

LE810

Service Manual

081009A

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WARNING

THE EQUIPMENT REFERENCED IN THIS DOCUMENT COMPLIES WITH THE REQUIREMENTS IN PART 15 OF FCC RULES FOR A CLASS B COMPUTING DEVICE. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA MAY CAUSE UNACCEPTABLE INTERFERENCE TO RADIO AND TV RECEPTION.

Table of Contents

Introduction	
About This Manual	1-2
General Description.....	1-3
Theory of Operation	1-4
Control Features.....	1-6
Technical Data	
Physical Characteristics	2-2
Power	2-2
Environmental	2-2
Processing.....	2-2
Interface Modules.....	2-2
Print.....	2-2
Sensing	2-3
Media.....	2-3
Command.....	2-3
Regulatory Approvals	2-3
Character Font Capabilities.....	2-4
Barcode Capabilities	2-5
Interface Specifications	
Interface Specifications	3-2
RS232C High-Speed Serial Interface.....	3-3
IEEE1284 Parallel Interface	3-6
Universal Serial Bus (USB)	3-7
Local Area Network (LAN) Ethernet.....	3-8
All Interfaces.....	3-9
Receive Buffer.....	3-9
ACK/NAK Protocol	3-9
Status	3-9
4 Return	3-9
Accessories Installation	
Accessories Installation.....	4-2
Interface Installation	4-2
Printer Configuration	
Printer Configuration	5-2

DIP Switch Settings.....	5-3
Software DIPSW Command.....	5-6
Configuration Modes	5-8
Normal Mode.....	5-8
Advanced Mode	5-9
Service Mode	5-10
Counters Mode.....	5-11
Emulation Mode	5-12
Test Print Mode.....	5-13
Boot Download Mode.....	5-14
Flash Memory Download Mode	5-15
Default Setting Mode.....	5-16
Hex Dump Mode	5-17
Maintenance Mode.....	5-18
Menu Definition Tables.....	5-19
Troubleshooting	
Error Signal Troubleshooting.....	6-2
Troubleshooting Table.....	6-4
Interface Troubleshooting.....	6-6
Performance Testing	6-8
Multimeter With Test Module	6-8
Multimeter Alone	6-9
Test Print Troubleshooting	6-10
Test Label Printing	6-11
Replacement Procedures	
Replacement Procedures.....	7-2
Print Head Replacement	7-2
Platen Roller Replacement.....	7-4
Platen Roller Timing Belt Replacement.....	7-6
Drive Motor Replacement.....	7-7
Main Board Replacement.....	7-8
Flash Memory Board Replacement.....	7-9
Power Board Replacement	7-10
Panel/LCD Board Replacement	7-11
Interface Board Replacement.....	7-13
Label Sensor Replacement.....	7-14
Head-Open Sensor Replacement	7-15
Fuse Replacement	7-16

Adjustment Procedures	
Adjustment Procedures	8-2
Print Head Balance Adjustment	8-2
Print Head Alignment	8-3
Label Sensor Positioning.....	8-4
Timing Belt Tension.....	8-5
I-Mark Sensor Sensitivity Adjustment.....	8-6
Operator Panel.....	8-6
Multimeter With Test Module	8-7
Multimeter Alone	8-7
Gap Sensor Sensitivity Adjustment.....	8-9
Operator Panel.....	8-9
Multimeter With Test Module	8-10
Multimeter Alone	8-10
Operational Adjustments.....	8-11
Appendix	
Cover Removal Diagram	9-2
Block Diagram	9-3
Print Setup Dimensions.....	9-4
Label Reference Position	9-5
Printer Connection Diagram	9-6
Printer Loading Diagram	9-7
Replacement Parts List	9-9
Glossary	9-10

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1

INTRODUCTION

- **About This Manual**
- **General Description**
- **Theory of Operation**
- **Control Features**

ABOUT THIS MANUAL

This manual is laid out consistent with the product discussed and provides all of the information required for printer maintenance and repair by Oki Data approved personnel. For the repair technician, this manual is intended to compliment, and to be used as an extension of, owner/operator literature.

WARNING: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN PERSONAL INJURY.

CAUTION: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN EQUIPMENT DAMAGE.

ATTENTION: Provides information that is deemed of special importance but will not result in personal injury or product damage if unheeded.

NOTE: Provides helpful hints to assist in performing the tasks at hand.

LCD DISPLAY: Provides the specific display that should be visible on the LCD at that point.

A comprehensive Table Of Contents provided at the front of this manual facilitates rapid movement within. The contents identify the different Units, Chapters, and some Sections. Each references the page number of their commencement.

The pages of this manual have embedded headers and footers to assist the user in identifying his or her exact position within the manual. The header provides the unit number followed by its name. The footer identifies the product and the page number.

Page enumeration is two-part with each separated by a hyphen. The first character set references the Unit and the second identifies the page number within that unit. Page numbers begin with the numeral one (1) at the beginning of a new unit and ascend sequentially.

GENERAL DESCRIPTION

The LE810/ LE820 printer brings the latest in technology to the world of thermal label printing by offering high-speed data transmission, unparalleled processing speed and large amounts of integrated memory to quickly and easily manage any label printing requirement.

These printers set new benchmarks in label throughput. The new generation RISC processor provides high performance in label production even when printing directly from standard Windows.

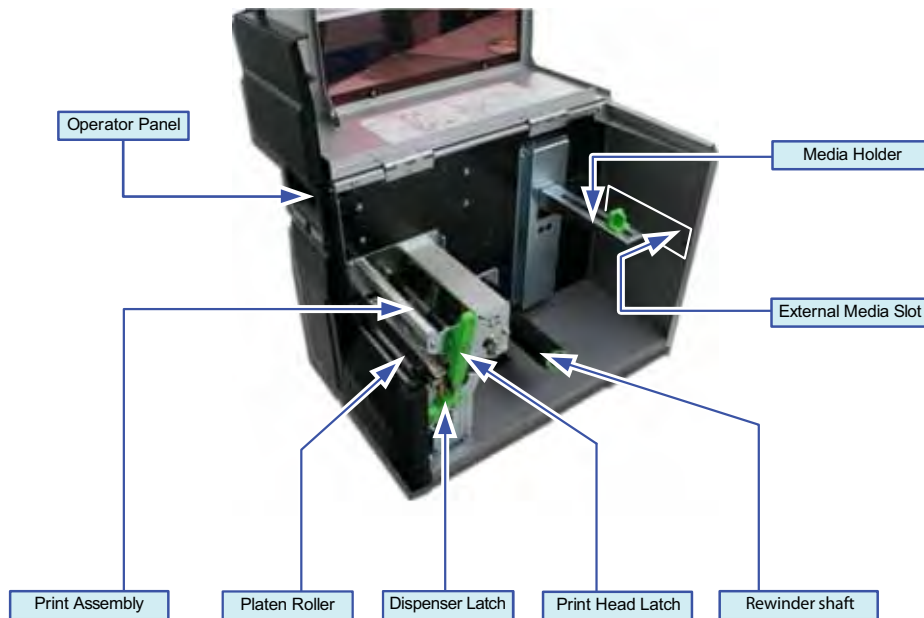


Figure 1-1a, Primary Components

THEORY OF OPERATION

When activated, media is fed past the print head by an integrated drive train. The drive train is electric, stepper motor driven and coupled to a gear and belt configuration located on the electrical side of the printer's center frame. A pulley is concentrically attached to the motor spindle and provides torque to a platen roller's pulley via a timing belt. This provides media movement through treading contact with the roller.

The same configuration, through a second belt also attached to the motor spindle, transfers torque to the liner rewind spindle's concentrically attached pulley. The spindle's pulley is located on the printer's electrical side and the spindle protrudes through the center wall extending outward and parallel to the platen roller on the printer's print side. The rewind spindle rotates on axis while maintaining enough torque to take up and rewind paper liner.

Paper guides within the chassis assembly ensures the media remains properly positioned beneath the print assembly and is fed unimpeded from the printer's rear through to the front.

A series of strategically located sensors and switches send signals to the processing unit. Some sensors are two part consisting of transmitting and receiving components. The transmitting component is mounted opposite of the receiving component so that media may pass between the two. When present, the media thusly blocks sensor transmission from reaching the receiver. The processing unit in turn sends response signals to the various features based on programmed and received data. These signals, are the controlling force of mechanical activities.

The print head, through thermal heat, inductively provided by electrical supply, transfers print images onto the media as it passes. The print image may be manifested through either a direct process initiated through a chemical reaction to the heat from within the label media.

Alternating current from an independent source (120V/240V jumper selectable), is required for proper function. The printer's integrated power transforms the supplied voltage to direct current which is mediated to the various circuitry. This circuitry is comprised of properly positioned transformers, relays, diodes, resistors, and chips which sends, receives, and processes communication data throughout the system.

Unit 1: Introduction

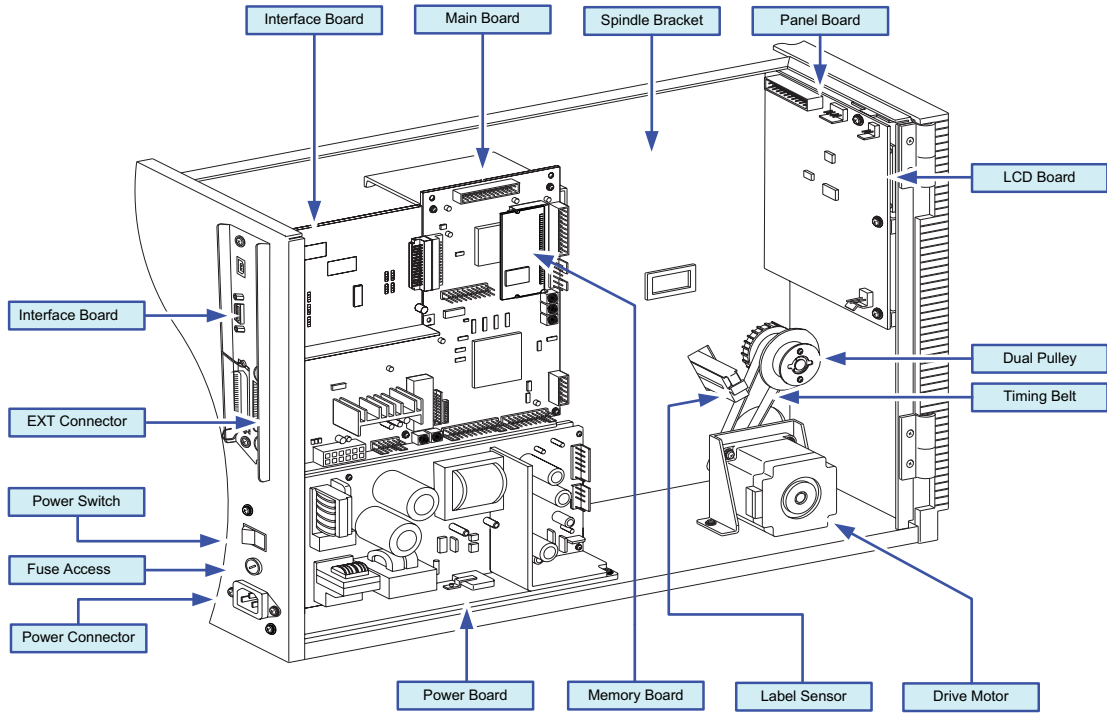


Figure 1-1b, Primary Components

CONTROL FEATURES

This chapter identifies the interactive control features of the printer. These functions are defined generally here. More specific explanations will be found throughout this manual on how to use them.

OPERATOR PANEL FEATURES	
LED	DEFINITION
STATUS	<ul style="list-style-type: none"> • Illuminates green when online and terminates when offline. • Blinks green when receiving data or the buffer is near full. • Illuminates or blinks red when detecting a printer error.
BUTTONS	DEFINITION
LINE	Moves the printer from an online to offline state and vice-versa, scrolls menu options, and performs other special functions as identified in flow charts throughout this manual where applicable.
FEED	Advances the label media when pressed, selects menu options, and performs other special functions as identified in flow charts throughout this manual where applicable.
POTENTIOMETERS	DEFINITION
PRINT	Adjusts the print density resulting in a lighter or darker print image.
OFFSET	Adjusts forward or back feed offset distance for peel, cut, or tear-off operations.
PITCH	Adjusts the print stop position (top of form).
DIP SWITCHES	DEFINITION
DIPSW 2-1	Determines direct thermal or thermal transfer printing. *This printer can only set as Direct Thermal. There is no options for Thermal Transfer.
DIPSW 2-2	Determines I-Mark or Gap Sensor function.
DIPSW 2-3	Enables/Disables the head check feature.
DIPSW 2-4	Enables/Disables the Hex Dump feature.
DIPSW 2-5	Determines Multi-Buffer Interface Receive Mode (periodic response) or Single-Item Interface Receive Mode (ENQ response) *This feature is not valid if the printer is operated on ZEBRA emulation and ZPL command.
DIPSW 2-6	Enables/Disables the Download Mode feature.
DIPSW 2-7	Enables/Disables non-standard Control Code feature. *Non-standard Protocol mode is not valid if the printer is operated on ZEBRA emulation and ZPL command.
DIPSW 2-8	Enables/Disables the software DIPSW commands. *This hardware DIP switch is default set as ON.
DIPSW 3-1, DIPSW 3-2	Determines the printing mode: Continuous, Tear-Off, Cutter, or Dispenser.
DIPSW 3-3	Enables/Disables the Pitch Sensor.
DIPSW 3-4	Enables/Disables the back feed function.
DIPSW 3-5	Enables/Disables an external device to initiate a label print for synchronization with an applicator.

DIP SWITCHES	DEFINITION
DIPSW 3-6, DIPSW 3-7	Determines the polarity and signal type (level or pulse) of the external print synchronizing signal to be selected.
DIPSW 3-8	Enables/Disables an alternate device to reprint the last label of the print job.

Note:

The potentiometers and hardware DIP switches mentioned above can only be accessed if the cover of the operator panel is removed.

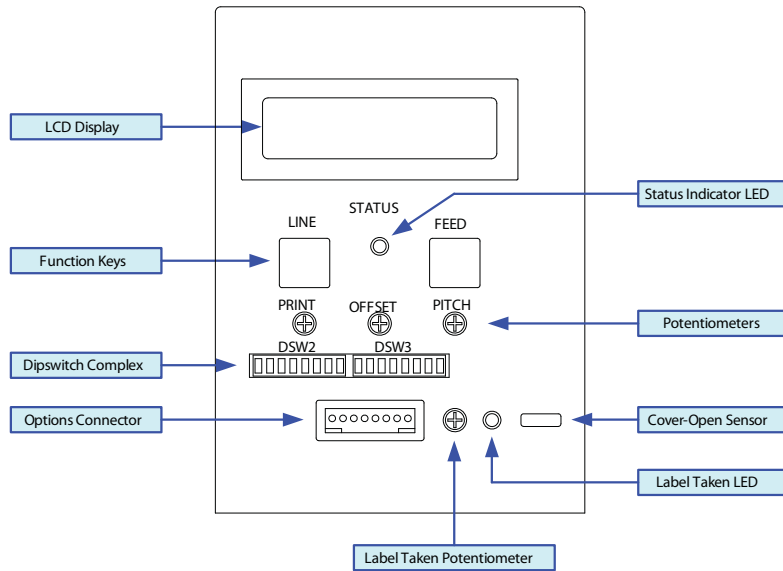


Figure 1-2, Operator Panel with cover removed

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2

TECHNICAL DATA

- **Physical Characteristics**
- **Power**
- **Environmental**
- **Processing**
- **Interface Modules**
- **Print**
- **Sensing**
- **Media**
- **Command**
- **Regulatory Approvals**
- **Character Font Capabilities**
- **Barcode Capabilities**

Unit 2: Technical Data

PHYSICAL CHARACTERISTICS	
Width	10.67 Inches (271 mm)
Height	12.68 Inches (322 mm)
Depth	16.85 Inches (428 mm)
Weight	32.63 Pounds (14.8 Kg)

POWER	
Input Voltage	100-120/200-240 Volts AC +/- 10%, 50/60 Hertz +/-5% (selectable via jumper position)
Power Consumption	Peak Time : 190VA 130W Idle : 24VA 16W

ENVIRONMENTAL	
Operating Temperature	41 to 104°F (5° to 40°C)
Storage Temperature	23 to 140°F (-5° to 60°C)
Storage Humidity	30 to 90% RH Non-Condensing
Operating Humidity	30 to 80% RH Non-Condensing

PROCESSING	
CPU	32 Bit RISC
Flash ROM	2 Megabytes
Receive Buffer	2.95 Megabytes maximum, 2 Megabytes near full

INTERFACE MODULES		
Combo Interface Board	Enhanced Parallel Port	IEEE1284
	Serial Port	RS232C (9600 to 57,600 bps)
	Universal Serial Bus	USB Full Speed
Optional Interface Board	Local Area Network (LAN)	10BASE-T/100BASE-TX Automatic Switching
	Universal Serial Bus	USB Full Speed

PRINT	
Method	Direct Thermal
Maximum Speed (selectable)	2, 3, 4, 5, 6 Inches Per Second (50.8 - 152.4 mm)
Print Module (dot size)	0.0049 Inches (0.125 mm)
Resolution	LE810: 203 Dots Per Inch (8 dpmm) LE820: 305 Dots Per Inch (12 dpmm)
Maximum Print Width	4.09 Inches (104 mm)
Maximum Print Length	15.75 Inches (400mm)
Pitch at EX Command	LE810: 49.17 Inches (1249 mm) LE820: 32.80 Inches (833 mm)

Unit 2: Technical Data

SENSING	
Gap	Adjustable
Reflective I-Mark	Adjustable
Media Out	Constant
Cover Open	Constant

MEDIA	
Width	Media Width: 0.866 to 5.04 Inches (22-128 mm) Media Width with Backing Paper: 0.984 to 5.16 Inches (25-131 mm)
Length	Media Length: 15.63 Inches (397 mm) Media Length with Backing Paper: 15.75 Inches (400mm)
Length (Tear-Off)	Media Length: 0.669 to 7.01 Inches (17-178 mm) Media Length with Backing Paper: 0.787 to 7.13 Inches (20-181 mm)
Type	Roll or Fan-Fold I-Mark or Gap Direct Thermal
Thickness	0.003 to 0.010 Inches (0.08-0.26 mm)
Roll Diameter	Maximum: 8.6 Inches (218.44 mm)
Core Diameter	3.0 Inches (76.2 mm)
Wind Direction	Face Inward
Fan-Fold Height	Maximum: 3.94 Inches (100 mm)

COMMAND	
Standard	ZEBRA emulation and ZPL command SATO Barcode Printer Language (SBPL) Intelligent Command
Non-Standard	N/A

REGULATORY APPROVALS	
Safety	FCC (Class B), CE (EN55022, EN55024)

CHARACTER FONT CAPABILITIES	
TTF FONTS	
0	15 dots H x 12 dots W
BITMAP FONTS	
A	9 dots H x 5 dots W
B	11 dots H x 17 dots W
C	18 dots H x 10 dots W
D	18 dots H x 10 dots W
E	28 dots H x 15 dots W
F	26 dots H x 13 dots W
G	60 dots H x 40 dots W
H	21 dots H x 13 dots W
P	20 dots H x 18 dots W
Q	28 dots H x 24 dots W
R	35 dots H x 31 dots W
S	40 dots H x 35 dots W
T	48 dots H x 42 dots W
U	59 dots H x 53 dots W
V	80 dots H x 71 dots W
DOWNLOADABLE FONTS	
	N/A
CHARACTER CONTROL	
	Expansion up to 12 x in either the X or Y coordinates. Character Pitch Control Line Space Control Journal Print Facility 0, 90, 180, and 270 Degree Rotation

BARCODE CAPABILITIES	
Linear Bar Codes	UPC A/E JAN 8/13 EAN 8/13 Code 39 Code 93 Code 128 Interleaved 2 of 5 Industrial 2 of 5 Matrix 2 of 5 Bookland NW-7 MSI POSTNET UCC/EAN 128 NW-7 (Codabar)
Two Dimensional	QR Code Data Matrix Maxi Code PDF417 Synthetic Symbol
Ratios	1:2, 1:3, 2:5, User definable bar widths
Bar Height	4 to 999 dots, User programmable
Rotation	0, 90, 180, and 270 Degrees
Sequential Numbering	Sequential numbering of both numerics and bar codes
Expansion Ratio of Character	Height: 1 to 12 times, Width: 1 to 12 times
Graphics	Full dot addressable graphics, BMP or PCX formats
Form Overlay	Form overlay for high-speed editing of complex formats

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3

INTERFACE SPECIFICATIONS

- **Interface Specifications**
- **RS232C High-Speed Serial Interface**
- **IEEE1284 Parallel Interface**
- **Universal Serial Bus (USB)**
- **Local Area Network (LAN) Ethernet**
- **All Interfaces**

INTERFACE SPECIFICATIONS

This unit presents the printer interface types and their specifications. These specifications include detailed information to assist in the selection of the most appropriate method for the printer to interface with the host. The five acceptable interface methods are:

- RS232C High-Speed Serial
- IEEE1284 Parallel
- Universal Serial Bus (USB)
- Local Area network (LAN) Ethernet (Optional Interface Module)

Following the selection of the desired interface, proceed to the next unit for instructions on how to configure the printer for that interface type.

WARNING: NEVER CONNECT OR DISCONNECT INTERFACE CABLES (OR USE A SWITCH BOX) WITH POWER APPLIED TO EITHER THE HOST OR THE PRINTER. THIS MAY CAUSE DAMAGE TO THE INTERFACE CIRCUITRY IN THE PRINTER/HOST AND IS NOT COVERED BY WARRANTY.

NOTE: Some hosts monitor the Request-To-Send (RTS) signal (pin 4 of 25) to determine if the printer is ready to receive data. Since the printer does not generate this signal, the RTS line must be held true (high) in order to allow communication. This can be performed by connecting the RTS pin to the Clear-To-Send (CTS) signal (pin 5 of 25).

RS232C HIGH-SPEED SERIAL INTERFACE

This High Speed Serial Interface is available with the standard Plug-in 3-in-1 Combination Interface Module.

INTERFACE SPECIFICATIONS	
Asynchronous ASCII	Half-duplex communication Bi-Directional Communication
Data Transmission Rate	9600, 19200, 38400, 57600 bps
Transmission Form	Start, b1, b2, b3, b4, b5, b6, b7, b8, Stop (b8 will be omitted if using 7 bit oriented)
Data Length	7 or 8 bit (selectable)
Stop Bit	1 or 2 bit (selectable)
Parity Bit	ODD, EVEN, NONE (selectable)
Codes Used	ASC II Character Codes: 7 bits, Graphics: 8 bits
Control Codes	STX (02H), ETX (03H), ACK (06H), NAK (15H)
Connector (Printer Side)	DB-9S Female (equivalent)
Cable Connector	DB-9P Male (equivalent)
Cable Length	50 feet or less.
Signal Levels	High = +5V to +12V, Low = -5V to -12V
Protocol	Ready/Busy, X-On/X-Off, Protocol for Driver, Status4 (Bi-Com)

Printer Configuration Setting when using Serial Interface

When RS232C Serial Interface is selected for communicating between printer and host, we need to set up some printer configuration for controlling communication conditions. These configurations can be set in the ADVANCED MODE LCD menu. Please refer to the Configuration unit of this manual to configure the printer for host computer interfacing.

READY/BUSY Flow Control

Ready/Busy is the hardware flow control method for the serial interface on the LE810/ LE820 printers. By raising/lowering the voltage level on Pin 4 of the RS232 port, the printer notifies the host when it is ready to receive data. Pin 7 (RTS) and pin 4 (DTR) are the important signals on the printer for this method of flow control. The host must be capable of supporting this flow control method for it to function properly.

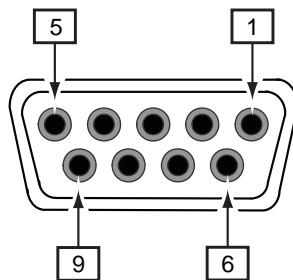


Figure 3-5, Serial Connector Pin Assignments

Unit 3: Interface Specifications

READY/BUSY INTERFACE SIGNALS		
PIN	DIRECTION	SIGNAL DEFINITION
1	-	Not connected
2	To Printer	RD (Receive Data) - Data to the printer from the host computer.
3	To Host	TD (Transmit Data) - Data from the printer to the host computer. Sends X-On/X-Off characters or status data (bi-directional protocols).
4	To Host	DTR (Data Terminal Ready) - This signal applies to Ready/Busy flow control. The printer is ready to receive data when this pin is high. It goes low when the printer is offline, either manually or due to an error condition, and while printing in the single-job buffer mode. It will also go low when the data in the buffer reaches the buffer near-full level.
5	Reference	SG (Signal Ground)
6	To Printer	DSR (Data Set Ready) - When this line is high, the printer will be ready to receive data. This line must be high before data is transmitted. If this line is not being used, it should be tied high (to pin 6).
7	To Host	RTS (Request To Send) - Used with Ready/Busy flow control to indicate an error condition. RTS is high and remains high unless the print head is open (in this case, RTS would return to the high state after the print head is closed and the printer is placed back online) or an error condition occurs during printing (e.g., label out).
8	To Printer	CTS (Clear To Send) - When this line is high, the printer assumes that data is ready to be transmitted. The printer will not receive data when the line is low. If this line is not being used, it should be tied high (to pin 4).
9	-	Not connected

READY/BUSY CABLE REQUIREMENTS					
DB9	DB25	HOST	DIRECTION	DB9	PRINTER
1	1	FG (Frame Ground)	-	1	-
3	2	TD (Transmit Data)	To Printer	2	RxD (Receive Data)
2	3	RD (Receive Data)	To Host	3	TxD (Transmit Data)
6	6	DSR* (Data Set Ready)	To Host	4	DTR (Data Terminal Ready)
5	7	SG (Signal Ground)	Bi-Directional	5	SGN (Signal Ground)
4	20	DTR (Data Terminal Ready)	To Printer	6	DSR (Data Set Ready)
8	5	CTS (Clear To Send)	To Host	7	RTS (Request To Send)
7	4	RTS (Request To Send)	To Printer	8	CTS (Clear To Send)

* This connection at the host side of the interface would depend upon the pin that is being used as the Ready/Busy signal by the driving software. Typically, on a PC, it would be either CTS (pin8) or DSR (pin 6) on a DB-9 connector.

X-ON/X-OFF Flow Control

X-On/ X-Off flow control is used whenever hardware (Ready/Busy) flow control is not available or desirable. Instead of a voltage going high/low at pin 4, control characters representing “Printer Ready” (**X-On** = 11 hexadecimal) or “Printer Busy” (**X-Off** = 13 hexadecimal) are transmitted by the printer on pin 3 (Transmit Data) to the host. In order for this method of flow control to function correctly, the host must be capable of supporting it. **X-On/X-Off** operates in a manner similar to the function of pin 4 (**DTR**) as previously explained. When the printer is first powered on it sends an **X-Off** when the “Buffer Near Full” level is reached and a **X-On** when the data level of the buffer drops below the “Buffer Available” mark. When the printer is taken off-line manually, it transmits an **X-Off** indicating it cannot accept data. When it is placed back on line manually, it sends an **X-On**, indicating it is again available for receipt of data. If an error occurs during printing (paper out), the printer sends an **X-Off** as soon as an error condition is detected. When the error is cleared and the printer is placed back on-line, it transmits an **X-On** indicating it is again ready to accept data. Upon power up if no error conditions are present; the printer will continually send **X-On** characters at five millisecond intervals until it receives a transmission from the host.

X-ON/X-OFF CABLE REQUIREMENTS					
Communicates with the host to determine if the printer is ready to receive data by sending “XON” (HEX 11H) or “XOFF” (HEX 13H) code to the TD line. The single and multiple item buffers are switchable in the Interface Mode of the printer.					
DB9	DB25	HOST	DIRECTION	DB9	PRINTER
1	1	FG (Frame Ground)	-	1	FG (Frame Ground)
3	2	TD (Transmit Data)	To Printer	2	RD (Receive Data)
2	3	RD (Receive Data)	To Host	3	TD (Transmit Data)
5	7	SG (Signal Ground)	Bi-Directional	5	SG (Signal Ground)

IEEE1284 PARALLEL INTERFACE

The parallel interface is available with the standard Plug-in 3-in-1 Combination Interface Module and is conforms to IEEE1284 specifications. It automatically detects the IEEE1284 signals and operates in the high speed mode. If the IEEE1284 signals are not detected, it will operate in the slower standard Centronics mode. For this reason, an interface cable and host interface conforming to the IEEE1284 specification must be present to fully utilize the speed capabilities. This interface also operates bi-directionally and can report the status of the printer back to the host.

SPECIFICATIONS	
Printer Connector	AMP 57-40360 DDK (or equivalent)
Cable Connector	AMP 57-30360 DDK (or equivalent)
Cable	10 feet (3 meter) or less
Signal Level	High = +2.4V to +5.0V, Low = 0V to -0.4V
Data Stream	<ESC>A . . Job#1 . . <ESC>Z<ESC>A . . Job#n . . <ESC>Z

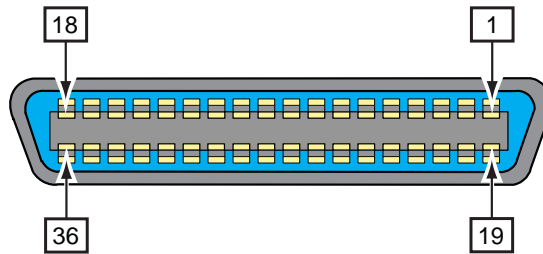


Figure 3-2, Parallel Connector Pin Assignments

PIN ASSIGNMENTS					
PIN	SIGNAL	DIRECTION	PIN	SIGNAL	DIRECTION
1	Strobe	To Printer	19	Strobe Return	Reference
2	Data 1	To Printer	20	Data 1 Return	Reference
3	Data 2	To Printer	21	Data 2 Return	Reference
4	Data 3	To Printer	22	Data 3 Return	Reference
5	Data 4	To Printer	23	Data 4 Return	Reference
6	Data 5	To Printer	24	Data 5 Return	Reference
7	Data 6	To Printer	25	Data 6 Return	Reference
8	Data 7	To Printer	26	Data 7 Return	Reference
9	Data 8	To Printer	27	Data 8 Return	Reference
10	ACK	To Host	28	ACK Return	Reference
11	Busy	To Host	29	Busy Return	Reference
12	Ptr Error	To Host	30	PE Return	Reference
13	Select	To Host	31	INIT	From Host
14	AutoFD1	To Host	32	Fault	To Host
15	Not Used		33	Not Used	
16	Logic Gnd		34	Not Used	
17	FG	Frame Gnd	35	Not Used	
18	+5V (z=24k ohm)	To Host	36	SelectIn1	From Host

1 Signals required for ieee 1284 mode.

UNIVERSAL SERIAL BUS (USB)

The Universal Serial Bus (USB) interface is available with the standard Plug-in 3-in-1 Combination Interface Module or available individually as an optional Plug-In Interface Module. It requires a driver (shipped with each printer that has the interface installed) that must be loaded onto the PC and configured to support USB peripherals using Windows 2000 or above. Up to 127 devices may be connected to a USB port using powered hubs.

ATTENTION: This Interface Type Is Not Compatible With Windows 98 Or Windows Me.

SPECIFICATIONS	
Printer Connector	USB Type B Plug
Cable	10 feet (3 m) maximum
Host	Windows 2000 or above with USB Port
Power Supply	BUS Power through cable
Power Consumption	+5 V at 80 ma

LOCAL AREA NETWORK (LAN) ETHERNET

A Local Area Network (LAN) interface is an optional Plug-In Interface Module that can be installed by replacing the standard 3-in-1 Combination Interface Module. It requires a driver shipped with each optional LAN interface module. The driver that must be loaded onto the host computer and configured to run one of the supported network protocols using a 10Base-T or 100Base-TX LAN connection. Details for loading the LAN driver are contained on the CD-ROM that is shipped with each optional LAN interface module.

SPECIFICATIONS	
Connector	RJ-45 Receptacle
Cable	10/100BaseT Category 5
Cable Length	100 meters or less
Power Supply	Powered from printer
Protocol	Status3 return Protocol for Driver (cyclic response mode) Protocol for Driver (ENQ response mode) Status5 return
IP Address	0.0.0.0 to 255.255.255.255
Subnet Mask	0.0.0.0 to 255.255.255.255
Gateway Address	0.0.0.0 to 255.255.255.255

DIP SWITCH SETTINGS	
SWITCH	SETTING
1	Reserved (setup prohibited).
2	LAN board EEPROM initialization (configuration).
3	Print configuration details on a label.
4	Print a self-diagnosis of the board onto a label.

