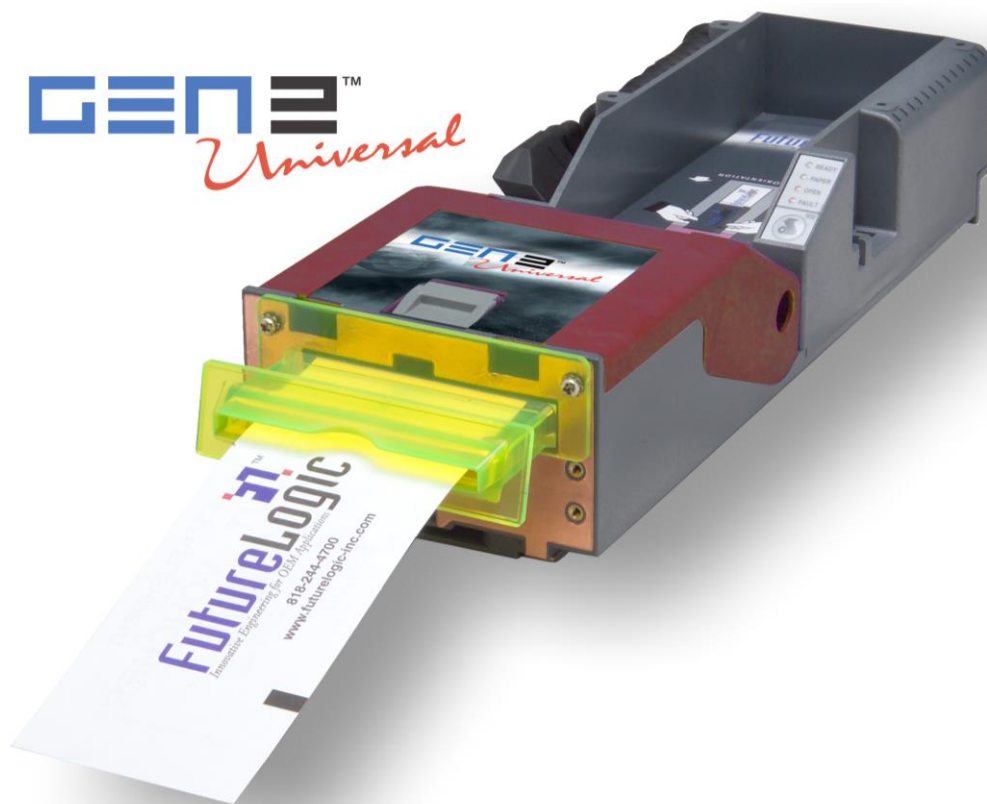


Operators and Technicians Manual

GEN2 Universal™ Printer



PSA-66-ST2RU (RS232/USB)

While PSA-66-ST2 refers to all models of the printer, this manual is primarily for the RS232/USB interface of the GEN2 Universal printer.

Operators and Technicians Manual

GEN2 Universal™ Printer (PSA-66-ST2RU (RS232/USB))

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FutureLogic, Inc.

425 East Colorado Street • Suite 100 • Glendale, CA 91205 USA

Phone 818.244.4700 • Fax 818.244.4764

www.futurelogic-inc.com • info@futurelogic-inc.com

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1 Manual Overview

Introduction

This manual is a comprehensive guide to the specifications and usage of the GEN2 Universal[™] (PSA-66-ST2RU) printer. It contains detailed information on many areas of its operation.

The list below will assist you in determining which sections should receive attention first. It is helpful to review the list to obtain a cursory understanding of the scope of this manual.

We hope that this manual is easy to read and informative. If you have any comments we would like to hear from you. Email us at info@futurelogic-inc.com.

Specific Content	Location
To review the paper specification for ordering more paper	See Appendix B
To understand paper loading and operator controls	See Chapter 3
To clear a paper jam	See Page 7
To review the cabling and connector specifications	See Chapter 5

Intended Audience




The intended audience for this document is operators and technicians.

Applicability

This manual covers the GEN2 Universal (PSA-66-ST2RU) printer.

Conventions Used in this Document

This document uses the following conventions.

Example	Description
	This is a note. A note includes information that emphasizes or supplements important points of the topic.
	This is a tip. A tip provides techniques and procedures to aid with a task.
	This is a Caution. A Caution emphasizes information that may cause damage to equipment and/or injury to a person.
Bold text	This document uses bold text to identify a field, a command selection, and an option selection.
Button	This document uses button text to identify a button to press. For example, Click the FEED button.

2 Product Overview

Introduction

Each GEN2 Universal[™] printer is an advanced thermal printer capable of creating high quality complex output with a minimum of development and effort on the part of the user.



Note: While PSA-66-ST2 refers to all models of the printer, this manual is primarily for the RS232/USB interface of the GEN2 Universal printer.

Features of the GEN2 Universal printer include:

- The ITH[®] (Intelligent Ticket Handling) technology that prevents player interference with any part of ticket production or presentation
- May be mounted on an angle or horizontally
- Simple paper loading—no loose parts
- Variable paper capacity with different paper trays—300, 600, and 900 ticket trays
- Windows[®] ticket/receipt development package via the TCL[™] Editor utility
- Page mode printing with TCL printer language
- Line printer capability
- High quality laser-like san serif fonts in multiple sizes
- Advanced graphics printing
- Windows connectivity
- 3.5" inch per second print speed
- Wide temperature range operation
- Standard and customized serial interfaces available—RS232 and USB

Additionally, a key feature of the GEN2 Universal printer is Universal Communications:

- USB 2.0 Full Speed (Future GSA Compliant[™], IGT Compliant)
- RS232 Port (Backward Compatible)

Warranty Information

Each printer has a two-year warranty as per the manufacturer's written warranty.

3 Operator Interface

Introduction

This chapter covers various operations of the printer including loading paper and clearing a paper jam.

Operator Indicators and Controls

The printer is equipped with status indicators and a **FEED** button for the management and interpretation of the printer operations.

The status indicators are:

- Front bezel light
- Keypad lights:
 - Ready – Green
 - Paper – Yellow
 - Open – Orange
 - Fault – Red

The following figure illustrates the location of these indicators and controls.

