



DCS & Labeling Worldwide

Lt408



OPERATOR'S MANUAL

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**Be sure to ask your dealer about our maintenance contracts
to ensure peace of mind during your usage of SATO products**

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SATO International

Warning: This equipment complies with the requirements in Part 15 of FCC rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.

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TABLE OF CONTENTS

1 OVERVIEW

1.1	General Specifications	1-2
-----	------------------------------	-----

2 INSTALLATION

Safety Precautions.....	2-2
2.1 Unpacking.....	2-4
2.1.1 Included Accessories	2-5
2.1.2 Parts Identification	2-6
2.2 Loading the Carbon Ribbon.....	2-10
2.3 Loading Labels A	2-11
2.3.1 Loading Roll Paper	2-12
2.3.2 Using the Dispenser	2-13
2.3.3 Adjusting the Paper Sensor	2-14
2.4 Replacing the Print Head.....	2-15

3 CONFIGURATION AND OPERATION

3.1 Operating Modes.....	3-1
3.2 The Operation Panel	3-2
3.3 Screen Icons And Their Meaning	3-3
3.3.1 How to adjust Screen Contrast	3-4
3.4 ONLINE And OFFLINE Modes.....	3-5
3.4.1 Online Mode	3-5
3.4.2 Offline Mode	3-5
3.5 User Mode.....	3-6
3.5.1 Entering User Mode	3-6
3.5.2 Setting Buzzer Volume, Print Pitch, Print Offset, Print Speed, Print Darkness	3-7
3.5.2 Setting Print Speed	3-7
3.5.3 Setting Print Darkness	3-8
3.5.4 Setting Pitch Offset	3-8
3.5.5 Setting Print Offset	3-8
3.5.6 Setting Zero Slash Changeover	3-9
3.5.7 Setting Proportional Pitch	3-9
3.6 Interface Mode.....	3-10
3.6.1 Entering Interface Mode	3-10
3.6.2 Enabling Interface Card Configuration	3-10
3.6.3 Handling CR/LF codes	3-11

3.7	Advanced Mode	3-12
3.7.1	<i>Entering Advanced Mode</i>	3-12
3.7.2	<i>Selecting The Print Density</i>	3-12
3.7.3	<i>Choosing Dispenser or Continuous Operation</i>	3-12
3.7.4	<i>Backfeed Operation Settings</i>	3-13
3.7.5	<i>Setting the Print Mode</i>	3-13
3.7.6	<i>Configuring the Pitch Sensor</i>	3-14
3.7.7	<i>Configuring the Paper Sensor Type</i>	3-14
3.7.8	<i>Turning Head Check Function ON/OFF</i>	3-14
3.7.9	<i>Choosing the Type of Head Check</i>	3-14
3.7.10	<i>Enabling/Disabling External Signal Output</i>	3-15
3.7.11	<i>Selecting the Type of External Signal Output</i>	3-16
3.7.12	<i>Selecting Reprint via External Signal Output</i>	3-16
3.7.13	<i>Setting the Calendar Chip (optional chip)</i>	3-16
3.7.14	<i>Using the Auto Online Feature</i>	3-17
3.7.15	<i>Enabling Auto Feed</i>	3-17
3.7.16	<i>Enabling Auto Feed On Error</i>	3-17
3.7.17	<i>Specifying the Euro Code Symbol</i>	3-18
3.7.18	<i>Specifying the Protocol Code Format</i>	3-18
3.8	HEX Dump Mode	3-19
3.8.1	<i>Entering HEX Dump Mode</i>	3-19
3.8.2	<i>Selecting Data To Dump</i>	3-19
3.8.3	<i>Controlling the Hex Dump Mode</i>	3-19
3.9	Test Print Mode	3-20
3.9.1	<i>Entering Test Print Mode</i>	3-20
3.9.1	<i>Choosing What The Test Print Contains</i>	3-20
3.9.2	<i>Setting Test Print Width for Configuration, Barcode and Head Check</i>	3-21
3.9.3	<i>Setting the Size of the Factory Test Print</i>	3-21
3.9.4	<i>Starting the Test Print</i>	3-21
3.10	Overview of All Modes	3-22
3.11	Restoring Factory DeFault Settings	3-31
3.11.1	<i>Entering Default Mode</i>	3-31
3.11.2	<i>If You Chose to Reset Printer Settings</i>	3-32
3.11.2	<i>If You Chose Alt Protocol Code</i>	3-32
3.11.3	<i>Completion of Default Setting</i>	3-32
3.12	Understanding Continuous Print and Dispenser Operations	3-33

4 CLEANING AND MAINTENANCE

4.1	Introduction	4-1
4.2	Cleaning The Print Head, Platen and Rollers	4-1
4.3	How To Clean The Printer (Cleaning SET).....	4-2
4.4	How To Clean The Printer (Cleaning SHEET).....	4-3
4.5	Adjusting Print Quality	4-4
4.5.1	<i>Adjusting Print Darkness</i> 4-4	
4.5.2	<i>Adjusting Print Speed</i> 4-5	

5 INTERFACE SPECIFICATIONS

5.1	Interface types.....	5-1
5.2	Interface Card DIP SWITCH Settings (RS-232C)	5-2
5.3	Interface Card DIP SWITCH Settings (LAN).....	5-3
5.4	Interface Card DIP SWITCH Settings (Wireless LAN).....	5-3
5.6	Serial Interface Specifications (RS-232C).....	5-5
5.7	READY/BUSY	5-6
5.8	Single Job Buffer	5-7
5.9	Multi Job Buffer.....	5-8
5.10	X-ON/X-OFF	5-9
5.11	Single Job Buffer	5-10
5.12	Multi Job Buffer.....	5-11
5.13	Parallel Interface SPECIFICATIONS (Centronics).....	5-12
5.14	Single Job Buffer	5-14
5.15	Multi Job Buffer.....	5-16
5.16	IEEE 1284 Interface.....	5-19
5.17	Interface Signals	5-21
5.18	Single Job Buffer	5-22
5.19	Multi Job Buffer.....	5-24

TROUBLESHOOTING

6.1	Initial Checklist.....	6-1
6.2	Using the Centronics (Parallel) Interface.....	6-1
6.3	Using the RS232C (SERIAL) Interface.....	6-3
6.4	Understanding the STATUS INDICATORS.....	6-4
6.5	Understanding the LCD Error Messages.....	6-5
6.6	LCD Warning Messages	6-8
6.7	Troubleshooting Guide.....	6-9

OPTIONAL ACCESSORIES

7.1	Introduction	7-1
7.2	Available Interface Boards	7-1
7.3	Label Management Accessories.....	7-2

1

OVERVIEW

Thank you for your investment in this SATO printer product.

This Operator's Manual contains basic information about the installation, setup, configuration, operation and maintenance of the printer.

A total of seven topics are covered herein, and they are organized as follows:

- Section 1: Overview**
- Section 2: Installation**
- Section 3: Configuration and Operation**
- Section 4: Cleaning and Maintenance**
- Section 5: Interface Specifications**
- Section 6: Troubleshooting**
- Section 7: Optional Accessories**

It is recommended that you become familiar with each section before installing and maintaining the printer. Refer to the **Table Of Contents** at the front of this manual to search for the relevant information needed. All page numbers in this manual consist of a section number followed by the page number within the stated section.

For specialized programming, refer to the separate Programming Manual located on the utility CD-ROM.

1.1 GENERAL SPECIFICATIONS

The SATO Lt408 dual use (Thermal Transfer and Direct Thermal) printer engine is a complete, high-performance labeling system designed for integration into in-line production facilities.

The key features of the Lt408 are:

- Low cost print engine without compromises in functionality
- Large 128 dot by 64 dot LCD panel with graphical icon display
- Clear printing at a fixed resolution of 203dpi
- Support for a wide range of I/O interfaces
- Supports SATO Barcode Programming Language for enhanced customizability
- Lightweight and easy to mount
- Comes in Left-hand and Right-hand orientations
- User friendly label and ribbon path

All printer parameters are programmable using the front panel controls and via software. All popular bar codes, including 2-D codes, seven human-readable fonts and two fast and efficient vector fonts, are resident in memory, providing literally thousands of combinations of type styles and sizes.

Feature	Lt408
Print resolution	203dpi for economical labeling solutions
Print method	Thermal Transfer and Direct Thermal
Label sizes supported (using default internal memory)	4 inches (W) by 9.4 inches
Label sizes supported	4 inches (W) by 49.2 inches at 203 dpi
Interfaces available	One of the following interfaces installable upon purchase: High speed RS-232C (25-pin), RS-232C, Wireless LAN, LAN, USB, RS-422/485, IEEE 1284/parallel interface

1.1 GENERAL SPECIFICATIONS (CONT'D)

Specification	Model Lt408 (LH/RH)
Electrical Characteristics	
Print method	Thermal transfer or direct thermal
Head density	8 dots/ mm (203 dpi)
Printable Area	W104 mm x pitch 1249 mm (203dpi)
	Not printable for 3mm from the inner edge
Print speed (Max)	2 to 6 inches/sec @203dpi (adjustable in 1-inch/sec increments)
	Note: Maximum speed may be further dependent on the type of print layout, paper, or carbon ribbon in use.
CPU	32-bit RISC
Onboard Memory	4MB FLASH ROM, 16MB SDRAM main memory (2.95MB allocated for Receive Buffer), 32KB FRAM
Memory cartridge	Not supported
Print Characteristics	
Print/Dispensing Modes	Continuous, Dispenser, Linerless (if optional linerless kit is installed)
Print Format	Transmitted from host (computer)
Paper Thickness	0.08 mm to 0.26 mm supported. Note: Be sure to use only printer supplies manufactured or certified by SATO.
Paper Size *in continuous mode	Width: 10mm to 112mm (13 mm to 115 mm including liner) Pitch 15mm to 1252mm (18 mm to 1255mm including liner)
Paper Supply Method	Via external unwinder
Label Pitch Sensor	Reflective type (I-mark) and Transmissive type (Gap)
Carbon ribbon Dimensions Thickness of base material Color Winding direction	Be sure to use the specified carbon ribbons manufactured or specified by SATO W25mm to 111m by 450 m/roll 4.5 µm Black (standard), also red, blue, purple, and green Face-In and Face-out winding (see table below)

Labels and Ribbons available for Lt408		
Ribbons		
Type	Wax	T102C, T101A, T104C
	Wax/Resin	T110A, T112D, T123A, T122B, T123B
	Resin	T222A, R335A, R236A, R333A
Labels		
Type	Paper	Vellum, Semi-gloss Coat, Matt Coat, Gloss Coat
	Film	Polyester (PET), Polyethylene (PE, white), Polyethylene (PE, transparent)