SOFTWARE SPECIFICATIONS	
Corresponding Protocol	TCP/IP
Network Layer	ARP, RARP, IP, ICMP
Session Layer	TCP, UDP
Application Layer	LPD, FTP, TELNET, BOOTP, DHCP
<i>NOTE: Print data can be sent by LPR and FTP of TCP/IP and dedicated socket protocol. Printer status is obtainable by dedicated socket protocol.</i>	
<i>NOTE: In the TCP/IP protocol environment, LPD and FTP are provided for printing; TELNET for variable setup; ARP, RARP, and BOOTP/DHCP for address setup.</i>	
<i>LPD protocol complies with RFC1179 and handles the list of logical printer name as queue name such as lp, sjjs, euc. In addition, a banner page can be printed by a proper setup.</i>	
<i>When sending the job by LPR, the transmission order of data file/control file within the job will not affect print operation. In addition, if the banner page is specified, it will be added to each data file. Job deletion by LPR is not available.</i>	
<i>FTP protocol complies with RFC959 and handles the list of logical printer name as a transfer directory. File transfer to this directory executes print operation. It is possible to specify ASCII(A), Binary(I) and TENEX(L8) as transfer mode - although the mode difference is dependent on the client. A banner page may be printed with a proper setup.</i>	
<i>TELNET Complies with RFC854. This operation consists of interactive menu form and enables change and reference of internal setup, and to display status. To change the setup, enter "root" user and password at the time of login. Default of root password is set as null (linefeed only).</i>	

ALL INTERFACES

This chapter contains information that is applicable to all interface types offered.

RECEIVE BUFFER

The data stream is received from the host to the printer one job at a time. This allows the software program to maintain control of the job print queue so that it can move a high priority job in front of ones of lesser importance. A multiple job buffer allows the printer to continuously receive print jobs while compiling and printing other jobs at the same time. It acts much like a Print buffer to maximize the performance of the host and the printer. The printer receives and prints one job at a time. If a print job exceeds the buffer size, transmission will be rejected by the printer. Flow control protocols to throttle transmission are not used. Error conditions that occur during the Print Data transmission will cause the printer to return a NAK.

ACK/NAK PROTOCOL

Bi-Directional ACK/NAK protocol is used for error control. In a normal transmission sequence when the transmission is received, the printer will return an ACK (06H) signifying that it was received without a transmission error. After the transmission command structure has been analyzed, a status byte is returned to the host. This status byte informs the host of the validity of the command structure.

If the command structure is error free, the printer proceeds with the print operation. When the print operation is completed, a Printer Status message is returned to the host. If an error was detected during the initial transmission sequence, a NAK (15H) will be returned signalling to the host that the received transmission contained errors and must be resent. If the returned Status byte indicates a command structure error, the error must then be corrected before the print data is resent to the printer.

A valid transmission to the printer must be bounded by an STX/ETX pair, with the STX (02H) signifying the start of the Print Data and ending with an ETX (03H) signifying the end.

STATUS

4 RETURN

This communication protocol is designed for the purpose of monitoring and controlling print data status in the host and featuring various functions.

INTERFACE SIGNALS		
PIN	DIRECTION	SIGNAL DEFINITION
1	Reference	FG (Frame Ground)
2	To Printer	RD (Receive Data) - Data to the printer from the host computer.
3	To Host	TD (Transmit Data) - Data from the printer to the host computer.
5	Reference	SG (Signal Ground)

Unit 3: Interface Specifications

CABLE REQUIREMENTS					
Depending on the host used, it may need to loop CS and RS (maintaining at high level) on the host side. For additional information, refer to the host computer documentation.					
DB9	DB25	HOST	DIRECTION	DB9	PRINTER
1	1	FG (Frame Ground)	-	1	FG (Frame Ground)
3	2	TD (Transmit Data)	To Printer	2	RD (Receive Data)
2	3	RD (Receive Data)	To Host	3	TD (Transmit Data)
5	7	SG (Signal Ground)	Bi-Directional	5	SG (Signal Ground)

RECEIVE BUFFER CONTROL	
Causes For Receive Buffer Near Full	Receive buffer near full occurs when the remaining free space of the buffer drops to 0.95MB of 2.95MB capacity or when the remaining free space is available for storing 50 of 500 items in the history buffer.
Release Of Receive Buffer Near Full	Receive buffer near full can be released when the remaining free space rises to 1.95MB or when the remaining free space is available for storing 200 items in the history buffer.

4

ACCESSORIES INSTALLATION

- **Interface Installation**

ACCESSORIES INSTALLATION

This unit covers the printer accessory installation procedures.

INTERFACE INSTALLATION

The diagram below displays the physical installation of interface hardware. Refer to the Configuration unit of this manual for instructions on printer setup for the interface type chosen.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Route interface cable (1, Figure 4-1) from host computer to interface board (2).
- 3 Insert interface board (2) into printer (4) and secure using two screws (3).
- 4 Connect interface cable (1).

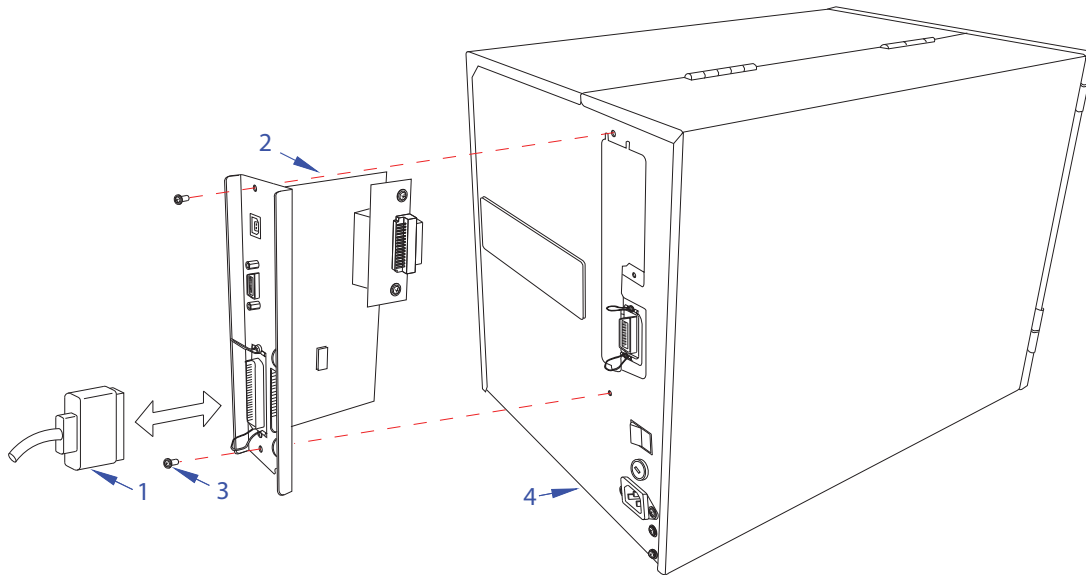


Figure 4-1, Interface Installation

5

PRINTER CONFIGURATION

- **Printer Configuration**
- **DIP Switch Settings**
- **Configuration Modes**
- **Menu Definition Tables**

PRINTER CONFIGURATION

This unit provides in-depth instruction on printer configuration for operation and for some troubleshooting.

The printer may be configured via the buttons and/or potentiometers located on the printer's operator panel. All of the printer's buttons, switches, and potentiometers are used either singularly, or in conjunction, to perform configuration activities.

Refer to the Control Features chapter of the Introduction unit for identification of specific interface features.

DIP SWITCH SETTINGS

This chapter identifies the functions of the printer's integrated DIP switches (DIPSW 2 and DIPSW 3). The configuration of the DIP switches enable/disable the various operational features of the printer.

The printer is factory preset to enable these DIP switches configured by sending the software commands from the host.

The service personnel may also access to the hardware DIP switch located at the operator panel when the cover is removed.

Refer to the tables below on switch designation, their specific functions and the commands to set the switches.

ATTENTION: Each DIP switch must be set for the printer to properly function. Address all eight switches individually, but some may not require change.

NOTE: A small, flat tool similar to a screwdriver is required to alter DIP switch position. When changing a switch setting, ensure that it has been moved fully up or down.

NOTE: The switches are arranged horizontally, from left to right, and oriented vertically. The ON position is always upward and the OFF position is always downward.

DIPSW 2 DEFAULT SETTINGS

2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
ON	OFF	OFF	OFF	OFF	OFF	OFF	ON*1

*1 The setting of DIPSW 2-8 is only available for the hardware DIP switch. The software DIPSW command cannot be used to set the DIPSW 2-8.

DIPSW 2 CONFIGURATION

DIPSW	FUNCTION	SETTING	CONFIGURATION
2-1	Transfer/ Direct*2	OFF	Thermal Transfer
		ON	Direct Thermal
2-2	Media Sensor Selection	OFF	Gap Sensor
		ON	I-Mark Sensor
2-3	Head Check	OFF	Head Check Disabled
		ON	Head Check Enabled
2-4	Hex Dump	OFF	Hex Dump Disabled.
		ON	Hex Dump Enabled
2-5	Multi-Job Receive Buffer*3	OFF	1 Item
		ON	Multi Buffer
2-6	Download Mode	OFF	Disabled
		ON	Enabled
2-7	Protocol Code*4	OFF	Standard Protocol Mode
		ON	Non-standard Protocol Mode

DIPSW 2 CONFIGURATION			
DIPSW	FUNCTION	SETTING	CONFIGURATION
2-8	Hardware/ Software DIPSW setting	OFF	Enable hardware DIPSW setting
		ON	Enable software DIPSW setting

DIPSW 2 FUNCTION DESCRIPTIONS	
FUNCTION	DESCRIPTION
Transfer/ Direct	This printer can only set as Direct Thermal. There is no options for Thermal Transfer.
Media Sensor Selection	Selects between a Gap or I-Mark sensor.
Head Check	When enabled, will check for malfunctioning head elements.
Hex Dump	Allows hexadecimal printing of all data received to the print buffer.
Multi-Job Receive Buffer	Allows to continuously receive print jobs while compiling and printing other jobs.
Firmware Download Mode	Places printer in mode for downloading software into flash ROM.
Protocol Code	Selects the command codes used for protocol control.

Notes:

- The hardware DIPSW 2-8 is set factory set to ON position, the user can only set the printer configuration by the software DIPSW commands as default.
 - When the hardware DIPSW 2-8 is set to OFF position, the printer configuration can only be set by the hardware DIPSW on the operator panel.
 - When the hardware DIPSW 2-8 is set from OFF to ON, the software DIPSW will be enabled and automatically set to the default setting as shown in this section.
 - On factory print label, DIPSW-2 and DIPSW-3 settings image will be printed according to the active mode set by DIPSW 2-8. For example,
 - if **DIPSW 2-8 is OFF**, factory print label will be printed according to the hardware DIPSW settings.
 - if **DIPSW 2-8 is ON**, factory print label will be printed according to the software DIPSW command settings.
- *2 Since this printer has no option for Thermal Transfer, it can only be set as Direct Thermal.
- *3 Multi-Job Receive Buffer is not valid if the printer is operated on ZEBRA emulation and ZPL command.
- *4 Non-standard Protocol Mode is not valid if the printer is operated on ZEBRA emulation and ZPL command.

DIPSW 3 DEFAULT SETTINGS							
3-1	3-2	3-3	3-4	3-5	3-6	3-7	3-8
ON	ON	OFF	OFF	OFF	OFF	OFF	OFF

DIPSW 3 CONFIGURATION				
DSW	FUNCTION	SETTING		CONFIGURATION
3-1 3-2	Operating Mode	3-1	3-2	
		OFF	OFF	Batch/Continuous
		OFF	ON	Tear Off
		ON	OFF	Cutter
		ON	ON	Dispenser

Unit 5: Printer Configuration

DIPSW 3 CONFIGURATION				
3-3	Pitch/ Label Sensor	OFF		Sensor Used
		ON		Sensor Not Used
3-4	Backfeed	OFF		Enabled
		ON		Disabled
3-5	Print Start Signal	OFF		Disabled
		ON		Enabled
3-6 3-7	External Signal Type	3-6	3-7	
		OFF	OFF	Type 4
		OFF	ON	Type 3
		ON	OFF	Type 2
		ON	ON	Type 1
3-8	Repeat Print via Ext Signal	OFF		Disabled
		ON		Enabled

DIPSW 3 FUNCTION DESCRIPTIONS	
FUNCTION	DESCRIPTION
Operating Mode	Batch/Continuous, Tear-Off, Cutter, Dispenser
Pitch/ Label Sensor	Enabled – detects the label's edge and positions it automatically. Disabled – it is under software control.
Back Feed	Enabled – positions the last printed label for dispensing and retracts the media for printing the next.
Print Start Signal	Allows an external device to initiate a label print for synchronization with the applicator. When on, the unit is in the Continuous print mode, Backfeed is disabled and External Signals are ignored.
External Signal	Refer to the Interface Specifications unit for information.
Repeat Print External Signal	Allows an external device to repeat the print sequence.

SOFTWARE DIPSW COMMAND

This section describes the new software commands to set the DIPSW 2 and DIPSW 3.

DIPSW 2 Setting Command

DIPSW 2 SETTING				~ESC + DS2
Hex code	~	ESC	DS2	Parameter
	<7E> ₁₆	<1B> ₁₆	<44> ₁₆ <53> ₁₆ <32> ₁₆	,a,b,c,d,e,f,g
Default Value	,1,0,0,0,0,0			

FUNCTION	To set the DIPSW-2 settings by software command																												
FORMAT	~ + <ESC> + DS2,a,b,c,d,e,f,g																												
PARAMETER	<table> <tbody> <tr> <td>a</td> <td>[DIPSW 2-1]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Transfer / Direct]</td> </tr> <tr> <td>b</td> <td>[DIPSW 2-2]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Gap / I-mark]</td> </tr> <tr> <td>c</td> <td>[DIPSW 2-3]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Headcheck Disable / Enable]</td> </tr> <tr> <td>d</td> <td>[DIPSW 2-4]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Hex Dump & Factory Mode Disable / Enable]</td> </tr> <tr> <td>e</td> <td>[DIPSW 2-5]</td> <td>= 0 : OFF / 1 : ON</td> <td>[1-item / Multi-Job Receive Buffer]</td> </tr> <tr> <td>f</td> <td>[DIPSW 2-6]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Download Disable / Enable]</td> </tr> <tr> <td>g</td> <td>[DIPSW 2-7]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Standard / Non-standard Protocol Mode]</td> </tr> </tbody> </table>	a	[DIPSW 2-1]	= 0 : OFF / 1 : ON	[Transfer / Direct]	b	[DIPSW 2-2]	= 0 : OFF / 1 : ON	[Gap / I-mark]	c	[DIPSW 2-3]	= 0 : OFF / 1 : ON	[Headcheck Disable / Enable]	d	[DIPSW 2-4]	= 0 : OFF / 1 : ON	[Hex Dump & Factory Mode Disable / Enable]	e	[DIPSW 2-5]	= 0 : OFF / 1 : ON	[1-item / Multi-Job Receive Buffer]	f	[DIPSW 2-6]	= 0 : OFF / 1 : ON	[Download Disable / Enable]	g	[DIPSW 2-7]	= 0 : OFF / 1 : ON	[Standard / Non-standard Protocol Mode]
a	[DIPSW 2-1]	= 0 : OFF / 1 : ON	[Transfer / Direct]																										
b	[DIPSW 2-2]	= 0 : OFF / 1 : ON	[Gap / I-mark]																										
c	[DIPSW 2-3]	= 0 : OFF / 1 : ON	[Headcheck Disable / Enable]																										
d	[DIPSW 2-4]	= 0 : OFF / 1 : ON	[Hex Dump & Factory Mode Disable / Enable]																										
e	[DIPSW 2-5]	= 0 : OFF / 1 : ON	[1-item / Multi-Job Receive Buffer]																										
f	[DIPSW 2-6]	= 0 : OFF / 1 : ON	[Download Disable / Enable]																										
g	[DIPSW 2-7]	= 0 : OFF / 1 : ON	[Standard / Non-standard Protocol Mode]																										
EXAMPLE	^XA ~ <ESC>DS2,0,1,0,0,0,0 ^XZ Above code snippets will set the DIPSW 2-2 to ON and so, the printer sensor type will be set at I-MARK when the printer restarts.																												
SPECIAL NOTES	<ol style="list-style-type: none"> 1 This command is valid only when DIPSW 2-8 is ON. 2 The LCD menu and DIPSW settings will become effective after the printer restarts. 3 Users can send this command to printer in Normal mode and Flash Download mode. 4 If software DIPSW 2-3 is switch to ON, it can be switch to OFF from HEXDUMP MODE LCD under Service Mode. 5 When software DIPSW 2-4 is ON, press LINE and FEED buttons while power-up will get the printer enters to Factory Mode directly. The software DIPSW 2-4 will switch to OFF automatically. 6 Selection from HEXDUMP MODE LCD under Service Mode will change software DIPSW 2-4 accordingly. 7 *DIPSW 2-5(1item/ Multi-Job Receive Buffer) is not valid in Zebra Emulation Firmware. 8 Non-standard Protocol mode of DIPSW 2-7 is not supported in Zebra Emulation Firmware. It is only valid for SATO SBPL commands. 9 Printer factory clear and default settings will not reset the software DIPSW 2 settings. 10 This command cannot be used to set the DIPSW 2-8. 11 When hardware DIPSW 2-8 is switched from OFF to ON position, software DIPSW-2 command setting will be automatically set to default values (software DIPSW2 default setting: DIPSW 2-1 ON (Direct Thermal) and other DIPSW OFF). 																												

DIPSW 3 Setting Command

DIPSW 3 SETTING				~ESC + DS3
Hex code	~	ESC	DS3	Parameter
	<7E> ₁₆	<1B> ₁₆	<44> ₁₆ <53> ₁₆ <33> ₁₆	,a,b,c,d,e,f,g,h
Default Value	,1,1,0,0,0,0,0,0			

FUNCTION	To set the DIPSW-3 settings by software command																														
FORMAT	~ + <ESC> + DS3,a,b,c,d,e,f,g,h																														
PARAMETER	<table> <tr> <td>a</td> <td>[DIPSW 3-1]</td> <td>= 0 : OFF / 1 : ON</td> <td rowspan="2">} [Print Mode]</td> </tr> <tr> <td>b</td> <td>[DIPSW 3-2]</td> <td>= 0 : OFF / 1 : ON</td> </tr> <tr> <td>c</td> <td>[DIPSW 3-3]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Pitch Sensor Used / Not Used]</td> </tr> <tr> <td>d</td> <td>[DIPSW 3-4]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Backfeed Enabled / Disabled]</td> </tr> <tr> <td>e</td> <td>[DIPSW 3-5]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Print Signal Disabled / Enabled]</td> </tr> <tr> <td>f</td> <td>[DIPSW 3-6]</td> <td>= 0 : OFF / 1 : ON</td> <td rowspan="2">} [External Signal Type]</td> </tr> <tr> <td>g</td> <td>[DIPSW 3-7]</td> <td>= 0 : OFF / 1 : ON</td> </tr> <tr> <td>h</td> <td>[DIPSW 3-8]</td> <td>= 0 : OFF / 1 : ON</td> <td>[Repeat Print Signal Disabled / Enabled]</td> </tr> </table>	a	[DIPSW 3-1]	= 0 : OFF / 1 : ON	} [Print Mode]	b	[DIPSW 3-2]	= 0 : OFF / 1 : ON	c	[DIPSW 3-3]	= 0 : OFF / 1 : ON	[Pitch Sensor Used / Not Used]	d	[DIPSW 3-4]	= 0 : OFF / 1 : ON	[Backfeed Enabled / Disabled]	e	[DIPSW 3-5]	= 0 : OFF / 1 : ON	[Print Signal Disabled / Enabled]	f	[DIPSW 3-6]	= 0 : OFF / 1 : ON	} [External Signal Type]	g	[DIPSW 3-7]	= 0 : OFF / 1 : ON	h	[DIPSW 3-8]	= 0 : OFF / 1 : ON	[Repeat Print Signal Disabled / Enabled]
a	[DIPSW 3-1]	= 0 : OFF / 1 : ON	} [Print Mode]																												
b	[DIPSW 3-2]	= 0 : OFF / 1 : ON																													
c	[DIPSW 3-3]	= 0 : OFF / 1 : ON	[Pitch Sensor Used / Not Used]																												
d	[DIPSW 3-4]	= 0 : OFF / 1 : ON	[Backfeed Enabled / Disabled]																												
e	[DIPSW 3-5]	= 0 : OFF / 1 : ON	[Print Signal Disabled / Enabled]																												
f	[DIPSW 3-6]	= 0 : OFF / 1 : ON	} [External Signal Type]																												
g	[DIPSW 3-7]	= 0 : OFF / 1 : ON																													
h	[DIPSW 3-8]	= 0 : OFF / 1 : ON	[Repeat Print Signal Disabled / Enabled]																												
EXAMPLE	<p>^XA ~ <ESC>DS3,0,0,0,0,1,0,0,0 ^XZ</p> <p>Above code snippets will set the DIPSW 3-5 to ON and so, the print start signal (external trigger) is Enabled when the printer restarts.</p>																														
SPECIAL NOTES	<ol style="list-style-type: none"> 1 This command is valid only when DIPSW 2-8 is ON. 2 The LCD menu and DIPSW settings will become effective after the printer restarts. 3 Users can send this command to printer in Normal mode and Flash Download mode. 4 Selection from PRINTER TYPE LCD under Advanced Mode will change software DIPSW 3-1 and 3-2 accordingly. 5 Printer factory clear and default settings will not reset the software DIPSW-3 settings. 6 When hardware DIPSW 2-8 is switched from OFF to ON position, software DIPSW-3 command settings will be automatically set to default values (software DIPSW3 default setting: DIPSW 3-1 & 3-2 ON (Dispenser Mode) and other DIPSW OFF). 																														

CONFIGURATION MODES

This chapter provides an overview of the various configuration modes of the operation menu. All of the configuration activities are performed via the use of the operator panel located on the printer's face. However, many settings may also be controlled via external software commands. In the case of conflict between external software commands and internal software commands (control panel settings) the printer will always use the last valid setting (the default is software commands).

NORMAL MODE

This mode allows configuration of printing features that are prone to change from job to job. These are some of the most basic and common adjustments of all of the configuration modes.

Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

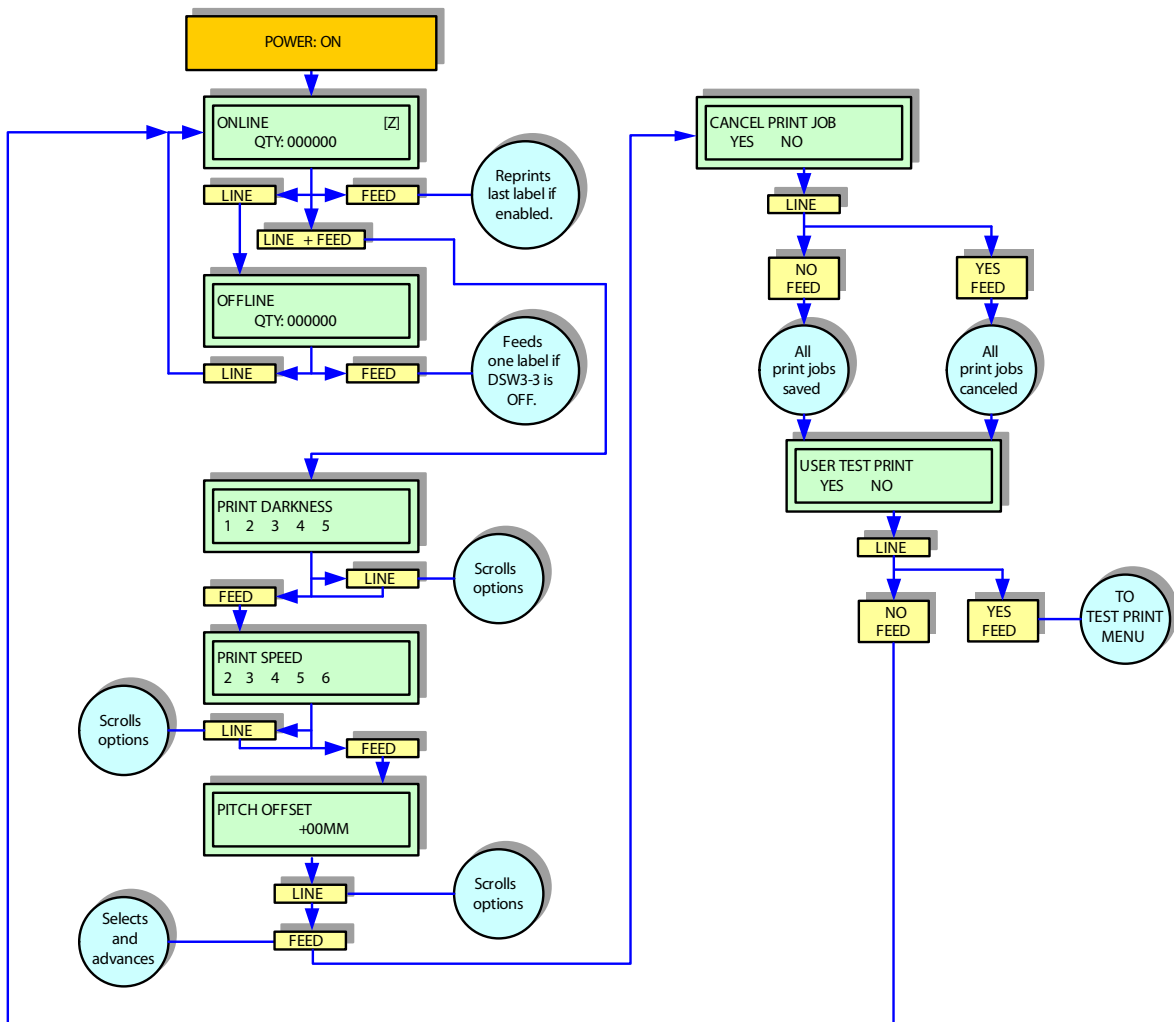


Figure 5-1, Normal Mode

ADVANCED MODE

The Advanced Mode is provided to make basic printer operational adjustments. Typically, once these adjustment settings have been made, they will not require additional address unless a new job is downloaded. Use the buttons of the printer's operator panel to select and enter the required options.

Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

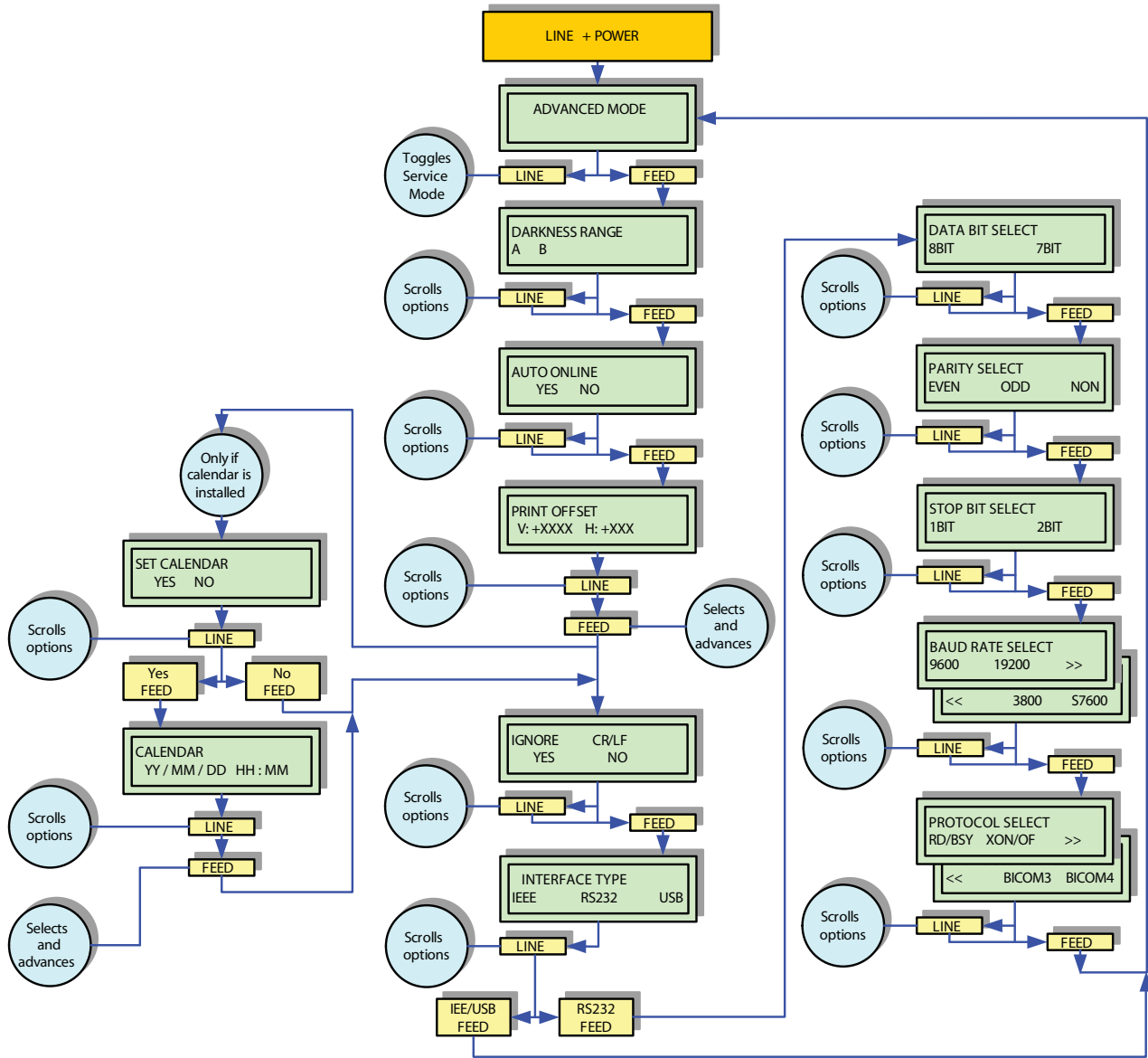


Figure 5-2, Advanced Mode

SERVICE MODE

Allows programming of various dimensional settings, sensor thresholds, and display the DIP switch settings. Use the buttons of the operator panel to select and enter the required options.

Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

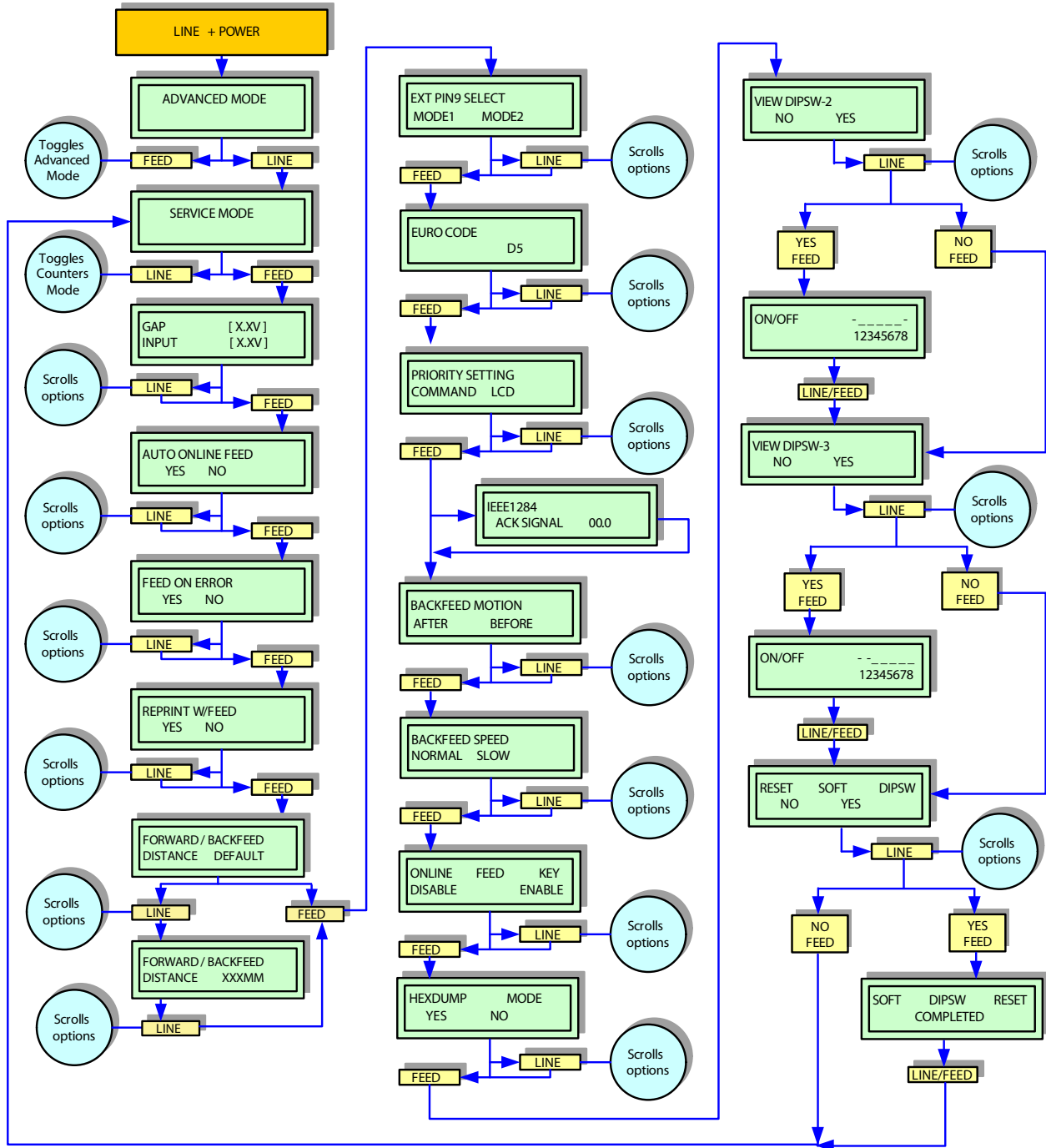


Figure 5-3, Service Mode

COUNTERS MODE

The printer has integrated counters to measure the accumulative activity of some features. The unit of measure is based on linear meters and includes a print head counter and a life counter. The head counter records the length of the media that has been printed since the print head was installed and should be reset each time the print head is replaced.