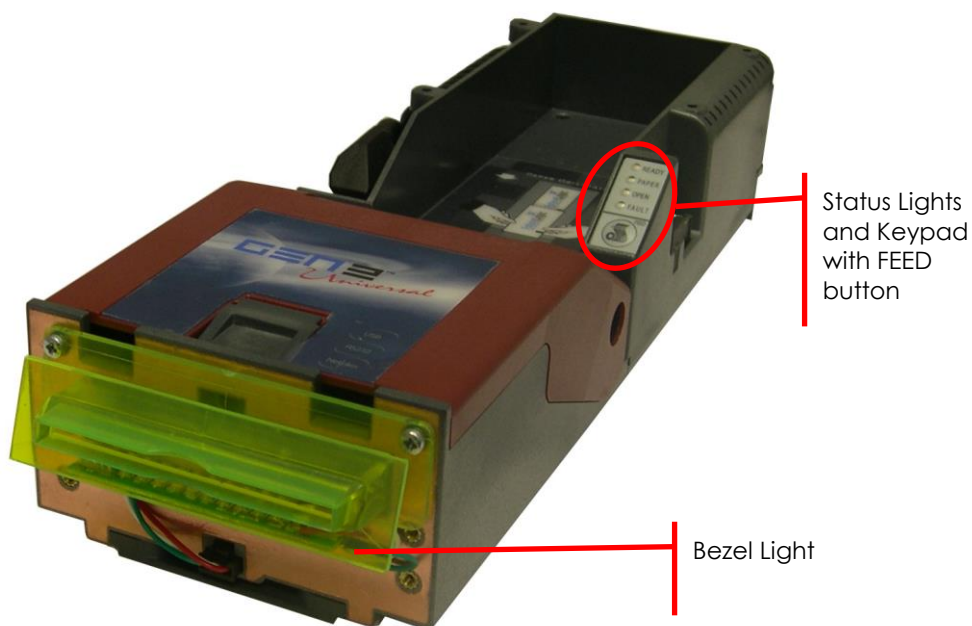



Figure 3-1 **Operator Indicators and Controls**

Keypad Status Light

The keypad LEDs report the status of the printer whenever power is present. Table 2-1 lists each condition of the keypad LEDs.

Table 3-1 Keypad LEDs Status Reporting Printer Condition

Condition	Ready	Paper	Open	Fault
Unit is Powered Off				
Unit Ready	blink			
Unit Flushed				
Paper Out				
Head Up or Ticket Module Open				
Temperature Error				
Voltage Error				
Print Head Error				
Missing Black Index Mark				
Paper is Jammed				blink

 = LED ON.

Bezel Operation

Use the front bezel display to determine the state of the printer while on the casino floor, at a distance, without disturbing the game. Table 2-2 lists the conditions indicated on the bezel display.

Table 3-2 Bezel Display Status

Bezel Display	Status
Solid On	Printer Idle and Ready
Slow Blink	Paper Low or Printer Error
Fast Blink	Ticket Printing and/or Ticket in Chute
Off	Printer power off

See Chapter 5 for information on the current ratings of the bezel ports.

Printer Sensor Functions

There are six primary sensor functions on the printer. These sensors work with the game firmware to provide reliable trouble-free operation. Any error conditions resulting from these sensors are indicated by the front bezel light and keypad LEDs. Table 3-3 describes each of these sensors.

Table 3-3 Sensors

Sensor	Description
Paper Out	The Paper Out sensor is located in the print head. It terminates the print operation when the paper has run out and checks for proper form registration. The printer ceases printing and feeding operations when it detects a Paper Out condition. Correct a Paper Out condition by loading more paper into the unit.
Paper Low	The Paper Low sensor is located in the paper well. It determines when the paper stack has approximately 2 tickets. A Paper Low condition automatically resets once a stack with a greater height is loaded. Paper low sensing occurs when the system is idle and takes a few seconds to detect the new paper level.
Paper Taken	The Paper Taken sensor is located in the presentation chute of the printer. It determines when the customer has actually taken their cashout ticket.
Drawer Open	The Drawer Open sensor is located in the paper well. It detects when the printer is open.

Sensor	Description
Platen Engaged	The Platen Engaged sensor is located in the print head. It detects when the printer platen is in use.
Printer Open	The Printer Open sensor is located in the front of the unit. It detects when the printer clamshell is open.

Printer Errors

Although there are a variety of error conditions that can occur, most printer errors are a result of the printer running out of paper or the operator opening the lid. Table 3-4 lists possible errors and the remedy for each condition.

Table 3-4 Errors and Error Descriptions

Error	Error Description	Remedy
Paper Out	Results when the printer does not detect paper present.	Load a new paper stack.
Head Up or Open	Results from raising the Side Release Lever or opening the lid.	Lower the yellow lever on the side of the unit.
Temperature	Results when the printer is operating outside of its allowable temperature range. If the printer is operating in an environment where the ambient temperature is roughly room temperature, this error would most likely be the result of a hardware problem.	The printer will automatically resume operation after the detected head temperature falls within range.
Voltage	Results if the printer detects a power supply voltage (+24VDC to +25VDC) outside range. This error could be the result of a poor cable connection.	The printer will automatically resume operation after the power supply is detected within range.
Print Head	Results when the printer senses an internal error due to connectivity or interfacing problem with the thermal print head. This can be a result of a cable problem between the main controller board and the printer engine.	The printer will remain in this error state until the power is cycled or the unit is reset. If the problem persists, the printer will require service.
Missing Black Index Mark	Results if the paper type selected is indexed paper and while feeding paper or printing a black mark is not seen within approximately 10" of the paper. This error alerts the user to the presence of the wrong kind of paper in the printer or that the paper was inserted in the wrong direction (so the black mark index is rotated 180 degrees).	Raise the Main Release Lever (presumably to change the paper).
Paper Jam	Results when the printer detects an error in the paper path for presenting the ticket to the customer.	Open the printer head and inspect for a jammed ticket.

Loading Paper

Generally, the only printer service required is to load new paper stacks. Use the automatic paper-loading feature to simplify this process to two steps: putting the paper stack into the Paper Tray and feeding the paper to the Paper Loading Slot of the printer.

To load paper:

1. Pull open the Printer Drawer until the Paper Tray is completely accessible.
2. Place the paper stack in the printer as indicated by the band around the stack and the label on the bottom of the Paper Tray.



Tip: To prevent a new paper stack from sticking together, fan out the paper after you take off the band.