1.1 GENERAL SPECIFICATIONS (CONT'D)

Specification/ Model Name		Lt408
Interface Characteristics		
External connectivity (Slot 1)	Interface board ✕ Parallel (IEEE1284) ✕ RS-232C <ul style="list-style-type: none"> • READY/BUSY • XON/XOFF • Status 2/3 • Driver specific protocol • Status 5 ✕ USB (Ver. 1.1) ✕ LAN (10BASE-T/ 100BASE-TX automatic changeover) ✕ Wireless LAN (IEEE802.11b) ✕ Centronics ✕ RS-422/485	
External connectivity (Slot 2)	External (EXT) signal interface (14-pin or 25-pin) Caution: Although the EXT card has a power supply outlet, it is not recommended for use to supply power to external peripherals, due to limitations of the Lt408 power supply.	
Configuration and Functions		
User settings (via LCD)	1. Settings indications 2. Print speed 3. Print darkness 4. Print position adjustments 5. Zero slash changeover 6. Proportional pitch adjustments	
Operation Panel	Buttons	LINE, FEED, ENTER, CANCEL, FUNCTION, 4 navigation buttons (up/down/left/right)
	Switch	POWER ON/OFF
	LCD	Green LCD (with backlight), Vertical 64 dots x horizontal 128 dots
	LEDs	POWER (Green), ONLINE (Green), LABEL (Red), RIBBON (Red) indicators
	Adjustment Potentiometers	VOLUME: buzzer loudness adjustment PITCH: print position adjustment OFFSET: dispense adjustment DARKNESS: print darkness adjustment
	Other Functions	Status Monitor function Commands for drawing of graphics Sequential numbering Storage of Customized Font Characters in memory Reverse printing function (White text on a black background) Function for printing of lines and boxes Label format storage function Zero-slash character switching, HEX Dump Print function, Calendar option. Note: The Lt408 does not support storage of data in any memory cartridge.
DIP Switches		One 8-bit DIP switch
Programming Language		SATO Barcode Printer Language Ver 4.0
Automatic diagnostics		Head check function (for detection of failed heating elements in the print head) "Paper-End" detection "Cover Open" detection Test Print Ribbon End detection Ribbon Near End detection Calendar Check

1.1 GENERAL SPECIFICATIONS (CONT'D)

Specification/ Model Name		Lt408
Barcoding Functions		
Barcodes Supported	One-dimensional code	<ul style="list-style-type: none"> • UPC-A/E, EAN8/13, JAN8/13 • NW-7 • INTERLEAVED 2 of 5 (ITF) • INDUSTRIAL 2 of 5 • MATRICES 2 of 5 • CODE39, CODE93, CODE128 • UCC/EAN128 • RSS-14 • MSI • POSTNET • BOOKLAND • Customer barcode
	Two-dimensional code	<ul style="list-style-type: none"> • QR code model 2, Micro QR (Ver 8.1) • PDF417 (Ver. 2.4, including micro PDF) • MAXI code (Ver. 3.0) • Data matrices code ECC200 (Ver. 2.0) • Composite Symbols Ver 1.0 (UPC-A/E, EAN8/13, JAN8/13, CODE39, CODE128 CC-A/B/C supported with RSS-14)
Stored Font Types	Standard	XU 5 x 9 dots (alphanumeric, symbol, and kana) XS 17 x 17 dots (alphanumeric, symbol, and kana) XM 24 x 24 dots (alphanumeric, symbol, and kana) XB 48 x 48 dots (alphanumeric, symbol, and kana) XL 48 x 48 dots (alphanumeric, symbol, and kana) Outline font (alphanumeric, symbol, and kana) OCR-A Lt408 15 x 22 dots (alphanumeric and symbol) OCR-B Lt408 20 x 24 dots (alphanumeric and symbol)
	Raster Fonts	CG Times, CG Triumvarite
Print Magnification		Vertical 1 to 12 times Horizontal 1 to 12 times (characters) 1 to 12x (barcodes)
Print Rotation		Characters: 0°, 90°, 180°, and 270° Barcode: Parallel 1 (0°), Serial 1 (90°), Parallel 2 (180°), Serial 2 (270°)
Barcode Ratio		1:2, 1:3, 2:5; Arbitrary user settings allowed
Accessories		
Options		<ul style="list-style-type: none"> • Calendar IC • Linerless option kit • Interface cards including Ethernet, Wireless LAN, Centronics, RS-422/485, High speed RS-232C (25-pin), IEEE1284 and USB (full speed) • EXT connector (Amphenol 14-pin or D-Sub 25-pin for connection to peripherals)

Specification/ Model Name	Lt408
Physical Characteristics	
Dimensions	W 330 mm x D 271 mm x H 270 mm x (Standard)
Weight	9.7 kg (for a standard configuration)
Power Supply	Input voltage: AC 100 V to 240 V ±10%
Power Consumption	180W (peak)
Standards Compliance	Noise emission: VCCI Class B, FCC Class B, ENN55022 Class B Safety Standards: MET, cMET, NEMKO, CCC Energy Saving: International Energy Star Program Environmental Conservation: Manufactured according to environment friendly processes In-house equipment level: Class B conformance Package Fall: ISTA-2A
Operating Environment	Operational ambient temperature: 5 to 40 degrees Celsius Operational ambient humidity: 15 to 85% (no condensation) Storing ambient temperature: -20 to 60 degrees Celsius Storing ambient humidity: 15 to 85% (no condensation) Paper, and carbon ribbon excluded.

2

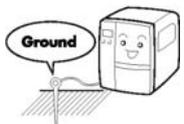
INSTALLATION

This section assists you in unpacking and installing the printer from the shipping container. You will also be guided through a familiarization tour of the main parts and controls. The following information is provided:

- Safety Precautions
- Unpacking and Parts Identification
- Loading the Carbon Ribbon
- Loading Labels and Tags
- Adjusting the Sensors
- Replacing the Print Head

SAFETY PRECAUTIONS

Please read the following information carefully before installing and using the printer

<p>THE CAUTION SYMBOL </p> <p>Whenever the triangular Caution logo appears in this manual, pay special attention to the warning(s) cited below it. Failure to abide by the warnings may result in injury or damage to property.</p>	
<p>PRINTER PLACEMENT TIPS</p>	
<ul style="list-style-type: none"> Place the printer on a solid, stable, horizontal surface that is not subject to strong vibrations from adjacent mechanical devices. Avoid shaky or slanting tables, or platforms that are liable to collapse under a heavy weight. If the printer is dropped or damaged, immediately turn off the power, pull out the power plug and contact a service center. In this case, continued use of the printer may cause a fire or electric shocks. Avoid installing the printer in direct sunlight, or in dusty, very hot or slippery areas. Also avoid placement in damp, unventilated or humid areas. If condensation forms, immediately turn off the power, and do not use the printer until the condensation disappears. Otherwise the moisture may cause electric shocks. Avoid placing the printer near large high-current equipment, as such equipment can cause spikes or undervoltages in the power supply. 	<div style="display: flex; align-items: center;">  <ul style="list-style-type: none"> Do not leave containers of water or chemicals around the printer. If any liquid is spilled onto the printer, immediately turn off the power, pull out the power cable from the AC outlet, and contact a sales outlet, dealer, or service center. In this case, continued use of the printer may cause fires or electric shocks. Do not move the printer with any paper loaded. The stack of paper may fall off, causing trips and accidents. When laying the printer down, be careful not to catch your foot or fingers under it. When moving the printer, be sure to pull out the power cable from the AC outlet, and check that any other external interface cables have been disconnected. Otherwise, the connected cables may be damaged, or may cause trips and falls, in addition to or a fire or electric shocks. </div>
<p>ELECTRICAL PRECAUTIONS</p>	
<ul style="list-style-type: none"> Do not damage, break, or process the power cable. Hanging heavy objects on it, heating or pulling it may damage the power cable and cause fires or electric shocks. When the power cable is damaged (cable conductors are exposed or cut, etc.), contact a sales outlet, dealer, or service center. In this case, continued use of the printer may cause fires or electric shocks. Do not process, forcibly bend, twist, or pull the power cable. Continued use of such a cable may cause fires or electric shocks. If the printer emits any smoke or peculiar odors at any time, turn it OFF and prevent further usage until you have contacted a qualified service personnel. Do not use any other voltage except the specified power voltage for the printer that matches your domestic power supply. Otherwise, it may cause fires or electric shocks. 	<ul style="list-style-type: none"> Do not operate the power switch or handle the power cable with a wet hand. Do not insert or drop anything metallic or flammable into the openings of the printer (the cable outlet or mounting hole of the memory cartridge). Otherwise, immediately turn off the power, pull out the power cable, and contact a sales outlet, dealer, or service center. In this case, continued use of the printer may cause fires or electric shocks. To reduce electrical risks, be sure to connect the printer to ground before use. Also, try not to share the printer's AC outlet with other electrical equipment, especially those that draw high amounts of current or cause electrical interference. <div style="text-align: right; margin-top: 20px;">  </div>

GENERAL PRECAUTIONS	
<ul style="list-style-type: none"> • Head cleaning liquid (if supplied) is flammable. Never heat it or throw it into a fire. Keep it out of children's reach to avoid accidental consumption. Should this occur, consult a doctor immediately. • When opening/closing the cover, beware of getting your fingers caught. Also, hold the opening/closing cover well so that it will not slip and fall on your hand. • After printing, the print head remains hot. When replacing paper or cleaning the printer immediately after printing, be careful not to burn yourself. • Touching even the edge of the printer head may cause injuries. When replacing paper or cleaning the printer, be careful not to hurt yourself. • If the printer will not be used for extended periods of time, disconnect the power cable for safety. • When releasing and locking down the printer head, be careful not to catch any other foreign matter in it except label paper. 	<ul style="list-style-type: none"> • Do not disassemble or perform modifications to the printer, as this renders the product unsafe. For maintenance, troubleshooting and repairs, consult a sales outlet, dealer, or service center for help, instead of attempting to perform this yourself. Renewable annual service contracts are available. • When maintaining or cleaning the printer, always disconnect the power cable for safety. • Do not insert your hand or other objects into the cutter. • When loading roll paper, be careful not to catch your fingers between the paper and the feeder. • Be careful not to hurt yourself when detaching the back cover of the fanfold through the hole and attaching it. • The simplified cutter (where installed) is structured as a blade. Be careful not to cut yourself.

This equipment is a piece of Class B information technology equipment based on the standards of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). Although this equipment is for use in home environment, if it is used close to a radio or television set, it may cause poor reception. Handle it properly in accordance with the content from the instruction manual.