The life counter measures the length of media the printer as a whole has printed. This counter would only be reset in case of circuitry replacement. The printer's Counter Mode allows the operator to view the accumulated measurement and also allows the printhead counter to be reset to zero.

Use the buttons of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

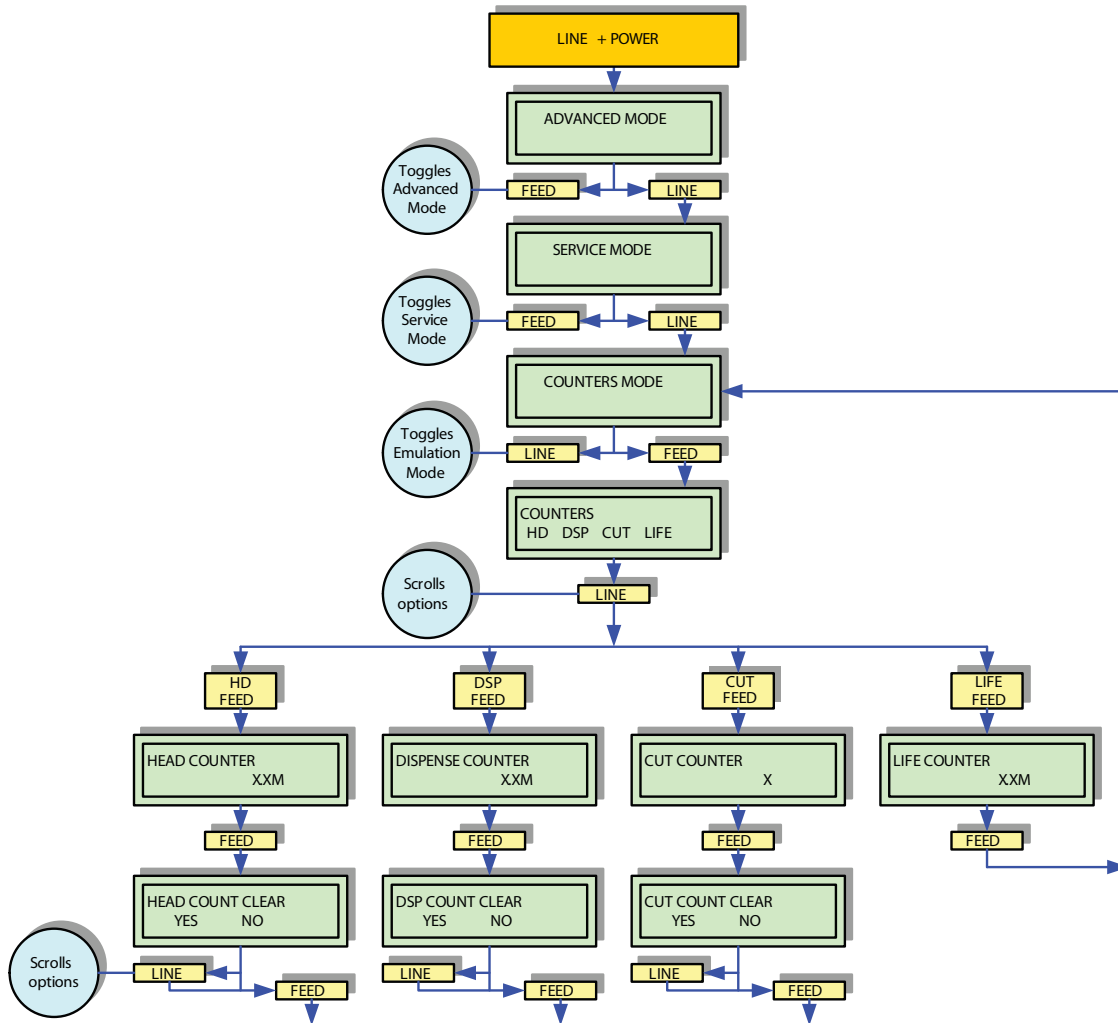


Figure 5-4, Counters Mode

EMULATION MODE

The emulation mode was created to emulate the existing Zebra print LCD menu option and provide similar functionality for the end users.

Use the buttons of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

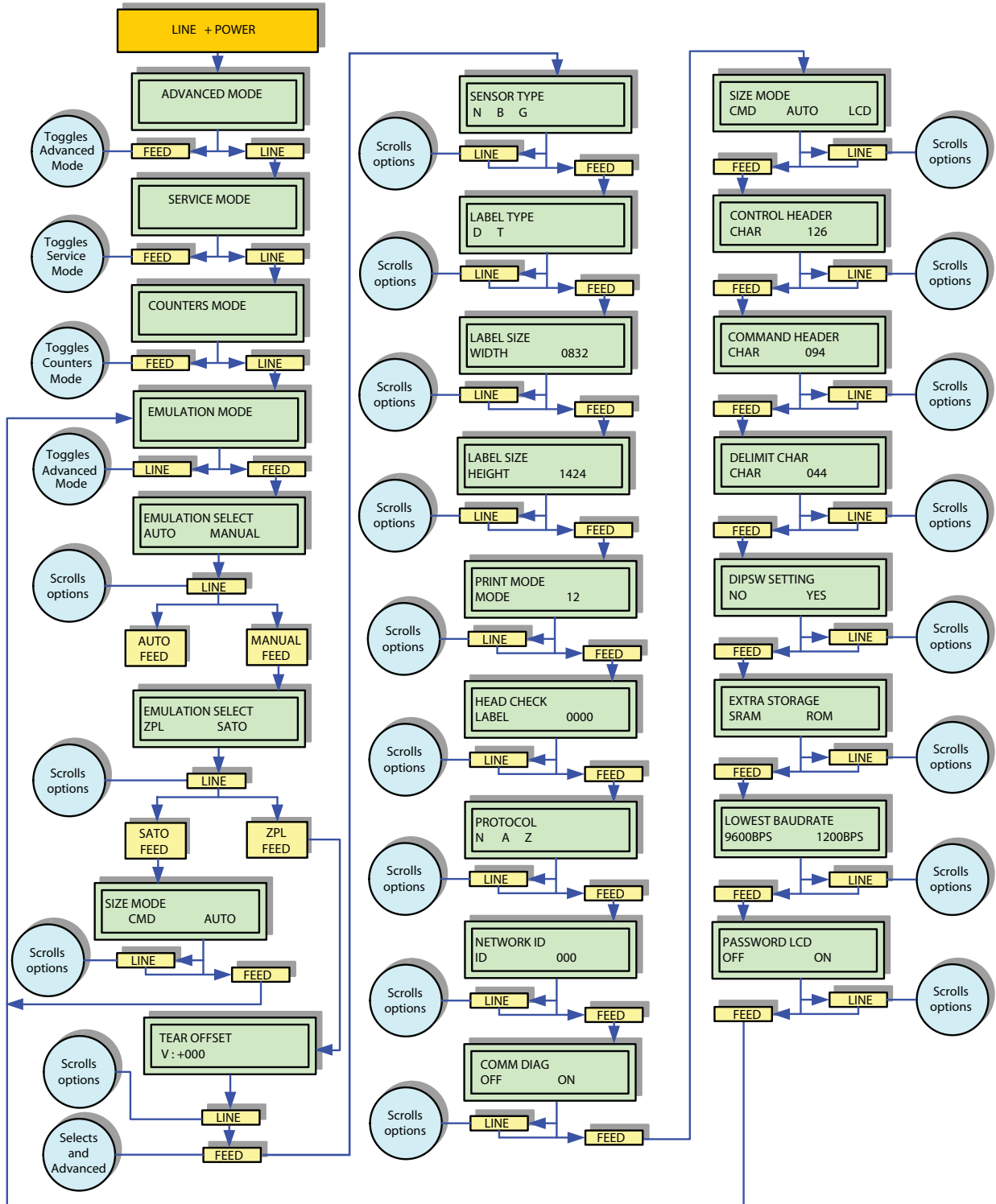


Figure 5-5, Emulation Mode

TEST PRINT MODE

Provides the specific sequence of events required by the operator, the printer, and the printer's software for a test label to be printed. Test labels are designed to identify failures in configuration, adjustments problems, and mechanical defects.

Use the buttons of the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

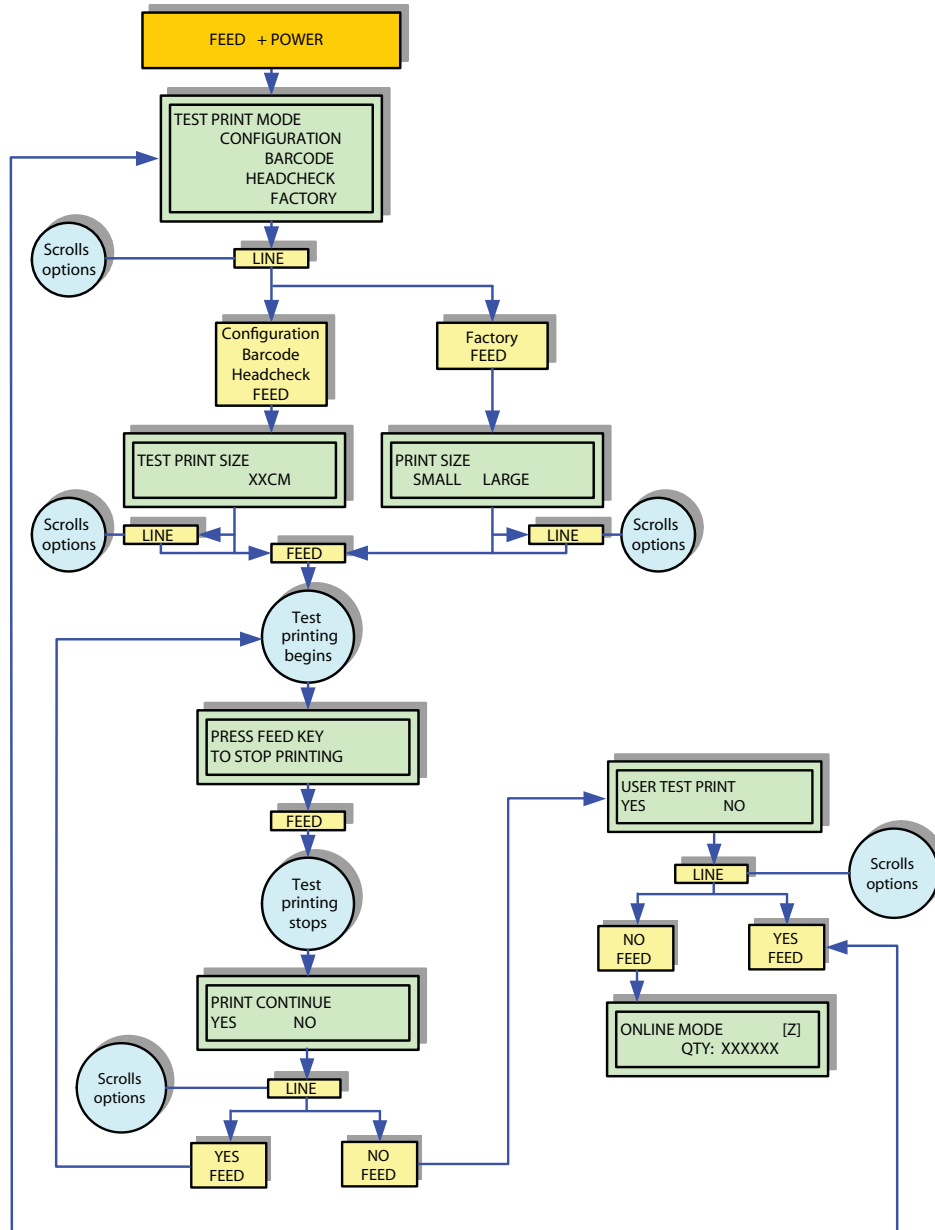


Figure 5-6, Test Print Mode

BOOT DOWNLOAD MODE

This download mode is used when the Firmware becomes corrupted and the normal download mode is not successful. This procedures are also used to download new firmware into the printer's Flash ROM when the previous firmware loaded was not UPS Combo firmware. Allows the program to be downloaded from the host computer.

Figure 5-7 provides the specific sequence of events required by the operator, the printer, and the printer's software. Use the printer's operator panel to select and enter the required options.

Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

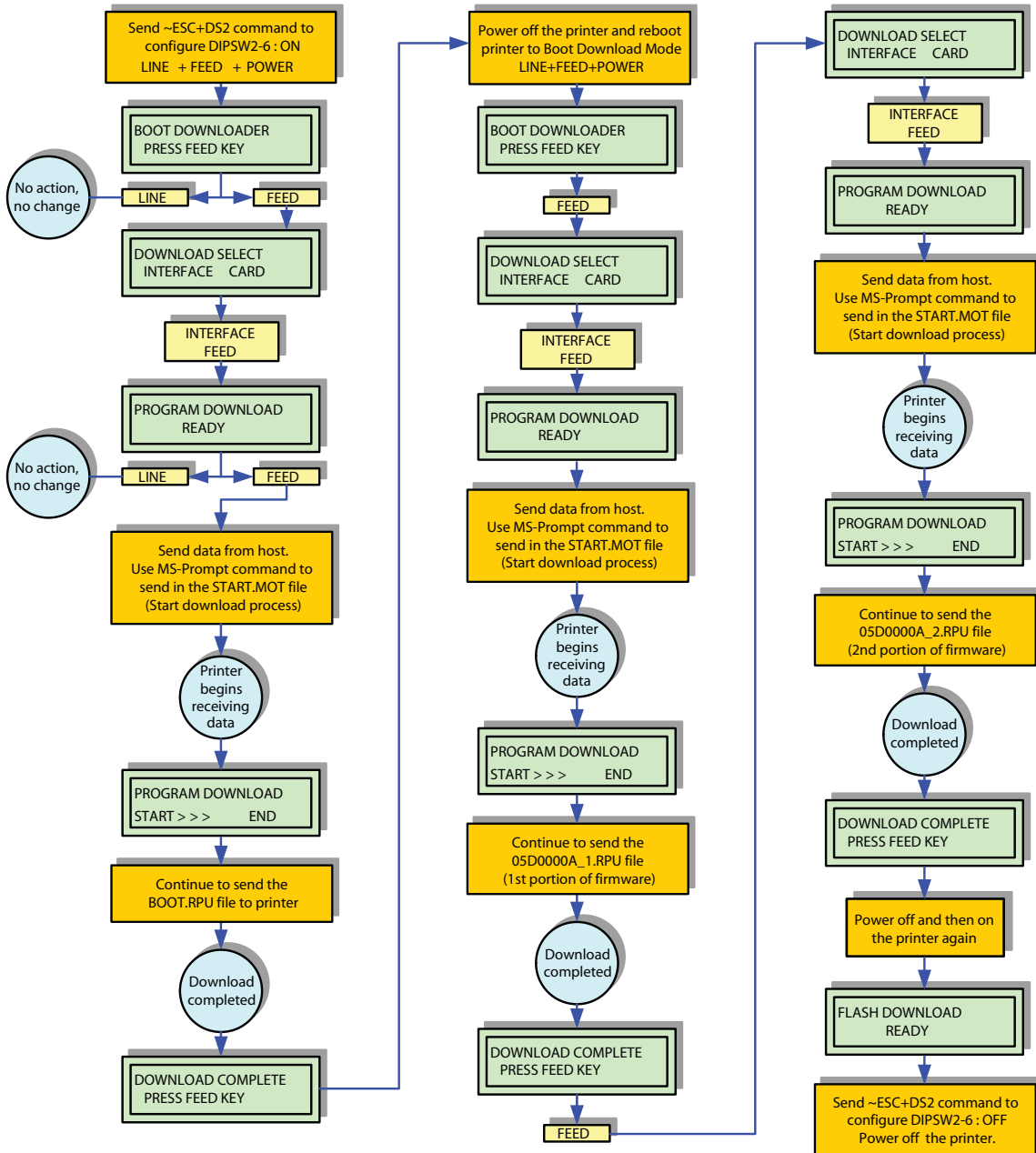


Figure 5-7, Boot Download Mode

FLASH MEMORY DOWNLOAD MODE

A Flash ROM internally stores/deletes font and custom designed character data. The data is sent from a host system to the printer. Use the printer's operator panel to select and enter the required options.

Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

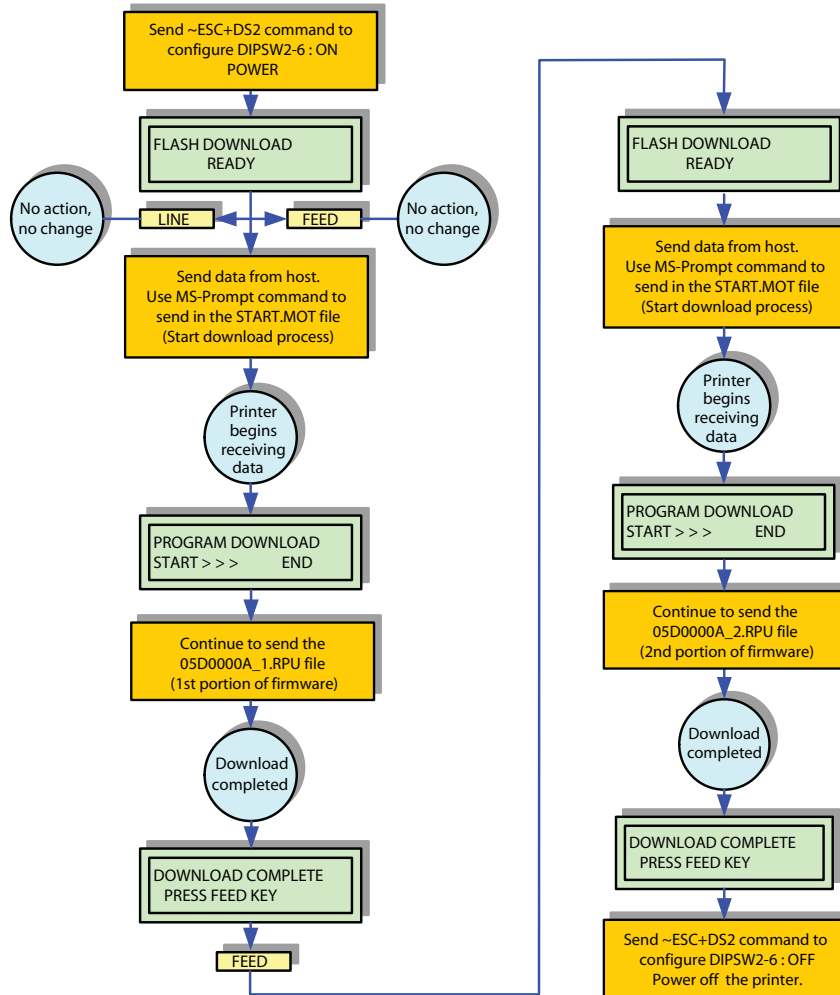


Figure 5-8, Flash Memory Download Mode

DEFAULT SETTING MODE

The Default Settings Mode allows the operator to return the printer to the configuration state as received from the factory. Use the printer's buttons to select and enter the required options.

Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

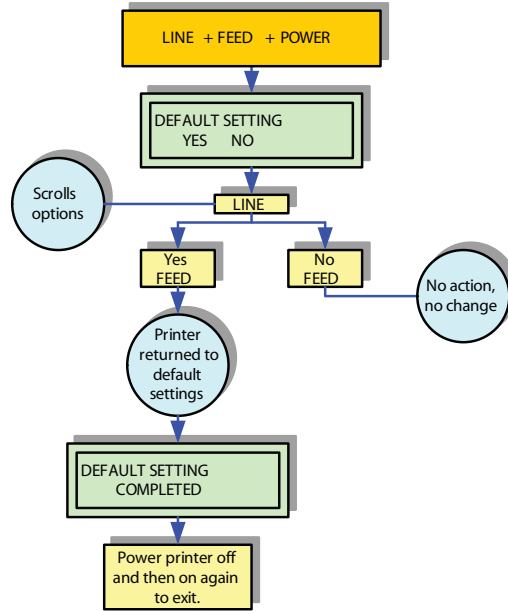


Figure 5-9, Default Setting Mode

HEX DUMP MODE

The contents of the print buffer and the contents received before it may be examined through the use of the Hex Dump Mode. Each line of the printed data is enumerated in the first column, the second column contains the data in hexadecimal format, and the right column contains the same data in ASCII format.

Use the printer's operator panel to select and enter the required options. Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

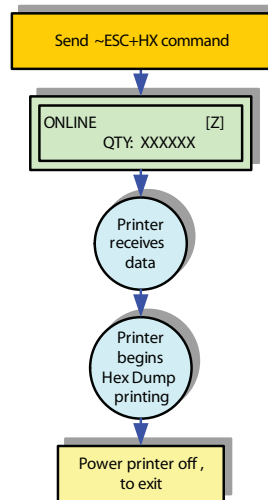


Figure 5-10, Hex Dump Mode

MAINTENANCE MODE

The Maintenance Mode permits counter reset of various printer components. Use the printer's operator panel to select and enter the required options.

The printer has integrated counters to measure the accumulative activity of some features. The unit of measure is based on linear meters and includes a print head counter and a life counter. The head counter records the length of the media that has been printed since the print head was installed and should be reset each time the print head is replaced. The life counter measures the length of media the printer as a whole has printed. This counter would only be reset in case circuitry replacement. The printer's Counter Mode allows the operator to view the accumulated measurement and also allows the print head counter to be reset to zero.

Refer to the Menu Definition Tables in this chapter to provide an explanation of each menu screen.

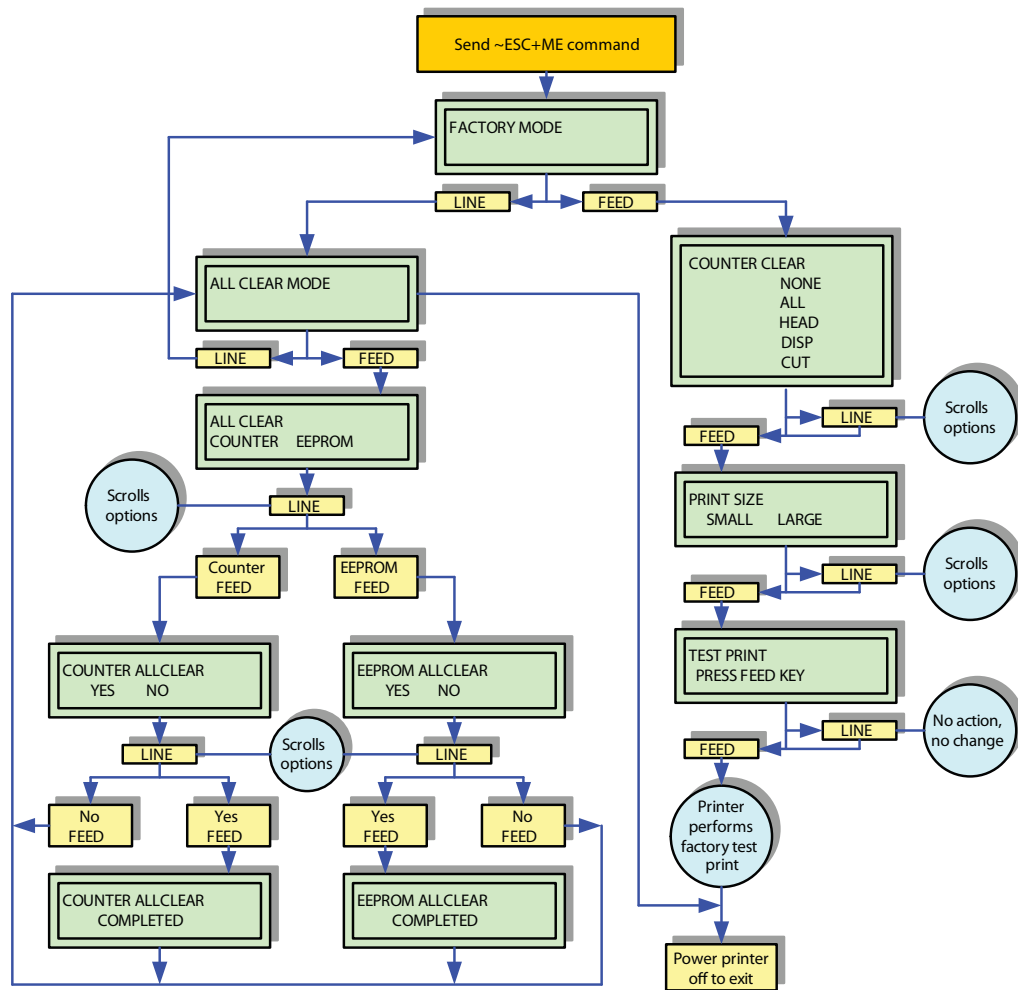
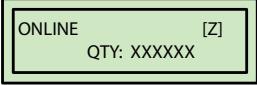
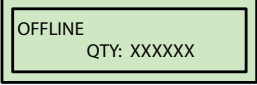
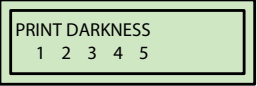
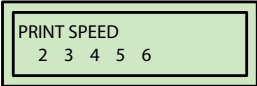

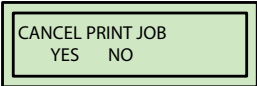
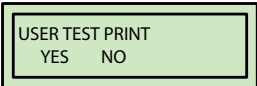
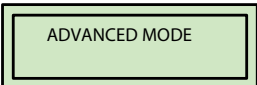
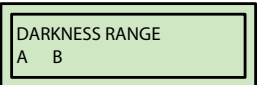


Figure 5-11, Maintenance Mode

MENU DEFINITION TABLES

NORMAL MODE (TABLE 5-1)	
MENU	DESCRIPTION
	Displays the printer's operational status. The ONLINE status is displayed on the top line and the label quantity status is on the bottom. The message will be changed to OFFLINE whenever the printer is switched offline by pressing the LINE key. When a print job is received, the quantity line will indicate the number of labels to be printed. As the label job prints, the display status indicates the quantity of labels remaining to be printed.
	Displays the printer's operational status. The OFFLINE status is displayed on the top line and the label quantity status is on the bottom. The message will be changed to ONLINE whenever the printer is switched online by pressing the LINE key.
	Permits the adjustment of print density. Higher print density equates to darker print images.
	Permits the printer's printing speed to be established based on inches per second (IPS).
	<p>The label pitch is the distance from the leading edge (the edge that comes out of the printer first) of a label and the leading edge of the next label. Once the position has been set, it can be fine adjusted using the PITCH potentiometer.</p> <p>Positive (+) digit settings moves the leading edge forward and away from the print head while a negative (-) setting moves the label's leading edge incrementally back into the mechanism.</p>
	Print data that has previously been received, can be cleared. If YES is selected, the print data will be deleted and then the printer will go offline. If the NO option is selected, the printer will go offline without deleting data in buffer.
	<p>Provides the specific sequence of events required by the operator, the printer, and the printer's software for a test label to be printed.</p> <p>Select YES to enter User Test Print menu while select NO will advance to Online mode.</p>

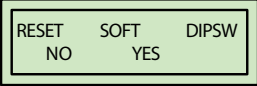

ADVANCED MODE (TABLE 5-2)	
MENU	DESCRIPTION
	Is the first menu screen of the Advanced Mode. The Advanced Mode is provided to make basic printer operational adjustments. Typically, once these adjustments or settings have been made, they will not require additional address unless a new job is downloaded.
	Allows the darkness (print density) selection of the printed image. Has two selection options.

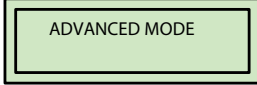
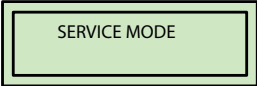
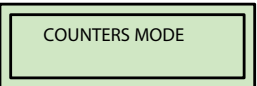
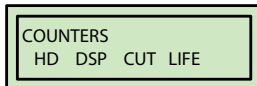
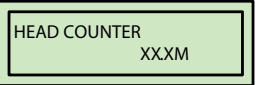
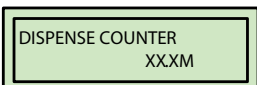
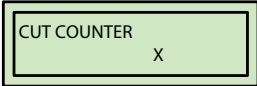
ADVANCED MODE (TABLE 5-2)	
MENU	DESCRIPTION
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> AUTO ONLINE YES NO </div>	The printer can be set to automatically go into the online mode when powered on. Otherwise, the printer starts in the offline state and must be manually placed online before it is ready to print.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> PRINT OFFSET V: +XXXX H: +XXX </div>	Print offset refers to the vertical and horizontal shifting of the entire print area relative to the label and the print start position. The movement is incremental by dots in the positive (+) or negative (-) direction. Positive and negative vertical adjustment is toward and away from the print head respectively. Positive and negative horizontal adjustment is to the left and right of the reference point respectively.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> IGNORE CR/LF YES NO </div>	Determines whether the print data code requires deletion. Hexadecimal graphic data will not be deleted. Select YES to delete all carriage return (CR) and line feed (LF) commands in the data stream - including graphics and 2D barcodes.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> SET CALENDAR YES NO </div>	The calendar is an optional feature that allows the date and time to be manually set using the operator panel or through command codes. This screen will not be displayed if the calendar chip (real-time clock) is not installed. This menu allows the operator to choose if the calendar settings are to be altered.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> CALENDAR 00 / 00 / 00 00:00 </div>	This menu screen allows the calendar settings to be altered. The calendar is divided into five sets of two digits. The first two allows for the year to be set, followed by the month, the day, the hour, then the minute.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> INTERFACE TYPE IEEE RS232 USB </div>	This menu will display only when the standard Plug-in 3-in-1 combo interface module is installed. Select the type of interface according to the connection to the host. Either IEEE, RS232 or USB interface can be selected. If the optional single interface board (LAN or USB) is installed, this menu will not be displayed.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> DATA BIT SELECT 8BIT 7BIT </div>	Select the Data bit for serial interface. Sets the printer to receive either 7 or 8 bits of data for each byte transmitted. 8 bit is set as default.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> PARITY SELECT EVEN ODD NON </div>	Select the type of Parity used for error detection in serial interface.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> STOP BIT SELECT 1BIT 2BIT </div>	Selects the number of stop bits to end each byte transmission.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> BAUD RATE SELECT 9600 19200 >> </div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin-top: 5px;"> BAUD RATE SELECT << 3800 57600 </div>	Select the data rate (bps) for the RS232 port. Either 9600, 19200, 38400 or 57600 can be selected. 9600bps is set as default.

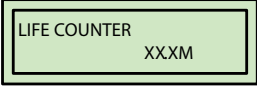
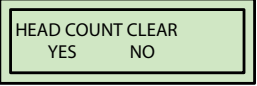
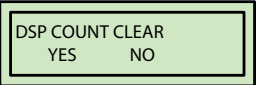
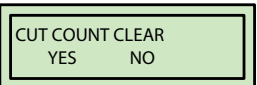
ADVANCED MODE (TABLE 5-2)	
MENU	DESCRIPTION
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> PROTOCOL SELECT RD/BSY XON/OF >> </div> <div style="border: 1px solid black; padding: 5px;"> PROTOCOL SELECT << BICOM3 BICOM4 </div>	Selects the flow control and status reporting protocols for serial interface. The selections are RD/BSY, XON/OF, BICOM3 or BICOM4. RD/BSY is set as default.