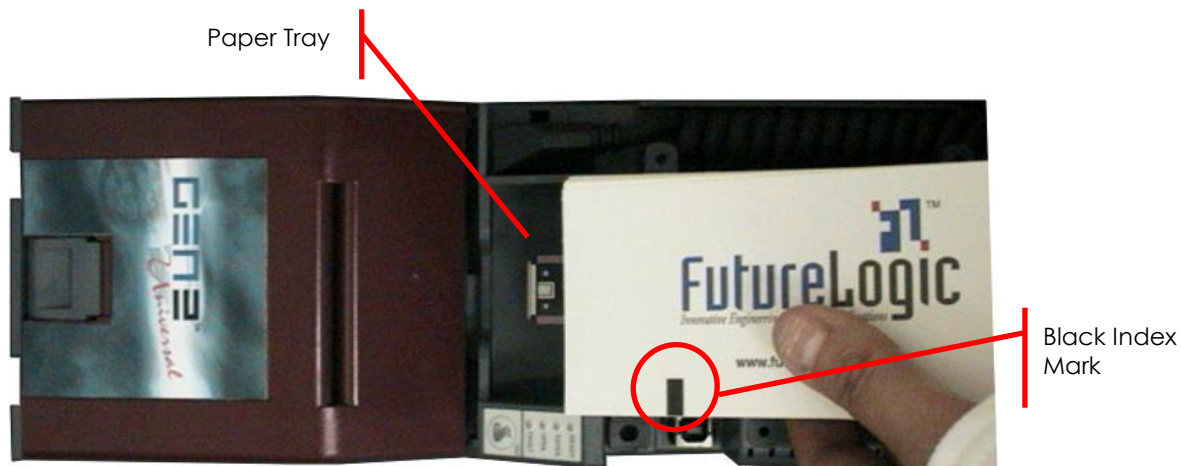


Figure 3-2 Load a Paper Stack

3. Feed the paper into the Paper Loading Slot and release it once the motor engages and the printer takes hold of the paper.
The printer pulls through a form or two, leaving it registered at the top of a form.



Figure 3-3 Feed Paper into Paper Loading Slot

4. Remove any excess ticket(s) from the printer.

Feeding Paper

The printer is designed to run with black mark indexed paper.

To feed paper into the printer:

- Press the **FEED** button.

Additionally, press the **FEED** button to advance the paper to the top of the next form.

Performing a Self Test

To run a self test:

- Press the **FEED** button during power-up or reset.

This self test prints a configuration ticket if the test passes successfully. The test ticket (illustrated in Figure 3-4) contains important information on how the unit is configured.

Model number	Model:	PSA-66 USB REV A	Resident ticket template package version
	Firmware:	GUU0010432 2006-05-17	Firmware version
System communications setup	COMMUNICATION Interface:	USB 2.0 Full Speed	
Print control parameters	PRINT CONTROL		
	Darkness Control:	+0.0	
	Black Bar Index:	Enabled	
	Print On Demand:	Disabled	
	Auto Sleep Timer:	Off	
Amount of memory	SYSTEM RESOURCES		
	FLASH -Used:	000000	List of fonts available in the printer by TCL page mode
	-Free:	065536	
	LIBRARY INVENTORY		
	Templates:	0,1,2,3,4,5,6,7,8,9,A,B,z,x	
	Fonts:	1,2,3,4,5,7,8,9	

Figure 3-4 Sample Configuration Ticket

Clearing a Paper Jam

The printer operates reliably with minimal paper jamming. To clear a paper jam, follow the instructions below. After you clear a paper jam, perform these steps in reverse to load paper.

When clearing a paper jam:

- Ensure that all paper paths from the entry point at the back of the paper well, through the printer, cutter, and the ticket module chute are clear of paper or obstructions.
- Use the Lid Release Lever located on the top of the unit.
- Do not allow a screwdriver or other probing object to come in contact with the printer. This can cause permanent damage to the printer.

To clear a paper jam:

- Remove the paper from the printer.



Figure 3-5 Remove the Paper

2. Open the lid by pressing the Lid Release Lever.
The spring-loaded lid opens, exposing the paper path.

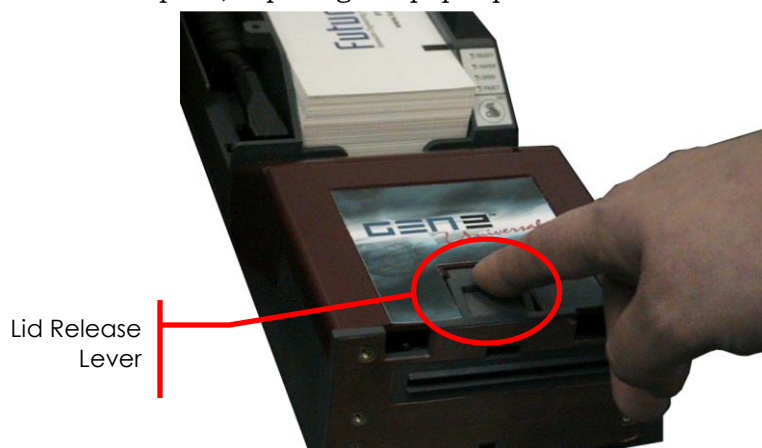


Figure 3-6 Open the Lid

3. Remove the jammed ticket.
4. If necessary, access the paper path through the print mechanism by opening the Main Release Lever.

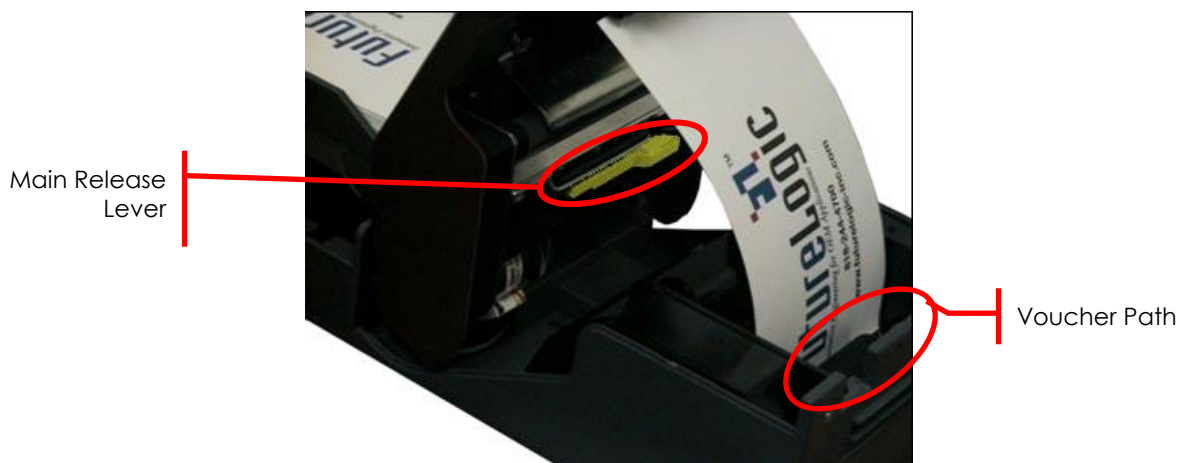


Figure 3-7 Clear the Paper Jam

5. Once you clear the jam, reverse these steps to return the printer to a ready state.
6. Load the paper.

Cleaning the Print Head

See MNL-000054, Printer Cleaning Guide for details.

