > NUL Set horizontal tab positions .....	151	[ESC] U <n> Turn on/off unidirectional printing mode .....	152
[ESC] e <n> Print and reverse feed <n> lines .....	139	[ESC] u <n <sub>1</sub> > <m <sub>1</sub> > Set rotated print line spacing .....	91
[ESC] E <n> Turn on/off emphasized mode .....	147	[ESC] V <n> Set intercharacter spacing .....	72
[ESC] E Begin emphasized print .....	85	[ESC] V <n> Turn on/off 90° rotation mode .....	148
[ESC] F End emphasized print .....	85	[ESC] W <n> Double-wide, double-high mode .....	84
[ESC] g <0> Process user macro .....	103	[ESC] w <n> Enable dynamic response .....	115
[ESC] g <1> Start macro record .....	97, 103	[ESC] x <n> Open cash drawer .....	109
[ESC] g <2> Stop macro record .....	97, 103	[ESC] X <n <sub>1</sub> > <n <sub>2</sub> > Set left/right print margin .....	108
[ESC] g <3> Stop macro record and save .....	103	[ESC] y <11> OCR character enable .....	81
[ESC] G <n> Turn on/off double-strike mode .....	148	[ESC] y <12> OCR character disable .....	81
[ESC] G Begin enhanced print .....	85	[ESC] y <n> Set feature control .....	113
[ESC] h <color> <length> <format> <data> Process color graphics .....	95	[ESC] Y <n <sub>1</sub> > <n <sub>2</sub> > Print full-speed double-density graphics .....	92
[ESC] h <color> <length> <format> <data> Process horizontal graphics .....	95	[ESC] Z <n <sub>1</sub> > <n <sub>2</sub> > Print quad-density graphics .....	93
[ESC] H End enhanced print .....	85	[FF] Set form feed .....	68
[ESC] I <n> Set print quality mode .....	73	[GS] a <n> Enable/disable Automatic Status Back .....	154
[ESC] i Partial knife cut .....	163	[GS] I <n> Transmit printer ID .....	164
[ESC] J <n> Fine line feed .....	66	[GS] P x y Set horizontal and vertical motion units .....	164
[ESC] J <n> Print and feed paper .....	140	[GS] r <n> Transmit status .....	156
[ESC] j Print and reverse feed .....	140	[GS] Start/end macro definition .....	167
[ESC] K <n> Print and reverse feed <n> lines .....	140	[GS] V <m> <n> Select cut mode and cut paper .....	163
[ESC] K <n <sub>1</sub> > <n <sub>2</sub> > Print single-density graphics .....	92	[GS] z 0 <t <sub>1</sub> > <t <sub>2</sub> > Set on-line recovery wait time .....	166
[ESC] L <n <sub>1</sub> > <n <sub>2</sub> > Print half-speed double-density graphics .....	92	[HT] Set horizontal tab .....	64, 151
[ESC] m Perform a partial knife cut .....	163	[LF] Print and line feed .....	139
[ESC] p <m> <t <sub>1</sub> > <t <sub>2</sub> > Generate pulse .....	165	[LF] Set line feed .....	63
[ESC] P <n> Begin rotated font .....	74	[SI] Begin 17 cpi .....	70
[ESC] p 3 <n> Select paper sensor(s) to output paper-end signals .....	111	[SO] Begin one-line double-wide print .....	83
[ESC] p 4 <n> Select paper sensor(s) to stop printing .....	111	[SOH] <n> Begin multi-drop control .....	115
[ESC] p 5 <n> Enable/disable paper feed .....	110	[VT] Set vertical tab .....	67
[ESC] q <n> Query marker .....	109		
[ESC] Q <n> Set right margin .....	153		
[ESC] r <0> End rotated print .....	90		
[ESC] r <1> Rotate 90° .....	89		
[ESC] r <11> Rotate 270° with two pass font .....	90		
[ESC] r <13> Rotate 90° with two pass font and line formatting .....	89		
[ESC] r <15> Rotate 270° with two pass font and line formatting .....	90		
[ESC] r <3> Rotate 270° .....	89		
[ESC] r <5> Rotate 90° with line formatting .....	89		
[ESC] r <7> Rotate 270° with line formatting .....	89		
[ESC] r <9> Rotate 90° with two pass font .....	89		
[ESC] r <n> Rotate 90°, 180°, or 270° .....	88		
[ESC] R <n> Select an international character set .....	142		
[ESC] r <n> Turn color mode on/off .....	146		