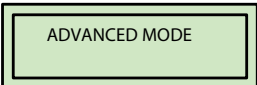
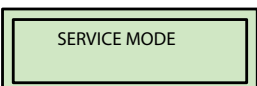
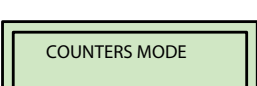
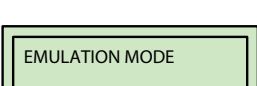
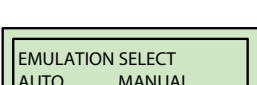
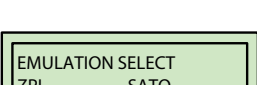
SERVICE MODE (TABLE 5-3)	
MENU	DESCRIPTION
<div style="border: 1px solid black; padding: 5px; text-align: center;"> ADVANCED MODE </div>	Is the first menu screen of the Advanced Mode. The Advanced Mode is provided to make basic printer operational adjustments. Typically, once these adjustments or settings have been made, they will not require additional address unless a new bob is downloaded. Is only a transitional menu screen to access the Service Mode.
<div style="border: 1px solid black; padding: 5px; text-align: center;"> SERVICE MODE </div>	The Service Mode allows the programming of various dimensional settings, sensor thresholds, and language options.
<div style="border: 1px solid black; padding: 5px;"> GAP [X.XV] INPUT [X.XV] </div>	When setting the sensor threshold, the voltage shown on the top line is the measurement depending on the media placed over the sensor. The lower line displays the input threshold value. DIPSW 2-2 determines which sensor will be enabled for use.
<div style="border: 1px solid black; padding: 5px;"> AUTO ONLINE FEED YES NO </div>	Allows it to be determined if the printer will feed a label when it is placed online to ensure proper media placement for printing.
<div style="border: 1px solid black; padding: 5px;"> FEED ON ERROR YES NO </div>	Allows it to be determined if the printer will feed a label when an error condition is cleared.
<div style="border: 1px solid black; padding: 5px;"> REPRINT W/FEED YES NO </div>	Allows it to be determined if the printer will print the last label in memory when the FEED key is pressed in the normal, online mode.
<div style="border: 1px solid black; padding: 5px;"> FORWARD / BACKFEED DISTANCE DEFAULT </div>	Allows the selection of whether to accept the default setting or to set the backfeed distance other than the default setting.
<div style="border: 1px solid black; padding: 5px;"> FORWARD / BACKFEED DISTANCE XXXMM </div>	Allows the backfeed distance to be set. If using thermal transfer for printing, set the feed distance less than 30mm to avoid detection of the ribbon end by accident.

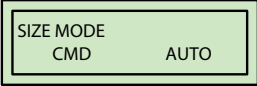

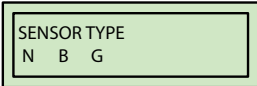
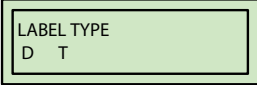
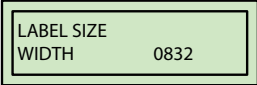
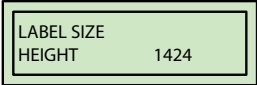
SERVICE MODE (TABLE 5-3)	
MENU	DESCRIPTION
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> EXT PIN9 SELECET MODE1 MODE2 </div>	Allows selection of the conditions that regulates Pin-9 of the EXT connector. MODE1 enables Pin-9 when the printer goes online and a print quantity is displayed. MODE2 enables Pin-9 when the printer goes online without consideration of print quantity.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> EURO CODE D5 </div>	Allows the hexadecimal value to be specified for the character replaced with the Euro Character. The default is D5H. ASCII (213)
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> PRIORITY SETTING COMMAND LCD </div>	Allows the selection of which type of operator programming will take priority precedence. By selecting the COMMAND option, downloaded command codes will be recognized by the printer as most important where conflicting data exists. Selecting LCD, places programming through the operator panel as taking precedence.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> IEEE1284 ACK SIGNAL XX.X </div>	This menu screen allows the pulse width to be set if single-item buffer has been chosen. If single-item buffer has not been chosen, this setting will not have effect.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> BACKFEED MOTION AFTER BEFORE </div>	Allows of the backfeed movement to be applied before print out or after print out. Two setting options are available.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> BACKFEED SPEED NORMAL SLOW </div>	Allows the selection of the speed of the backfeed movement. Two setting options are available, Normal or Slow. Normal is set as default.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> ONLINE FEED KEY DISABLE ENABLE </div>	Select the Online FEED button as Enable or Disable. If Enable is selected, pressing FEED button will feed a label when printer is in online mode.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> HEXDUMP MODE YES NO </div>	Change printer communication mode to HexDump.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> VIEW DIPSW-2 NO YES </div>	To view the software DIPSW-2 setting.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> ON/OFF - - - - - 12345678 </div>	Is an informational screen that provides the Software DIP switch setting. The “-” mark on top position shows DIPSW ON, while the “_” mark on the lower position shows DIPSW OFF.
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> VIEW DIPSW-3 NO YES </div>	To view the software DIPSW-3 setting.

SERVICE MODE (TABLE 5-3)	
MENU	DESCRIPTION
	Allows the determination of whether or not to reset the software DIPSW-2 and DIPSW-3 setting.
	Is an informational screen only and confirms that reset activity is complete.

COUNTERS MODE (TABLE 5-4)	
MENU	DESCRIPTION
	Is the first menu screen of the Advanced Mode. The Advanced Mode is provided to make basic printer operational adjustments. Typically, once these adjustments or settings have been made, they will not require additional address unless a new bob is downloaded. Is only a transitional menu screen to access the Counters Mode.
	The Service Mode allows the programming of various dimensional settings, sensor thresholds, and language options. Is only a transitional menu screen to access the Counters Mode.
	Is the first menu screen of the Counters Mode. The Counters Mode allows the printers various internal counters to be reset to zero or to view count in meters printed thus far.
	Allows the selection of which counter to be viewed to reset. HD: Head counter DSP: Dispense counter CUT: Cutter counter LIFE: Life counter
	Is an informational screen that provides the printed length of media using the existing print head. The head counter should be reset each time the print head is replaced.
	Is an informational screen that provides the dispense cycles of media since dispenser installation or use.
	Is an informational screen that provides the cut cycles of media since cutter installation or use.

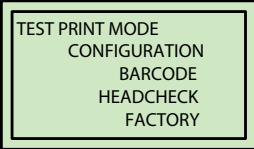
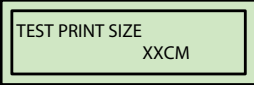


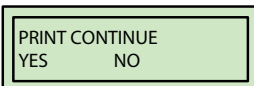
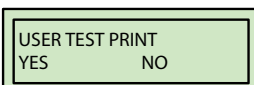
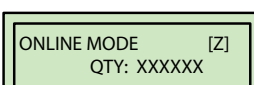
COUNTERS MODE (TABLE 5-4)	
MENU	DESCRIPTION
	Is an informational screen that provides the printed the length of media since printer setup.
	Allows the determination of whether or not to reset the print head counter to zero.
	Allows the determination of whether or not to reset the dispenser counter to zero.
	Allows the determination of whether or not to reset the cutter counter to zero.



EMULATION MODE (TABLE 5-5)	
MENU	DESCRIPTION
	Is the first menu screen of the Advanced Mode. The Advanced Mode is provided to make basic printer operational adjustments. Typically, once these adjustments or settings have been made, they will not require additional address unless a new bob is downloaded. Is only a transitional menu screen to access the Counters Mode.
	The Service Mode allows the programming of various dimensional settings, sensor thresholds, and language options. Is only a transitional menu screen to access the Counters Mode.
	Is the first menu screen of the Counters Mode. The Counters Mode allows the printers various internal counters to be reset to zero or to view count in meters printed thus far. Is only a transitional menu screen to access the Emulation Mode.
	Is the first menu screen of the Emulation Mode. The emulation mode was created to emulate the existing Zebra print LCD menu option and provide similar functionality for the end users.
	Allows the selection of the Emulation mode, Auto or Manual. Default setting is Manual.
	Allows the selection between ZEBRA emulation or SATO emulation. Default setting is ZPL (ZEBRA) emulation.




EMULATION MODE (TABLE 5-5)	
MENU	DESCRIPTION
	<p>Allows the selection of size mode for SATO emulation, CMD (command) or AUTO.</p> <p>If AUTO is selected, the EMULATION SELECT mode will automatically change from MANUAL to AUTO.</p> <p>Default setting is CMD.</p>
	<p>Allows the Tear Offset Position to be set. The range of setting is -999 to +999.</p>
	<p>Allows the selection of the Media Sensor type.</p> <p>N: No sensor</p> <p>B: I-Mark</p> <p>G: Gap sensor</p> <p>The default setting follows DIPSW 2-2 setting.</p>
	<p>Allows the selection of the Label type.</p> <p>D: Direct Thermal</p> <p>T: Thermal Transfer</p> <p>The default setting follows DIPSW 2-2 setting.</p>
	<p>Allows to set the label width. The default value is set as 832 dots.</p> <p>The range of label width setting is 0000 to 0896 dots and changes with increments of 8 dots.</p>
	<p>Allows to set the label height. The default value is set as 1424 dots.</p> <p>The range of label height setting is 0000 to 9992 dots and changes with increments of 8 dots.</p>



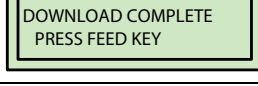
EMULATION MODE (TABLE 5-5)																																																																																																																																															
MENU	DESCRIPTION																																																																																																																																														
<div style="border: 1px solid black; padding: 2px; width: fit-content;"> PRINT MODE MODE 12 </div>	<p>Allows to set the Print mode with combination of Operation mode, Pitch sensor and Backfeed functions. The Print mode setting range from 00 to 15 as shown in the table below. The default setting follows the DIPSW 3 setting.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Mode</th> <th>3-1</th> <th>3-2</th> <th>3-3</th> <th>3-4</th> <th>Motion mode</th> <th>Pitch Sensor</th> <th>Backfeed</th> </tr> </thead> <tbody> <tr><td>0</td><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>Dispenser</td><td>Not valid</td><td>Valid</td></tr> <tr><td>1</td><td>OFF</td><td>ON</td><td>ON</td><td>ON</td><td>Tear off</td><td>Valid</td><td>Valid</td></tr> <tr><td>2</td><td>ON</td><td>OFF</td><td>ON</td><td>ON</td><td>Cut</td><td>Not valid</td><td>Not valid</td></tr> <tr><td>3</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td><td>Continuous</td><td>Not valid</td><td>Not valid</td></tr> <tr><td>4</td><td>ON</td><td>ON</td><td>OFF</td><td>ON</td><td>Dispenser</td><td>Not valid</td><td>Valid</td></tr> <tr><td>5</td><td>OFF</td><td>ON</td><td>OFF</td><td>ON</td><td>Tear off</td><td>Valid</td><td>Valid</td></tr> <tr><td>6</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>Cut</td><td>Not valid</td><td>Valid</td></tr> <tr><td>7</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>Continuous</td><td>Not valid</td><td>Valid</td></tr> <tr><td>8</td><td>ON</td><td>ON</td><td>ON</td><td>OFF</td><td>Dispenser</td><td>Valid</td><td>Valid</td></tr> <tr><td>9</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>Tear off</td><td>Valid</td><td>Valid</td></tr> <tr><td>10</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td><td>Cut</td><td>Valid</td><td>Not valid</td></tr> <tr><td>11</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>Continuous</td><td>Not valid</td><td>Not valid</td></tr> <tr><td>12</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>Dispenser</td><td>Valid</td><td>Valid</td></tr> <tr><td>13</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>Tear off</td><td>Valid</td><td>Valid</td></tr> <tr><td>14</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Cut</td><td>Valid</td><td>Valid</td></tr> <tr><td>15</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>Continuous</td><td>Not valid</td><td>Valid</td></tr> </tbody> </table>							Mode	3-1	3-2	3-3	3-4	Motion mode	Pitch Sensor	Backfeed	0	ON	ON	ON	ON	Dispenser	Not valid	Valid	1	OFF	ON	ON	ON	Tear off	Valid	Valid	2	ON	OFF	ON	ON	Cut	Not valid	Not valid	3	OFF	OFF	ON	ON	Continuous	Not valid	Not valid	4	ON	ON	OFF	ON	Dispenser	Not valid	Valid	5	OFF	ON	OFF	ON	Tear off	Valid	Valid	6	ON	OFF	OFF	ON	Cut	Not valid	Valid	7	OFF	OFF	OFF	ON	Continuous	Not valid	Valid	8	ON	ON	ON	OFF	Dispenser	Valid	Valid	9	OFF	ON	ON	OFF	Tear off	Valid	Valid	10	ON	OFF	ON	OFF	Cut	Valid	Not valid	11	OFF	OFF	ON	OFF	Continuous	Not valid	Not valid	12	ON	ON	OFF	OFF	Dispenser	Valid	Valid	13	OFF	ON	OFF	OFF	Tear off	Valid	Valid	14	ON	OFF	OFF	OFF	Cut	Valid	Valid	15	OFF	OFF	OFF	OFF	Continuous	Not valid	Valid
Mode	3-1	3-2	3-3	3-4	Motion mode	Pitch Sensor	Backfeed																																																																																																																																								
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<div style="border: 1px solid black; padding: 2px; width: fit-content;"> HEAD CHECK LABEL 0000 </div>	<p>Allows to set the Head Check. The range of setting is 0000 to +9999. The default value is set as 0000 (Disable).</p>																																																																																																																																														
<div style="border: 1px solid black; padding: 2px; width: fit-content;"> PROTOCOL N A Z </div>	<p>Allows to set the ZPL Communication Protocol.</p> <p>N: None</p> <p>A: Ack</p> <p>Z: Zebra</p> <p>The default setting is (N)one.</p>																																																																																																																																														
<div style="border: 1px solid black; padding: 2px; width: fit-content;"> NETWORK ID ID 000 </div>	<p>Allows to set the RS-485 Network ID. The range of setting is 000 to 999. The default value is set as 000 (Unused)</p>																																																																																																																																														
<div style="border: 1px solid black; padding: 2px; width: fit-content;"> COMM DIAG OFF ON </div>	<p>Allows the activation of the Communication Diagnostics (Hex Dump Mode) for troubleshooting. The default setting is OFF.</p> <p>Note: Communication Diagnostics is only valid when DIPSW 2-4 is set to OFF.</p>																																																																																																																																														

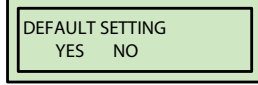

EMULATION MODE (TABLE 5-5)	
MENU	DESCRIPTION
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> SIZE MODE CMD AUTO LCD </div>	<p>Allows the determination on the source for information of the label size.</p> <p>CMD: Command</p> <p>AUTO: When AUTO is selected, the printer will automatically feed 2 blank labels during power on stage to calibrate correct label size.</p> <p>LCD: LCD setting</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> CONTROL HEADER CHAR 126 </div>	<p>Allows to set the Control Header Character, ranging from 000(00H) to 255(FFH). The default value is 126(7EH).</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> COMMAND HEADER CHAR 094 </div>	<p>Allows to set the Command Header Character, ranging from 000(00H) to 255(FFH). The default value is 094(5EH).</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> DELIMIT CHAR CHAR 044 </div>	<p>Allows to set the Delimit Character, ranging from 000(00H) to 255(FFH). The default value is 044(2CH).</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> DIPSW SETTING NO YES </div>	<p>Allows to determine the setting of items based on DIPSW setting or on the LCD setting in the Emulation menu.the default setting is YES.</p> <p>NO: EEPROM, the printer will be override by corresponding LCD items in Emulation menu.</p> <p>YES: Printer, the items are based on the setting of the DIPSW set in printer.</p> <p>The items mentioned above are the Sensor type, Label type and the Print mode.</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> EXTRA STORAGE SRAM ROM </div>	<p>Allows the selection of the Extra Storage. SRAM or ROM is available. The default setting is SRAM.</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> LOWEST BAUDRATE 9600BPS 1200BPS </div>	<p>Allows the setting of the Lowest Baudrate for serial communication.</p> <p>9600 bps or 1200bps can be selected. 9600 bps is set as default.</p> <p>The lowest baud rate setting becomes valid only when the RS232 interface baud rate set to 9600 through LCD in Advance mode menu.</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> PASSWORD LCD OFF ON </div>	<p>Allows to enable or disable the Password LCD feature whenever enters to configuration procedure. The default setting is OFF.</p>

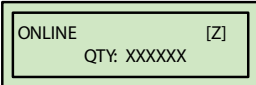
TEST PRINT MODE (TABLE 5-6)	
MENU	DESCRIPTION
	<p>Is the initial screen of the Test Print Mode.</p> <ul style="list-style-type: none"> • CONFIGURATION: The printer's configuration settings. • BARCODE: The printer's installed barcodes. • HEAD CHECK: A pattern to check print head elements. • FACTORY: A factory test label will be printed.
	<p>This menu screen only appears if CONFIGURATION, BARCODE, or HEAD CHECK was chosen in the previous menu. The increments of measure is 1cm.</p>
	<p>For factory test prints, this screen appears instead of the previous screen for setting print size.</p> <p>Large (10cm) and small (4cm) are the only two options.</p>
	<p>Is a directional screen prompting action on how to terminate print activity. Press FEED to stop printing and press again to resume printing.</p>
	<p>A confirmation screen to stop test printing or to continue the label test printing.</p> <p>If YES is selected, the printer will go back to TEST PRINT MODE selection menu. If NO is selected, the test print mode will stop and proceed to Online mode.</p>
	<p>Provides the specific sequence of events required by the operator, the printer, and the printer's software for a test label to be printed.</p> <p>Select YES to enter User Test Print menu while select NO will advance to Online mode.</p>
	<p>Displays the printer's operational status. The ONLINE status is displayed on the top line and the label quantity status is on the bottom.</p> <p>Ready for print job.</p>

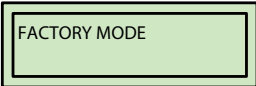
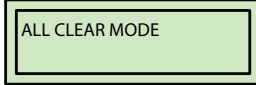
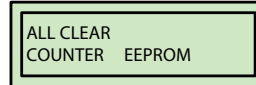
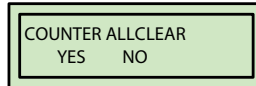
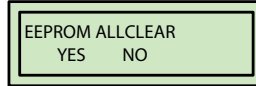
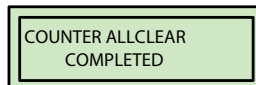

BOOT DOWNLOAD MODE (TABLE 5-7)	
MENU	DESCRIPTION
	<p>Is the first menu screen of the Boot Download Mode and provides a prompt to proceed.</p> <p>Pressing the FEED key will place the printer in a condition waiting for the data to be received.</p>
	<p>Select the INTERFACE option for a standard download.</p>

BOOT DOWNLOAD MODE (TABLE 5-7)	
MENU	DESCRIPTION
	Is an informational screen only and confirms that the printer is ready to receive the data.
	Provides download status that the data is being received and its progression.
	<p>This menu screen appears when all of the data has been received and the process is complete.</p> <p>Also prompts the operator on how to proceed.</p>

FLASH DOWNLOAD MODE (TABLE 5-8)	
MENU	DESCRIPTION
	Is an informational screen only and confirms that the printer is ready to receive the data.
	Provides download status that the data is being received and its progression.
	<p>This menu screen appears when all of the data has been received and the process is complete.</p> <p>Also prompts the operator on how to proceed.</p>

DEFAULT SETTING MODE (TABLE 5-9)	
MENU	DESCRIPTION
	<p>Is the first menu screen of the printer's Default Setting Mode. The Default Setting Mode allows the printer to be reset to the programmed condition as received from the factory.</p> <p>The selection of YES confirms the operator wants to proceed and the selection of NO allows for exit without default reset. If YES is selected, resetting will immediately begin.</p> <p>Reboot the printer to return to normal operation.</p>
	Is an informational screen only indicating that reset activity is complete.

HEX DUMP MODE (TABLE 5-10)	
MENU	DESCRIPTION
	Displays to indicate the printer is online and waiting to print HEX interpretation of data received by the print buffer.

MAINTENANCE MODE (TABLE 5-11)	
MENU	DESCRIPTION
	<p>The Factory Mode is divided into two sub-menus: the All Clear Mode and the individual Counter Clear.</p> <p>The All Clear Mode permits the operator to entirely clear all of the printer's internal counters or to clear its EEPROM of all data.</p> <p>Counter Clear permits the operator to select individual counters to be reset to zero.</p>
	<p>Is a transitional, informational menu screen to inform of the coming menu functions. Pressing LINE, retreats one menu screen to allow the operator to change direction within the menu.</p> <p>Pressing FEED advances onward to allow the operator to entirely clear either the printer's internal counters and/or, its EEPROM data.</p>
	<p>Allows the selection of the direction to proceed within the menu tree. Selecting COUNTER will advance to menu screens that will allow the printer's internal counters to be reset to zero.</p> <p>Selecting EEPROM will advance to menu screens that will allow the printer's EEPROM to be emptied of data.</p>
	Allows the selection of whether to clear all of the printer's internal counters or not. Select YES to clear and NO to not clear.
	Allows the selection of whether to clear all of the printer's EEPROM or not. Select YES to clear and NO to not clear.
	Is an informational screen only. Momentarily displays when the printer's internal counters are reset to zero and then automatically returns to the ALL CLEAR MODE screen.
	Is an informational screen only. Momentarily displays when the printer's EEPROM has been emptied of data and then automatically returns to the ALL CLEAR MODE screen.

MAINTENANCE MODE (TABLE 5-11)	
MENU	DESCRIPTION
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> COUNTER CLEAR NONE ALL HEAD DIS CUT </div>	<p>This screen allows the selection of which of the printer's internal counters are to be cleared or not at all. Following the process, factory test printing is performed.</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> PRINT SIZE SMALL LARGE </div>	<p>Allows the selection of large (10cm) or small (4cm) font print size for the printing of a factory test page. These are the only two options.</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: auto;"> TEST PRINT PRESS FEED KEY </div>	<p>Pressing FEED will initialize continuous test printing. Pressing FEED again will suspend printing.</p>

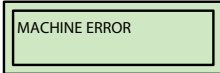
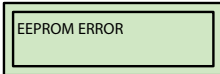
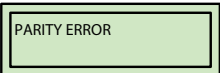
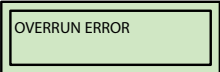
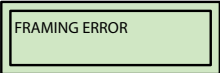
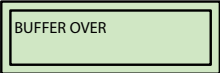
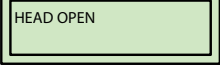
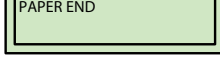
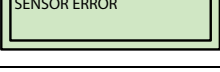

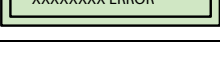
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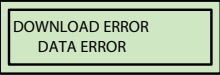
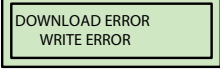
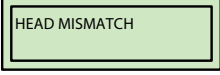
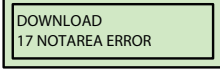
6

TROUBLESHOOTING

- **Error Signal Troubleshooting**
- **Troubleshooting Table**
- **Interface Troubleshooting**
- **Performance Testing**
- **Test Print Troubleshooting**

ERROR SIGNAL TROUBLESHOOTING

ERROR DISPLAYS			
ERROR	LED	LCD DISPLAY	DESCRIPTION
01 Machine	Red		<ol style="list-style-type: none"> 1. Ensure all wiring harnesses are properly connected. 2. Replace main circuit board.
02 Flash ROM	Red		<ol style="list-style-type: none"> 1. Ensure correct communication protocols. 2. Check cables, cycle printer power and resend. 3. Replace board.
03 Parity	Red		<ol style="list-style-type: none"> 1. Ensure correct communication parameters. 2. Check cables, cycle printer and resend. 3. Replace board.
04 Overrun	Red		<ol style="list-style-type: none"> 1. Check and correct communication cables and settings. 2. Reboot printer and try again.
05 Framing	Red		<ol style="list-style-type: none"> 1. Ensure host system and interface settings match. 2. Check and correct communication cables (null modem serial cable required).
06 Buffer Overflow	Red		<ol style="list-style-type: none"> 1. Size of received data exceeds size of receiving buffer. 2. Establish the correct communication protocol.
07 Head Open	Red		<ol style="list-style-type: none"> 1. Properly latch the print head. 2. Replace the head-open switch.
08 Paper End	Red		<ol style="list-style-type: none"> 1. Ensure media is properly loaded. 2. Clean sensor transmit/receive surfaces. 3. Ensure correct sensor configuration.
09 Sensor Error	Red		<ol style="list-style-type: none"> 1. Ensure media is properly loaded. 2. Clean sensor transmit/receive surfaces. 3. Ensure correct sensor configuration.
10 Head Related	Red		<ol style="list-style-type: none"> 1. Clean the print head's contact surface. 2. Replace the print head.
11 Memory Reading	Red		<ol style="list-style-type: none"> 1. Delete unnecessary data to free up memory space. 2. Ensure the data communication settings are correct.

ERROR DISPLAYS			
ERROR	LED	LCD DISPLAY	DESCRIPTION
12 Interface	Red		<ol style="list-style-type: none"> 1. Data sequence number doesn't match previous data. 2. Check send data and communications setting.
13 Download Data	Red		<ol style="list-style-type: none"> 1. Confirm settings are correct. 2. Retry command.
14 Download Write	Red		<ol style="list-style-type: none"> 1. Confirm settings are correct. 2. Retry command.
15 Head Mis-Match	Red		<ol style="list-style-type: none"> 1. Ensure print head is properly connected. 2. Ensure the print head type and printer configuration.
17 Font Download Error	Red		<ol style="list-style-type: none"> 1. Printer has no font download functionality. Error message displayed when font download commands received. 2. Reboot the printer.

TROUBLESHOOTING TABLE

TROUBLESHOOTING TABLE	
IMAGE VOIDS	
Dirty print head.	Clean print head.
Damaged print head.	Replace print head.
Damaged electronics.	Replace circuit board.
Damaged or worn roller.	Replace rollers.
Poor label quality.	Use higher quality media.
LIGHT PRINT IMAGES	
Low print head energy/darkness.	Adjust darkness level.
Low print head pressure.	Adjust head pressure and/or balance.
Foreign material on print head.	Clean print head and rollers.
Improper head alignment.	Align print head as required.
Excessive print speed.	Reduce print speed setting.
UNEVEN PRINT DARKNESS	
Unbalanced print head.	Adjust head balance.
Worn rollers.	Replace rollers as required.
Dirty print head.	Clean print head.
MEANDERING MEDIA	
Incorrectly loaded media.	Ensure correct loading.
Improperly adjusted media guides.	Adjust as required.
Unbalanced print head.	Adjust as required.
Worn rollers.	Replace as required.
NO LABEL MOVEMENT	
Loose or broken timing belt.	Replace or adjust as required.
Incorrect label sensor selected.	Check printer configuration for proper sensor selection.
No voltage output.	Replace fuse as stated, T3.15A 250V. Test power supply and replace as required.
Drive motor not operating.	Ensure wiring harness connection. Replace as necessary.
LCD FIELD ILLUMINATED BUT WITHOUT WORDS OR NO DISPLAY AT ALL	
Power supply issues.	Ensure cable properly connected. Check/replace power supply.
NO PRINTED IMAGE	
Print head is disconnected.	Ensure print head wiring harness is connected on each end.
No voltage output.	Replace fuse. Test power supply and replace as required.
Defective print head.	Replace print head and reset counter.
Damaged electronics.	Replace circuit board.
Interface problems.	Troubleshoot interface - refer to the next chapter.
Data input error.	Ensure correct data stream.

PRINTER CREATES A BLANK LABEL.	
Data input error.	Ensure correct data stream.
Incorrect label sensor selection.	Ensure correct printer configuration.
Disconnected print head.	Power off the printer and ensure a proper connection.
Defective print head.	Replace print head as required.
Defective main circuit board.	Replace main board as required.
INCORRECT LABEL POSITIONING.	
Incorrect label sensor selection.	Ensure correct printer configuration.
Improper sensor adjustment.	Adjust sensor sensitivity as required.
Data input error.	Ensure correct data stream.
Incorrect offset settings.	Adjust settings as required.
Incorrect applicator setup.	Refer to applicator documentation or contact manufacturer.
SMEARED PRINT IMAGES	
Poor media quality.	Use higher quality media.
Foreign material on print head and platen roller.	Clean print head and rollers.
Foreign material on labels.	Use higher quality media.
Excessive print head energy.	Adjust darkness setting.
Excessive print speed.	Adjust print speed as required.

INTERFACE TROUBLESHOOTING

This chapter provides a checklist for the various interface types. Locate the checklist relative to the interface used and perform each of the troubleshooting tasks until the problem has been isolated.

PARALLEL INTERFACE	
CHK	TROUBLESHOOTING STEP
	Ensure the interface module is correctly installed. Run self-test to verify.
	Ensure the printer cable is connected to the appropriate LPT port on the host computer. If using a Windows printer driver, ensure the correct port is selected.
	Ensure a IEEE1284 printer cable is being used.
	Ensure the host's peripheral settings are set to ECP for faster throughput. Refer to the computer manufacturer's documentation for details.
	Ensure the printer is receiving information from the computer using the Receive Buffer Hex Dump mode. Refer to that procedure within this manual for instructions. The command stream should be continuous and possess 0Dhex and/or 0Ahex (carriage return and line feed) characters throughout. However, there should not be either located between the start (<ESC>A and the stop (<ESC>Z) commands.
	Replace the interface board with another to isolate the problem.
	Replace the interface board permanently if determined to be the problem.

RS232 SERIAL INTERFACE	
CHK	TROUBLESHOOTING STEP
	Ensure the correct interface module is correctly installed. Run self-test to verify.
	Ensure the serial cable (Null Modem) meets specifications and is correctly connected at each end.
	Ensure the serial cable is not defective.
	Ensure the communication parameters for the baud rate, parity, data bits and stop bits are consistent with those being sent from the host computer.
	Ensure the printer is receiving information from the computer using the Receive Buffer Hex Dump mode. Refer to that procedure within this manual for instructions. The command stream should be continuous and possess 0Dhex and/or 0Ahex (carriage return and line feed) characters throughout. However, there should not be either located between the start (<ESC>A and the stop (<ESC>Z) commands.
	Replace the interface board with another to isolate the problem.
	Replace the interface board permanently if determined to be the problem.

UNIVERSAL SERIAL BUS (USB) INTERFACE	
If nothing prints during a test print, verify the device drivers have been successively installed by performing the following:	
CHK	TROUBLESHOOTING STEP
	Click on Start, Settings, and then Control Panel.
	Click on System within the new window.
	Click on the Device Manager tab.
	Ensure that the View Device By Type is checked.
	Scroll to USB Device and ensure that errors do not exist. Reinstall as required.
	Reboot the PC and the printer.
	Contact Microsoft technical support for further assistance as required.

LAN ETHERNET INTERFACE	
CHK	TROUBLESHOOTING STEP
	Ensure the interface has been correctly configured. Wait two minutes and run self-test to verify. If a test label does not print, there may be a hardware problem.
	Ensure the cable and its ports are not defective.
	Ensure that a faulty print server or other protocol related scenarios are not creating a queue setup issue. Systematically perform checks and tests to isolate the cause.
	If using TCP/IP, ensure a valid IP address is specified and that all parameters are correct (subnet mask, gateway, etc.). Attempt to PING the IP address assigned to the network interface.
	If using a repeater or hub, ensure the SQE is turned off. Also ensure the repeater port is not defective by trying the print server on another port.
	Install the IPX/SPX protocol on a workstation to determine if the network device can be discovered via the MAC address. If able, configure the appropriate protocols and retest connectivity.
	Use a crossover cable to isolate the printer from the network by connecting from the interface and workstation. Verify that the parameters match on each. Test connectivity.

CENTRONICS INTERFACE	
CHK	TROUBLESHOOTING STEP
	Ensure the interface module is correctly installed. Run self-test to verify.
	Ensure the printer cable is connected to the appropriate LPT port on the host computer. If using a Windows printer driver, ensure the correct port is selected.
	Ensure the host's peripheral settings are set for Centronics output for faster throughput. Refer to the computer manufacturer's documentation for details.
	Ensure the printer is receiving information from the computer using the Receive Buffer Hex Dump mode. Refer to that procedure within this manual for instructions. The command stream should be continuous and possess 0D Hex and/or 0A Hex (carriage return and line feed) characters throughout. However, there should not be either located between the start (<ESC>A and the stop (<ESC>Z) commands.
	Replace the interface board with another to isolate the problem - permanently replace if defective.

PERFORMANCE TESTING

This chapter explains how to troubleshoot circuitry using a multimeter. These activities may be performed with, or without, test module assistance in conjunction with the multimeter.

MULTIMETER WITH TEST MODULE

The following procedure provides in-depth instruction on troubleshooting the DC power supply voltage. If the voltage values measure outside the specified parameters, the power board is deemed defective and must be replaced. Those relative procedures may be found in the Replacement Procedures unit of this manual.