4 Printer Service

Introduction

This chapter provides instructions on how to remove the printer to service it outside of the game.



Note: While the printer is hot connectable, it is still a good maintenance procedure to turn off the power.



Important Information!

Do not remove the ground screw in the rail as it will release the internal nut!

After removing the printer, do not slide the unit on a tabletop or other surface. Doing so will cause damage to the copper grounding clips on the bottom of the unit.

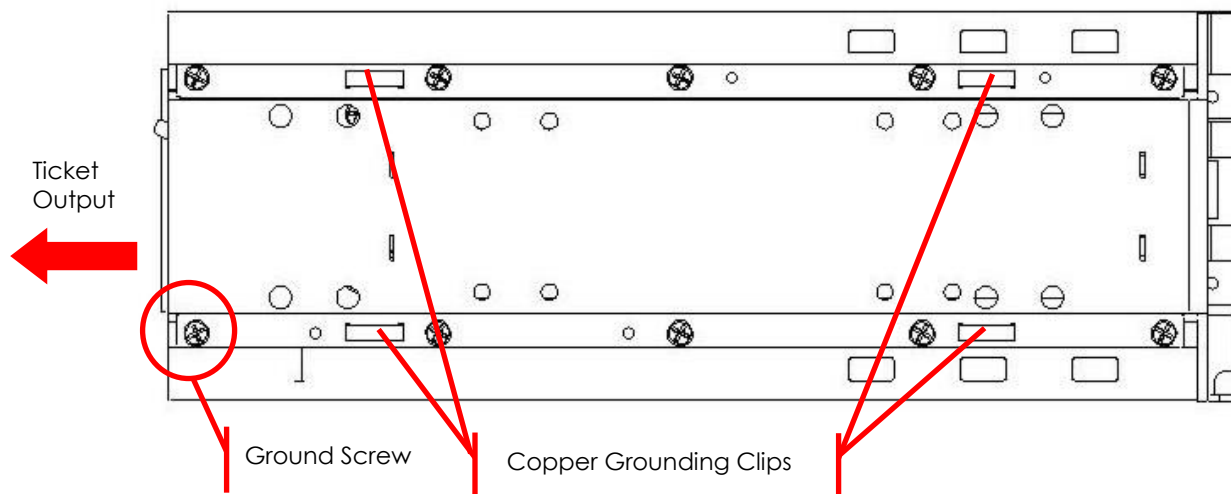


Figure 4-1 Ground Screw and Copper Grounding Clips Location

Removing the Printer



CAUTION!

ESD Sensitive Equipment!

Electronic boards and their components are sensitive to static electricity. Care must be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.

Do not handle this product out of its protective enclosure while it is not used for operations purposes unless it is otherwise protected.

Discharge your clothing before touching the assembly. Discharge tools before use.

Whenever possible, unpack or pack this product only at EOS/ESD safe workstations. Where a safe workstation is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools.

To remove the printer:

1. Disconnect the power.
2. Disconnect the Coiled Cable Connector.



CAUTION! The cable is under tension.

Coiled Cable
Connector



Figure 4-2 Disconnect the Coiled Cable Connector

3. Slide the printer out until it stops in the stationary module.

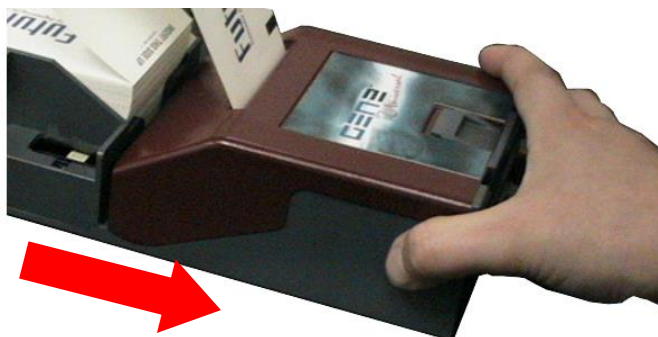


Figure 4-3 Slide the Printer until It Locks

4. Remove the paper from the printer.



Figure 4-4 Remove the Paper

5. Push the Release Bar (located under the bottom of the printer) to remove. While holding in the Release Bar, gently pull the printer towards you.

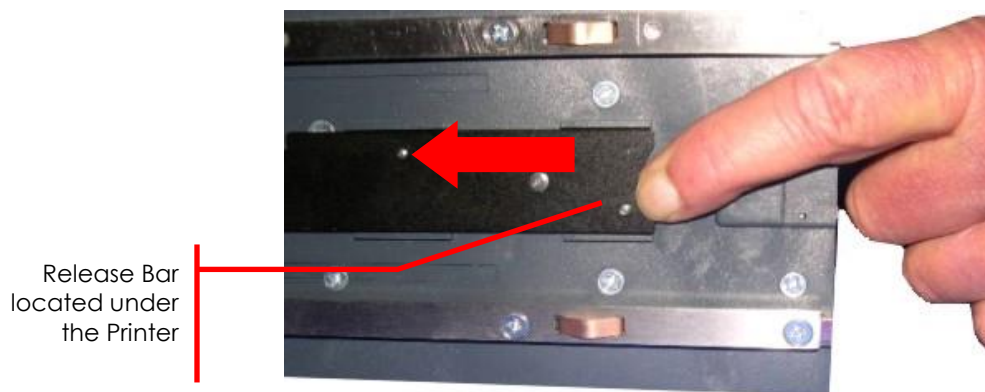


Figure 4-5 Push Release Bar



Important Information!

After removing the printer, do not slide the printer on a tabletop or other surface. Doing so will cause damage to the copper grounding clips on the bottom of the printer.

5 Ports and Cables

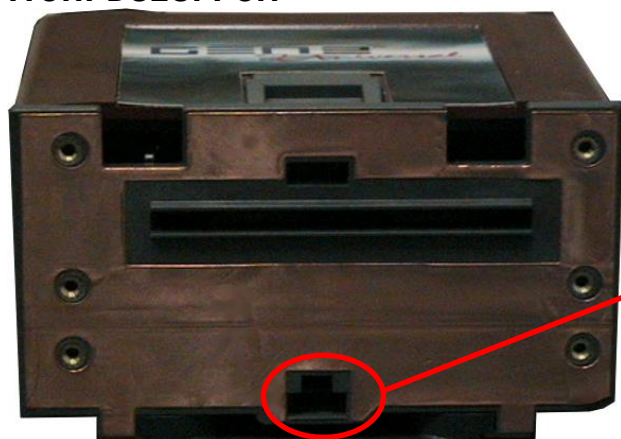
Introduction

This chapter describes the interface connectors and port pin-outs for the printer. For complete electrical specifications on these ports, refer to Appendix A in the Developers Manual (MNL-000033) for the power connector.