---

**I**

10 CPI Character Pitch, Beginning .....	70
12 CPI Character Pitch, Beginning .....	70
12 x 12 Draft Print Mode, Beginning .....	73
17 CPI Character Pitch, Beginning .....	70

---

**2**

24 CPI Character Pitch, Beginning .....	70
---	----

---

**A**

Activate test characters .....	191
APA Graphics, Printing .....	93
Application Development .....	56
<b>Audio Alert</b> .....	13
Audio Alert, Configuring .....	110

Auido alert.....	110
Auto cut, Performing.....	109
Auto Line Feed, Beginning.....	69
Automatic Status back, Enable/Disable.....	154

## B

Back Space.....	64
<b>Bar Code Commands</b> .....	160
Bar Code, Print.....	104
Bar Code, Set height.....	107
Bar Code, Set Justification, Print Direction.....	107
<b>Bar Codes</b> .....	104
Begin Italics.....	86
Bidirectional Printing, Beginning.....	94
Bit Image Mode, Selecting.....	153
<b>Bit-Image Command</b> .....	153
Boot Loader Mode.....	41
<b>Buffer</b> .....	197
Button	
cartridge change.....	38
Power.....	32

## C

<b>Care of Ink Cartridges</b> .....	26
Carriage Return.....	63
Cartridge Ink status, Resetting.....	190
<b>Cartridge Status</b> .....	37
Cash Drawer 1 Status, Inquire.....	117
<b>Cash Drawer Drivers</b> .....	15
Cash drawer, Opening.....	109
Change User Store Terminator.....	102
Changing Interface Cards.....	20
Character attributes.....	83
Character Code Page, Setting.....	76
Character Code table, Selecting.....	144
Character Code Table, Selecting.....	146
<b>Character Commands</b> .....	141
Character Generation.....	5
Character Pitch.....	4
Character Pitch, Setting.....	71
Character Set, Redefining.....	79
Character Spacing, Setting.....	141
<i>Citizen</i>	
<i>command summary</i> .....	177
<b>Citizen Codes</b> .....	176
Citizen Emulation.....	56
<b>Code Page Definitions</b> .....	211
<b>Color Graphics</b> .....	182
Color Mode, Turning on/off.....	146
Color Ready Configuration.....	47
<b>Color-Ready Configuration</b> .....	47
Commands, User-store.....	99
<b>Communication</b>	
<b>Features</b> .....	209
<b>Parallel Port</b> .....	196
<b>Serial Port</b> .....	200
<b>Communications</b> .....	192

<b>Communications Interface</b> .....	13
Configuration	
Features.....	48
manual.....	43
<b>Manual Emulation</b> .....	46
<b>Remote</b> .....	46
Configuration Control, Extending.....	114
Configuration Mode	
Overview.....	43
Using the New Cartridge Button.....	44
Viewing Settings.....	44
Configuring the Cash Drawer Interface.....	22
Connecting Communication Cables.....	24
Connecting Power.....	23
contacting TransAct's Ithaca Facility.....	19
Control Character, Printing.....	78
<b>Control Codes</b>	
<b>Overview</b> .....	55
<b>Control Codes and Commands</b> .....	57
Control Feature, Setting.....	113
<b>Cover Interlock</b> .....	13
Cover Open Status, Inquire.....	118
Current Requirements.....	13
Cut Mode/Cut paper, Selecting.....	163