1. Switch off the printer and remove the exterior cover from the printer's mechanical side.

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

2. Connect the Test Module to the available test connector on the main circuit board (Figure 6-1).
3. Connect the multimeter ground probe to the pin identified as GRD on the Test Module.
4. Connect the multimeter positive probe to the pin identified as SIG on the Test Module.
5. Switch on the printer and rotate the test module dial to the required position (Table 6-1).
6. Record the multimeter values and confirm they are within specified tolerances (Table 6-1).
7. Troubleshoot and replace components as directed in their relative procedures.

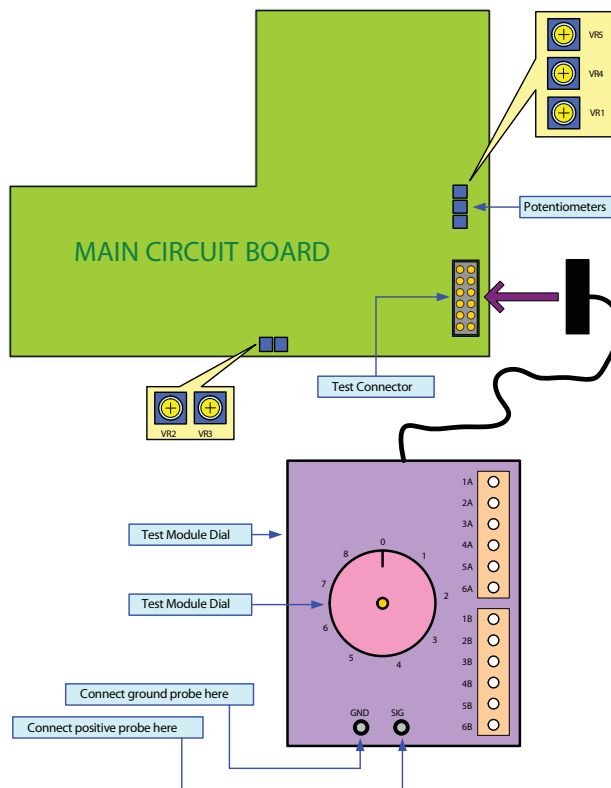


Figure 6-1, Test Module Usage

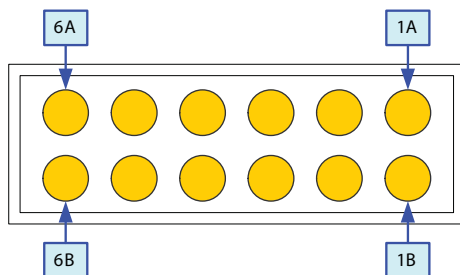


Figure 6-2, Test Connector Pin Designation

TEST REFERENCE CHART		
MODULE DIAL	CONNECTOR PIN	FUNCTION
	1A	This connector pin is used as a ground post.
	2A	Reserved.
0	3A	Used to determine voltage of components that require between +4.3 and +5.2 VDC to properly function.
1	4A	Used to determine voltage of components that require between +1.9 and +2.1 VDC to properly function.
2	5A	Used to determine voltage of components that require between +3.1 and +3.5 VDC to properly function.
3	6A	Used to determine voltage of components that require between +23.5 and +24.5 VDC to properly function.
4	1B	Used in conjunction with potentiometer VR5 to set eye-mark sensor sensitivity.
5	2B	Used in conjunction with potentiometer VR4 to set gap sensor sensitivity.
6	3B	Used to test Ribbon-End sensor on the feed side (RE2). Measurement must be made while the printer is in the Maintenance Mode. If an error signal occurs, the sensor is functioning properly. If an error signal does not occur, the sensor must be replaced.
7	4B	Used to test Ribbon-End sensor on the feed side (RE1). Measurement must be made while the printer is in the Maintenance Mode. If an error signal occurs, the sensor is functioning properly. If an error signal does not occur, the sensor must be replaced.
8	5B	Reserved.
	6B	Reserved.

MULTIMETER ALONE

Testing of circuitry and sensor adjustment may be performed by using a multimeter without the assistance of the Test Module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Refer to the Table 6-1 to correlate the desired testing or adjustment function with its relative connector pin. Afterward, refer to Figure 6-2 to locate the required pins.

SENSOR SENSITIVITY VALUES	
SENSOR	VALUES
I-Mark	Low Level: +0.8 VDC minimum, High Level: Greater than +1.2 VDC.
Gap	Low Level: +0.2 VDC to +1.0 VDC, High Level: +0.8 VDC minimum
Ribbon-End	Refer to Table 6-1.

TEST PRINT TROUBLESHOOTING

Chapter provides instruction on special printing to identify and resolve specific print problems.

HEX DUMP	Allows the operator to determine if there were problems in the downloading of data.
TEST LABEL	Allows the operator to identify specific problems regarding mechanical performance and setup.

HEX DUMP MODE

The contents of the print buffer can be examined using the Hex Dump Mode. In the left column, each line of data received is numbered. The center column provides the data in hexadecimal format. And in the right column, same data is provided in the ASC II format. Follow the flow chart provided below to perform this activity.

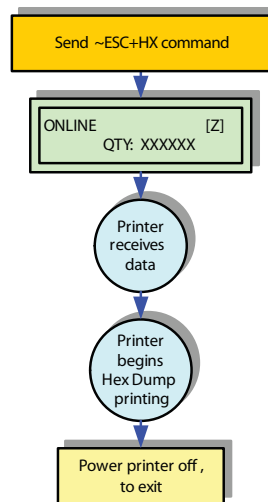


Figure 6-3, Hex Dump Mode

TEST LABEL PRINTING

The test label is designed to assist in the identification of print problems. Follow the flow chart provided below to perform this activity.

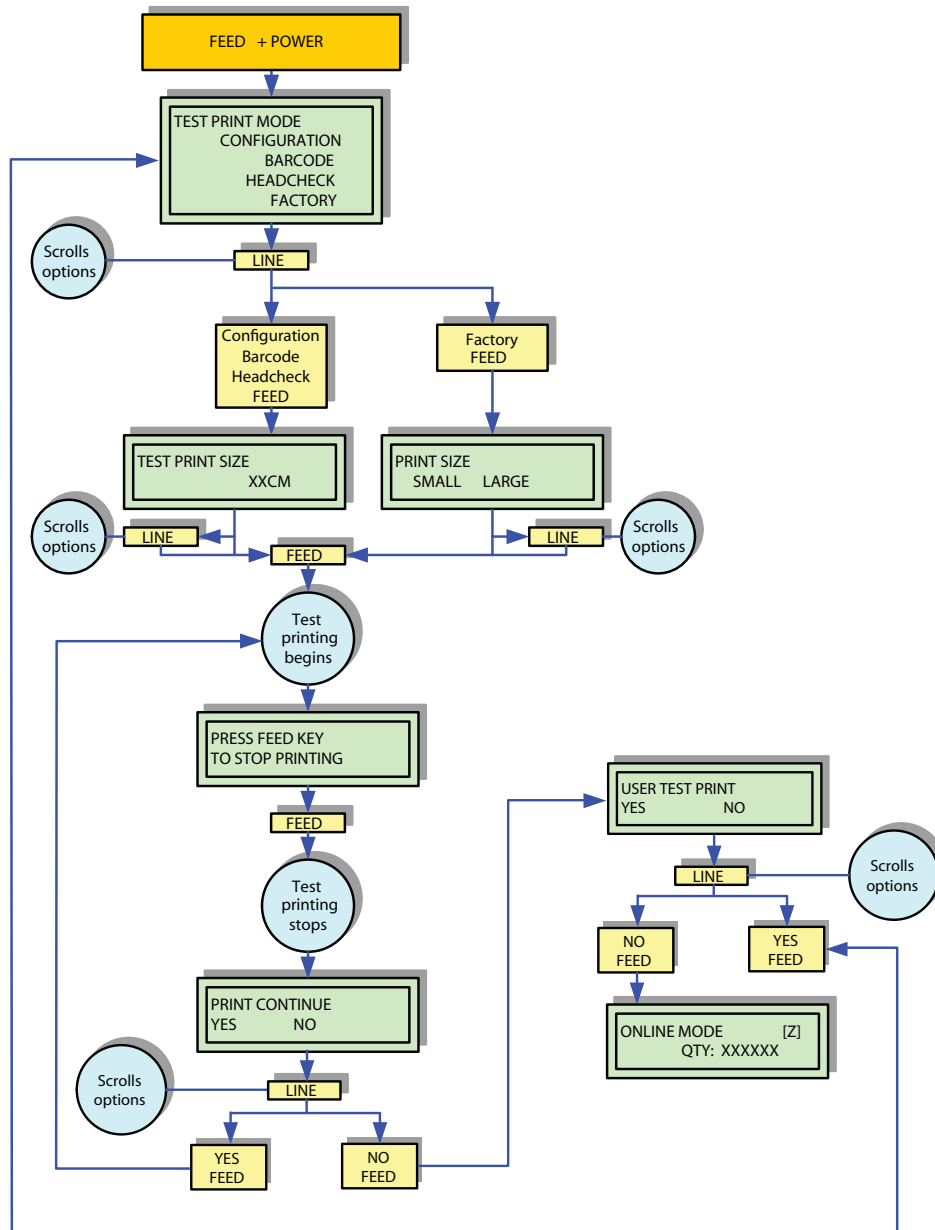


Figure 6-4, Test Print Model

NOTE: The only print problem that the following sample test label does not display is fading of print image from one side of the label to the other. This is the result of improper print head balance.

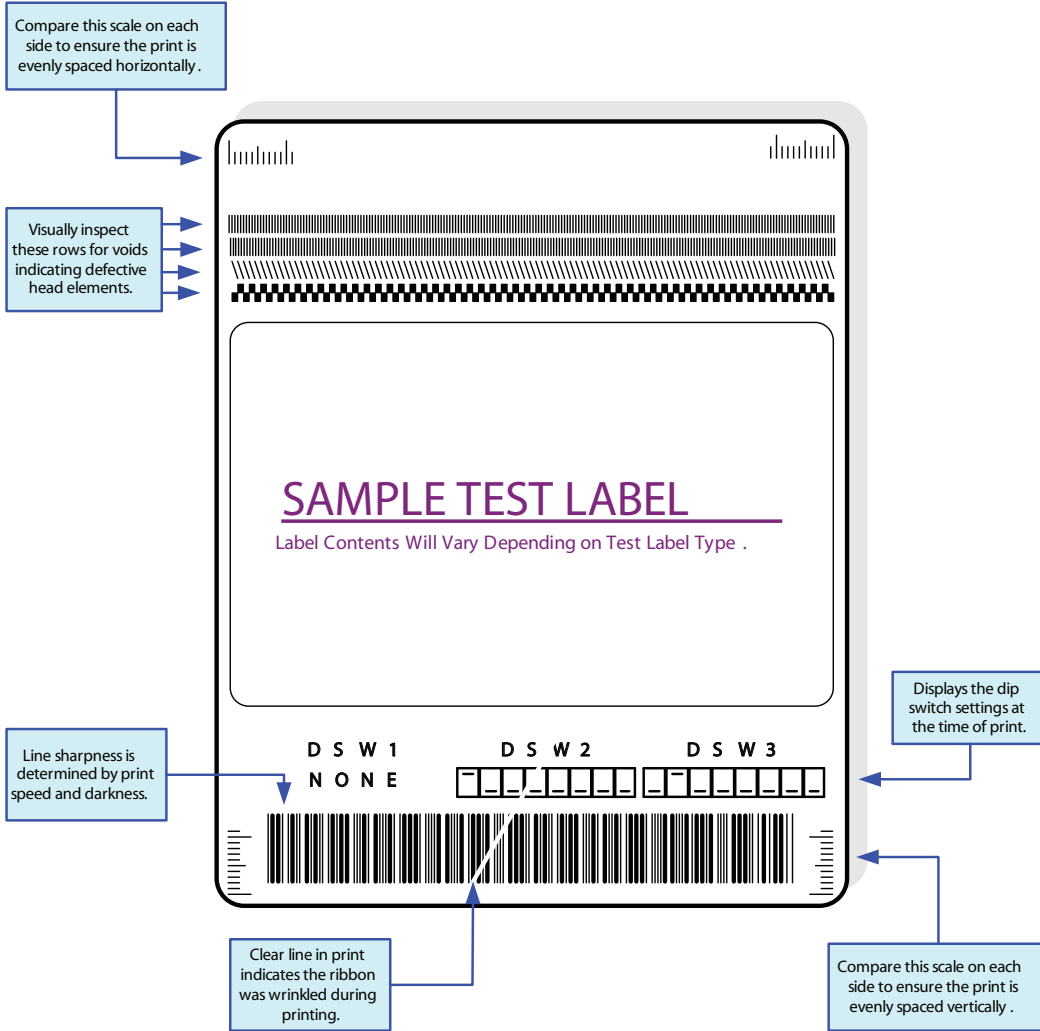


Figure 6-5, Sample Test label

7

REPLACEMENT PROCEDURES

- **Print Head Replacement**
- **Platen Roller Replacement**
- **Platen Roller Timing Belt Replacement**
- **Drive Motor Replacement**
- **Main Board Replacement**
- **Flash Memory Board Replacement**
- **Power Board Replacement**
- **Panel/LCD Board Replacement**
- **Interface Board Replacement**
- **Label Sensor Replacement**
- **Head-Open Sensor Replacement**
- **Fuse Replacement**

REPLACEMENT PROCEDURES

This unit provides in-depth instruction on all primary component and assembly replacement, in addition to most secondary components. Use the text in conjunction with their accompanied graphics to ensure complete comprehension throughout the process. Especially observe all cautionary or warning notations.

CAUTION: STATIC ELECTRICITY CAN RESULT IN COMPONENT DAMAGE. OBSERVE APPROPRIATE GROUNDING PROCEDURES WHEN REPLACING ANY COMPONENTS.

PRINT HEAD REPLACEMENT

If the print head becomes damaged or worn, it can be easily removed and replaced without having to make critical adjustments. Before replacing the print head, check the head counter values by printing a test pattern. Instructions relating to the Head Counter may be found in the Configuration unit of this manual.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Open the right housing cover and latch print head release lever (1, Figure 7-1a) as necessary.
- 3 Remove center screw (2) from upper print assembly (3) securing defective print head (4, Figure 7-1b).

NOTE: Looking downward into the print assembly there will be three screws visible, remove the one in the center.

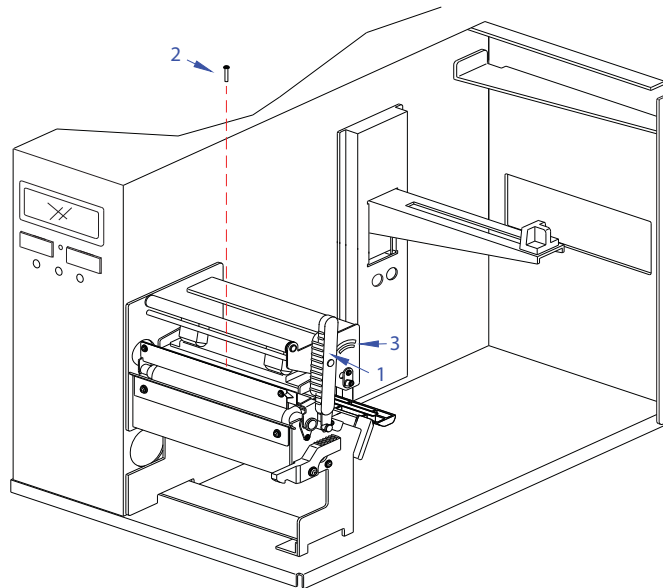


Figure 7-1a, Print Head Replacement

- 4 Unlatch print head release lever (1) and withdraw defective print head (4) from within print assembly (3).
- 5 Disconnect the two wiring harnesses (not shown) from defective print head (4)

Unit 7: Replacement Procedures

- 6 Reconnect two wiring harnesses (not shown) to replacement print head (4).

NOTE: Each of the printer's wiring harness connectors are different from all others to ensure proper mating. Mate each matching half for reconnection.

- 7 Insert replacement print head (4) into print assembly (3) and latch lever (1, Figure 7-1a).

CAUTION: EXERCISE CARE WHEN INSTALLING THE PRINT HEAD TO ENSURE THAT ITS ELEMENTS ARE NOT DAMAGED DURING INSTALLATION.

NOTE: Apply the print to the upper surface of the print assembly's print bracket and ensure the alignment pins insert into their respective slots.

- 8 Secure replacement print head (4) to print assembly (3) and secure using screw (2).
- 9 Restore power, reset the head counter, and test print.

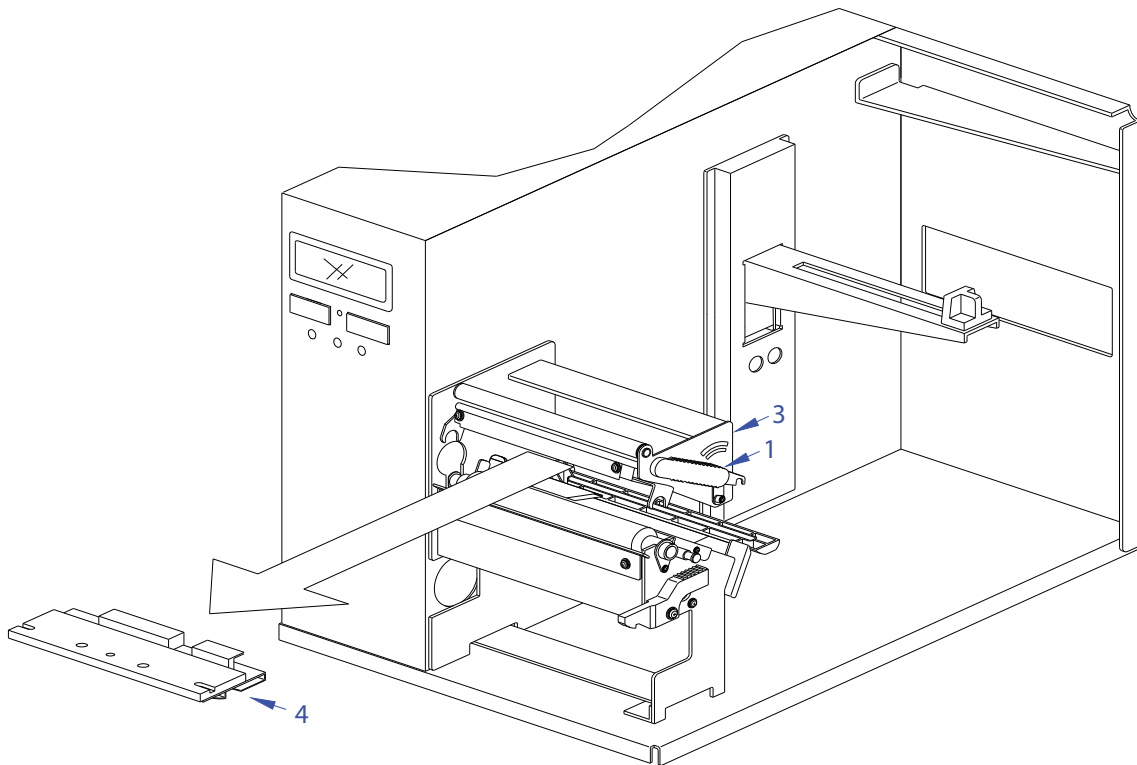


Figure 7-1b, Print Head Replacement

PLATEN ROLLER REPLACEMENT

The printer's platen roller is considered to be a high-wear component due to constant treading of the print media and ribbon stock against its contact surface. This constant contact will eventually wear grooves into the rubber material and negatively effect print output/operation.

- 1 Switch off the printer, disconnect the power supply cord, unlatch the print head, and remove the left housing cover.

NOTE: Figure 9-1 of the Appendix unit displays housing cover removal.

- 2 Loosen the four screws (not referenced) securing drive motor (1, Figure 7-2) to motor bracket (2).
- 3 Remove two screws (3) securing belt guide (4).
- 4 Lift away belt guide (4) from dual pulley (5).
- 5 Remove timing belts (A) from dual pulley (5).
- 6 Remove screw (6) securing platen roller assembly (7) to the printer's center frame.
- 7 Withdraw worn platen roller assembly (7) from the printer along with bushing (8).
- 8 Insert bushing (8) onto replacement platen roller assembly (7).

NOTE: A properly applied bushing will be oriented so that its flanged end is facing the rubber portion of the platen roller.

- 9 Insert replacement platen roller assembly (7) into its respective cavity in the printer's center frame.
- 10 Access print assembly (9) located on the opposite side of the printer's center frame.
- 11 Advance replacement platen roller assembly (7) so that bushing (8) inserts into retaining plate (10).

NOTE: Ensure the flat sides of the bushing's flange nests within the bracket of the print assembly.

- 12 Secure replacement platen roller assembly (7) to the printer's center frame using screw (6).

NOTE: Ensure the platen roller assembly is fully nested in the printer's center frame when screw (6) has been secured.

- 13 Apply timing belt (A) onto the middle section of pulley (5) and then apply belt guide (4).

NOTE: Ensure that the end of timing belts (A) wrap around the respective pulleys and that the tension roller rests against the outer surface of the belt.

- 14 Secure belt guide (4) using two screws (3).
- 15 Retighten four screws (not referenced) to secure motor (1) to motor bracket (2).
- 16 Adjust the belt tension.
- 17 Attach and close housing covers, restore power, and test print.

NOTE: Figure 9-1 of the Appendix unit displays housing cover installation.

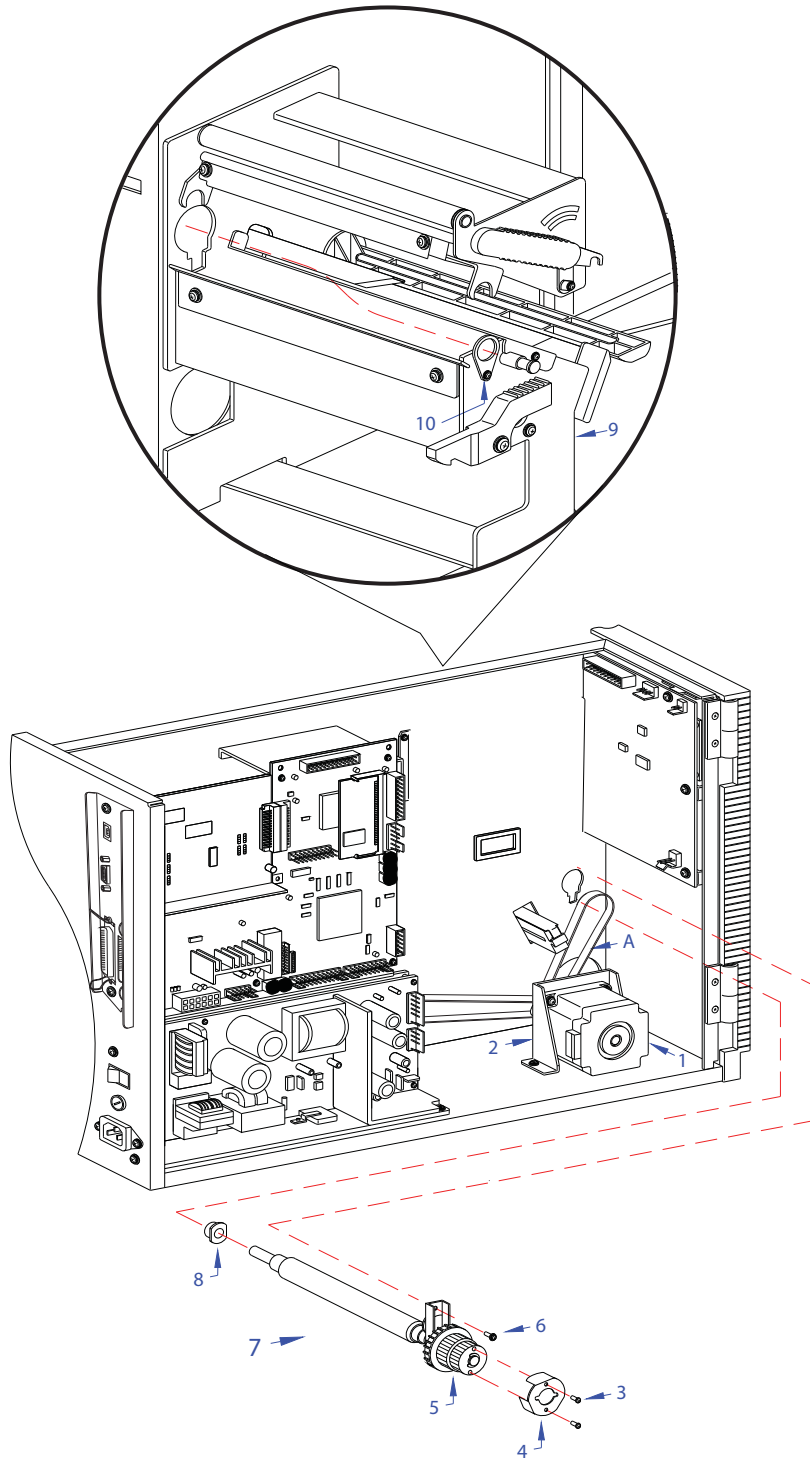


Figure 7-2, Platen Roller Replacement

PLATEN ROLLER TIMING BELT REPLACEMENT

Following long periods of use, a belt may become worn or excessively stretched beyond the printer's adjustment ability and require replacement. It is at this time that the pulleys should be inspected for damage or wear.

- 1 Switch off the printer and disconnect the power supply cord.
- 2 Remove the left housing cover from the printer's electrical side.

NOTE: Figure 9-1 of the Appendix unit displays housing cover removal.

- 3 Loosen the four screws (not referenced) securing drive motor (1, Figure 7-3) to motor bracket (2).
- 4 Remove timing belt (A) from drive motor (1). To replace the timing belt (A), please refer to Rewinder Timing Belt Replacement.
- 5 Remove worn timing belt (B) from drive motor (1) and pulley (3) of platen roller.
- 6 Apply replacement timing belt (B) to drive motor (1) and pulley (3) followed by timing belt (A).
- 7 Retighten four screws (not referenced) to secure motor (1) to motor bracket (2).

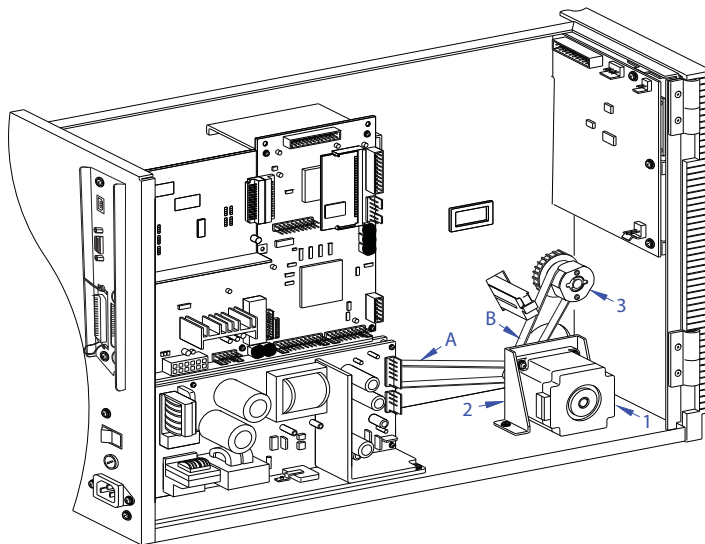


Figure 7-3, Timing Belt Replacement

- 8 Adjust the belt tension.

CAUTION: A PROPERLY TENSIONED BELT WILL BE JUST ENOUGH TO PREVENT SLIPPAGE. AN EXCESSIVELY TENSIONED BELT WILL INCREASE DRAG ON THEIR PULLEYS RESULTING IN PREMATURE COMPONENT WEAR.

- 9 Attach and close housing covers, restore power, and test print.

NOTE: Figure 9-1 of the Appendix unit displays housing cover installation.

DRIVE MOTOR REPLACEMENT

The stepper drive motor transmits kinetic energy to the roller assemblies via a timing belt and gear configuration for precise print positioning and ribbon advancement.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Remove the left housing cover from the printer's electrical side.

NOTE: Figure 9-1 of the Appendix unit displays housing cover removal.

- 3 Disconnect from the defective motor's wiring harness from main circuit board (1, Figure 7-4).
- 4 Remove four screws (2) securing defective drive motor (1) to motor bracket (3).
- 5 Apply timing belts (A) and (B) to the motor's spindle (not shown).
- 6 Secure replacement drive motor (1) to motor bracket (3) using four screws (2) and mounting plate (4).

NOTE: A properly installed motor will be oriented so that its harness connector is facing the power board.

- 7 Adjust the belt tension.

CAUTION: A PROPERLY TENSIONED BELT WILL BE JUST ENOUGH TO PREVENT SLIPPAGE. AN OVERLY TENSIONED BELT WILL EXCESSIVELY INCREASE DRAG ON THEIR PULLEYS AND INCREASE COMPONENT WEAR.

- 8 Connect the motor's wiring harness (not shown) to replacement drive motor (1).
- 9 Attach and close housing covers, restore power, and test print.

NOTE: Figure 9-1 of the Appendix unit displays cover installation.

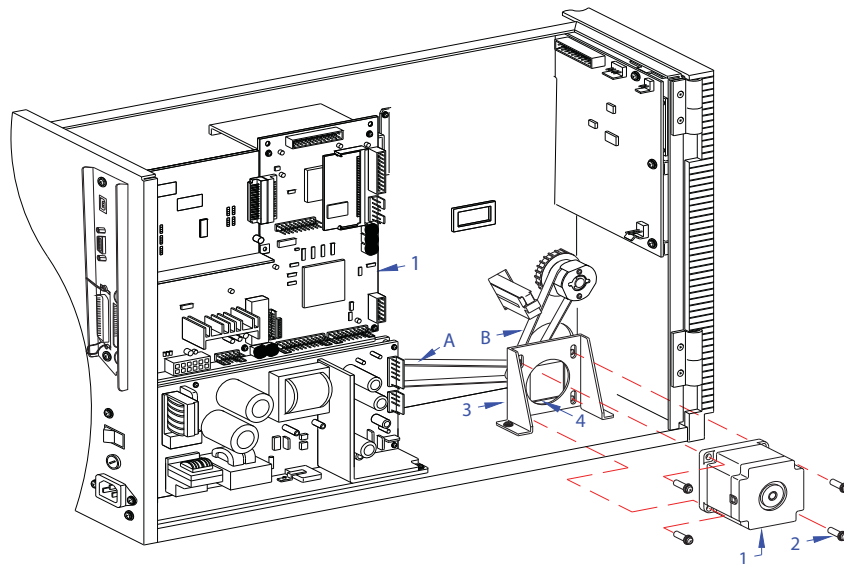


Figure 7-4, Drive Motor Replacement

MAIN BOARD REPLACEMENT

The main circuit board is the primary brain-center for all printer activities. Circuit boards generally have long lives due to the lack of moving parts. Generally, if a circuit board becomes defective, it is contributable to a negative external condition.

If it is determined that the circuit board has become defective, search the printer over for possible visual factors that may have led to the damage.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Remove the left housing cover from the printer's electrical side.

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

- 3 Remove two screws (1, Figure 7-7) securing interface board (2) to rear cover (3). Withdraw board (2).
- 4 Disconnect all wiring harnesses from defective main board (4).
- 5 Remove five screws (5) securing defective main board (4) to the printer. Lift away defective main board (4).

NOTE: Two of the five screws (5) are located on the rear housing cover and accessed externally, the remaining three screws are attached directly to the board and are accessed internally.

- 6 Secure replacement main board (4) to the printer using five screws (5).
- 7 Connect all relative wiring harnesses previously disconnected.

NOTE: Each of the printer's wiring harness connectors are different from all others to ensure proper mating. Mate each matching half for connection.

- 8 Secure left housing cover to the printer, restore power, factory reset, and test print to ensure proper function.