SECTION 2: INSTALLATION

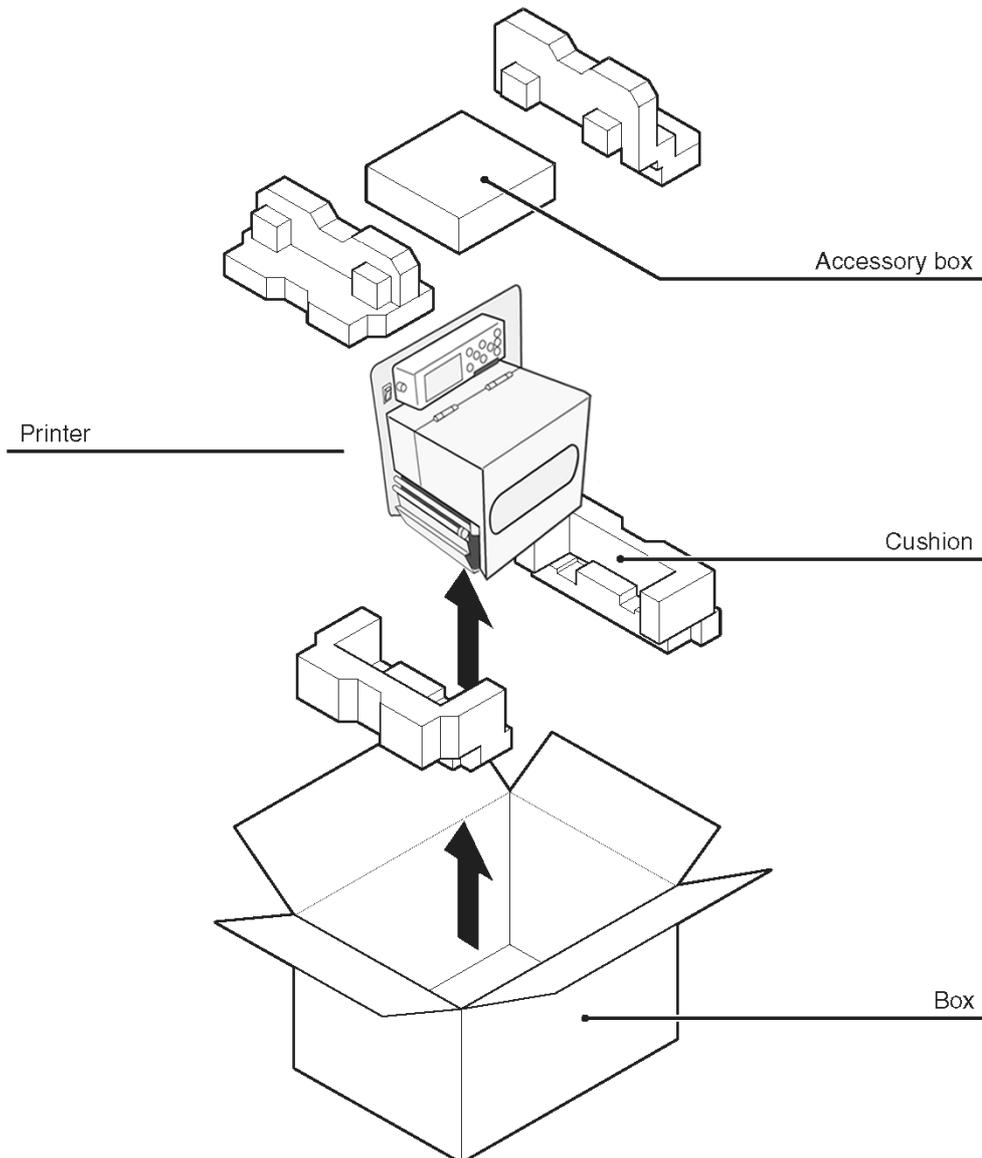
2.1 UNPACKING

When unpacking the printer, take note of the following:

1 The box should stay right-side up. Lift the printer out of the box carefully.	4 If the printer was been stored in the cold, allow it to reach room temperature before turning it on.
2 Remove the plastic covering from the printer.	5 Set the printer on a solid, flat surface. Inspect the shipping container and printer for any sign of damage that may have occurred during shipping.
3 Remove the accessory items from their protective containers.	

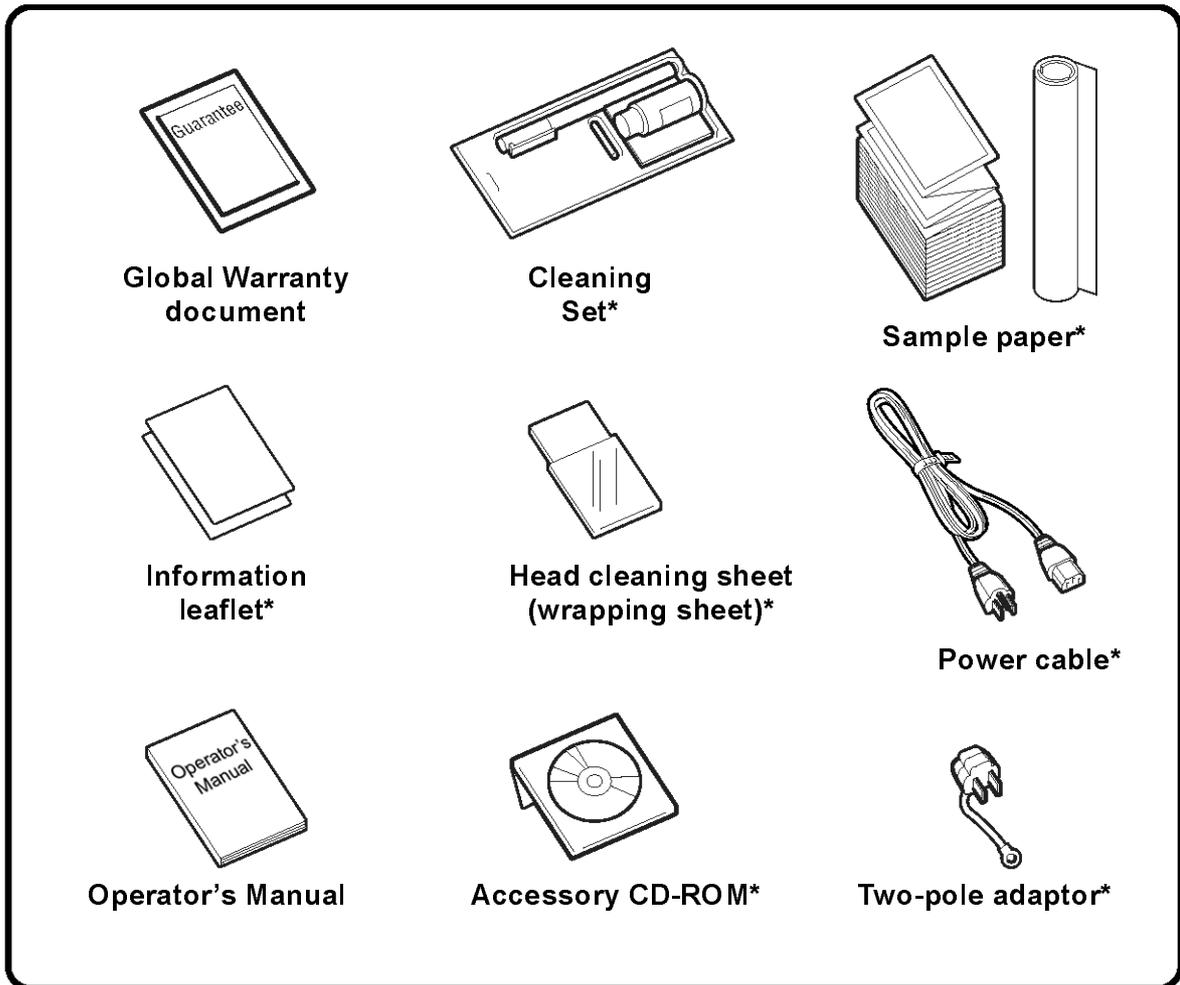
Note

The following illustrations are representative only. Your printer may not be packed exactly as shown, but the unpacking steps are similar.

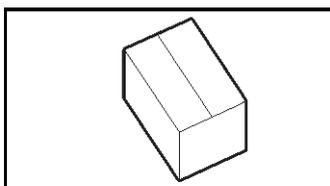


2.1.1 INCLUDED ACCESSORIES

After unpacking the printer, verify that the following materials are in the accessories or packaging:



Items marked with an asterisk may be different from what you see here, or may be excluded.



Important!

Please fill out the Global Warranty card and submit it to us in order that we can provide fast and efficient after-sales service. For malfunctions under **normal use**, this product will be repaired free of charge according to the warranty terms applicable for the country of use.

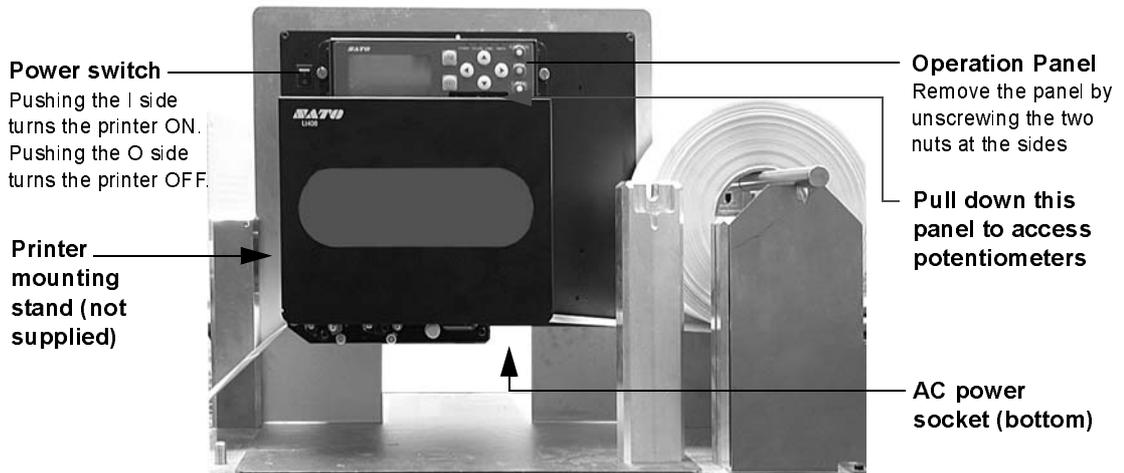
Please do not discard the original packaging box and cushioning material after installing the printer. They may be needed in future, if the printer needs to be shipped for repairs.

SECTION 2: INSTALLATION

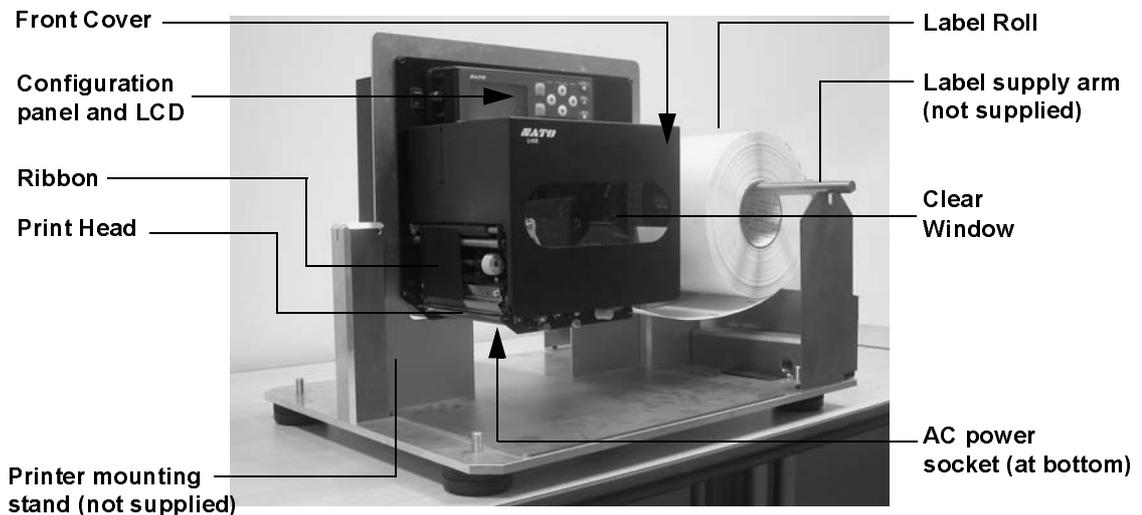
2.1.2 PARTS IDENTIFICATION

IDENTIFYING THE MAIN PRINTER PARTS

Front View (Right Hand model)