## D

Data pass-through.....	209
Display Pass Through.....	14, 207
Display pass-through.....	209
Double Density Graphics, Full-Speed Printing.....	92
Double Density Graphics, Half-Speed Printing.....	92
Double Strike Mode, On/Off.....	148
Dynamic Response, Enable.....	115

## E

<b>Electrical Characteristics</b> .....	9
Emphasized Mode, On/Off.....	147
Emphasized Print Mode, Beginning.....	85
Emphasized Print Mode, Ending.....	85
End Italics.....	86
Enhanced Print Mode, Ending.....	85
Enhanced print, Beginning.....	85
Entering Configuration Mode.....	43
Entering Self-Test Mode.....	39
<b>Environmental</b> .....	10
<b>EPOS</b>	
<b>Codes</b> .....	132
<b>command summary</b> .....	136
EPOS 90° Rotation Mode, On/Off.....	148
EPOS Absolute Print Position, Setting.....	151
EPOS Back Space, Setting.....	151
EPOS Bar Code Height, Setting.....	160
EPOS Bar Code, Printing.....	160
EPOS Character Size, Setting.....	149
EPOS Control Character, Printing.....	146
EPOS Emulation.....	56
EPOS Euro Character, Insert.....	146

EPOS Execute Macro .....	167
EPOS HRI Characters, Selecting Font .....	162
EPOS HRI Characters-Printing Position, Selecting .....	161
EPOS Italics, Beginning .....	149
EPOS Italics, Ending .....	149
EPOS Knife Cut-Partial .....	163
EPOS Knife Cut-Partial, Performing .....	163
EPOS Macro Definition, Start/End .....	167
EPOS margin-eft, Setting .....	152
EPOS Margin-left, Setting .....	152
EPOS Margin-Right, Setting .....	153
EPOS Motion Units, Setting .....	164
EPOS Nonvolatile Memory, Erasing All Entries ...	170
EPOS Nonvolatile Memory, Erasing Single Entry ..	170
EPOS Paper Error Signal Control .....	173
EPOS Printing Area Width, Setting .....	152
EPOS Query Nonvolatile Memory Pool Information .....	172
EPOS Relative Print Position, Setting .....	151
EPOS Sound Buzzer .....	163
EPOS Startup Macro Definition, Deleting .....	168
EPOS Unidirectional Printing Mode, On/Off .....	152
EPOS User Defined Bit Image, Define .....	171
EPOS User Defined Bit Image, Defining .....	169
<b>EPOS User Defined Bit Image, Printing</b> .....	170, 172
EPOS User Defined Character Set, Saving .....	172
EPOS User Defined Character Set, Selecting .....	172
EPOS User Defined Storage Buffers, Copying .....	166
EPOS, Print and Reverse Feed .....	140
Error Indicator Chart .....	38
Error Status, Inquire .....	123
ESC [ T <n <sub>i</sub> > <n <sub>j</sub> > Select character code table .....	144
Euro Character, Inserting .....	78
Exiting Self-Test Mode .....	34
Extended APA Graphics .....	93
Extended diagnostics	
self test .....	42
Extended Diagnostics .....	42
Hex-Dump .....	42
Extended Functionality .....	39

---

**F**

features	
options .....	47
Firmware Check .....	41
Firmware Configuration .....	24
Flow control	
Data Terminal Ready (DTR) .....	200
Ready/Busy .....	200
XON/XOFF .....	200
Form Feed .....	68
Form Length, Setting Inches .....	69
Form Length, Setting Lines .....	68