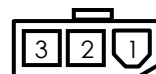


Note: While PSA-66-ST2 refers to all models of the printer, this manual is primarily for the RS232/USB interface of the GEN2 Universal printer.

Front Bezel Port



Bezel LED Control Port



Connector: Molex Micro-Fit 43640-0301
Mate: Molex Micro-Fit 43645-0300

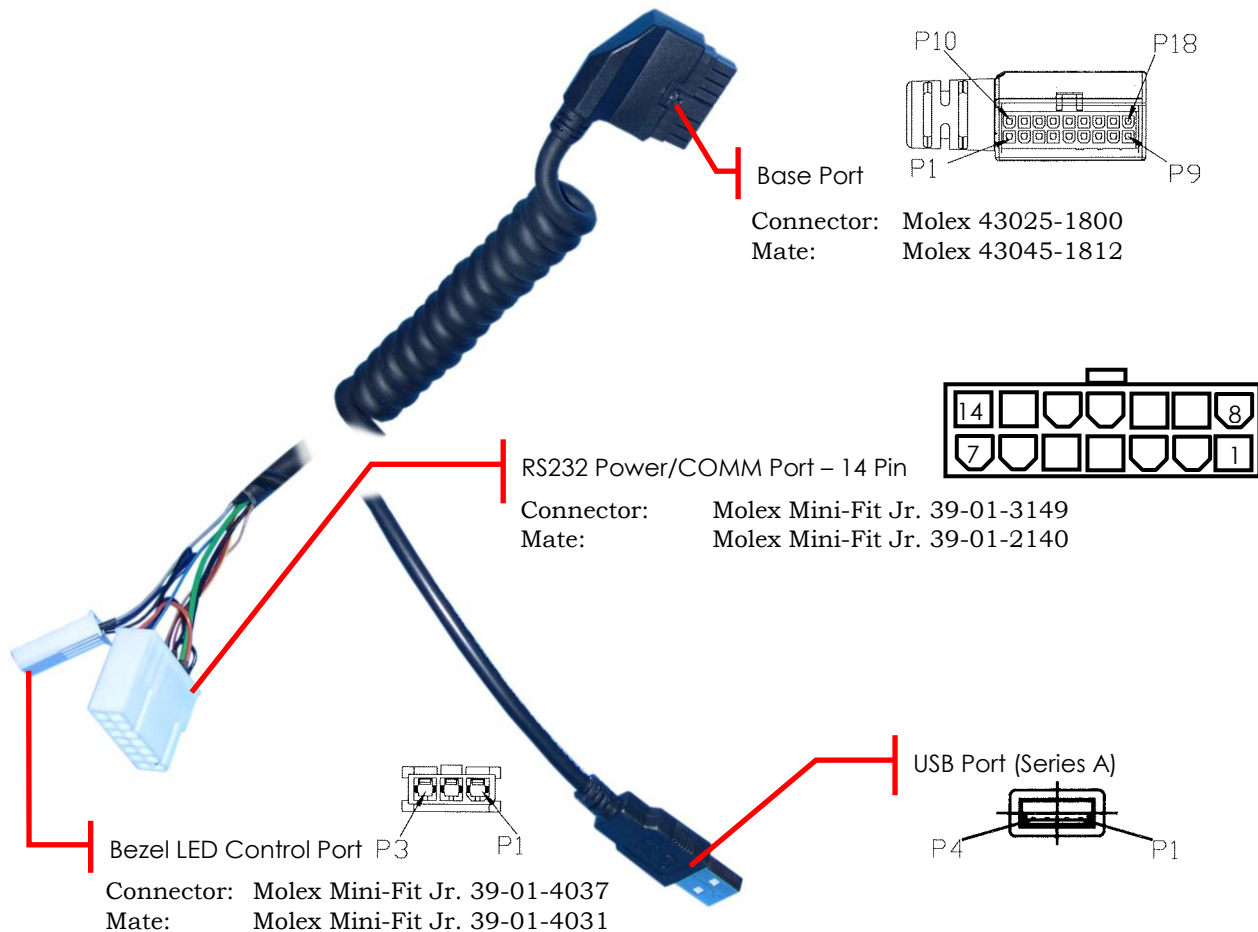
Figure 5-1 Front Bezel LED Control Port

Table 5-1 lists information on the LED bezel port on the printer. This is an open drain modulated high side drive 25VDC port capable of driving up to a maximum 1.5A.

Table 5-1 Front Bezel LED Control Port Pin-outs

Pin	Function
1	Switched 25VDC, 100mA Min
2	BGND
3	Frame (Chassis) Ground

RS232/USB Interface Cable



RS232/USB 14 Pin Cable P/N 150-00176-100

Figure 5-2 RS232/USB Interface Cable

Table 5-2 Base Port Cable Pin-outs

Pin	Function
1	RAW BGND
2	D-
3	+13V
4	SWITCHED 24V
5	DTR 232
6	MRESET
7	D+
8	RAW 24V
9	RTS 232
10	RX2/SCL
11	TX2/SDA
12	RX1/232
13	TX1 232
14	TX1 NET
15	RX1 NET
16	OPTO GND
17	DGND
18	+9 – 14V

Table 5-3 RS232 Power/COMM Port Pin-outs

Pin	Function
1	MRESET
2	Netplex TXD
3	+12 VDC (RS232 optional)
4	Netplex RXD
5	GND
6	+24 VDC
7	GND
8	+24 VDC
9	Modulated +24VDC
10	GND
11	RS232 RXD
12	RS232 TXD
13	DTR
14	RTS

Table 5-4 USB Port (Series A) Pin-outs

Pin	Function
1	USB BUS SUPPLY
2	D-
3	D+
4	GND

Table 5-5 Bezel LED Control Port Pin-outs

Pin	Function
1	SWITCHED 24V
2	NO CONNECT
3	GND



Note: For Bezel LED Port on cable, no Intermittent or in rush current exceeding 1.5A is allowed.

As a special order, the GEN2 Universal RS232 Interface Cable also is available with an auxiliary communication port. Please contact FutureLogic for details.