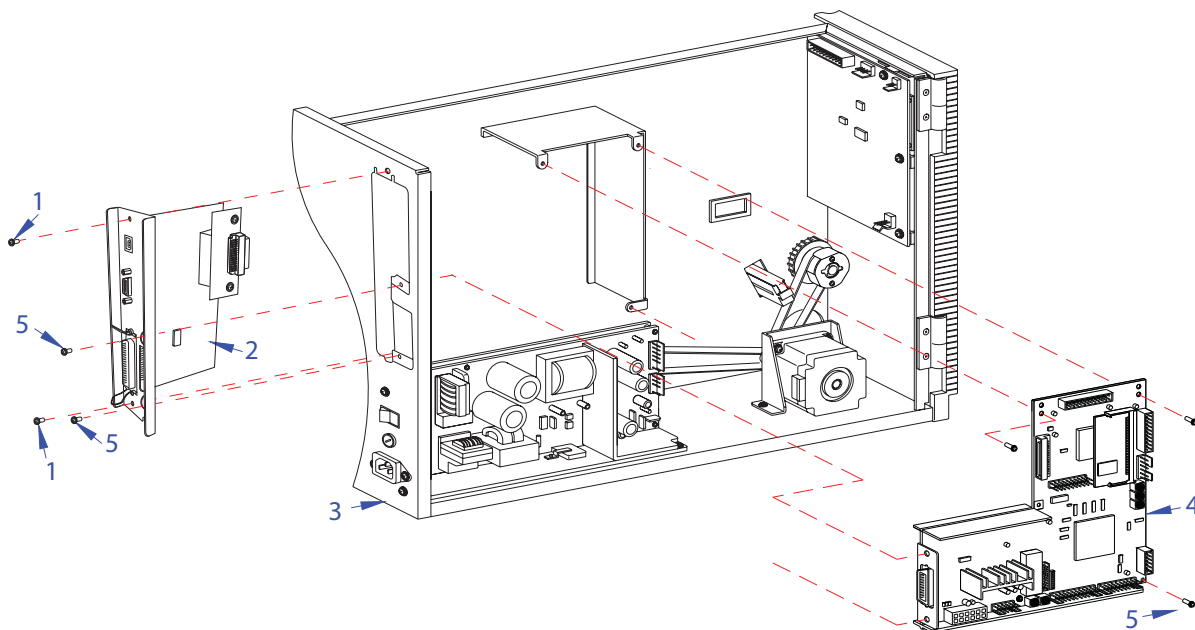


Figure 7-7, Main Circuit Board Replacement

FLASH MEMORY BOARD REPLACEMENT

Circuit boards generally have long lives due to the lack of moving parts. Generally, if a circuit board becomes defective, it is contributable to a negative external condition.

If it is determined that the circuit board has become defective, search the printer over for possible visual factors that may have led to the damage.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Remove the left housing cover from the printer's electrical side.

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

- 3 Locate memory board (1, Figure 7-8) located on the face of main circuit board (2).
- 4 Lift upward and downward simultaneously on upper and lower clips respectively to release defective memory board (1) from its connector/bracket (3).

NOTE: The bracket clips are two small silver pieces of metal secured to the left end of the bracket.

- 5 Withdraw defective memory board (1) and insert replacement memory board (1) in its place.

NOTE: To install memory board (1), insert its connector edge first into bracket (3) at a forty-five degree angle. Then press the board's left side inward until it snaps into the bracket's clips.

- 6 Secure the left housing cover to the printer, restore power, and test print to ensure proper function.

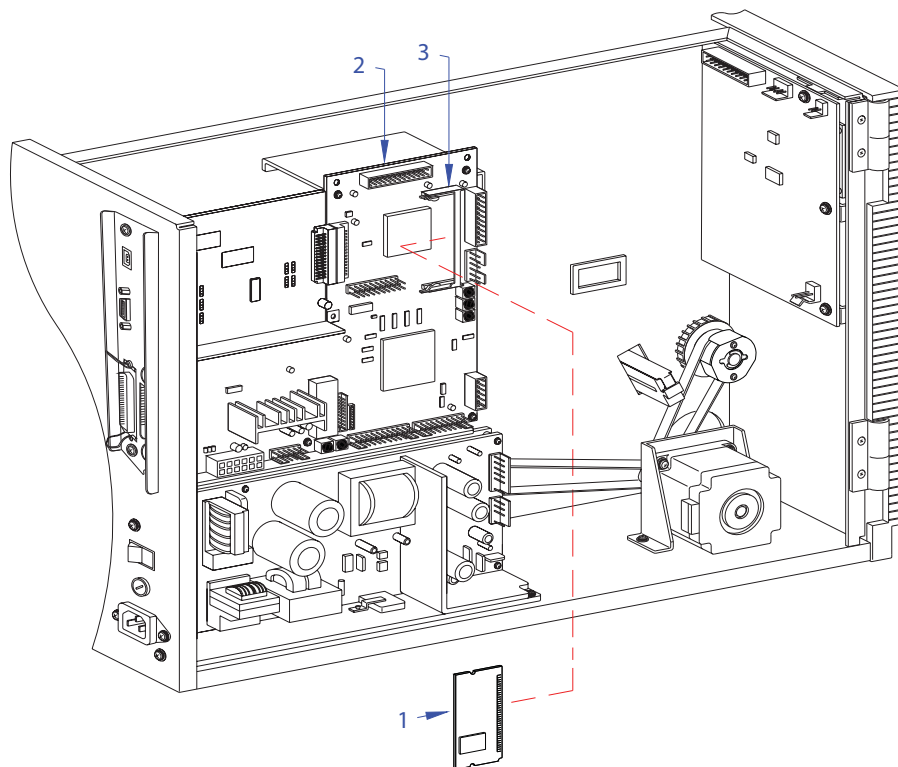


Figure 7-8, Flash Memory Board Replacement

POWER BOARD REPLACEMENT

The power board contains the printer's transformers, relays, etc., for transference of electrical current from the source supply to the printer's control circuits.

Circuit boards generally have long lives due to the lack of moving parts. Generally, if a circuit board becomes defective, it is contributable to a negative external condition.

If it is determined that the power board has become defective, search the printer over for possible visual factors that may have led to the damage.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Remove the left housing cover from the printer's electrical side.

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

- 3 Disconnect all wiring harnesses from defective power board (1, Figure 7-9) from other printer components.
- 4 Remove three screws (2) securing defective power board (1) to the printer.

NOTE: Two of the screws (2) are located on the rear housing cover and accessed externally, the remaining screw is attached directly to the board and is accessed internally.

- 5 Lift away defective power board (1) and insert replacement power board (1) in its place.
- 6 Reconnect all relative wiring harnesses previously disconnected.

NOTE: Each of the printer's wiring harness connectors are different from all others to ensure proper mating. Mate each matching half for connection.

- 7 Secure left housing cover, restore power, and test print to ensure proper function.

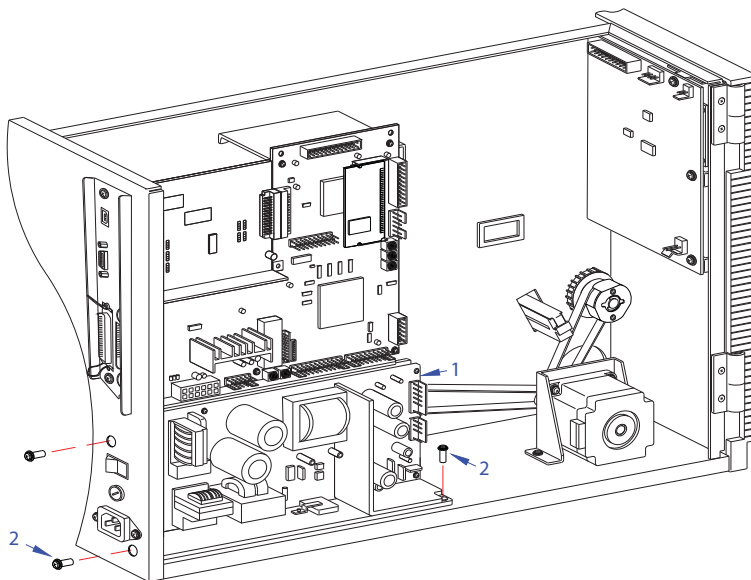


Figure 7-9, Power Board Replacement

PANEL/LCD BOARD REPLACEMENT

Circuit boards generally have long lives due to the lack of moving parts. Generally, if a circuit board becomes defective, it is contributable to a negative external condition.

If it is determined that the circuit board has become defective, search the printer over for possible visual factors that may have led to the damage.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Remove the left housing cover from the printer's electrical side.

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

- 3 Disconnect all wiring harnesses from defective panel board (1, Figure 7-10a) from other printer components.
- 4 Remove three screws (2) securing defective panel board (1) to the printer frame (3). Lift away board (1).

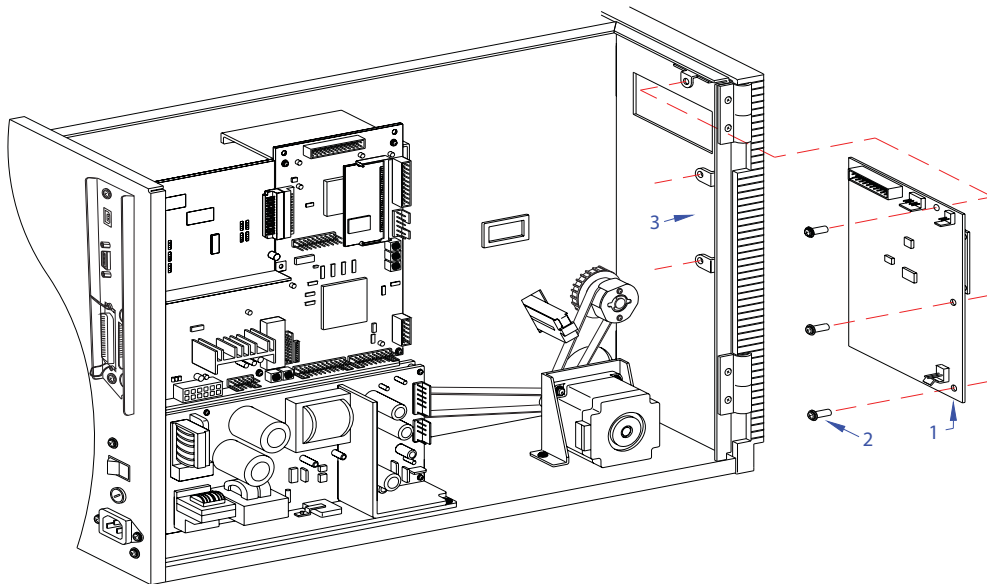


Figure 7-10a, Panel & LCD Board Replacement

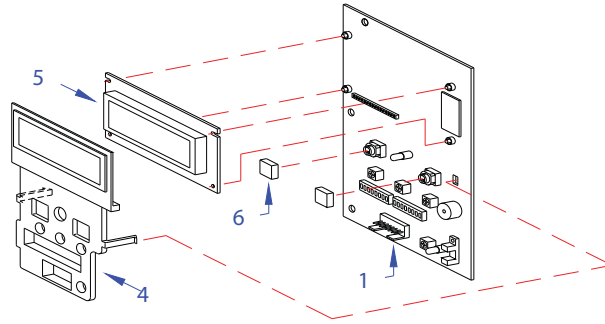


Figure 7-10b, Panel & LCD Board Replacement

- 5 Detach clear cover (4, Figure 7-10b) from defective panel board (1) followed by LCD board (5).
- 6 Attach original or replacement LCD board (5) to original or replacement panel board (1) as necessary.

NOTE: Exercise care when attaching the LCD board to the panel board to ensure its connector pins do not become bent. Ensure all pins insert into their proper receptacles.

- 7 Attach clear cover (4) to panel board (1) and secure to printer frame (3) using three screws (2).
- 8 Connect all applicable wiring harnesses to replacement panel board (1).
- 9 Secure left housing cover, restore power, and test print to ensure proper function.

INTERFACE BOARD REPLACEMENT

Circuit boards generally have long lives due to the lack of moving parts. Generally, if a circuit board becomes defective, it is contributable to a negative external condition.

If it is determined that the circuit board has become defective, search the printer over for possible visual factors that may have led to the damage.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Disconnect interface cable (1, Figure 7-11) from defective interface board (2).
- 3 Remove two screws (3) securing defective interface board (2) to printer (4).
- 4 Insert replacement interface board (2) into printer (4) and secure using two screws (3).
- 5 Connect interface cable (1).

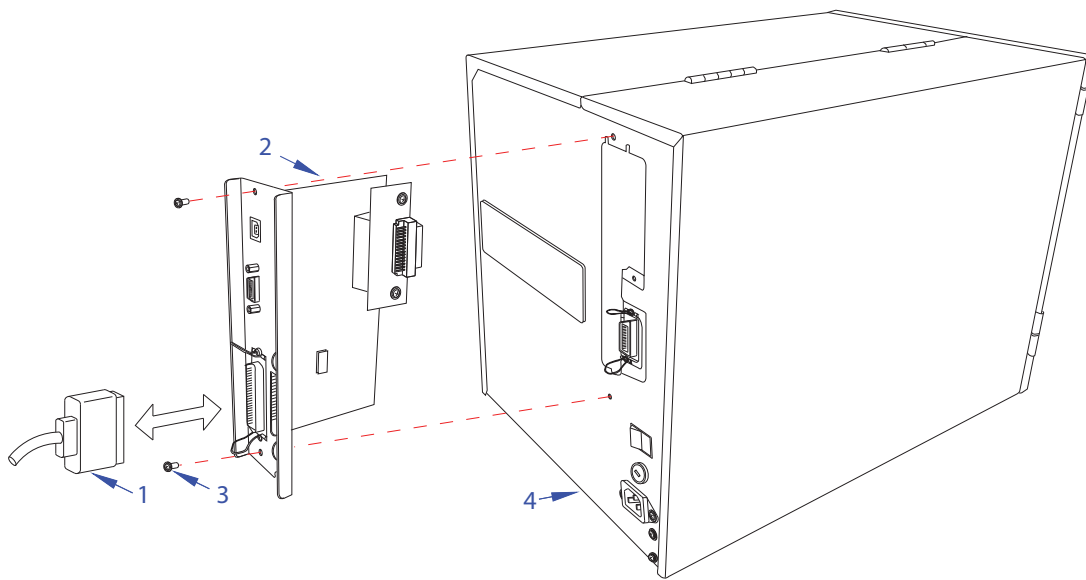


Figure 7-11, Interface Board Replacement

LABEL SENSOR REPLACEMENT

The label sensor is a sensor complex comprised of the label-out sensor, gap receiver, and I-Mark sensor all contained within a single housing. This sensor assembly is mounted to the printer's center frame to protrude across the print assembly's ramp.

The label sensor assembly may be easily identified by its green adjustment knob located behind the print assembly.

ATTENTION: Before replacing the assembly assuming the sensor defective, ensure that the condition is not the result of debris buildup. Thoroughly clean the sensor before replacing it.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Remove the left housing cover from the printer's electrical side.

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

- 3 From the printer's print side, detach media plate (1, Figure 7-12) from defective label sensor (2).
- 4 Remove two screws (3) securing RFID antenna cover (4). Withdraw cover (4) from defective sensor (2).
- 5 Locate and remove screw (5) securing green, label adjustment knob (6).
- 6 Lift away knob (6), spring (7), and nylon washer (8) from defective label sensor (2).
- 7 Disconnect the label sensor wiring harness from the main board located on the printer's electrical side.
- 8 Manipulate defective label sensor assembly (2) upward from within print assembly (9) and remove it.
- 9 Route the replacement label sensor's wiring harness through the slot in the printer's center frame (10) and then manipulate the replacement sensor assembly downward into print assembly (9).
- 10 Apply nylon washer (8), spring (7), and green knob (6) to replacement label sensor assembly (2) and secure using screw (5).
- 11 Secure the RFID antenna cover (4) with two screws (3) and attach the media plate (1) to the replacement label sensor (2).
- 12 Connect the sensor's wiring harness, secure left housing cover, restore power, and test print to ensure proper function.

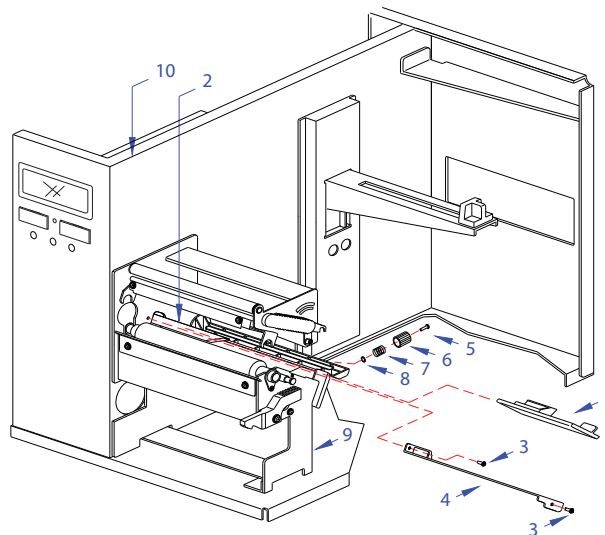


Figure 7-12, Label Sensor Replacement

HEAD-OPEN SENSOR REPLACEMENT

The head-open sensor disables the printer if the print head is not properly latched. The sensor is of an on/off, switch variety that sends a signal to the processor should the circuit be completed. The processor in turn, relays an error signal to the panel board.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Remove the left housing cover from the printer's electrical side.

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

- 3 Disconnect the head-open sensor wiring harness from the panel board located on the printer's electrical side.
- 4 Unlatch the print head and remove two screws (1, Figure 7-13) securing defective head-open sensor (2) to print assembly (3).
- 5 Withdraw defective head-open sensor (2) from within print assembly (3).
- 6 Route the wiring harness of replacement head-open sensor (2) though the printer's center frame (4).
- 7 Secure replacement head-open sensor (2) to print assembly (3) using two screws (1).

NOTE: A properly installed sensor switch will be oriented so that its lever is facing upward.

- 8 Connect the replacement head-open sensor's wiring harness to the panel board (not shown).
- 9 Secure left housing cover to the printer, restore power, and test print to ensure proper function.

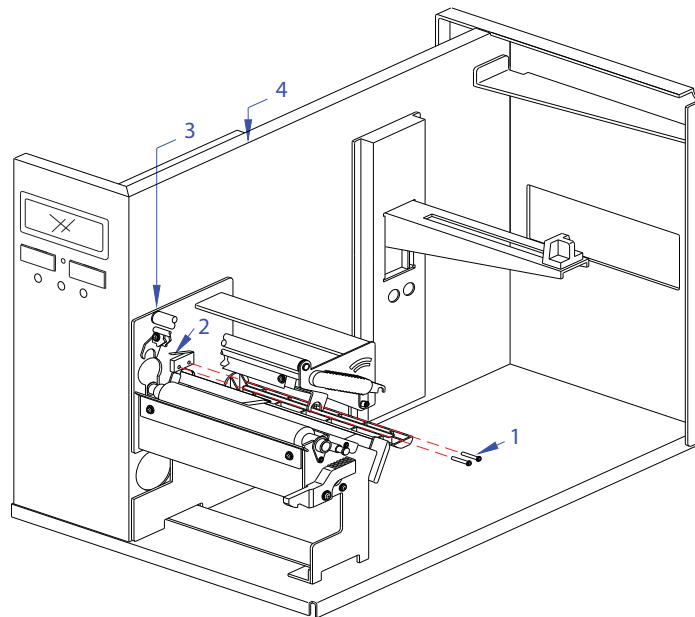


Figure 7-13, Head-Open Sensor Replacement

FUSE REPLACEMENT

The fuse is wired to the power receptacle and protects the printer from power surges from the electrical source. If a surge of electricity reaches the fuse, its filament will melt creating a disruption of the flow. In order to bridge the gap so the printer may again be functional, the damaged fuse must be replaced.

- 1 Switch off the printer and disconnect power supply cord.
- 2 Unscrew fuse cap (1, Figure 7-15) from fuse cylinder (2) located on rear housing cover (3).
- 3 Withdraw damaged fuse (4) from fuse cap (1).
- 4 Insert replacement fuse (4) into fuse cylinder (2) and screw on cap (1).

CAUTION: Replace fuse of equal rating, T3.15A 250V. Do not use a fuse with a higher rating.

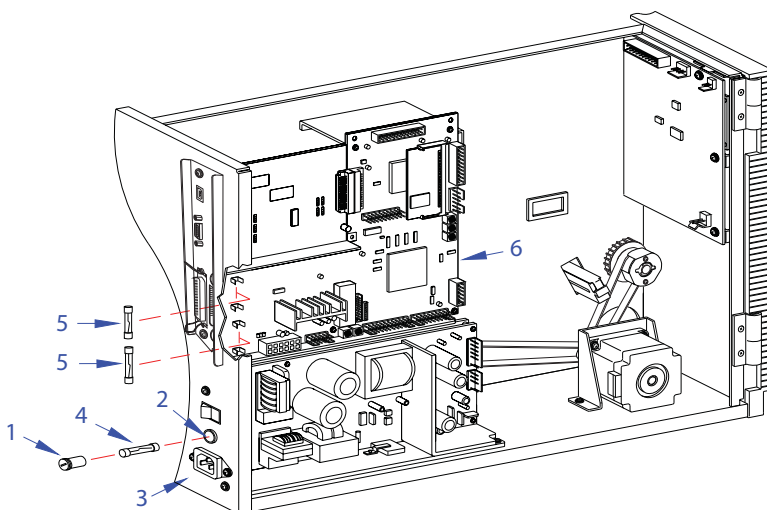


Figure 7-15, Fuse Replacement

To replace the check or replace the two fuses on the printer's interior located on the main circuit board, perform the following procedure.

- 1 Remove the printer's left housing cover.

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

- 2 Located two fuses (5) clamped to main circuit board (6).
- 3 Replace each fuse (5) as required.

CAUTION: Replace fuse of equal rating as stated on the circuit board. Do not use a fuse with a higher rating.

NOTE:

- The fuses may be visually inspected by looking for a void in its filament or by using a multimeter to check for circuit continuity.
- The orientation of the fuse does not matter. It only has to be installed into its respective cylinder and be able make contact on each end to function.

CAUTION: IMPROPER FUSE USAGE MAY RESULT IN DESTROYED ELECTRICAL COMPONENTS AND/OR FIRE. ENSURE THE DAMAGED FUSE IS REPLACED WITH ONE OF IDENTICAL PHYSICAL DIMENSIONS AND AMPERAGE. TO DO THIS, DUPLICATE THE INFORMATION STAMPED ON THE FUSE'S METAL CASING OR ON THE CIRCUIT BOARD.

8

ADJUSTMENT PROCEDURES

- **Print Head Balance Adjustment**
- **Print Head Alignment**
- **Label Sensor Positioning**
- **Timing Belt Tension**
- **I-Mark Sensor Sensitivity Adjustment**
- **Gap Sensor Sensitivity Adjustment**
- **Operational Adjustments**

ADJUSTMENT PROCEDURES

This chapter covers all of the printer and printer accessory adjustments. These adjustments include mechanical adjustments required following the replacement of components and assemblies, in addition to, the operational adjustments required following a job change.

PRINT HEAD BALANCE ADJUSTMENT

Print head balance is the equalization of pressure against the platen roller from one end to the opposite. If the print head balance is out of adjustment, the printed image will be darker on one side of the label than the other and the media will be prone to travel in the direction of least resistance.

The adjustment of print head balance on the label can be subjective. One will know when balance is achieved by the disappearance of prevailing negative print characteristics.

To adjust the balance, begin test printing, slightly loosen set screw (1, Figure 8-1), and slightly move adjustment plate (2) to the right or left as necessary. Retighten set screw (1) while holding adjustment plate (2) when proper printing is achieved.

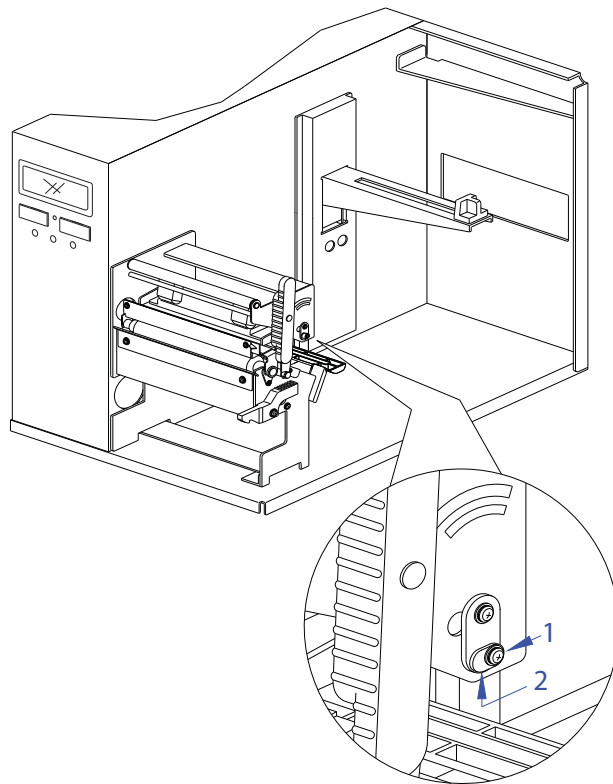


Figure 8-1, Print Head Balance Adjustment

PRINT HEAD ALIGNMENT

Print head position has a direct impact on print quality. The print head must be parallel with the platen roller for the printed image to be consistent across the label.

- 1 Open the right housing cover to access print assembly (1, Figure 8-2a).
- 2 Ensure print head (2) is latched (3).
- 3 Look downward to print head (2) to locate head alignment plate (4, Figure 8-2b).
- 4 Ensure the values of alignment scales (A) and (B) are the same.

NOTE: If the scale values are not the same, this may be the cause of print quality issues. However, matching scale values does not ensure proper alignment. If the scales do not match, for this procedure to align the scales, reprint, and then readjust as deemed necessary.

- 5 Determine which end of alignment plate (4) should be adjusted and loosen its relative set screw (5) or (6).
- 6 Adjust alignment plate (4) then retighten relative set screw (5, 6) while maintaining plate position.

NOTE: There is a slot at each adjustment scale (A, B) in alignment plate (4) where an object may be inserted to assist in adjustment. An appropriately sized Standard screwdriver works best.

- 7 Test print a label to determine if print head (2, Figure 8-2a) is properly aligned.
- 8 Repeat this procedure until proper alignment is achieved.

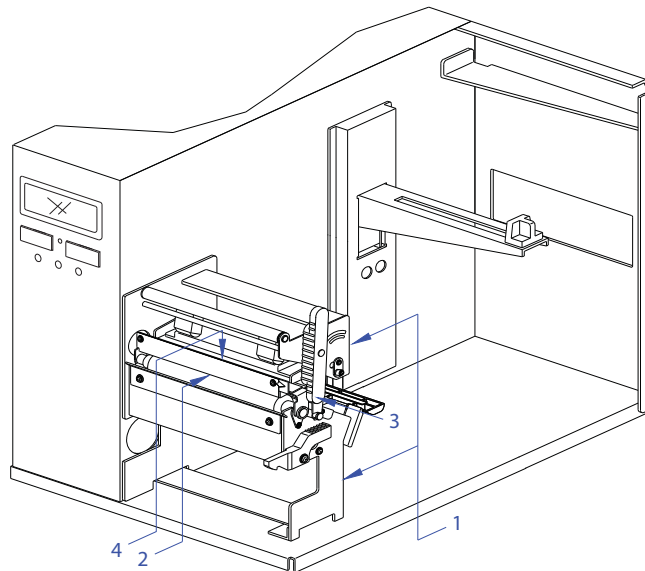


Figure 8-2a, Print Head Alignment

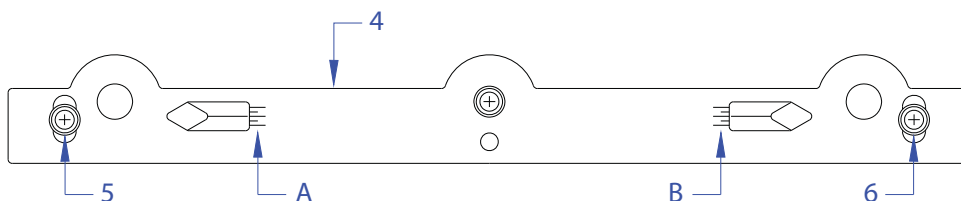


Figure 8-2b, Print Head Alignment

LABEL SENSOR POSITIONING

The label sensor assembly provides a mounting apparatus for the I-mark, gap, and paper-end sensors. Position adjustment of the label sensor is not required when using standard label media.

When non-standard media is used, place a section of the media on the media ramp oriented as if loaded for printing. Manually grasp the sensor assembly and move it laterally so that the sensor indicators embossed in its side are aligned with the reference marks on the media.

- 1 Open the right housing cover to access print assembly (1, Figure 8-4).
- 2 Find label sensor adjustment knob (2) located behind lower print assembly (1).

NOTE: The label sensor adjustment knob is green colored ABS plastic.

- 3 Manually move knob (2) to the left or right as required to properly position label sensor (3).

NOTE:

- There are two lines on the front face of the label sensor. The line closes to the printer's center frame references the location of the I-mark sensor, the one furthest out references the gap sensor. Adjust according to the type of media to be used.
- Sensor positioning may also be achieved by measuring from the printer's center frame outward to the specified distance for sensor/reference mark alignment. Refer to Figure 9-1 in the Appendix unit of this manual for applicable dimensions.

- 4 Test print a label to determine if label sensor (3) is properly aligned.

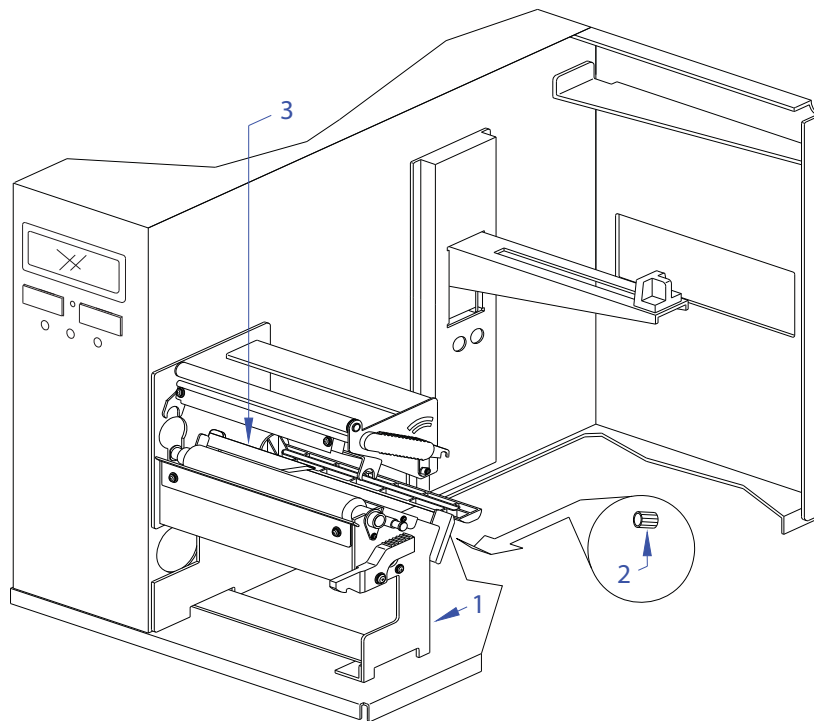


Figure 8-4, Label Sensor Positioning

TIMING BELT TENSION

This printer model incorporates the use of dual timing belts that transfers torque from the drive motor to the platen motor and rewinder shaft.

To adjust the tensioning of the timing belt, simply loosen the four motor mount screws (1, Figure 8-6) and then retighten them. The motor's mass will provide the proper belt tension without overt pressure, then retighten the four screws (1).

NOTE: Figure 9-1 of the Appendix unit displays cover removal and installation.

CAUTION: EXCESSIVE BELT TENSION WILL CREATE UNDESIRABLE DRAG ON THE DRIVE TRAIN. A PROPERLY ADJUSTED BELT WILL POSSESS JUST ENOUGH TENSION TO PREVENT SLIPPAGE.

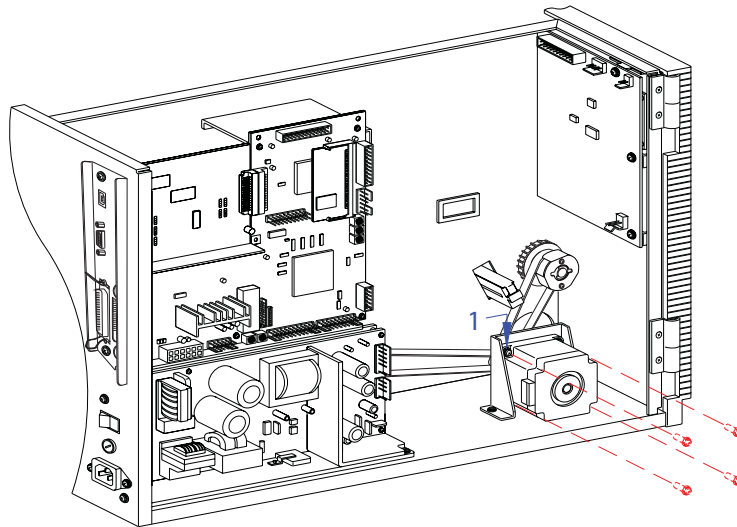


Figure 8-6, Timing Belt Tension

I-MARK SENSOR SENSITIVITY ADJUSTMENT

This sensor adjustment regulates reflecting ability for media referencing. Reflection modification is performed via a potentiometer that is part of the potentiometer complex integrated to the main circuit board accessible behind the left housing cover.

To establish reflection levels, upper and lower voltage levels must be set and the difference between the two voltage levels should be maximized for optimum performance.

For proper performance, the sensor must have a voltage difference greater than 0.9V between high and low. If performing the following procedure does not result in acceptable voltage levels, clean the window over the sensor's eye. If this fails, the sensor or circuit board may require replacement.