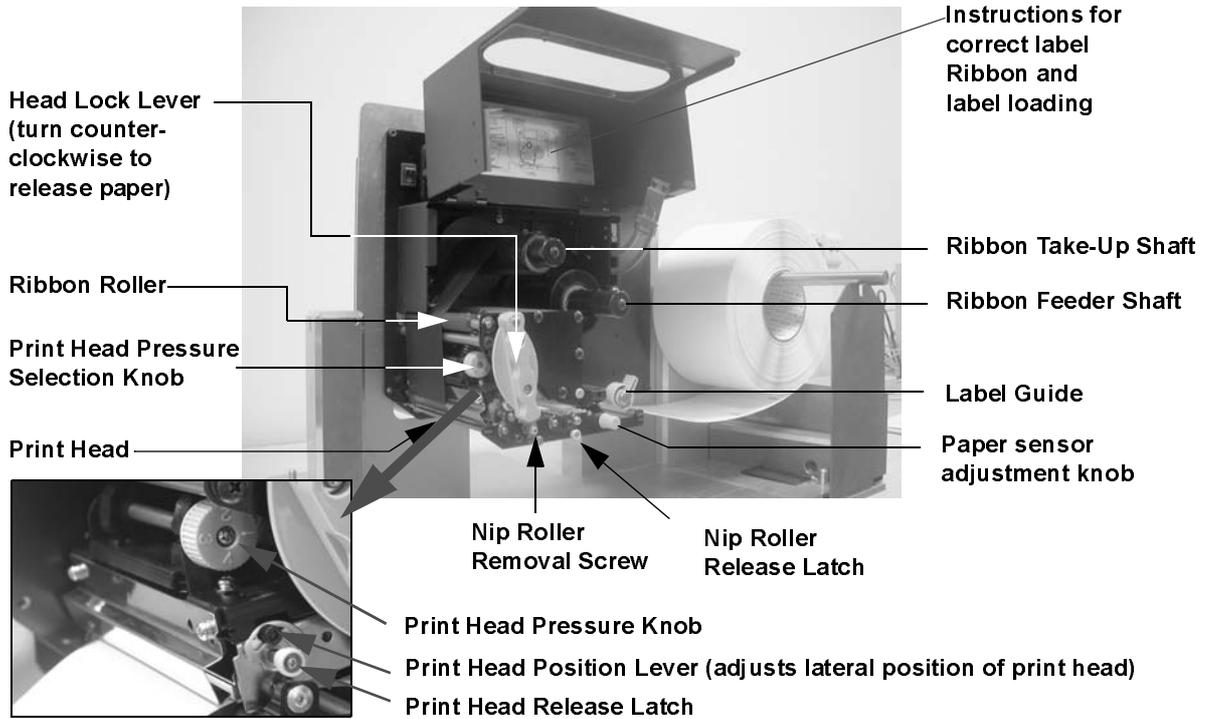
Angled Front View (Right Hand model)



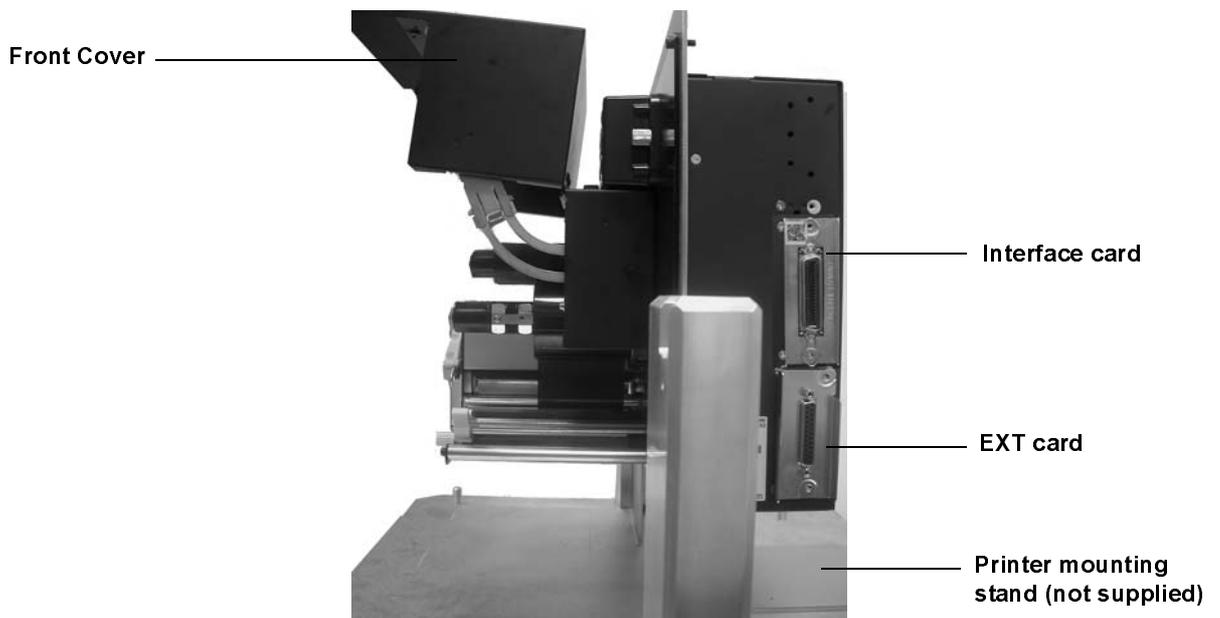
2.1.2 PARTS IDENTIFICATION (CONT'D)

IDENTIFYING THE MAIN PRINTER PARTS

**Front View, Cover open
(Right-hand model)**

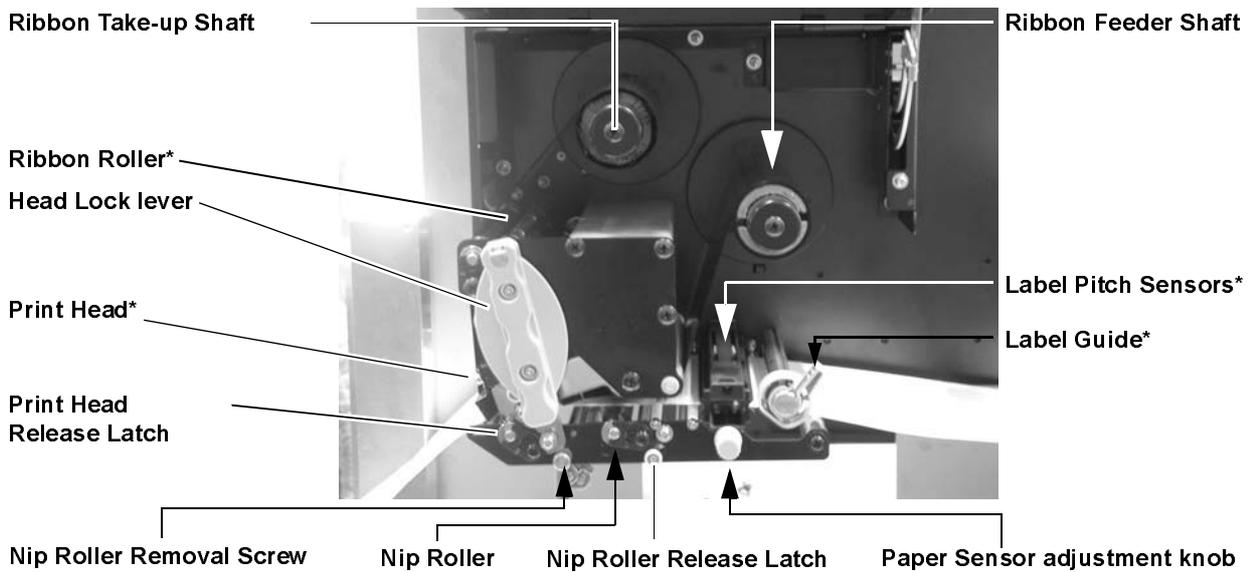


**Rear View
(Right-hand model)**



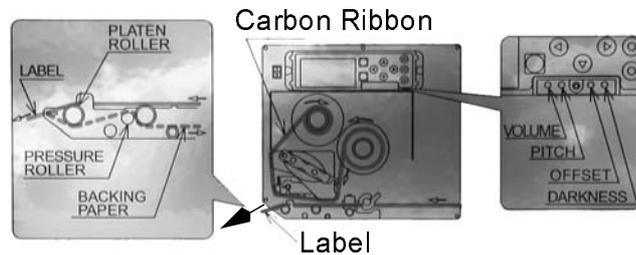
IDENTIFYING THE MAIN PRINTER PARTS

Media Path Parts



* Clean and maintain this part regularly

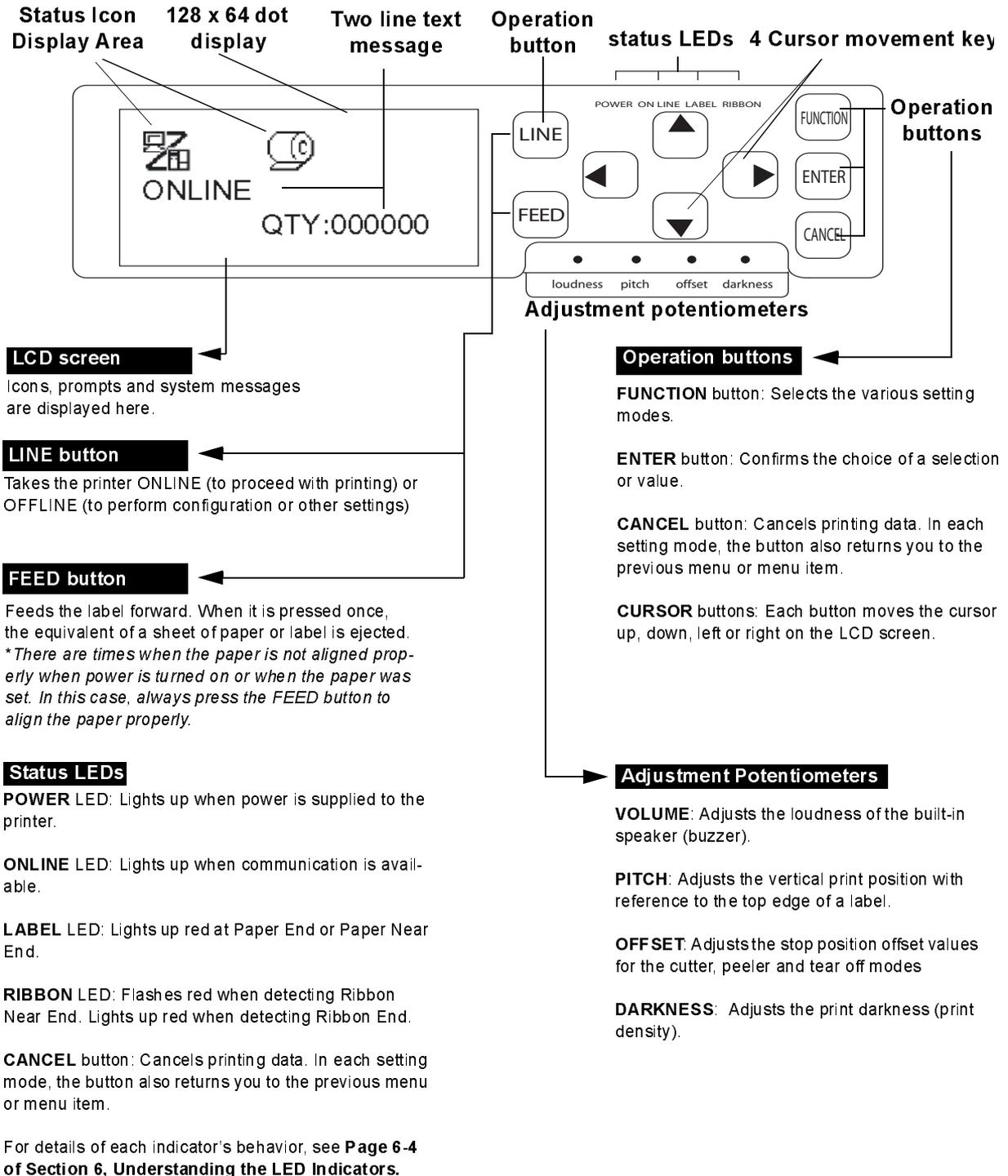
Label and Ribbon Loading Routes



2.1.2 PARTS IDENTIFICATION (CONT'D)

IDENTIFYING THE MAIN PRINTER PARTS

View of Front Panel



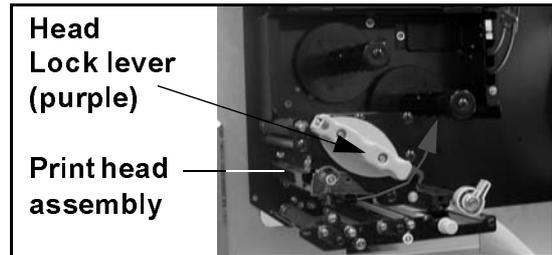
SECTION 2: INSTALLATION

2.2 LOADING THE CARBON RIBBON

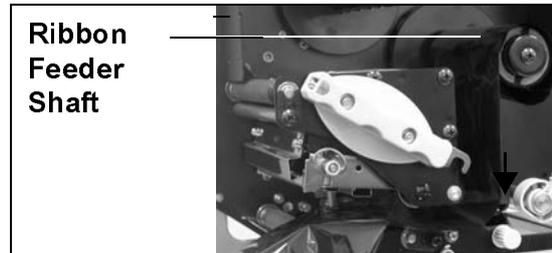
1. Lift up the main cover. Make sure that the cover is pushed upwards until it locks firmly in place so that it will not fall downwards and injure your hands.