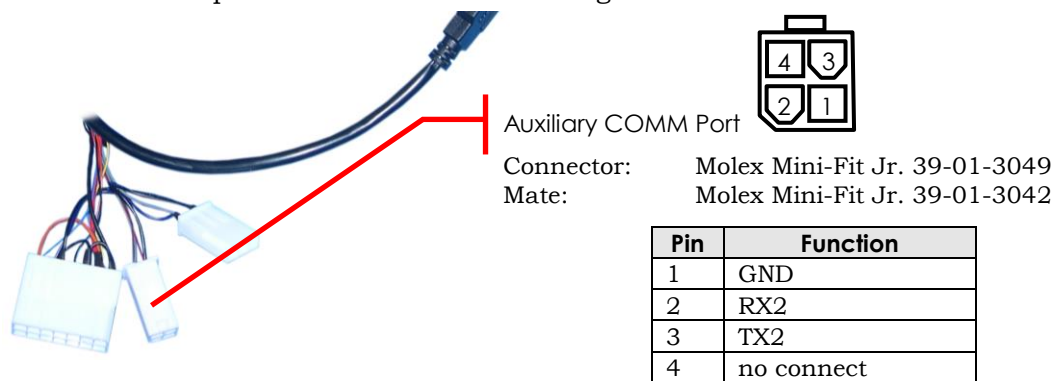


Figure 5-3 RS232/USB Interface Cable, Auxiliary Communications

RS232 Evaluation Cable

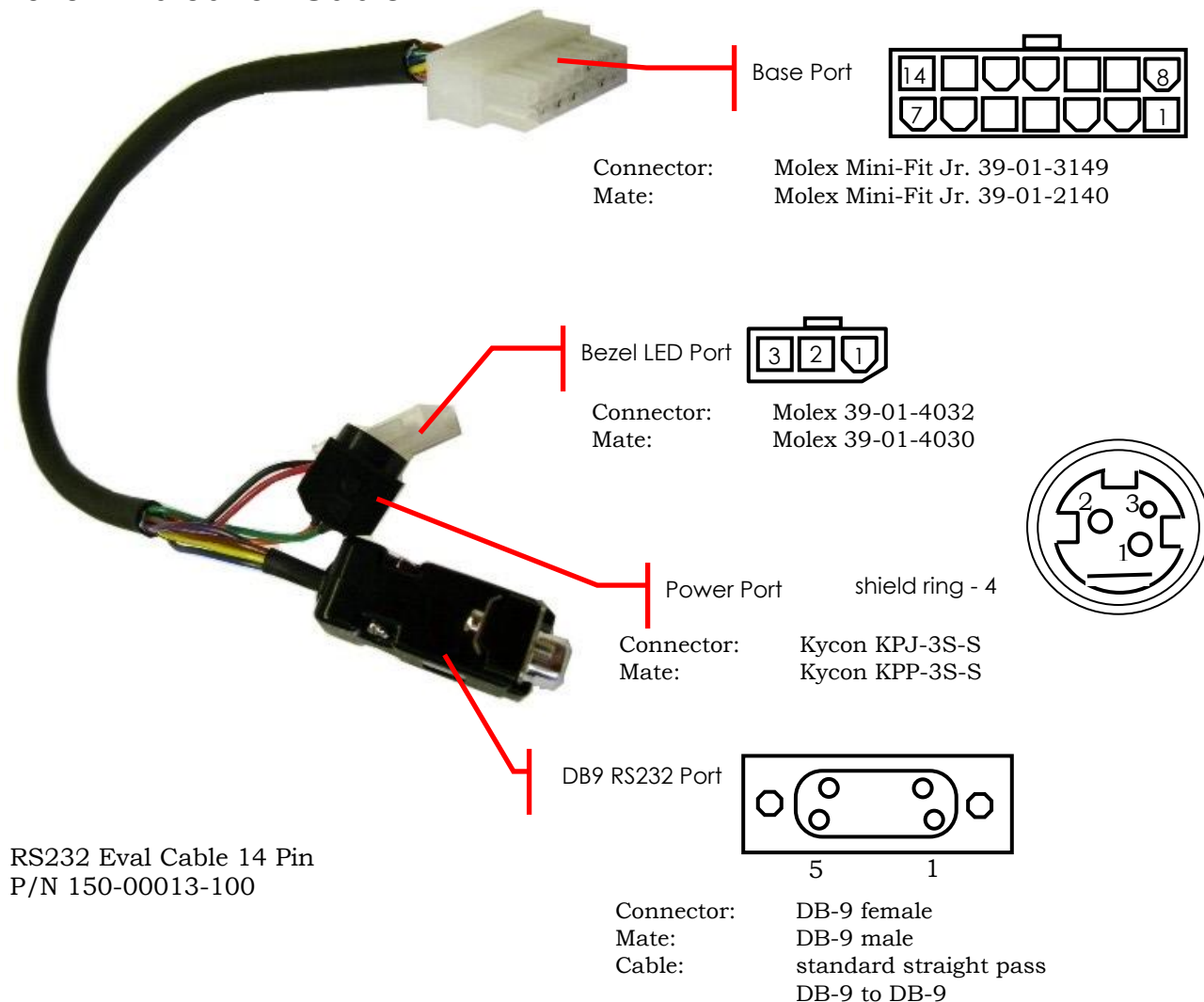


Figure 5-4 RS232 Evaluation Cable

The Bezel port on the rear of the unit is identical in function and characteristics to the one on the front of the unit described earlier.

Table 5-6 Evaluation Cable Bezel Port Pin-outs

Pin	Function
1	Modulated +24VDC
2	No connect
3	GND



Note: For Bezel LED Port on cable, no Intermittent or in rush current exceeding 1.5A is allowed.

The following table lists the pin out of the 14 pin base port. The Modulated +24VDC pin has the same function as the bezel port pin.

Table 5-7 Evaluation Cable 14 pin Base Port Pin-outs

PIN	FUNCTION	I/O*
1	No connect	-
2	No connect	-
3	No connect	-
4	No connect	-
5	GND	-
6	+24 VDC	-
7	GND	-
8	No connect	-
9	Modulated +24VDC	O
10	GND	-
11	RS232 RXD	I
12	RS232 TXD	O
13	DTR	O
14	RTS	O

*I/O viewed from the printer

Table 5-8 Evaluation Cable DB9 RS232 Port Pin-outs

Pin	Function	I/O*
1	No connect	-
2	TX	O
3	RX	I
4	No connect	-
5	GND	-
6	DTR	O
7	No connect	-
8	RTS	O
9	No connect	-

*I/O viewed from the printer

GDS Adaptor Cable

The GDS adaptor cable changes the RS232 14 pin down to a 1 x 4 Molex mini fit to match the GDS power connector standard.