---

**G**

<b>General Printer Description</b> .....	1
<b>General Specifications</b> .....	3

Generate Pulse .....	165
<b>Graphic</b>	
<b>Mode</b> .....	92
Graphic Data, Processing .....	95
Graphic Mode, Reassigning .....	94
Graphic mode, Set Horizontal .....	96
<b>Graphic save</b> .....	97
Graphics	
<b>all-points-addressable (APA)</b> .....	181
<b>Character</b> .....	177
color .....	95
horizontal .....	95
<b>Horizontal</b> .....	181
<b>printing</b> .....	177
GS - <Name..> <0> x y d <sub>1</sub> ... d(x x y x 8) Define user-	
defined bit image .....	169
GS ! <n> Set character size .....	149
GS # <n> Insert Euro character .....	146
GS * x y d <sub>1</sub> ... d(x x y x 8) Define single user-defined	
bit-image .....	171
GS / <m> Print single user-defined bit-image .....	172
GS ^ r t m Execute macro .....	167
GS _ Delete start-up macro definition .....	168
GS 0 <Name..> <0> Print user-defined bit image ..	170
GS 1 <Name..> <0> Erase single entry from	
nonvolatile memory .....	170
GS 3 Query nonvolatile memory pool information ..	172
GS 5 Erase all entries from nonvolatile memory pool .....	170
GS 6 <Name..> <0> Save user-defined character set .....	172
GS 7 <Name..> <0> Select user-defined character set .....	172
GS f <n> Select font for HRI characters .....	162
GS H <n> Select printing position of HRI characters .....	161
GS h <n> Set bar code height .....	160
GS k <m> <d <sub>j</sub> > ... <d <sub>k</sub> > NUL Print bar code .....	160
GS L <n <sub>j</sub> > <n <sub>h</sub> > Set left margin .....	152
GS W <n <sub>j</sub> > <n <sub>h</sub> > Set printing area width .....	152

---

**H**

Home, Returning .....	153
<b>Horizontal Motion Control</b> .....	64
Horizontal Position, Setting .....	65
<b>Horizontal Tab</b> .....	64
Horizontal Tab Positions, Setting .....	151
Horizontal tab Stops, Setting .....	64
Horizontal Tab, Setting .....	151

---

**I**

IEEE 1284 buffer, Clearing .....	118
<b>Indicator Lights</b> .....	35
<b>Indicators</b>	
<b>Fault</b> .....	35
Information Disclaimer .....	iii
Initialize the Printer .....	110, 164

Ink Cartridge	
Determining Status .....	37
Status .....	33
Ink Cartridges	
Using.....	26
<b>Inquire Commands</b> .....	117
Installing Cables.....	23
Installing Ink Cartridges .....	25
Installing New Interface Cards .....	21
Installing OPOS Printer Drivers .....	31
<b>Installing Paper</b> .....	29
Installing Printer Drivers .....	30
Installing USB Printer Drivers .....	31
Intercharacter Spacing, Setting.....	72
International Character Set, Selecting .....	75, 142
<b>International Character Sets</b> .....	143
Internet Support.....	18
IPCL Codes .....	56
<b>Ithaca Specific POSjet™ Commands</b> .....	173

---

## J

Justification, Selecting .....	151
Justification, Setting .....	65

---

## K

Keypad Overview.....	32
<b>Kitchen buzzer</b> .....	13

---

## L

LED indicator	
cartridge left.....	35
cartridge right.....	35
error .....	35
paper .....	35
power .....	35
<b>Level 0 diagnostics</b> .....	41
Line feed .....	63
<b>Line Feed Button</b> .....	33
Line Feed, Performing.....	66
Line Feed, Reverse .....	69
<b>Line Spacing Commands</b> .....	141
Line Spacing, Enabling .....	67
Line Spacing, Feeding Lines .....	67
Line Spacing, Select Default .....	141
Line Spacing, Set at 2 ½, 16-inch and 7/72 inch .....	67
Line Spacing, Set-1/8 inch .....	66
Line Spacing, Set-n/216 inch .....	66
Line Spacing, Setting .....	141
Line Spacing-Variable, Setting .....	67

---

## M

Mechanical Error Status, Inquire.....	120
---------------------------------------	-----