2. Pull the purple Head Lock lever upwards in a counterclockwise direction. The print head assembly will be lifted up to allow ribbon loading.



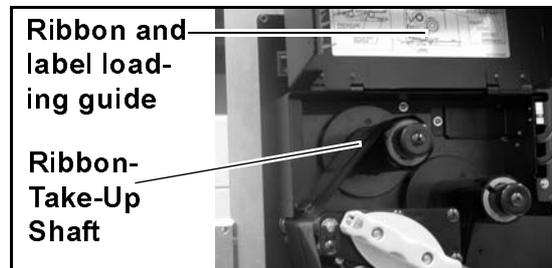
3. Insert the carbon ribbon in the ribbon feeder shaft. Push the ribbon roll inwards all the way, with the ribbon winding in a counterclockwise direction, as shown. Pull the ribbon around the print head assembly so it reaches the Ribbon Take-up Shaft.
Note: For maximum print quality and printer durability use genuine SATO carbon ribbons.



4. Insert an empty ribbon core into the Ribbon Take-Up Shaft. If necessary, use secure the ribbon with adhesive tape, and wind the ribbon around the core a few times.

Note:

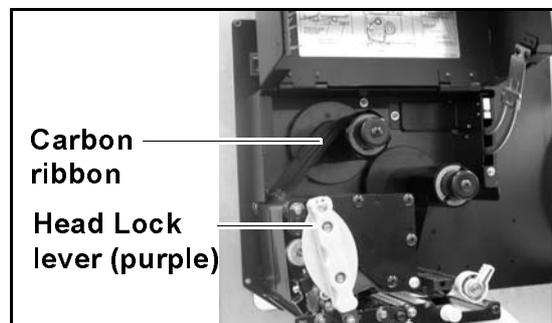
If in doubt about the ribbon path, refer to the useful diagram pasted on the front cover.



5. Press the purple Head Lock lever clockwise and downwards to lock the print head assembly into place. The ribbon is now loaded.

Note:

To remove the ribbon, reverse the steps described here.



Caution

- When replacing the carbon ribbon, bear in mind that the print head and its surrounding area remain hot. Keep your fingers away from these areas to prevent injury.
- Avoid touching even the edge of the print head with your bare hands.

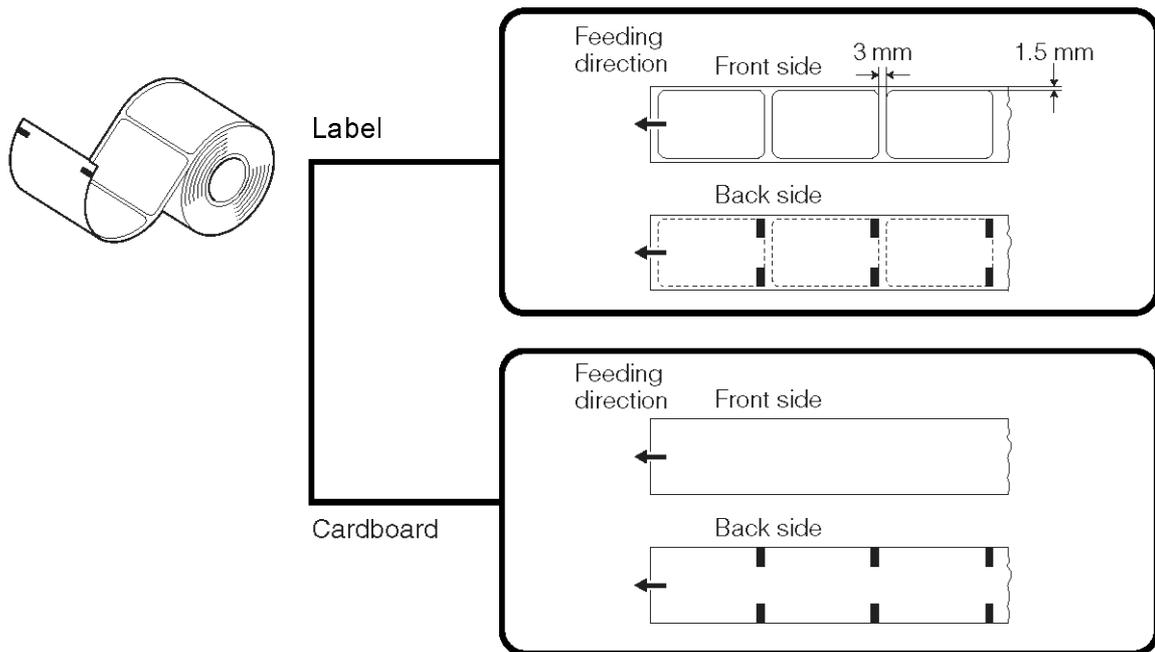
2.3 LOADING LABELS

This print engine is designed to print on **roll paper** supplied via a separate label supply stand. The printing mechanism can be set to detect the l-mark on the paper to feed each label correctly.

Note:

For optimal print performance and durability, **please use SATO-certified label and ribbon supplies on this printer.** Using supplies not tested and approved for use by SATO can result in unnecessary wear and damage to vital parts of the printer, and may void the warranty.

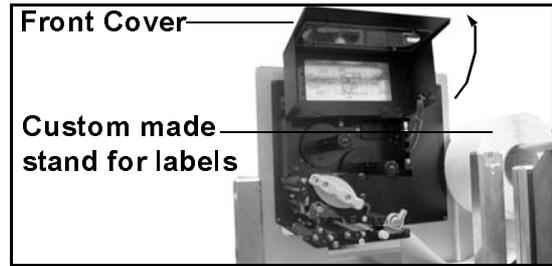
Roll Paper Characteristics



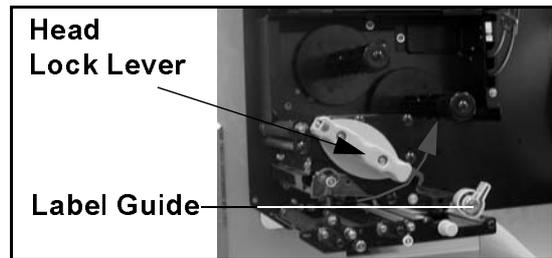
SECTION 2: INSTALLATION

2.3.1 Loading Roll Paper

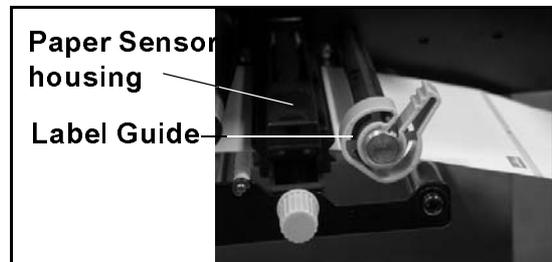
1. Lift up the main cover. Make sure that the cover is pushed upwards until it locks firmly in place so that it will not fall downwards and injure your hands. Use a customized stand to hold the label roll.



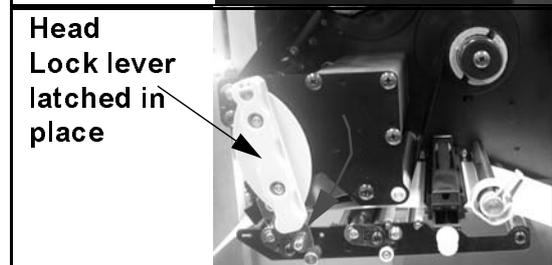
2. Release the purple Head Lock lever by pushing it downwards. The print head assembly will be lifted up to allow label loading.



3. Guide the label between the two halves of the Paper Sensor housing, and then under the print head. Make sure the label runs parallel to the side of the printer. The label should emerge at a perpendicular angle from the print head.



4. Push the Label Guide against the outside edge of the label to restrict and straighten the label path. Now turn the purple Head Lock Lever clockwise to latch the print head assembly back in place.



5. To check whether your ribbon and label are loading correctly, perform a test print.

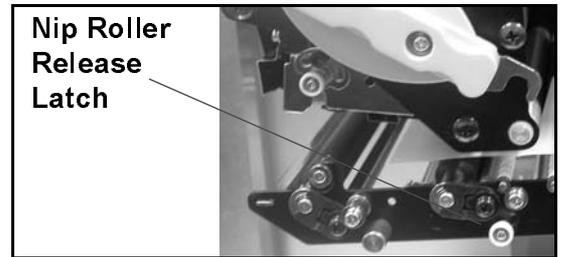
Caution

- When replacing paper, bear in mind that the print head and its surrounding area remain hot. Keep your fingers away from these areas to prevent injury.
- Avoid touching even the edge of the print head with your bare hands.

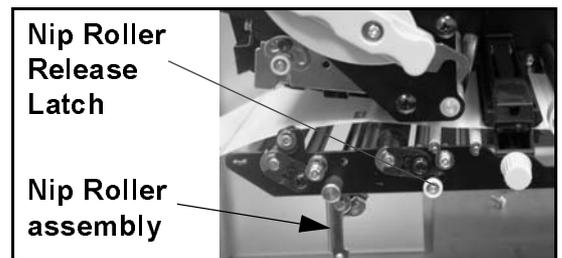
2.3 LOADING LABELS AND TAGS (CONT'D)

2.3.2 Using the Dispenser

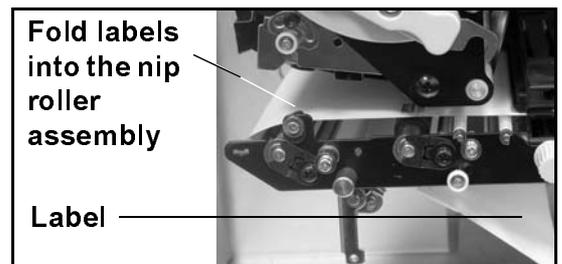
1. Load the paper as described in the previous section.



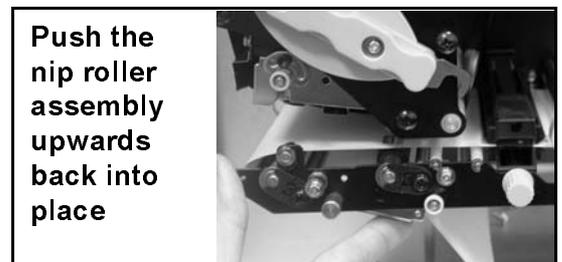
2. Now unlatch the Nip Roller assembly by pressing the release latch as indicated on the right.