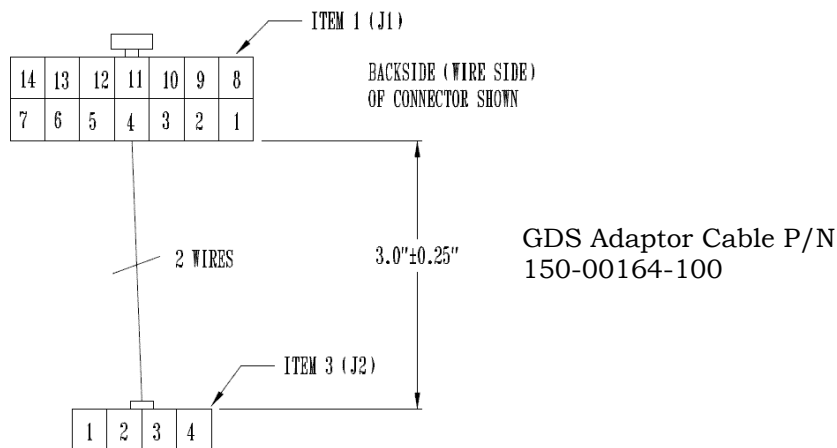


Figure 5-5 GDS Adaptor Cable

Table 5-9 GDS Adaptor Cable Connectors

From Connector	To Connector	Color	Length
J1-5	J2-3 *	Black	3.0" ±0.25"
J1-6	J2-4	Red	3.0" ±0.25"

* Use Grounding Terminal (Item 5) for J2-3.

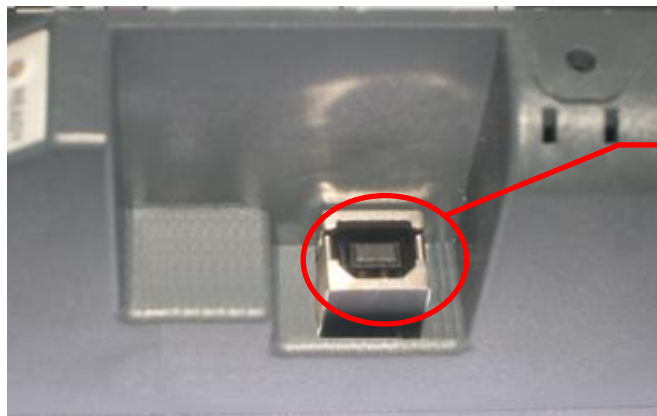
Table 5-10 GDS Adaptor Cable Assembly

Item #	Qty	FL. Part #	Description	OEM	OEM Part #
1	1	170-00267-100	Conn, 14 Ckt, 2x7, 4.20MM Pitch	Molex	39-01-2145
2	2	170-00172-100	Term, Crimp, Female, 18-24AWG, 4.20MM Pitch	Molex	39-00-0038
3	1	170-00269-100	Conn, 4 Ckt, 1x4, 4.20MM. Pitch, Free Hanging	Molex	39-01-4046
4	1	170-00149-100	Term, Crimp, Male, 18-24AWG	Molex	39-00-0040
5	1	170-00152-100	Term, Crimp, Male, 18-24AWG, Grounding Pin	Molex	30490-2002
6	.28	513-00061-100	Wire Stranded, 20 AWG, Red, 1 Ft.	Belden	9982-2
7	.28	513-00062-100	Wire Stranded, 20 AWG, Black, 1 Ft.	Belden	9982-10

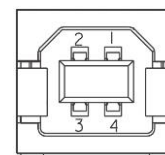
Firmware Upload Port

The Firmware Upload Port upgrades the printer firmware while the printer is installed and powered in the game. The printer uploads through its Firmware Upload Port just as it would through its communications connector at the rear of the printer.

To use this port, slide the printer out until the upload port (shown in the following figure) is visible. Then plug an appropriate upgrade cable into the printer. This connection may be made while the power is on.



Firmware Upload Port



Connector: Molex 6717101-000
Mate: USB B Plug

Figure 5-6 Firmware Upload Port

Appendix A Technical Specifications

This appendix identifies the general specifications of the printer.

General	
Dimensions (WxDxH)	110 x 304.8 x 64.3 mm
Weight	2.7 lbs.
Power Requirements	These units are to be supplied by Listed or IEC Certified Power Supplies, rated 24 VDC, minimum 2.7 A, marked "Class 2" or "LPS". (4.0A peak with 60% gaming ticket)
Sensors	Paper Low, Paper Out, Printer Drawer Open, Ticket Taken, Ticket Jam, Ticket in Chute, Black Mark (Includes a Host Controllable Buzzer)
Printing Speed	90mm/Second (3.5"/Second)
Print and Present	2.2 Seconds
Printing Width	62mm (true near-edge printing)
Storage	300 Tickets
Ticket Tray Extenders	Interchangeable, 600, 900 Ticket Tray
Resolution	8 dots/mm (203 dpi)
Firmware	Application in Memory is Reprogrammable (via Flash BIOS)
Self Test	Yes
Page Mode	Full Page Mode Printing (Simultaneous 4 Orientation Printing: 0°, 90°, 180°, 270°) Line and Box Draw Printer Resident Bitmap Graphics Printer Resident (Stored in Flash) Graphics
Paper Loading	Manual
Paper Feed	Automatic Hands Free
Method	Direct Thermal, Top Coated, Fanfolded and Perforated
Paper Specification	66mm W x 156mm L 4.5 mil, 1 Color/2 Colors
Bezel Control	Two High Current Ticket Printing Bezel Control Ports
User Interface	4 LED Indicators, Paper Advance Button
Upgrade Port	Allows for Printer Upgrades via USB Download or RS232 Main port
Hot Swappable	100%
Duty Cycle	Max. continuous feed of 1200 tickets with 8-second delay between tickets
Printing Resources	
Template Capacity	8Mb; Stores hundreds of clip art objects & thousands of graphic templates
Graphic Storage	6Mb
Color Printing	Red on Black and Blue on Black are available. Other colors can be supported as the print media becomes available. Color selection is controlled through the TCL™ language.

Characteristics	
Printer Languages	TCL Printer Language (Page Description Language) Subset of ESCP2
Fonts	8 (2.5 cpi, 3.3 cpi, 4.0 cpi, 5.5 cpi, 5.6 cpi, 7.3 cpi, 10.1 cpi, 20.5 cpi)
Font Scalability	May Be Independently Scaled from 1x – 7x in Both Height and Width
Bar codes	PDF-417, Interleaved 2 of 5, Code 39, UPC-A, UPC-E, UPC-E+2, UPC-E+5, Codabar, EAN-13, EAN-8, Code 128, MSI
Memory	2MB with 512K RAM
Interface	
Communications	USB 2.0 game interface (full speed of 12Mbps) with separate USB Download Port, Future GSA Compliant, Compliant with GSA, GDS, IGT USB and traditional protocols RS232C and Netplex
Environmental	
Operating temperature	5°C to 50°C
Storage temperature	-20°C to 75°C
Operating humidity	5 to 85% RH non-condensing
Reliability	
Maintenance	Annual Print Head Cleaning Required
Print Head Life	100km Min. (656,000 Tickets Based on US Currency Size)
Certifications	CE Certified, ISO 9001, RoHS, UL

Appendix B Paper Specifications

This appendix provides information on the paper used in the printer. For authorized ticket converters and complete paper specifications, contact your sales representative or visit our Web site:

www.futurelogic-inc.com.