Macro Data, Run from user Store .....	100
Macro Data, Saving .....	97
<b>Macro Data, Saving in user Store</b> .....	100
Macro Record, Beginning.....	97
Macro Record, Ending.....	99
Macro Record, Ending name .....	97
Macro Record, Start.....	103
Macro Record, Starting.....	97, 99
Macro Record, Stop .....	103
Macro Record, Stop and Save.....	103
Macro Record, Stopping .....	97
Macro, Flag on Startup .....	101
<b>Macro-Function Commands</b> .....	167
<b>Mechanism Control Commands</b> .....	163
<i>Media specifications</i>	
ink cartridge .....	11
receipt paper .....	11
<b>Media Specifications</b> .....	11
Microline Emulation.....	56
<b>Miscellaneous Commands</b> .....	164
Multidrop configuration.....	209
Multi-Drop Control, Beginning .....	115
Multiline Mode.....	84

---

## N

New Cartridge Button.....	33
<b>New Cartridge Button/Self-Test</b> .....	34

---

## O

OCR character	
disable .....	81
enable .....	81
OCR Character, Disable .....	81
OCR Characters, Enabling.....	81
OFF Button.....	33
Off-line active.....	209
One Line/Double Wide Print, Beginning.....	83
One Line/Double Wide Print, Canceling .....	83
Operator panel controls	
cartridge change button .....	38
Operator Panel Controls .....	32
OFF Button .....	32
<b>Optional Features</b> .....	2
options .....	47
Output Paper end Signals, Selecting Paper Sensors	
.....	111, 150

---

## P

Panel Button Commands .....	149
paper Feed, Enable, Disable .....	110, 149
Paper Feed, Enable/Disable .....	173
Paper Low	
Adjusting .....	27
Paper Low Adjustment Requirements .....	28
Paper Low Sensor .....	173

Paper Low Setup .....	27
Paper Motion .....	63
Paper Out Sensor, disable.....	108
Paper Out Sensor, enabling .....	108
Paper Out Status, Inquire.....	117
Paper Sensor Commands.....	150
Paper Sensors, Selecting to Stop Printing.....	111, 150
Parallel Interface Connector .....	24
Parallel port timing .....	196
<b>PcOS Control Codes</b> .....	57
PcOS Quick Reference Chart .....	58
Peripheral Device Status, Selecting .....	165
<b>Physical Specifications</b> .....	8
Plug and Play	
parallel .....	199
Serial .....	204
<b>POSjet™ 1000 Printer</b> .....	17
Power Control, Remote .....	114, 207
Power Cycle Status, Inquire .....	119
Power-cycle recovery .....	209
<b>Print</b>	
<b>rotation</b> .....	87
Print and Carriage Return.....	139
Print and Feed Lines.....	139
Print and Feed Paper .....	140
Print and Line Feed .....	139
Print and Reverse Feed Lines .....	139, 140
Print Buffer Flow .....	202
Print Buffer Size .....	204
Print buffer, control .....	108
<b>Print buffers</b> .....	192
Print Current Configuration.....	191
Print Current totals .....	191
Print margins, setting.....	108
Print Modes, Selecting .....	147
Print Position Commands .....	151
Print Quality Mode, Setting.....	73
Print Style, Setting.....	84
Print Suppress/Data Pass Through, Enabling .....	112
printer	
options .....	47
<b>Printer Care</b> .....	32
Printer ID, Inquire .....	122
Printer Reset, Requesting .....	119
Printer State, Inquire .....	120
Printer Status .....	116
Printer Status, Inquire.....	117, 121
Printing Specifications .....	3
Process User Macro .....	103
<b>Programmer's Notes</b> .....	210
Programming Considerations .....	102
<b>Programming Controls</b> .....	55