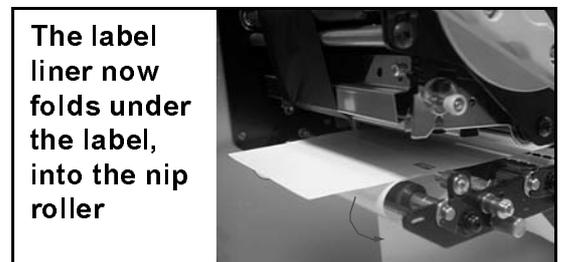
3. Loop the label through the Nip Roller assembly so that two or three labels are hanging freely under the label guide.



4. Press the Nip Roller assembly upwards and latch it into place.



5. Do a paper feed to check that each label is dispensed properly. Go to the User Mode to adjust the paper offset for proper dispensing.



Caution

- When replacing paper, bear in mind that the print head and its surrounding area remain hot. Keep your fingers away from these areas to prevent injury.
- Avoid touching even the edge of the print head with your bare hands.

SECTION 2: INSTALLATION

2.3 LOADING LABELS AND TAGS (CONT'D)

Adjusting for the paper width

This printer is adjusted so that quality printing can be obtained without any adjustments. However, in certain situations, better results can be obtained if you adjust the “head pressure balance” to compensate for different widths of label paper used.

The head pressure balance knob adjusts the amount of pressure being applied along different sections along the length of the print head. For suggested settings of the pressure knob (1 to 4), see the table below:

SETTING	PAPER WIDTH	MEDIA THICKNESS
1	55~115 mm	0.080~0.200 mm
2	65~115 mm	0.200~0.268 mm
3	15~55 mm	0.080~0.200 mm
4	15~65 mm	0.200~0.268 mm

Head pressure balance adjustment knob



Note:

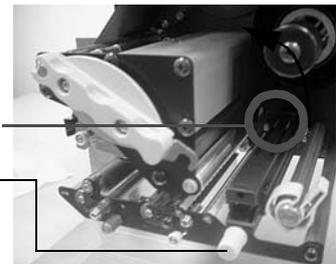
Adjustments are only necessary if print quality is not satisfactory. Otherwise, you do not need to vary the head pressure balance.

2.3.3 Adjusting the Paper Sensor

Adjustment of the paper sensors is usually not necessary, but the procedure is described here.

1. Lift up the main cover. Make sure that the cover is pushed upwards until it locks firmly in place so that it will not fall downwards and injure your hands.

Paper Sensors
Sensor Adjustment knob



2. The green sensor assembly is located just under the Ribbon Feeder Shaft. Turn the purple Sensor Adjustment knob to adjust the sensors' position. (The gap and I-mark sensors are underneath the green plastic tabs)
3. After adjustment, feed a few labels and do a test print to see if the sensor is working properly. Adjust the label pitch if necessary.

Caution

- When closing the front cover, be careful not to injure your fingers due to a sudden release of the heavy cover.

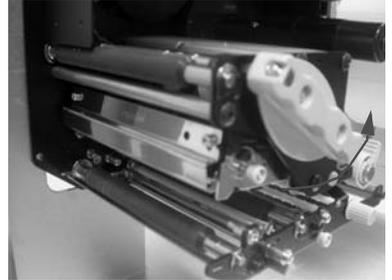
2.4 REPLACING THE PRINT HEAD

Before attempting to replace the print head, it is advisable to contact your local dealer or service center so that they can assist you in case of problems.

1. Make sure the printer has been turned off for at least 30 minutes so that the print head is not hot. Lift up the front cover.
2. Push the Head Lock Lever (the purple slide lever) upwards, in the direction shown here.

Caution

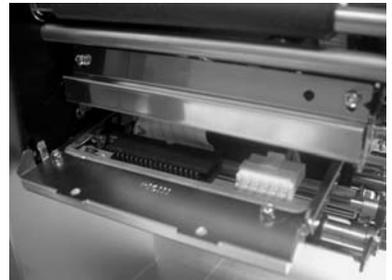
- Do not touch the print head's heating elements. If you do so inadvertently, use the cleaning pen (supplied) to clean the area thoroughly. For more details, see Section 4, Cleaning and Maintenance.



3. Pull the Print Head Release Latch. The print head will drop downwards.



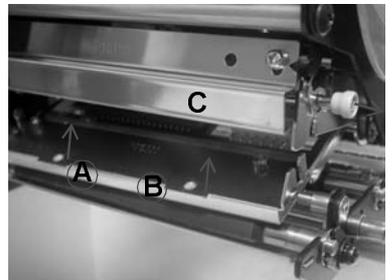
4. Pull the print head outwards and disconnect the two connectors attached to it.



5. Insert the two connectors to the replacement print head. Pull the Head Lock lever and push the print head back into place.

Note:

Push the print head inwards and upwards so that the two protruding tabs (labeled A and B) at its front will rest on the inside ledge of the print head assembly (labeled C)



SECTION 2: INSTALLATION

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3

CONFIGURATION AND OPERATION

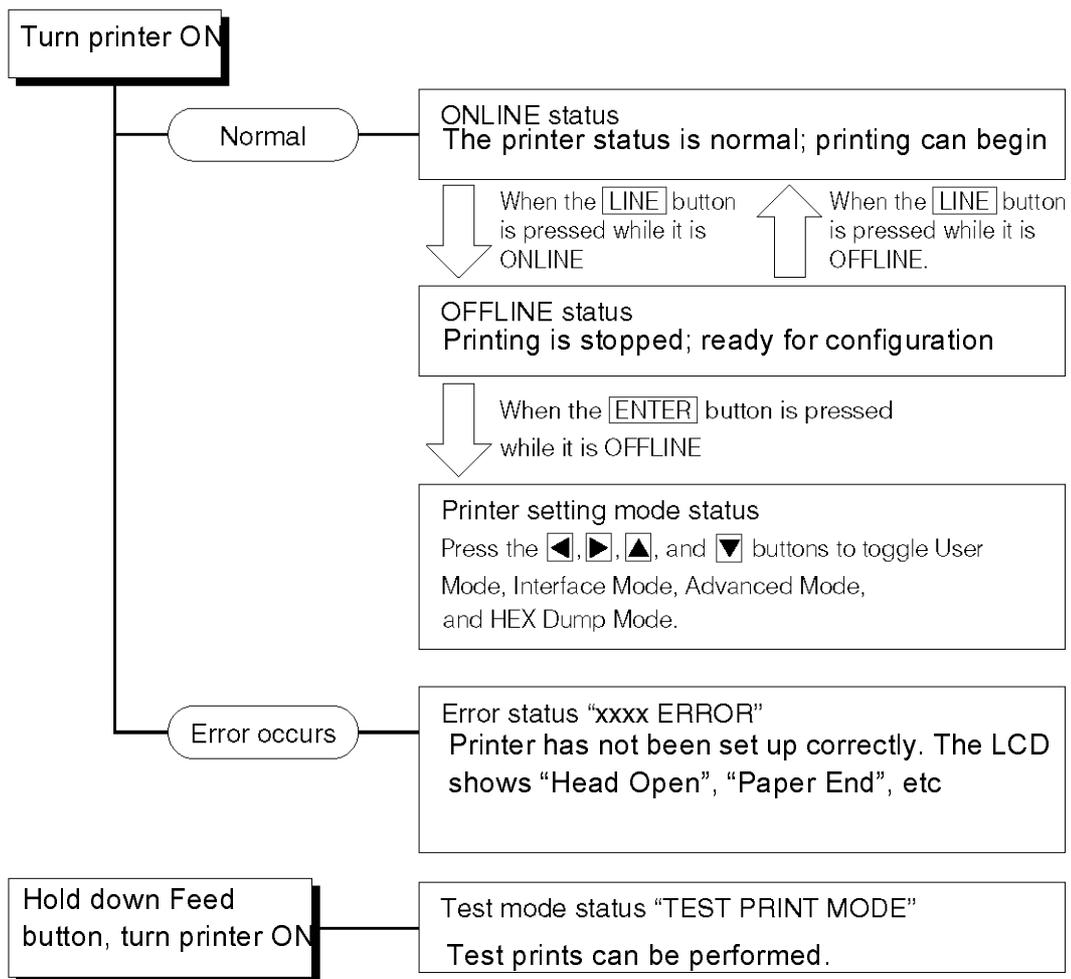
Before using the printer, it is best to read this manual thoroughly first. Otherwise, you may disturb default settings around which the instructional procedures in this manual are based on.

3.1 OPERATING MODES

The operating status of this printer can be set to one of five modes:

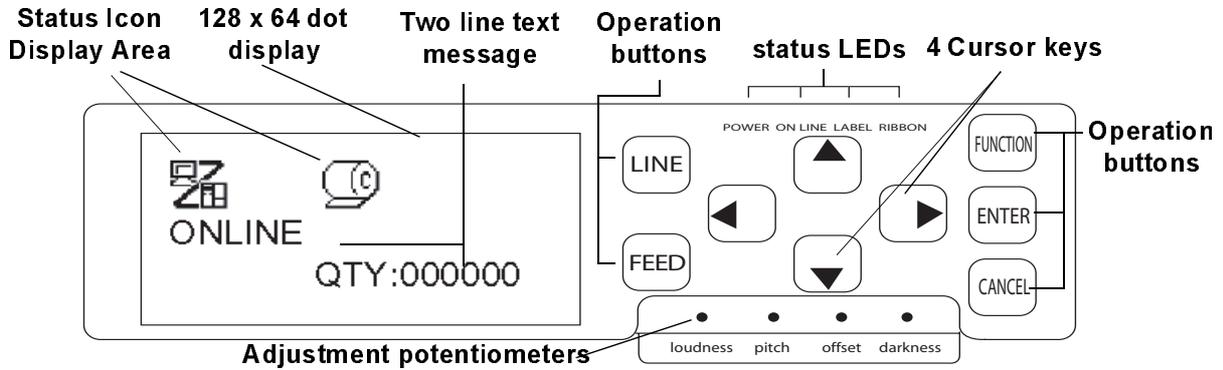
- 1) Online mode
- 2) Offline mode
- 3) Printer Setting: User Mode, Interface Mode, Advanced Mode, Hex Dump Mode
- 4) Error mode
- 5) Test Print mode

The operation flowchart is as follows:



3.2 THE OPERATION PANEL

Overview



Status Icon display area

Up to five icons can appear here to indicate the current printer status. The same area can also display two lines of alphanumeric text instead.

Status LEDs

POWER: This LED lights Green when power is supplied to the printer

ON LINE: Lights up Green when printer is in "Online" state. Otherwise, LED is not lit.

LABEL: Lights up Red at "Paper end"

RIBBON: Normally does not light up until Ribbon End is detected. Just before Ribbon End, the LED blinks in red, signalling "Ribbon near end" status.

Adjustment Potentiometers

Loudness: Adjusts the loudness of the built-in buzzer

Pitch: Adjusts the print position in User Mode (Offset Volume menu)

Offset: Adjusts the offset for Dispense offset

Darkness: Adjusts the print darkness User Mode (Offset Volume menu)

Two-line Message display area

Other icons, or up to two lines of alphanumeric messages, can be displayed here.

In total, up to four lines of text can be displayed on the whole screen.

Operation and Cursor buttons

LINE: Switches between online and offline modes. Not valid for other settings.

FEED: Feeds a single label feed only when in offline mode. Not valid for other settings.

FUNCTION: Recalls the Mode Selection screen for selection of various function menus. Also returns the user to the mode selection screen from other menus.