Note: Use only approved paper in the printer. Use of improper paper may cause damage to the device and will void the printer's warranty.

Nominal paper thickness: 4.5mil

Paper dimensions: 65mm x 156mm

Ticket Stack
Ticket, 300STK, 65X156, 5M, Fanfold
Ticket, 600STK, 65X156, 5M, Fanfold
Ticket, 900STK, 65X156, 5M, Fanfold

Note: Paper width is +0mm, -1mm.

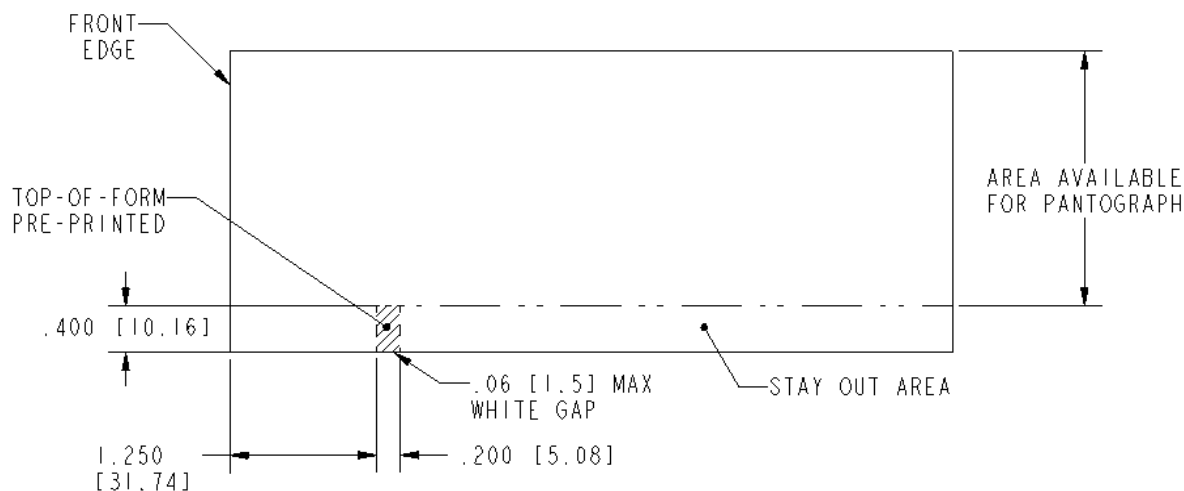




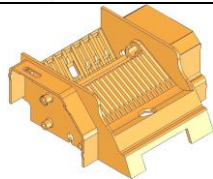




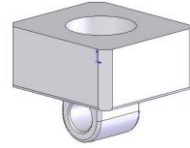
Figure B-1 Ticket Dimensional Specification

Appendix C Part Numbers – Printer/Spares

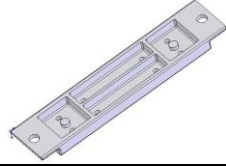
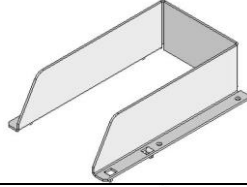
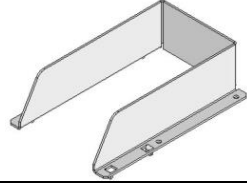
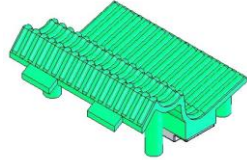
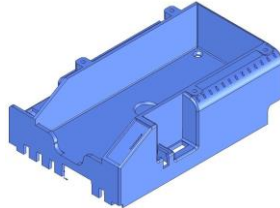
This appendix provides the part number and description of the GEN2 Universal (PSA-66-ST2RU) printer and spare parts.

Printers – P/N	Description		
220-00086-300	GEN2 Universal Printer (RoHS) PSA-66-ST2RU USB, RS232, Future GSA Compliant*	RoHS Versions—Look for either of these labels:  	

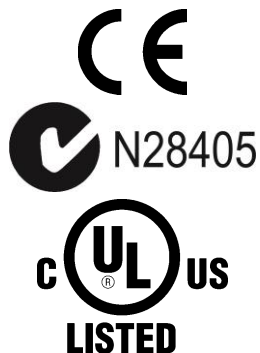
Spares – P/N	Description	
370-00015-100	Base RoHS	
370-00170-100	Bottom Chute RoHS	
150-00176-100	Cable, USB-RS232, 14 pin RoHS	
150-00013-100	Cable, Evaluation, RS232, 14 pin RoHS	
150-00164-100	Cable, GDS Adaptor	

Spares – P/N	Description	
370-00021-100	Floating Part RoHS	
370-00024-100	Hinge RoHS	
370-00025-100	Hinge Pin RoHS	
500-00005-100	Keypad Membrane RoHS	
362-00047-107	Lid, Label RoHS	
370-00020-100	Lid, Top, Red RoHS	
370-00022-100	Locker RoHS	
370-00023-100	Locker Base RoHS	
370-00016-100	Main Bracket RoHS	

Spares – P/N	Description	
140-00099-100	Paper Taken Sensor Board RoHS	
140-00161-103	PCBA, GEN2 Mother board, with the new Low Paper Sensor (interrupter sensor) RoHS	
460-00005-100	Platen Shaft Assembly RoHS	
350-00031-102	Power Supply RoHS	
400-00007-100	Print Mech, F03-66 RoHS	
310-00112-100	Release Bar Bracket RoHS	
310-00115-100	Release Bar Guide RoHS	
460-00006-100	Roller Idler RoHS	
473-00078-100	Screws (100 pack) RoHS	
485-00008-100	Spring (50 pack) RoHS	

Spares – P/N	Description	
370-00026-100	Spring Plate RoHS	
482-00012-100	Star Washers (100 pack) RoHS	
320-00224-101	Ticket Extension Tray, 600 Tickets RoHS	
320-00224-102	Ticket Extension Tray, 900 Tickets RoHS	
370-00019-100	Top Presenter RoHS	
370-00291-100	Tray, Paper RoHS	

Appendix E Regulatory & Compliance



The printer described in this manual is in compliance with all applied CE standards.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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FutureLogic, Inc.
425 East Colorado Street • Suite 100
Glendale, CA 91205 USA
Phone 818.244.4700 • Fax 818.244.4764
www.futurelogic-inc.com • info@futurelogic-inc.com