---

**Q**

Quad Density Graphics, Printing.....	93
Query marker .....	109

---

**R**

Read and return Totals.....	191
Real Time Status, Transmitting .....	157
real-time Request to Printer .....	165
<b>Receipt Printing</b> .....	12
Recovery from Mechanical Errors.....	210
Regulatory Compliance .....	iii
<b>Remote Power Control</b> .....	114, 207
Remote Power Down .....	34
<b>Remote Reset</b> .....	208
Removing Old Interface Cards .....	20
Rotated Font, Beginning .....	74
Rotated Print, 270° .....	89
Rotated Print, 270° with 2 Pass Font .....	90
Rotated Print, 270° with 2 Pass Font and line formatting .....	90
Rotated Print, 270° with Line Formatting.....	89
Rotated Print, 90° .....	89
Rotated Print, 90° with 2 Pass Font and Line Formatting .....	89
Rotated Print, 90° with Line Formatting.....	89
Rotated Print, Begin 90° with 2 pass font.....	89
Rotated Print, Beginning .....	88
Rotated Print, Ending .....	90
Rotated Print, Line Length.....	91
Rotated Print, Line Spacing .....	91

---

**S**

Select Color .....	83
Select Subscript .....	86
Select Superscript .....	86
Self-Test	
Using .....	39
Serial Device Identification .....	205
Serial Interface Communication .....	14
Serial Interface Connector .....	24
Serial port	
flow control .....	200
Serial Port	
Inquire .....	206
Series 50 Cash Drawer, Set Extended.....	125
Series 50 Pass through, Set Extended .....	125
<b>Service Information</b> .....	17
<b>Setup Procedures</b> .....	20
Signal Levels .....	13
Single Cartridge Operation .....	47
Single Density Graphics, Printing.....	92
Specifications	
Paper and Core Diameter.....	28
<b>Standard</b>	
<b>Features</b> .....	1
Standard APA Graphics.....	92
Standard Emulation .....	56
<b>Star</b>	
command summary .....	174
<b>Control Codes</b> .....	174
Star Emulation .....	56

Start up Macro, Flagging .....	98
<b>Status Commands</b> .....	154
Status Inquire .....	116
Status, Inquire Receipt Paper Low .....	117
Superscript and Subscript .....	86

---

## **T**

Tab Stops, Resetting .....	65, 68
Testing the Printer .....	39
<b>TM 200 and EPOS Command Descriptions</b> .....	139
<b>TM-200</b>	
<b>Command Summary</b> .....	133
TM200 On Line Recovery Wait Time, Setting .....	166
<b>TM-200 Restrictions</b> .....	135
Top of Form, Setting .....	68
TransAct Technologies	
contacting .....	19
<b>TransAct Technologies, Ithaca facility</b> .....	19
Transmit Printer ID .....	164
Transmit Status .....	156
Two Cartridge Operation .....	47

---

## **U**

Underline Mode, On/Off .....	147
Underline, Beginning .....	83, 85
Unidirectional Printing, Beginning .....	94
Upside down Print Mode, On/Off .....	148
USB Interface Connector .....	24

User Defined Character Set, Selecting .....	141
User Defined Character, Saving .....	98, 100
User Defined Characters, Canceling .....	81, 142
User Defined Characters, Defining .....	80, 97, 142
User Defined Characters, Enabling .....	81
<b>User macros</b> .....	102
<b>User store</b> .....	97
User Store Status, Inquire .....	123, 124
User Store, Delete item .....	101
User Store, Flush Information .....	101
User Store, Flushing information .....	98
User Store, Load item .....	100
User Store, Loading item .....	98
User Store, Removing Item .....	98
User Store, Report .....	101
User Store, Reporting .....	99
<b>User-Defined Memory Commands</b> .....	169
Using Configuration Mode .....	45
Using DSR .....	204
Using the New Cartridge Button .....	33

---

## **V**

Verify Cash Drawer Interface .....	21
Verticle Tab .....	67
Verticle Tab Stops, Setting .....	68

---

## **W**

warranty .....	17
----------------	----