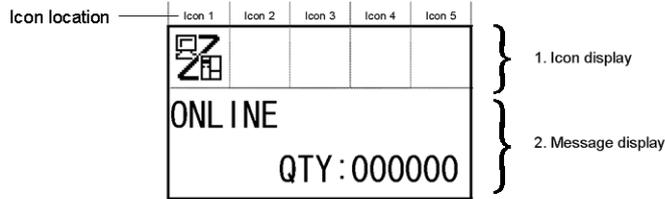
ENTER: Selects a menu item in any screen in offline mode. Button is inactive when the printer is online.

CANCEL: Cancels print data in offline state. Button is inactive when the printer is online. Also returns the user to a previous menu screen.

Four cursor movement buttons:

These cause the cursor to shift Up, down, Left and Right on the screen.

3.3 SCREEN ICONS AND THEIR MEANING



[Mode display]

<List of icons>

No.	Icon	Description	Display position
1		Displayed when the printer is online	Icon 1
2		Displayed when the printer is offline	Icon 1
3		Displayed when the printer is in Test Printing Mode and Dump Printing Mode	Icon 1
4		Displayed when the printer is in Download Mode	Icon 1
5		Displayed when the printer is in Upload Mode	Icon 1

[Mode selection screen]

No.	Icon	Description	Display position
1		Switches the printer to Normal Mode	—
2		Switches the printer to User Mode	—
3		Switches the printer to Interface Mode	—
4		Switches the printer to Advanced Mode	—
5		Switches the printer to Dump Printing Mode	—

[Error-related]

No.	Icon	Description	Display position
1		Displayed when label end is detected	Icon 1
2		Displayed when ribbon end is detected	Icon 1
3		Displayed when sensor error is detected	Icon 1
4		Displayed when head open is detected	Icon 1
5		Displayed when head element failure is detected	Icon 1
6		Displayed when a communication error is detected	Icon 1
7		Displayed when a receive buffer error is detected	Icon 1
8		Displayed when a item No. error or BCC error is detected	Icon 1

3.3 SCREEN ICONS AND THEIR MEANING (CONT'D)

No.	Icon	Description	Display position
10		Displayed when there is a calendar error (calendar chip is optional)	Icon 1
11		Displayed when a printer error other than the above is detected.	Icon 1
12		Error number corresponding to each error is displayed.	Icon 2

[Warning-related]

No.	Icon	Description	Display position
1		Displayed when ribbon near end is detected.	Icon 3 to 5
2		Displayed when label near end is detected.	Icon 3 to 5
3		Displayed when command error is detected.	Icon 3 to 5
4		Displayed when receive buffer near full is detected.	Icon 3 to 5
5		Displayed when head element failure is detected	Icon 3 to 5

How To Adjust Screen Contrast

In Normal/ONLINE mode, press the left/right arrow buttons   repeatedly to adjust the contrast.



There are 32 levels of adjustments. Contrast settings are reset whenever you set the printer to factory default settings.

3.4 ONLINE AND OFFLINE MODES

3.4.1 Online Mode

Pressing the **LINE** button causes the printer to go **ONLINE** or **OFFLINE** alternately.

When the printer is **ONLINE**, the following activities will be possible:

- The printer is ready to receive print data from the computer or other connected devices
- The printer is ready to start printing

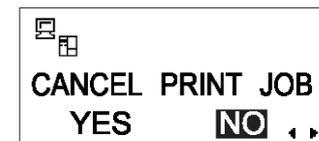
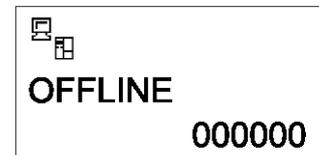


3.4.2 Offline Mode

When the printer is **ONLINE**, pressing the **LINE** button once will cause the printer to go **OFFLINE**.

When the printer is **OFFLINE**, the activities for **ONLINE** mode are no longer possible, but the following activities will be possible:

- The printer can eject labels when you press the **FEED** button.
- The printer can be switched to other modes when you press the **ENTER** button.
- Any printing job can be stopped once the printer is brought **OFFLINE**
- Any printing job can be cancelled once the **CANCEL** button is pressed in **OFFLINE** mode. The menu for canceling the print job then appears. Move the cursor to "No" and press **ENTER** to confirm cancellation of the print job. The message "CANCEL PRINT JOB COMPLETED" then appears as shown on the right.



3.5 USER MODE

The following settings are available in User Mode:

- OFFSET VOLUME (volume of the built-in speaker)
- PRINT SPEED (print speed setting)
- PRINT DARKNESS (print density setting)
- PRINT OFFSET (print position correction setting)
- ZERO SLASH (zero slash changeover setting)
- CHARACTER PITCH (proportional pitch setting)

3.5.1 Entering User Mode

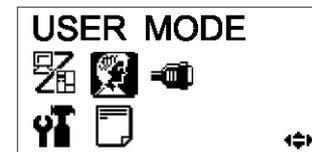
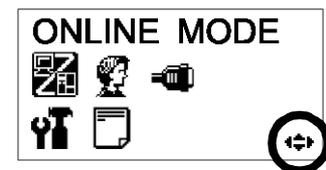
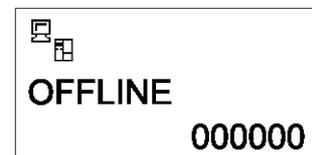
1. Press the **LINE** button to take the printer OFFLINE.
2. Pull down the cover of the Operation Panel and press **ENTER**. The ONLINE MODE screen appears.

3. Press the     arrow buttons until you see "USER MODE", then press **ENTER**.

Note:

The bottom right-hand corner of the screen sometimes displays one to four arrow symbols (see circled symbols on the right). Each arrow symbol represents the corresponding arrow button on the operation panel which is valid for the changing the current screen or its settings.

4. When the first User Mode Offset Volume menu screen appears, use a Cross Head (Phillips) screwdriver to adjust the OFFSET VOLUME, PITCH, OFFSET and DARKNESS potentiometers. See **Section 3.5.2 Setting Print Speed**.
5. Subsequently, pressing the **ENTER** button brings you to screens for setting PRINT SPEED, PRINT DARKNESS and OFFSET. At any time, pressing **CANCEL** takes you back one screen. Pressing the **FUNCTION** button returns you immediately to the main User Mode screen.



3.5.2 Setting Buzzer Volume, Print Position, Print Offset, Print Speed & Print Darkness

The volume level of the built-in speaker buzzer can be adjusted at the first menu of the User Mode. Use the yellow screwdriver to adjust the VOLUME potentiometer below the LCD. The value on the screen changes as you turn the screwdriver clockwise or counter-clockwise.

```

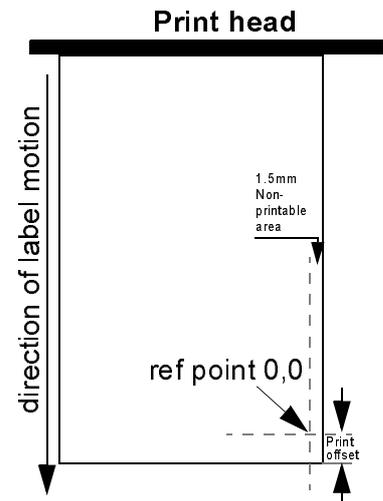
OFFSET VOLUME
PITCH      +0.00
OFFSET     +0.00
DARKNESS   00
    
```

Next, you can use the screwdriver to rotate the potentiometer for the **Print Position** or **Reference Point**. This setting adjusts where printing begins vertically, relative to the leading edge (nearest the print head) of each label. The maximum value allowed is 3.75 mm.

Adjusting the **OFFSET** potentiometer adjusts the dispense position.

Finally, adjusting the Print Darkness potentiometer adjusts the print darkness.

When all the settings are satisfactory, press the **ENTER** button to proceed to set other parameters in the User Mode.



3.5.2 Setting Print Speed

After setting OFFSET VOLUME, PITCH, OFFSET and DARKNESS, pressing **ENTER** takes you to the Print Speed setting. This setting can be used to achieve a high print speed that does not compromise print quality.

```

PRINT SPEED

04 IPS
    
```

Press the ▲▼ buttons to change the setting. Press the **ENTER** button to confirm a setting and proceed to the next screen.

If quality printing cannot be obtained due to the quality of the paper or the printing contents, lower the speed accordingly. For the 203dpi Lt408, print speed can be set as follows:

Print head resolution: default print speed setting	Available print speed settings (lower numbers mean slower print speeds)
203 dpi: default 04 inches/sec	02, 03, 04, 05, 06 inches/sec

3.5.3 Setting Print Darkness

After setting Print Speed, the next screen allows you to set the Print Darkness—the darkness of the print on paper.

This setting can be set from 1 (lightest) to 5 (darkest). The default setting is 3.



Press the ◀/▶ buttons to change the setting. Press the **ENTER** button to confirm a setting and proceed to the next screen.

3.5.4 Setting Pitch Offset

After setting Print Darkness, the next screen allows you to set the Pitch Offset in millimeters.

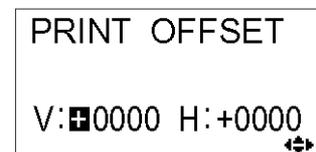
This setting can be set from -49 mm to +49 mm. The default setting is 00.



Use the ◀/▶ and the ▲/▼ buttons to set the value in mm. **ENTER** button to confirm a setting and proceed to the next screen.

3.5.5 Setting Print Offset

After setting Print Darkness, the next screen allows you to set the Print Position Offset—which refers to the vertical and horizontal shifting of the entire print area, relative to the start position of printing (V=0, H=0), defined by default to be the bottom right hand corner of the label.



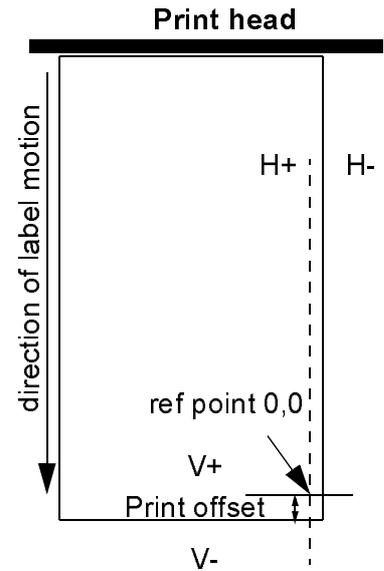
Use the ◀/▶ buttons to select the V or H setting, and the ▲/▼ buttons to change a highlighted setting. Press the **ENTER** button to confirm a setting and proceed to the next screen.

The V setting is for the Vertical print offset. A positive (+) offset means the printing is shifted towards the print head; a negative (-) offset means shifting away from the print head. If the Print Pitch setting has been used to offset the vertical start position, then all Vertical offset adjustments are made relative to that start position.

The H setting is for the Horizontal print offset. The + or - prefix determines whether the offset is to the left or to the right of the reference point.

Model	Valid H and V settings (in dots)
Lt408	V: +/- 000 to 1424 dots, H: +/- 000 to 832 dots

After setting the Vertical and Horizontal OFFSET, press ENTER to proceed to the next setting.

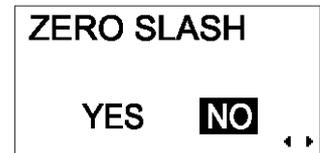


3.5.6 Setting Zero Slash Changeover

You can use this setting to determine whether zeroes are printed with a slash across them or not. The zero slash (excluding Kanji) can be set to either "0" or "Ø".

Use the ◀/▶ buttons to select YES or NO. 'YES' means zeroes will be printed with a diagonal slash across them. 'NO' means otherwise. The default value is 'YES'.