These adjustment activities may be performed through the use of the printer's internal menus or by utilizing a multimeter connected to the test connector located on the main circuit board. If using a multimeter, the adjustment may be performed with or without the assistance of the Test Module. Each of the three methods are addressed below.

OPERATOR PANEL

This procedure allows the I-mark sensor threshold and the input threshold to be adjusted using the printer's operator panel. The input threshold sets the minimum acceptable voltage level based on overall sensor voltage levels. Once the overall sensor thresholds have been established, the input voltage may be set.

NOTE: The input threshold is an average of the low and high voltages.

- 1 Remove media from the printer.
- 2 Press and hold the LINE button while powering on the printer to enter the Advanced Mode.
- 3 Press the LINE button to advance to the Service Mode.
- 4 When Service Mode appears on the LCD, press the FEED button.

NOTE: The next menu screen should display the sensor type selected and its relative threshold levels.

- 5 Ensure the correct sensor is selected.
- 6 Change the sensor type when necessary by altering DIP switch DSW2-2 (either software or hardware DIP switch depending on DIPSW 2-8 setting).
- 7 Ensure the sensor threshold displayed is a minimal setting of approximately 0.1 V.
- 8 Adjust potentiometer VR5 located on the main circuit to achieve the required minimal as necessary.
- 9 Physically position the media with its backing paper (without the I-Mark) rests over the I-Mark sensor. To stabilize the sensor level, make sure the print head assembly is latched and the media is threaded correctly after setting the media.
- 10 Adjust the VR5 potentiometer until the LCD displays a reading between 0.2 and 0.5 V.
- 11 Physically re-position the media so that the I-Mark is oriented over the sensor directly.
- 12 Observe the threshold level displayed on the LCD to ensure that reading has increased more than 0.9 V.
- 13 Repeat steps 8 through 12 until the required value of +0.9 V or greater is achieved.
- 14 To set the input threshold, press the LINE button repeatedly until the values displayed on the LCD roll over to display 0.0 V.

MULTIMETER WITH TEST MODULE

Refer to the procedure that follows for directions on test module usage and Figure 8-7 for visual assistance.

- 1 Remove the rear and left housing covers.

NOTE: Figure 9-1 of the Appendix unit displays housing cover removal.

- 2 Adjust the VR5 potentiometer fully counter clock-wise.
- 3 Connect the test module to the available test panel.
- 4 Connect the multimeter ground probe to the pin identified as GRD on the test module.
- 5 Connect the multimeter positive probe to the pin identified as SIG.
- 6 Turn the printer on and rotate the test module dial to the 4 position.
- 7 Physically position the media with its backing paper (without the I-Mark) rests over the I-Mark sensor. To stabilize the sensor level, make sure the print head assembly is latched and the media is threaded correctly after setting the media.
- 8 Adjust the VR5 potentiometer until the multimeter displays a value of 0.2 to 0.5 V.
- 9 Physically relocate the media so the I-Mark is oriented over the sensor directly.
- 10 Regard the multimeter to determine the second measurement is +0.9 V greater than the previous.
- 11 Repeat steps 7 through 11 until the required value of +0.9 V or greater is achieved.
- 12 Begin normal printing to ensure proper adjustment.
- 13 Replace left and rear housing covers.

MULTIMETER ALONE

Sensor adjustment may be performed by using a multimeter without the assistance of the test module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Connect the multimeter negative probe to pin 1A and the positive probe to pin 1B. Refer to Figure 8-8 for visual assistance.

ATTENTION: Enter the printer's Service Mode to verify the sensor level setting.

Unit 8: Adjustment Procedures

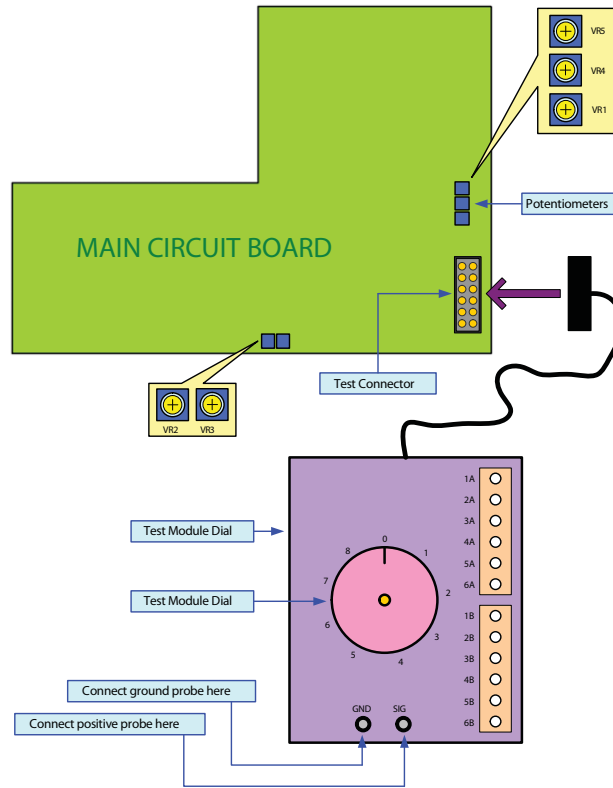


Figure 8-7, Test Module Usage

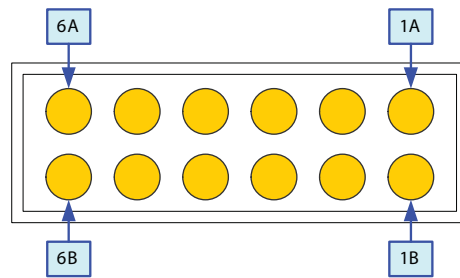


Figure 8-8, Test Connector

GAP SENSOR SENSITIVITY ADJUSTMENT

This sensor adjustment regulates penetrating ability for media referencing. Penetration modification is performed via a potentiometer that is part of the potentiometer complex integrated to the main circuit board accessible behind the left housing cover.

To establish penetration levels, upper and lower voltage levels must be set and the difference between the two voltage levels should be maximized for optimum performance.

For proper performance, the sensor must have a voltage difference greater than 0.9 V between high and low. If performing the following procedure does not result in acceptable voltage levels, clean the window over the sensor's eye. If this fails, the sensor or the circuit board may require replacement.

These adjustment activities may be performed through the use of the printer's internal menus or by utilizing a multimeter connected to the test connector located on the main circuit board. If using a multimeter, the adjustment may be performed with or without the assistance of the Test Module. Each of the three methods are addressed below.

OPERATOR PANEL

This procedure allows the gap sensor threshold and the input threshold to be adjusted using the printer's operator panel. The input threshold sets the minimum acceptable voltage level based on overall sensor voltage levels. Once the overall sensor thresholds have been established, the input voltage may be set .

NOTE: The input threshold is an average of the low and high voltages.

- 1 Remove media from the printer.
- 2 Press and hold the LINE button while powering on he printer to enter the Advanced Mode.
- 3 Press the LINE button to advance to the Service Mode.
- 4 When Service Mode appears on the LCD, press the FEED button.

NOTE: The next menu screen should display the sensor type selected and its relative threshold levels.

- 5 Ensure the correct sensor is selected.
- 6 Change the sensor type when necessary by altering DIP switch DSW2-2 (either software or hardware DIP switch depending on DIPSW 2-8 setting).
- 7 Ensure the sensor threshold displayed is a minimal setting of approximately 0.1 V.
- 8 Adjust potentiometer VR4 located on the main circuit to achieve the required minimal as necessary.
- 9 Physically position the media's backing paper (portion without the label) so that its rests over the Gap sensor. To stabilize the sensor level, make sure the print head assembly is latched and the media is threaded correctly after setting the media.
- 10 Adjust the VR4 potentiometer until the LCD displays a reading between 0.2 and 0.5 V.
- 11 Physically re-position media (label and backing paper combined) so that its rests over the Gap sensor.
- 12 Observe the threshold level displayed on the LCD to ensure that reading has increased more than 0.9 V.
- 13 Repeat steps 8 through 12 until the required value of +0.9 V or greater is achieved.
- 14 To set the input threshold, press the LINE button repeatedly until the values displayed on the LCD roll over to display 0.0 V.

MULTIMETER WITH TEST MODULE

Refer to the procedure below for directions using the test module and Figure 8-7 for visual assistance.

- 1 Remove the rear and left housing covers.

NOTE: Figure 9-1 of the Appendix unit displays housing cover removal.

- 2 Adjust the VR2 potentiometer fully counter-clockwise.
- 3 Connect the test module to the available test panel.
- 4 Connect the multimeter ground probe to the pin identified as GRD on the test module.
- 5 Connect the multimeter positive probe to the pin identified as SIG.
- 6 Turn the printer on and rotate the test module dial to the 5 position.
- 7 Physically position the media's backing paper (portion without the label) so that its rests over the Gap sensor. To stabilize the sensor level, make sure the print head assembly is latched and the media is threaded correctly after setting the media.
- 8 Adjust the VR2 potentiometer until the multimeter displays a value of 0.2 to +1.0 V.
- 9 Physically re-position media (label and backing paper combined) so that its rests over the Gap sensor.
- 10 Regard the multimeter to determine the second measurement is 0.9 V greater than the previous reading.
- 11 Repeat steps 7 through 11 until the required value of +0.9 V or greater is achieved.
- 12 Begin normal printing to ensure proper adjustment.
- 13 Replace left and rear housing covers.

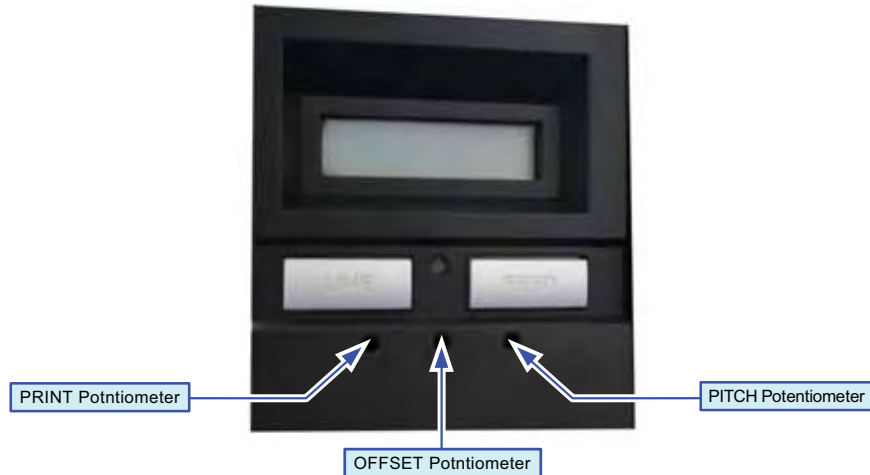
MULTIMETER ALONE

Sensor adjustment may be performed by using a multimeter without the assistance of the test module. To perform this task the multimeter probes must be attached to the correct connector pins of the test connector. Connect the multimeter negative probe to pin 1A and the positive probe to pin 2B. Refer to Figure 8-8 for visual assistance.

ATTENTION: Enter the printer's Service Mode to verify the sensor level setting.

OPERATIONAL ADJUSTMENTS

These operational adjustments are for fine tuning the printer as necessary following the configuration process and are largely confined to the three potentiometers located on the operator panel. Refer to the table below for their function.



POTENTIOMETER	DESCRIPTION/ PROCEDURE
PITCH	Is to be used in conjunction with the configuration adjustments. Make course adjustments there and then fine tune here. If unable to achieve the desired setting here, the course adjustment must be reset. Adjust this potentiometer as labels are being printed. Allow two labels to be printed for each adjustment to ensure a desired setting. Adjustment of the PITCH potentiometer will affect the print offset position.
OFFSET	The offset adjustment is used to reposition the media for printing following advancement for dispensing. A label is printed, it is fed forward for dispense, the printer retracts the remaining media (offset) to print the next label. To perform this adjustment: <ol style="list-style-type: none"> 1. Power On the printer. 2. Press the LINE button to place printer offline. 3. Press FEED. 4. Adjust the OFFSET potentiometer. 5. Press the FEED button to feed another label. 6. Repeat steps 3 and 4 until properly adjusted. 7. Press the LINE button to bring the printer back online.
DARKNESS	Is used to adjust the darkness or lightness of the printed image and should be used in conjunction with the configuration adjustments. Make course adjustments there and then fine tune here. If unable to achieve the desired setting here, the course adjustment must be reset. Adjust this potentiometer as labels are being printed. Allow two labels to be printed for each adjustment to ensure a desired setting.

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9

APPENDIX

- **Cover Removal Diagram**
- **Block Diagram**
- **Print Setup Dimensions**
- **Label Reference Position**
- **Printer Connection Diagram**
- **Printer Loading Diagram**
- **Replacement Parts List**
- **Glossary**

COVER REMOVAL DIAGRAM

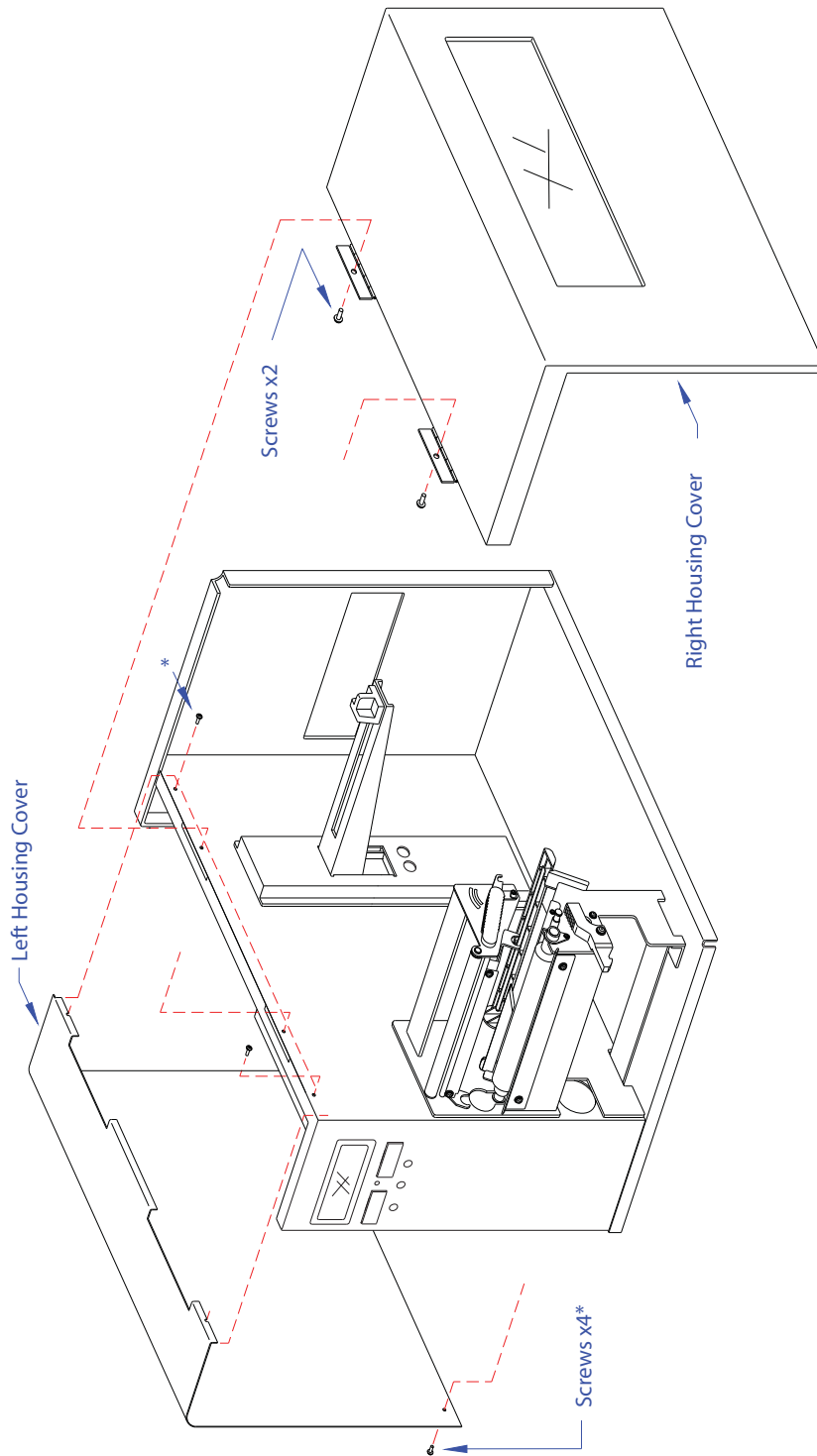


Figure 9-1, Cover Removal Diagram

BLOCK DIAGRAM

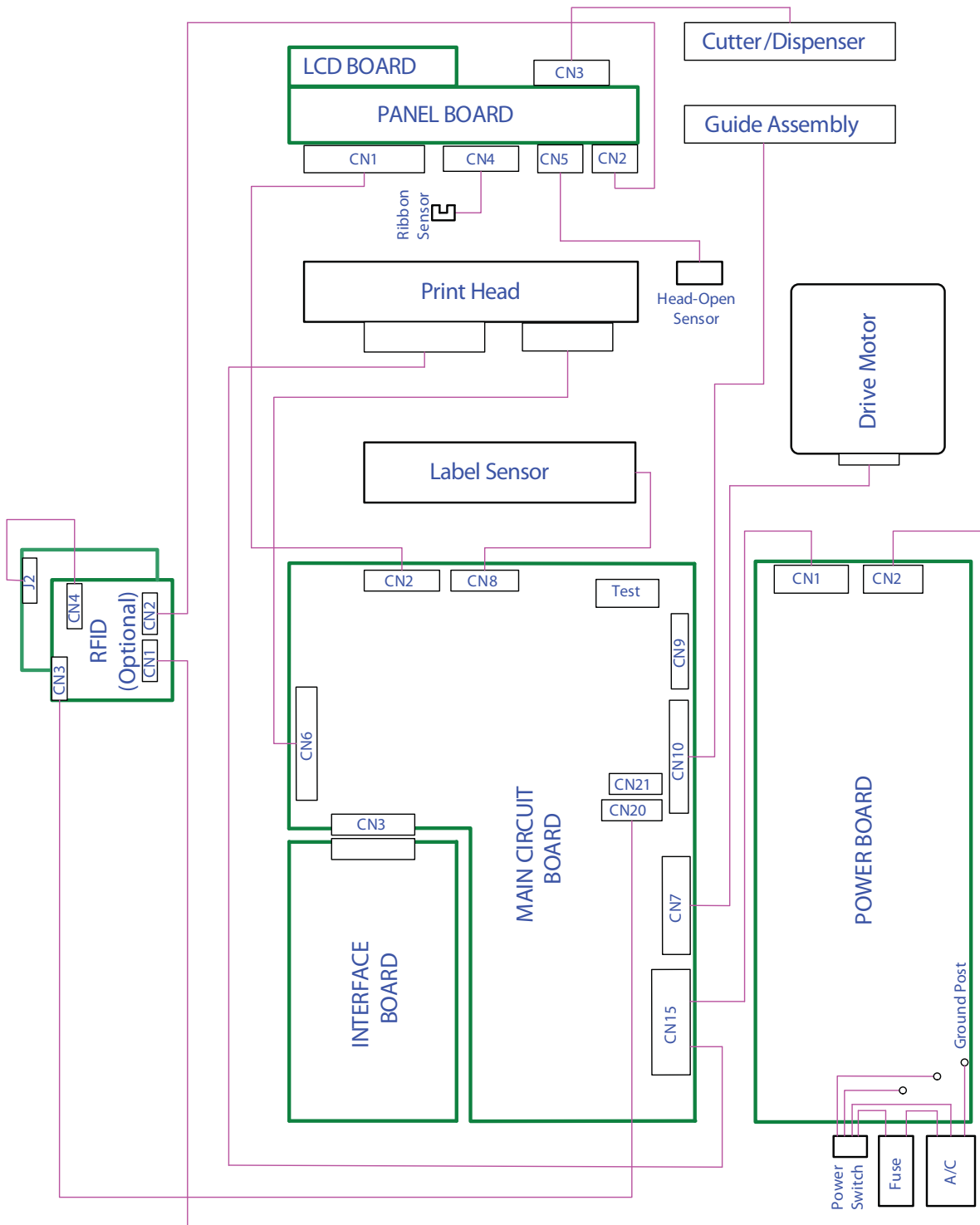


Figure 9-2, Block Diagram

PRINT SETUP DIMENSIONS

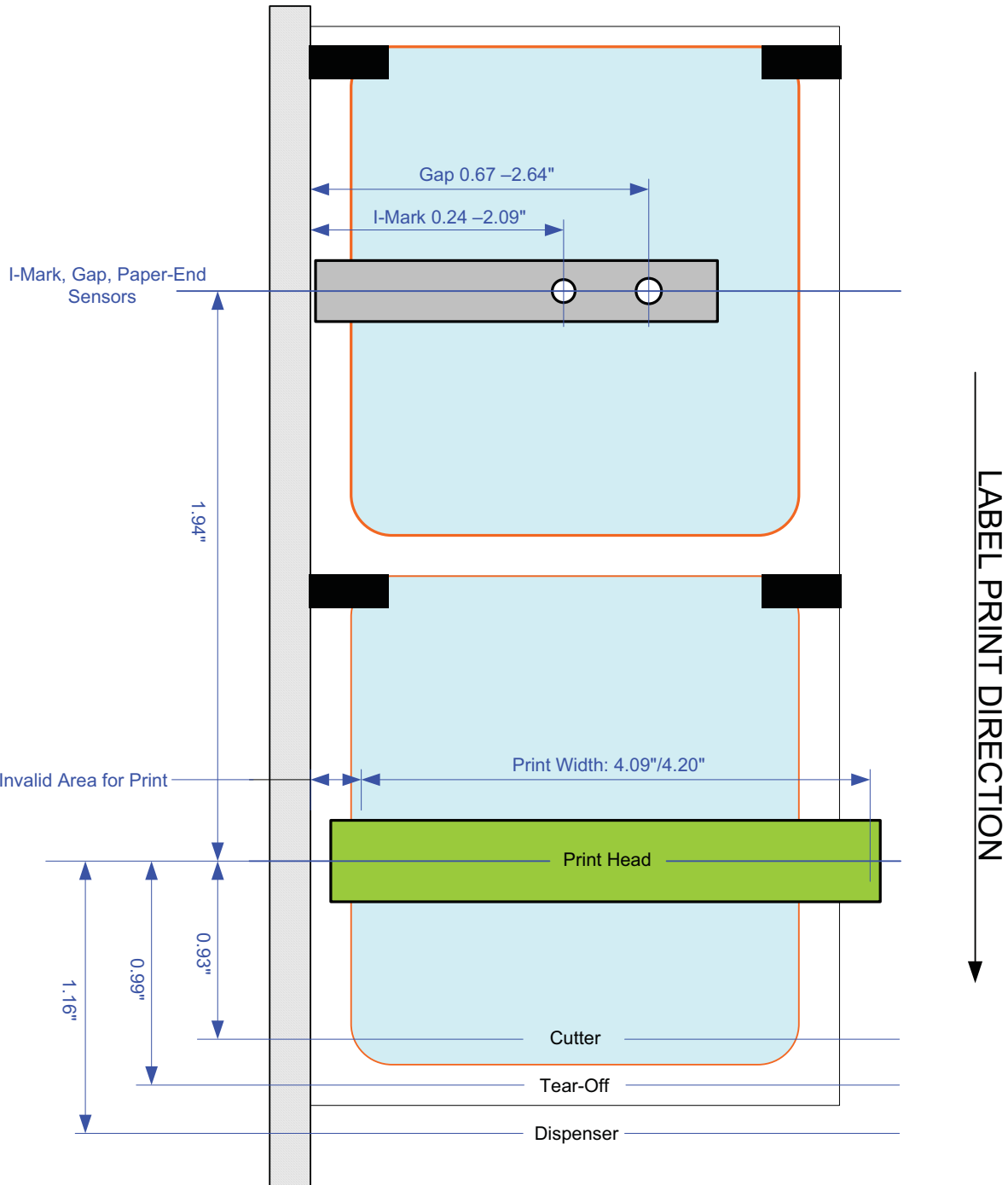


Figure 9-3, Print Setup Dimensions

LABEL REFERENCE POSITION

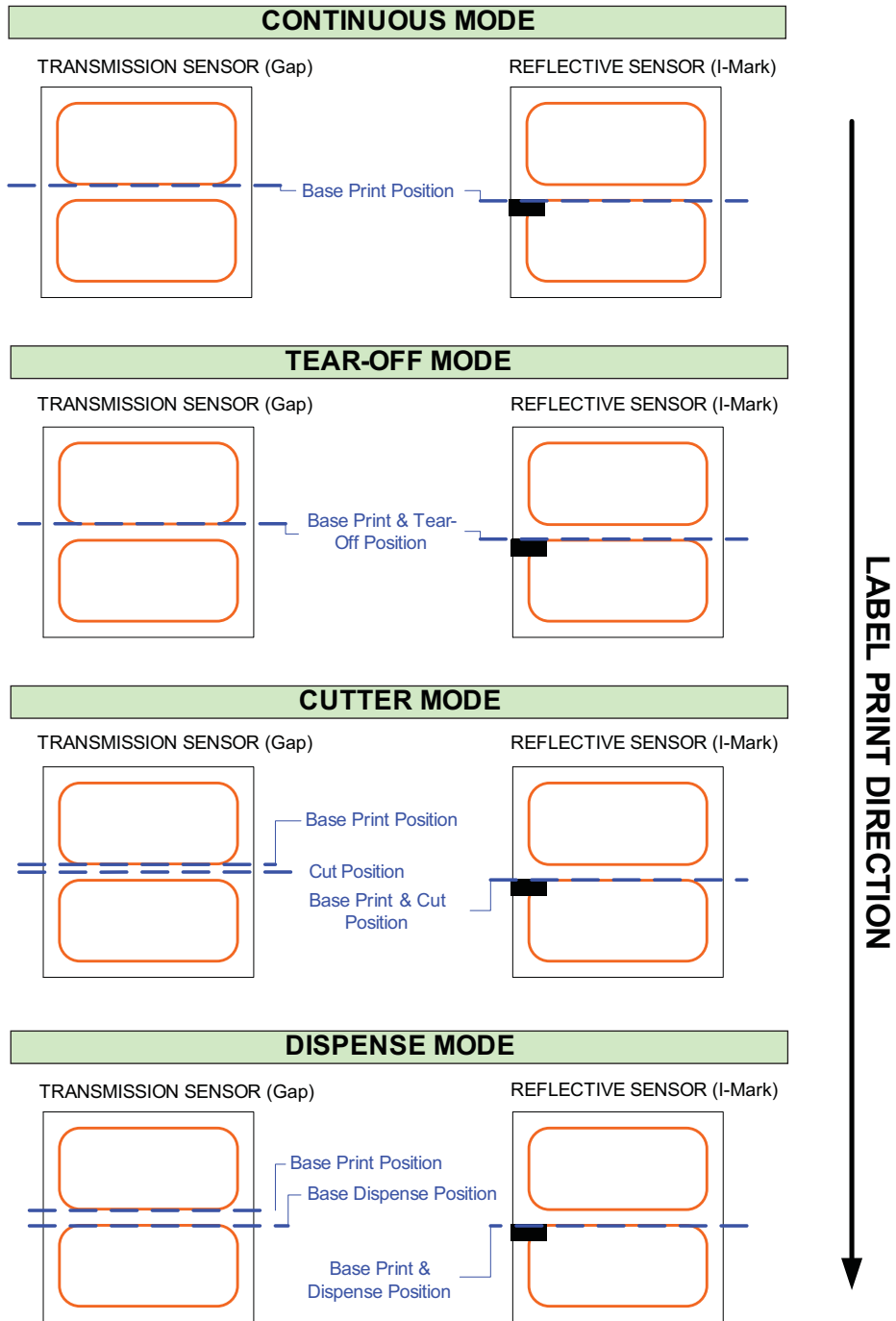


Figure 9-4, Label Reference Position Diagram

PRINTER CONNECTION DIAGRAM

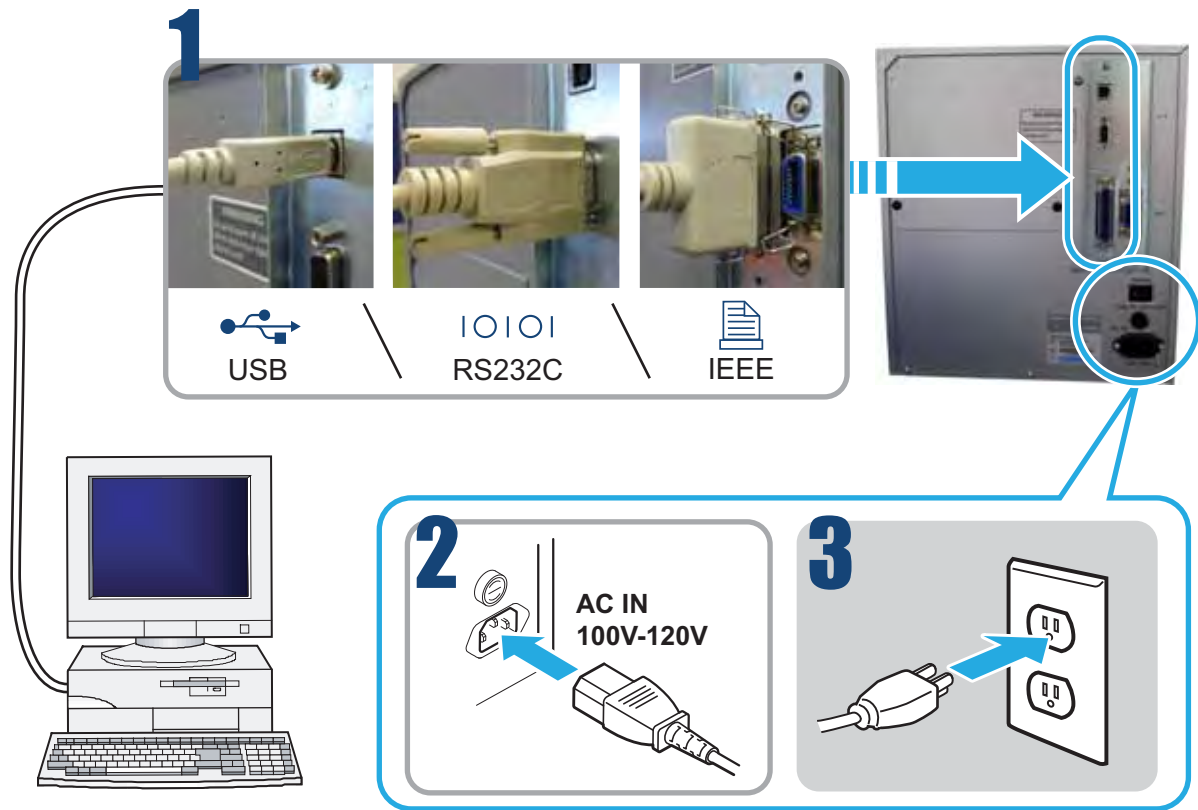


Figure 9-5, Printer Connection Diagram

PRINTER LOADING DIAGRAM

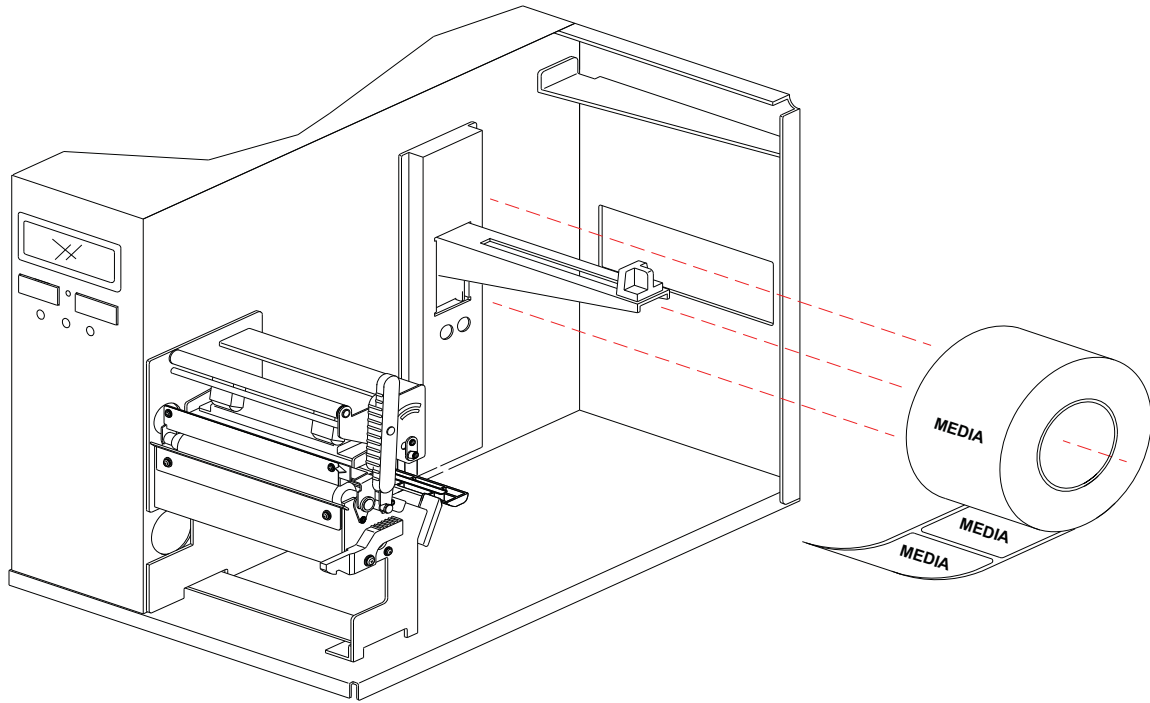


Figure 9-6a, Roll Media Loading

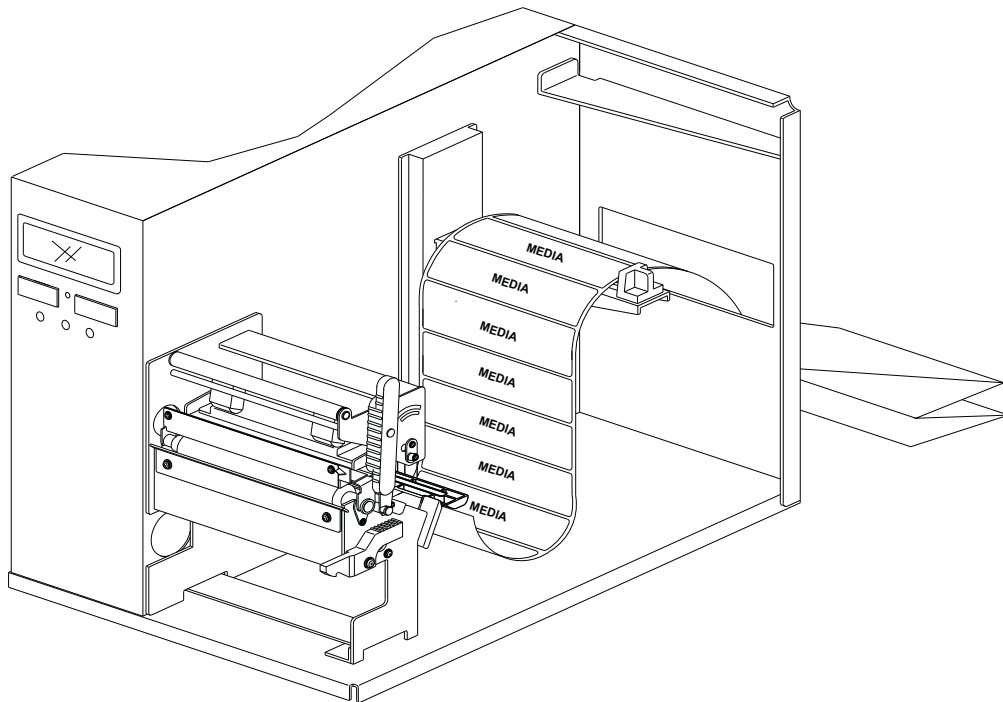


Figure 9-6b, Fan-Fold Media Loading

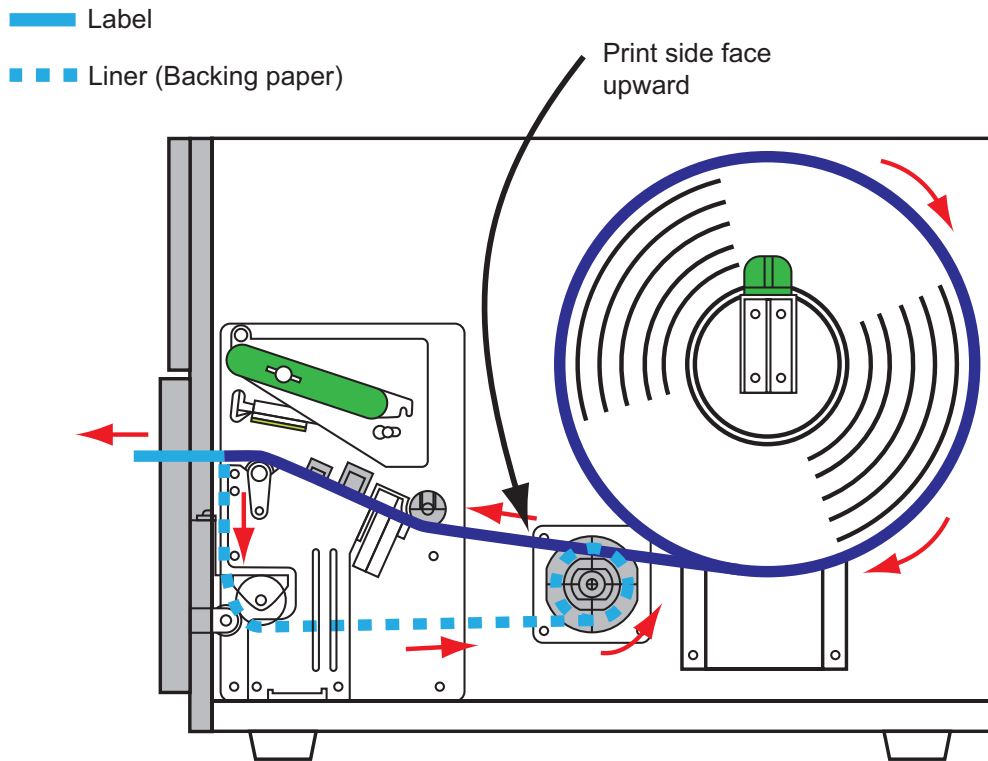
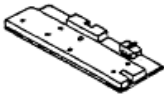
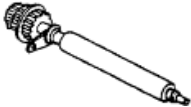


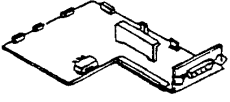
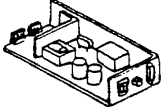
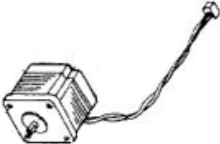



Figure 9-6c, Ribbon Loading

Replacment Parts List

Part Number	Parts View	Part Description
50144501		Print Head
53365601		Platen Roller Sub Assay
55110101		Key Board Assay PCB
50427601		Pitch Sensor Sub Assay
55110001		Cont PCB Assay-A
56422701		Power Supply Unit
56526301		Stepping Motor
55110501		MEMORY PCB ASSY-N-LF

GLOSSARY

GLOSSARY	
AC	(Alternating Current) Electrical current that reverses its direction regularly and continually.
Accessory	An optional assembly that may be used to provide an additional function.
Active Tags	RFID tags which use batteries as partial or complete source of power which are further differentiated by separating them into those with replaceable batteries and those which have the batteries inside a sealed unit. Also referred to as Utilized Active Tags.
Addressability	The ability to address bits, fields, files, or other portions of the storage in an RFID tag.
Advance	To bring forward - the opposite of retract.
Allen Screw	A screw whose head has a hexagonal recess to be driven by an allen wrench.
Aluminum	A silvery, light-weight, metal that resists corrosion.
Anti-Static	Resists static electricity.
Arc	A bow-like curved line or object. The band of sparks between to closely placed electrodes when current leaps the gap from one to the other.
ASCII	(American Standard Code for Information Interchange) The most common format for text files in computers and on the internet. In a ASCII file, each alphabetic, numeric, or special character is represented with a 7-bit binary number (a string of seven 0s or 1s). 128 possible characters are defined.
Assembly	The fitting together of parts, components, or sub-assemblies to form a complete unit.
Asynchronous	A type of two-way communication that occurs with a time delay, allowing participants to respond at their own convenience. This communication allows characters to be sent at irregular intervals by preceding each character with a start bit and following it with a stop bit. The timing of the transmission is not determined by the timing of the previous character.
Audible	A sound loud enough to be heard.
Batch	A grouping of anything.
Baud	The number of signaling elements that occur each second; or stated differently, the number of changes to the transmission media per second in a modulated signal. At slow speeds, one bit of information (signaling element) is encoded in each electrical change. The baud therefore, indicates the number of bits per second (bps) that are transmitted. Assuming asynchronous communication, which requires 10 bits per character, this translates to 30 characters per second (cps). For slow rates, (below 1200 baud), the baud can be divided by 10 to see how many characters per second are sent. At higher speeds, it is possible to encode more than 1 bit in each electrical change. Thusly, 4800 baud may allow 9600 bits to be sent each second. At high data transfer speeds, data transmission rates are usually expressed in bits per second (bps) rather than baud.
Bi-Directional	Capable of operating in two directions along the same plane or medium. In the case a communication cable or an RFID tag, one that transmits as well as receives, read and written.
Binary	A numeral system that represents numeric values using two symbols, typically 0 and 1. A binary number can be represented by any sequence of bits (binary digits), which in turn may be represented by any mechanism capable of being in two mutually exclusive states.
Bits	Refers to a single digit in the binary numeral system. A bit can either be <i>on</i> or <i>off</i> - a 1 or 0. A byte is a collection of eight bits.
Block Diagram	Shows the interconnections between system components by using a pictorial representation of a system and sub-systems linked to illustrate their relationships.
Bolt	A threaded metal rod with a flanged head that is used with a nut to hold parts together.

GLOSSARY	
Bore	A hole in, or through something.
Bytes	A collection of 8 bits used in the binary system.
Capacity	As it relates to RFID, the number of bits or bytes that can be programmed into a tag. This may represent the bits accessible to the user or the total number - including those reserved to the manufacturer (e.g., parity or control bits).
Capture Window/Field	Region of the scanner field in which an RFID tag will operate.
Cavity	A recessed area in something. In the case of a die set, the core is one of two part with the core being its mating half.
Chamfer	To slice off the corners of an angle to create a beveled edge.
Character	Any single numeral, letter, or symbol.
Chassis Assembly	A group of components or sub-assemblies that comprise the base of an assembly.
Circumference	The periphery of a circle or other rounded object - also the measurement of this distance.
Circuit	A network of wires, resistors, and other electronic devices over which electrical impulses travel.
Clockwise	To rotate from left to right.
Closed Systems	As it relates to RFID, a system in which relevant data regarding the attributes of the object is stored in a common database accessible via data link by referencing the individual ID code.
Collar	A sleeve applied to a rod, shaft, or pipe to prevent sideward motion.
Component	A single part that may applied to others to form an assembly.
Composite	An object that is comprised of, or layered with, two or more materials to achieve a desired outcome.
Concave	A curved recess or hollow - the opposite of convex.
Concentric	Multiple items that share a common center - example: a circle centered within a circle.
Configuration	The arrangement of parts or components to operate in unison for a specific activity.
	To program software to enable, disable, or specify how various features will function.
Connector	Devices for joining electrical and electronic circuits through coupling. Typically, one mating half is a plug (male) and the other is a socket (female).
Convex	A spherical shaped surface - one that is curved outward.
Core	The protruding portion of a die set. The core is one of two parts and the cavity being its mating half. The core is convexed and the cavity is concaved.
CPU	(Central Processing Unit) A programmable device that performs all the instruction, logic, and mathematical processing in a computer - is the brains of the computer. The CPU is a microchip that is installed on a motherboard (primary board) that coordinates hardware components. Also referred to as "processor".
Counter-Clockwise	To rotate from right to left.
Couple	Two mating halves that are connected - example: a plug or receptacle.
Cubic	The X, Y, and Z axis all being equal in size - a three-dimensional object that is equally proportioned.
Current	The flow or rate of flow of electric force.
Cycle	A single revolution of a potentially reoccurring activity - in the case of printer, one label being printed.
DC	(Direct Current) Electrical current flowing in a single direction.
Density	The quantity within a given or specific area or unit.
Deviation	A change in course or the measurement of that change.
Diameter	A straight line from the outer edge of a circle, through the center, and onward to the opposite edge. Also the measurement of that distance (dimension).
Dimension	Any measurable distance.

GLOSSARY	
Diode	Allows current to flow in one direction but not the other to protect sensitive electronics. A diode functions by compositing two conductive materials with one possessing low resistance to electrical current on one side and high resistance on the other.
DIP switch Complex	A group of tiny switches directly attached to a circuit board to enable configuration for a particular type of application. These switches are two-position: On/Off.
Direct Thermal	The printing method that uses a chemically coated heat sensitive media. Once the heat from the thermal printhead is applied to the media, the media darkens with the image. Direct thermal printing does not require ribbon and is typically used in applications where the label needs to endure for a year or less.
Disable	To deactivate or make unable to function.
Divergent	To deviate from the norm or to possess opposing positions.
DPI	(Dots Per Inch) The quantity of printed dots within a square inch area - the print density.
DRAM	(Dynamic Random Access Memory) DRAM is the most common kind of RAM and is a network of electrically-charged points in which a computer stores quickly accessible data in the form of 0s and 1s. Each storage or memory cell can be directly accessed if the intersecting row or column is known. Each cell consists of a capacitor and a transistor.
Drive Train	The components and sub-assemblies that comprise the mechanical apparatus of motion or kinetic energy.
Eccentric	Multiple items that do not share the same center - example: a circle whose center axis is not the same as that of another to whom it is connected. The opposite of concentric.
E-Clip	Type E snap ring.
EEPROM	(Electrically Erasable Programmable Read-Only Memory) Are ROM chips that do not have to be removed to be rewritten. Nor does the entire chip have to be completely erased to change a specific portion. Changing the contents does not require additional dedicated equipment. The localized application of an electric field to each cell erases the targeted cells which can be rewritten. Since only 1 byte can be changed at a time, EEPROM's are versatile but slow.
Electronic Label	A label that has an electronic RFID tag embedded within.
Electromagnetic Coupling	In RFID, a system that uses a magnetic field as means of transferring data or power.
Electrostatic Coupling	In RFID, a system which uses the induction of voltage on a plate as a means of transferring data or power.
Ellipse	An oval shape that is symmetrical on either side of its center when divided into quadrants.
Embossed	Characters or graphics that are raised above the remaining surface.
Enable	To activate or make able to function.
Encompass	To surround, encircle, or contain.
Error Correcting Code	(ECC) In RFID, supplemental bits in a data transfer used in conjunction with a polynomial algorithm in order to compute the value of missing or erroneous data bits. Example: for a 32-bit data transmission, seven additional bits are required.
Error Correcting Mode	Relative to RFID, a mode of data communication in which missing or erroneous bits are automatically corrected.
Error Correcting Protocol	Relative to RFID, the rules by which the error-correcting mode operates.
Error Management	In RFID, the techniques used to ensure that only correct information is presented to the system's user.
Error Rate	In RFID, the number of errors per number of transactions.
Exciter	In RFID, the electronics which drive an antenna. When coupled with antenna, they are collectively referred to as a scanner. Also referred to as a transmitter.
Expansion Port	A plug accessing additional I/O capability on a computer or peripheral device.
Eye-Mark Media	Print media with a mark on the paper backing between each label for the label sensor to read. This mark is used by the printer to identify the end of the printed label so that the next up can be properly positioned for printing.

GLOSSARY	
Factory Programming	Relative to RFID, the programming of information into a tag occurring as part of the manufacturing process resulting in a read-only tag.
Field Programming	In RFID, programming that usually occurs before the tag is installed on the object to be identified enabling the introduction of data relevant to the specifics of the application. However, the tag would typically have to be removed from its object.
Field Protection	In RFID, the ability to limit the operations that can be performed on portions of data fields stored in a tag.
Fillet	To round off the sharp edges of the angle.
Flange	The projecting rim of an object used to keep another object or objects in place.
Flash Memory	A form of rewritable memory chip that allows multiple memory locations to be erased or written in one programming operation. Flash Memory is very high-speed and non-volatile - does not need power to maintain the stored information. Its information is stored in an array of floating gate transistors called "cells".
Font	A type or style of letter or numeral characters used in written text.
Frequency	The number of times a signal executes a complete excursion through its maximum and minimum values and returns to the same value. The number of vibration cycles.
Gap Media	Print media with a space between each label where only the paper backing exists. The printer's sensor uses this "gap" to identify when the printed label ends and to properly position the next label for printing.
Gauge	A unit of measurement used to describe the nominal thickness of wire. The higher the gauge number, the smaller the diameter.
Gear	A system of toothed wheels meshed together so that the motion of one is passed on to the others.
Gigabytes	Used to describe data transfer rates or storage capacity of 1 billion bytes.
Groove	An elongated slot cut into an object.
Hertz	Radio waves or other electromagnetic radiation resulting from oscillations of electricity in a conductor. Also the measurement of those oscillations.
Hexidecimal	A numbering system composed of six letters (A-F) and ten numbers (0-9) used to condense binary numbers.
Hex Screw	A threaded rod having a flanged head that is comprised of six sides - a type of hardware used to attach two or more objects.
Hole	In engineering: a recess that does not penetrate completely through as a bore or orifice. Term may be casually used in lieu of a bore or orifice.
Horizontal	On a level plane ninety-degrees from vertical.
Hz	(Hertz) Radio waves or other electromagnetic radiation resulting from oscillations of electricity in a conductor. Also the measurement of those oscillations.
Icon	An image or picture that has a specific meaning.
I.D. Filter	In RFID, software that compares a newly read ID with those in a database or set.
Idle Gear	A toothed wheel that is not directly driven, but instead receives motion from another.
Idle Roller	A non-toothed wheel that is not driven - in the case of printers, it is typically used to provide tension on a timing belt. Also referred to as "tension roller".
Illuminate	To give or emit light.
Inductive Coupling	In RFID, systems that use the inducing of a current in a coil as a means of transferring data or power.
Intermittent	Stopping and starting again at intervals.
In-Use Programming	The ability to read from, and write to, an RFID tag while attached to its object.
Junction	A place or point of joining or crossing.
Kinetic	The science dealing with the motion of masses in relation to the forces acting on them.

GLOSSARY	
Key	The button on a panel that may be pressed to send an electrical signal to influence a predetermined activity.
Keyed	A physical object shaped in a manner so as to prevent unwanted movement or to ensure desired movement.
Kg	(Kilogram) A unit of weight measure within the metric system.
Kilo-Bytes	Used to describe data transfer rates or storage capacity of approximately 1000 bytes.
Knob	A rounded handle to facilitate the manual opening, closing, securing, or otherwise movement of the object to which it is attached.
Knurled	An item that has recessed grooves or elevated areas on its surface to increase manual grip.
Label	Print media that has been used or printed upon that has adhesive on one side.
LAN Interface	(Local Area Network) A computer network limited to the immediate area, consequently capable of transmitting data at a very fast rate. Usually the computer is limited to the same building, or floor of a building, as the periphery device.
Latch	An object that is designed to be moved from one position to another for the purpose of preventing or allowing the opening of another object.
Lateral	Movement to the left or to the right - horizontal movement.
LCD	(Liquid Crystal Display) A display technology involving optical glass panels whose opacity can be controlled by electrical signals. A liquid crystal surface is sandwiched between two polarizing panels and when voltage is applied to certain areas, the crystal darkens. A light source behind the panel transmits through the transparent crystals and is mostly blocked by the darkened ones.
LED	(Light Emitting Diode) A semiconductor light source that emits visible light or invisible infrared radiation. The color of the emitted light depends on the chemical composition of the semiconducting material used.
Lever	An object that turns on a fixed point usually to engage or disengage a latch.
Laminate	A film or sheet placed onto and adhered flatly over another material.
Life	Relative to RFID, the functional period within which maintenance, adjustment, and repair is not reasonably expected.
Linear	The measurement of length without consideration of other dimensions.
Linerless Media	Print media that does not have a space between each label as does the I-mark and gap type media. This media is continuous and is divided based on printer programming.
Link	An active connection to another document, graphic, or address. By selecting the designated button, text, graphic, or screen location; one is taken to the predetermined linked location.
M	(Meter) A unit of measure in the metric system equal to 39.37 inches.
MB	(Megabytes) Used to describe data transfer rates or storage capacity of approximately 1 million bytes depending on the manner of compression.
MM	(Millimeter) A unit of measure in the metric system equal to 0.03937 (1/25) inches.
Media	In printing, a batch of unprinted labels or tags.
Megabytes	Used to describe data transfer rates or storage capacity of approximately 1 million bytes depending on the manner of compression.
Menu	A display of items that may be chosen.
Meter	A unit of measure in the metric system equal to 39.37 inches.
Millimeter	A unit of measure in the metric system equal to 0.03937 (1/25) inches.
Module	A self-contained unit that may be plugged into another unit to operate.
Multimeter	A device that is used to measure output units relating to electrical current.
Memory Card	Relative to RFID, a read/write or reprogrammable tag in credit card size.
Memory Modules	A read/write or reprogrammable RFID tag.

GLOSSARY	
Mobile Inventory Vehicle	In RFID, a vehicle equipped with a system for locating tagged vehicles, containers, and other objects for the purpose of inventory control.
Modulation	In RFID, the methods of altering carriers in order to transmit the encoded information.
Nest	A set of similarly shaped objects with one smaller and resting within the other.
Nominal	The point between a positive and negative deviation which is considered to be optimum.
Nut	A small metal block with a threaded hole through its center for screwing onto a bolt.
Nylon Material	A milky-white, synthetic material used in manufacturing that is purchased in blocks and machined to the desired shape - resembles plastic.
Offset	In label printing, it is the repositioning distance that the printer must make after advancing the printed label for cutting or dispensing. The offset is the distance that the media must be retracted following one of those activities so that printing may again take place.
Omni-Directional	The ability of an RFID tag to operate in any orientation.
Orientation	Having to do with the manner or angle of placement.
Orientation Sensitivity	In RFID, the range or measurement of decreased readability by non-optimal orientation.
Orifice	An opening for which something is to pass through - similar to a bore.
O-Ring	A typically circular object made of round, elastic material to provide a seal between two objects.
Oscillate	To move back and forth along a span.
Pan Head Screw	A threaded rod with a rounded, flanged head used to attach multiple object together.
Paper	In printing applications, the temporary backing for print media. The paper is removed following printing so the label may be applied.
Parallel	Objects extending in the same direction maintaining the same distance part.
Parallel Interface	An interface between computer and printer where the computer sends multiple bits of information to the printer simultaneously by sending each bit over a separate wire.
Parameter	The span or area that something is allowed to exist or operate.
Parity	A simple form of error checking that is used in serial communication. A parity bit is a binary digit that is added to a group of bits to detect the presence of an error. The parity bit take on the value of an 0 or a 1 to satisfy a constraint on the overall parity of a binary number. The parity scheme in use must be specified as even or odd. Parity is even if there are an even number of 1 bits, and odd otherwise. None may also be chosen.
Passive Tags	Passive RFID tags that do not contain an internal power source. They are externally powered and typically derive their power from the carrier signal radiated from the scanner.
PC	(Personal Computer) An electronic computing device that may be individually and independently used or coupled to other similar devices.
Perforation	A series of through-holes in a material to facilitate tearing apart.
Perpendicular	At right angles to a given line or plane - a vertical line is perpendicular to a horizontal one and vise-versa.
Phenolic Material	A black, synthetic material used in manufacturing that is purchased in blocks and machined to the desired shape - resembles plastic.
Pinion Gear	A smaller gear meshed with a larger one.
Pitch	Physical top of form of media placed under the print head elements in the feed direction.
Plastic	A synthetic material typically rigid in nature that is molded to its useful shape. Plastic is typically injection molded along with its color additive and may be of any color chosen.
Post	A pin or shaft to which an object may be tethered or latched.
Potentiometer	A variable resistor used to adjust voltage to affect various mechanical activities. This electronic component is comprised of two terminals connected to either end of an resistive element and a conductor that can be moved between the two ends, thus allowing the creation of a resistor or voltage divider.
Primary	Something first in order or importance.

GLOSSARY	
Print Assembly	The sub-assembly of a printer that comprise the printing components.
Print Head	The device on a direct thermal or thermal transfer printer containing the heating elements that causes an image to be transferred to print media.
Processor	A programmable device that performs all the instruction, logic, and mathematical processing in a computer - is the brains of the computer. The processor is a microchip that is installed on a motherboard (primary board) that coordinates hardware components. Also referred to as "CPU".
Profile	A side view of an item.
Program	To enter or send to the processor, the control parameters for electronic equipment to operate.
Proportional	To be equal.
Proximity Sensor	A device that detects and signals the presence of a selected object at, or near, the sensor's location.
Pulley	A toothed wheel for providing movement to a belt.
Quadrant	One quarter of the circumference of a circle.
Radial	Branching out in equal distances from a common center.
Radius	A straight line from the center of a circle or sphere to its periphery - also the measurement of its distance.
RAM	(Random Access Memory) A network of electrically-charged points in which a computer stores quickly accessible data in the form of 0s and 1s. Each storage or memory cell can be directly accessed if the intersecting row or column is known.
Ratio	The quotient of one quantity divided by another of the same kind.
Reader	Relative to RFID, a device containing the digital electronics which extract and separate the information from the format definition and error management bits.
Read/Write	Relative to RFID, many applications require that new data or revisions to data already in the tag, be entered while it remains on the object. Some items with this capability of being re-programmable are read/write tags, memory cards, or memory modules.
Receive Buffer	An area of temporary data storage to help compensate for differences in the transfer rate and the processing ability of the printer.
Receptacle	A female connector to which a male connector may be inserted - typically for electrical current.
Relay	A simple electro-mechanical switch made up of an electromagnet and a set of contacts. Relays use a small amount of power to energize things that require a greater amount of energy. Sometimes relays are serial connected so that one smaller relay activates a larger relay which in turn, activates another larger still, and so on until the thing that is desired to be activated - is.
Retain	To keep or to hold in place.
Retract	To withdraw - the opposite of advance.
Resistor	A two-terminal electrical or electronic component that resists the flow of current producing a voltage drop between its terminals in accordance with Ohm's law. This electrical resistance is equal to the voltage drop across the resistor, divided by the current that is flowing through it.
RF/AIS	(Radio Frequency Automatic Identification Systems)
RF/DC	Systems that communicate over a radio link between a host computer and a data source. RF/DC enhances the capabilities of automatic ID Systems by providing the capabilities of hard-wire data communications without the physical restrictions interconnecting wires.
RFID	(Radio Frequency Identification) A method of identifying unique items using radio waves. Typically, a reader communicates with a tag, which holds digital information in a microchip. But there are chipless forms of RFID tags that use material to reflect back a portion of the radio waves beamed at them.

GLOSSARY	
RFID Tags	<p>A system of finding the position or location of assets.</p> <p>A microchip attached to an antenna that is packaged in a way that it can be applied to an object. The tag picks up signals from, and sends signals to, a reader. The tag contains a unique serial number, but may have other information and come in many forms, such as smart labels that can have a barcode printed on it, or can simply be mounted inside a carton or embedded in plastic. RFID tags can be active, passive, or semi-passive.</p> <p>Each tag broadcasts a signal to be received by three reader antennas. The time each signal is received is passed on to a software system that uses triangulation to calculate the location of the asset.</p>
Rigid	Not flexible - stiff.
ROM	<p>(Read-Only Memory) Also known as firmware, is an integrated circuit programmed with specific data when it is manufactured. There are five basic types: ROM, PROM, EPROM, EEPROM, and Flash Memory.</p> <p>Each type has unique characteristics, but they all are types of memory that have two things in common: the stored data is non-volatile (not lost when power is removed) and the stored data is unchangeable or requires a special operation to do so.</p> <p>ROM chips contain a grid of columns and rows. A diode is used to connect the lines and gain access to the data if the value is 1. If the value is 0, the lines are not connected and access is denied.</p>
RPM	(Revolutions Per Minute) The number of cycles within the time span of one minute.
Route	The path or course taken to get from one location to another - example: the routing of a cable within a machine.
SAM	(Serial Access Memory) Stores data as a series of memory cell that can only be accessed sequentially. Works very well for memory buffers where data is normally stored in the order in which they will be used.
Scale	<p>The units to measure distance - or a short tool for measurement.</p> <p>To increase or decrease the proportionate size of an object - example: text or graphics on a printed label.</p>
Scanner	In RFID, an antennas transmitter and receiver electronics integrated in a single package.
Screen	An electronic display.
Seat	To nest or couple one object to another. The same as to nest.
Secondary	The next to follow the primary in sequence or importance.
Sensitivity	The degree of ease or difficult to gain a response - example: a sensor transmitter signal may require increase to penetrate the thickness of print media in order to be receipted by its receiver.
Sensor	A device that responds to a physical stimulus and produces and electronic signal.
Separation	The operational distance between two RFID tags.
Sequential	One to follow another in a specified order - examples: 1, 2, 3; A, B, C.
Serial Interface	A general-purpose interface that can be used for almost any type of device in which only 1 bit of communication is transmitted at a time.
Set Screw	Attachment hardware specifically used to secure an object may be moved in a specific position or location.
Shaft	Any rod, bar, or tube.
Simultaneous	To take place at the same time.
Sleeve	A thin hollow material that is inserted onto another to provide proportionate spacing.
Snap Ring	A circular clip that may be applied to a shaft, etc. to prevent another object from moving - used to retain objects in position.
Solid	<p>An item that is not porous.</p> <p>An item that is not transparent or translucent.</p>

GLOSSARY	
Spacer	Any object of purpose to maintain a specific distance from two other objects - example: a sleeve or washer.
Spindle	A shaft or rod that is fixed on one or both ends and spins on its axis while maintaining its projection.
SRAM	(Static Random Access Memory) A type of memory that is faster and more reliable than the more common DRAM. The term <i>static</i> is derived from the fact that it doesn't need to be refreshed like DRAM.
Stainless Steel	A shiny, mirror-like carbon steel alloyed with chromium to inhibit rust.
Steel	Metal that contains a specific percentage of carbon. The percentage of carbon determines its strength, in addition to how prone it is to rust.
Stepper Motor	An electrical motor designed to rotate in both directions and to move in incremented distances.
Sub-Assembly	A group of components assembled to form a complete unit that is a part of a larger unit.
Switch	A small mechanical device when altered sends an electrical signal to influence a predetermined activity. Unlike a button or key, switches may have multiple positions.
Tag	Relative to RFID, the transmitter/receiver pair of transceiver plus the information storage mechanism attached to the object. Also referred to as Transponder.
Thermodynamics	The science that deals with the relationship of heat and mechanical energy - also the conversion of one into the other.
Threads	The spiral grooves on the shaft of a screw,
Three-Dimensional	The three projectories of an object: X axis is the distance left and right, the Y axis is the distance up and down, and the Z axis is the distance inward and outward.
Torsion Spring	A piece of wire bent into a spiral and connected on each end by different objects to allow them to be pulled apart and then automatically return to their original position once released.
Transformer	A device used to increase or decrease electricity's voltage and current. The device consists of one or more windings (typically copper) which, the ratio of the number of turns inversely determines the voltage change. The windings are wrapped around a magnetic core affecting magnetic induction.
Transistor	A device used to amplify a signal or open and close a circuit. Is constructed of a semiconductive material and is comprised of three terminals where one can be used to control the flow of current through the other two.
Translucent	When a medium is of a condition so as to allow light to filter.
Transparent	When a medium is of a condition so one can see through it unfettered.
Transponder	Relative to RFID, the transmitter/receiver pair of transceiver plus the information storage mechanism attached to the object. Also referred to as Tag.
Tread	The act of an object making repetitive contact upon another that is in motion.
Troubleshoot	The act of locating the source of a problem or problems.
Two-Dimensional	Two of the projectories of an object: X axis is the distance left and right and the Y axis is the distance up and down. In a two-dimensional perspective, the Z axis is not recognized.
Uniform	The state of multiple objects being the same.
Units	Any fixed quantity, measure, etc.
USB Interface	(Universal Serial Bus) An external peripheral interface standard for communication between a computer and external peripherals over a cable using bi-serial transmission.
Value	The quantity for which a symbol stands.
Vertical	A plane or axis that is plum - the Y axis.
Voltage	The units of electrical force - the ampere current that flows through a conductor.
Volume	The amount of space occupied in three dimensions - cubic contents.
	The strength or loudness of sound.
Washer	A flat disk of metal, rubber, etc., used to make a seat for the head of a bolt, screw, or nut.

GLOSSARY	
Wattage	The amount of electrical power to operate an electrically powered device - arrived by multiplying amperage by voltage.
Wear	To diminish in quality by repetitive activity.
Wiring Harness	Multiple electrical wires bundled together.
X-ON/X-Off	<p>A protocol for controlling the flow of data between computers and other devices on an asynchronous serial connection.</p> <p>For example, a computer typically sends data to a printer faster than the printer can print. The printer contains a buffer where data is stored until it catches up, a small microprocessor in the printer sends back an Xoff signal to stop sending data. When enough data is printed and the buffer storage becomes free, the printer sends an Xon signal to resume sending data.</p>

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