Press ENTER to select the desired option and proceed to the next setting.



3.5.7 Setting Proportional Pitch

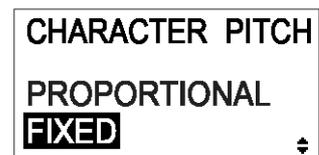
This setting determines whether the space surrounding each text character is of a fixed width, or whether that space is to be varied to be visually more pleasant.

Use the ▲▼ buttons to select either PROPORTIONAL or FIXED. The default value is PROPORTIONAL.

Press ENTER to confirm your selection and return to the main User Mode screen. Press the **FUNCTION** or **CANCEL** key to exit the User Mode setting.

Note:

The subject fonts are from x21 to x24

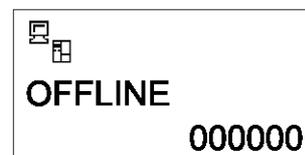
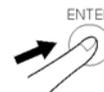


3.6 INTERFACE MODE

In this mode, you can set various parameters governing the use of interface cards. Due to the wide range of interface cards available, only the default interface configuration settings are covered in this section. A flowchart overview of advanced settings for all the optional interface cards is included at the end of this chapter, and a detailed discussion of advanced settings can be found in the GT Series Service Manual available upon request.

3.6.1 Entering Interface Mode

1. Press the **LINE** button to take the printer OFFLINE.
2. Pull down the cover of the Operation Panel and press **ENTER**. The ONLINE MODE screen appears.



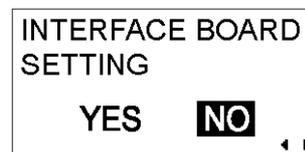
3. Press the arrow buttons until you see "INTERFACE MODE", then press **ENTER** to perform the first setting. At any time within this mode, pressing **CANCEL** takes you back one screen. Pressing the **FUNCTION** button returns you immediately to the main Interface Mode screen.



3.6.2 Enabling Interface Card Configuration

The first setting in the Interface Mode lets you select whether you wish to configure an interface card.

If NO is selected, the next screen is **IGNORE CR/LF** (Section 3.6.3). Press the buttons to select either YES or NO. The default setting is NO. Press the **ENTER** button to confirm the NO setting and proceed to the next screen (see either Section 3.6.3 or 3.6.4 on the next page).



If YES is selected, the next screen lets you select an interface card to configure. Depending on which interface card is installed, and which settings are active, a wide range of possible screens may appear. Refer to **Section 3.10 Overview of All Modes**, on page 3-26 to page 3-30, for detailed flowcharts of the settings available for LAN/Wireless LAN, IEEE1284, RS-232C, Parallel and USB.

3.6.3 Handling CR/LF CODES

This setting determines whether Carriage Return and Line Feed codes are processed or ignored. It only appears when an IEEE1284 interface is installed, and the Protocol option is set to STATUS4, for Receive Buffer in multi buffer mode.

Select YES to ignore the codes, and NO to process them.

IGNORE CR/LF
YES NO ◀ ▶

3.6.4 Handling CAN/DLE

This setting determines whether the CANCEL and DATA LINK ESCAPE codes are processed or ignored.

Select YES to ignore the codes, and NO to process them.
Press the **ENTER** button to confirm the setting and return to NORMAL Mode.

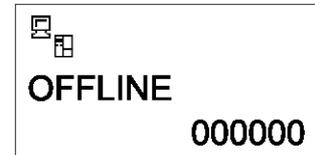
IGNORE CAN/DLE
YES NO ◀ ▶

3.7 ADVANCED MODE

Advanced Mode lets you configure the more advanced features of the printer hardware.

3.7.1 Entering Advanced Mode

1. Press the **LINE** button to take the printer OFFLINE.
2. Pull down the cover of the Operation Panel and press **ENTER**. The ONLINE MODE screen appears.

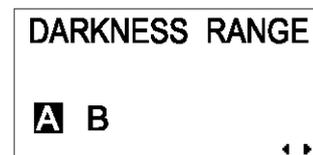


3. Press the     arrow buttons until you see “ADVANCED MODE”, then press **ENTER** to perform the first setting. At any time in this mode, you can press the **FUNCTION** or **CANCEL** key to return to the Advanced Mode screen.



3.7.2 Selecting The Print Density

This first setting in ADVANCED MODE lets you set how dark the print quality is. Available options are from 'A' to 'B', with 'B' being the darkest density. The default value is 'A'.



Adjustment of this setting is usually unnecessary. To adjust the print density, use the  /  buttons to select an option.

Press ENTER to confirm your selection and proceed to the next setting.

3.7.3 Choosing Continuous or Dispenser Operation

With this setting, you can choose between continuous paper feed or Dispenser operation. If the printer supports linerless labels, you will also see a LINERLESS option.



Press the   buttons to select any one of the options. The default setting is DISPENSER.

Press the **ENTER** button to confirm the setting and proceed to the next screen.

3.7.4 Backfeed Operation Settings

The printer can be set to apply or not apply a backfeed to the label *before* or *after* printing each label.

Press the ▲/▼ buttons to choose from AFTER, BEFORE or NONE. The default setting is BEFORE.

Press the ENTER button to confirm the setting and proceed to the next screen.

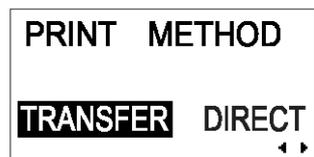


3.7.5 Setting the Print Mode

The printer can be switched to operate in Thermal Transfer or Direct Thermal mode with this setting.

Press the ◀/▶ buttons to select the TRANSFER or DIRECT option. The default value is TRANSFER.

Press the ENTER button to confirm the setting and proceed to the next screen.



3.7.6 Configuring the Pitch Sensor

The printer can be switched to operate the Pitch Sensor in Enable or Disable mode. This screen does not appear if Dispenser Operation is selected (see Section 3.7.4)

Press the ◀/▶ buttons to select the ENABLE or DISABLE option. The default value is ENABLE.

Press the ENTER button to confirm the setting and proceed to the next screen.



3.7.7 Configuring the Paper Sensor Type

This setting specifies which paper sensor is to be used: Gap sensor (penetration sensor) and I-Mark sensor.

Press the ◀/▶ buttons to select between I-Mark or GAP settings. The default value is GAP.

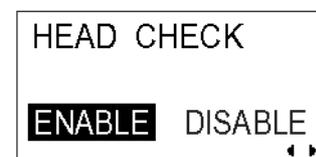


Press the **ENTER** button to confirm the setting and proceed to the next screen.

3.7.8 Turning Head Check Function ON/OFF

The printer can be set to perform a check of the print head when printing each label.

Press the ◀/▶ buttons to select the ENABLE or DISABLE option. The default value is ENABLE.

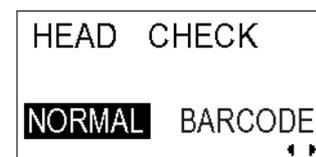


Press the **ENTER** button to confirm the setting and proceed to the next screen.

3.7.9 Choosing the Type of Head Check

If Head Check has been enabled, you will see this screen. Here, you can specify the print head checking to be performed unconditionally, or only when barcodes are being printed.

Press the ◀/▶ buttons to select the NORMAL or BARCODE option. The default option is NORMAL.



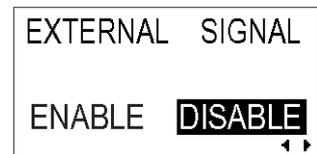
Press the **ENTER** button to confirm the setting and proceed to the next screen.

About the Head Check function

- The head check function detects the integrity of the heating elements in the thermal print head. However, malfunctions cannot be detected instantaneously—a few printed labels may start showing printing defects before the printer warns of a print head error.
- After detection of a print head error, use a scanner to check all affected labels.
- When a head check error occurs during normal printing (barcodes, text and graphics), press and hold down the **FEED** button for five seconds. At the next screen, select **NORMAL** and then press and hold down the **LINE** and **FEED** buttons for five seconds to cause printing to resume. If the head check error occurs again, set the type of head check to **BARCODE** and see if printing can be resumed normally.
- Although restricting the head check type to **BARCODE** allows you to continue printing, you should only do so in order to complete an urgent print job. Check the printed labels to make sure the output is usable in spite of the head error. As soon as possible, stop using the print head to prevent further damage. If necessary, get the print head replaced.

3.7.10 Enabling/Disabling External Signal Output

Set this option to enable or disable the printer's external signal communication port. If the port is enabled, you can send and receive data using an appropriate device plugged into the EXT port.

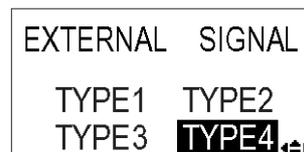


Press the ◀/▶ buttons to select the ENABLE or DISABLE option. The default value is DISABLE.

Press the **ENTER** button to confirm the setting and proceed to the next screen.

3.7.11 Selecting the Type of External Signal Output

If the External Signal Output option is enabled, you will be brought to this screen to select the type of PREND output signal.

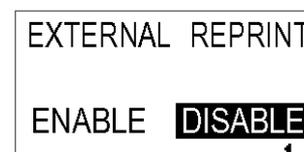


Press the / / buttons to select TYPE1, TYPE2, TYPE3 or TYPE4. The default value is TYPE4. For more details, refer to the SBPL Programming Guide found in the accessory CD-ROM.

Press the **ENTER** button to confirm the setting and proceed to the next screen.

3.7.12 Selecting Reprint via External Signal Output

If the External Signal Output option is enabled, you will be brought to this screen to choose whether the Reprint function can be activated via the external signal port.

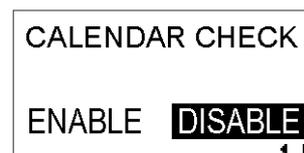
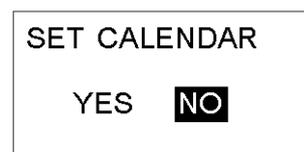


Press the / buttons to select ENABLE or DISABLE. The default setting is DISABLE.

Press the **ENTER** button to confirm the setting and proceed to the next screen.

3.7.13 Setting the Calendar (if Calendar Chip is installed)

If the optional Calendar Chip is installed, the following screen appears. Press the / buttons to select YES or NO. Select NO to skip to the Auto Online setting screen. Select YES to set the date and time using the Press the / / buttons. Thereafter, the next screen lets you ENABLE or DISABLE the Calendar Check function. Choose the appropriate option and press the **ENTER** button leave the Calendar settings and proceed to the next screen.

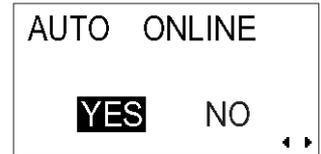


3.7.14 Using the Auto Online Feature

The printer can be set to go into ONLINE mode automatically upon being turned on. Otherwise, the printer starts in the OFFLINE state.

Press the ◀/▶ buttons to select YES or NO. The default setting is YES.

Press the **ENTER** button to confirm the setting and proceed to the next screen.

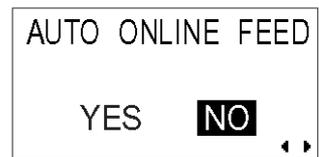


3.7.15 Enabling Auto Feed

The printer can be set to feed one label upon being turned on.

Press the ◀/▶ buttons to select YES or NO. The default setting is NO.

Press the **ENTER** button to confirm the setting and proceed to the next screen.

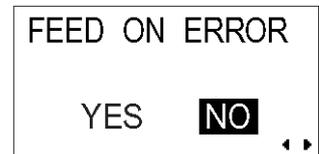


3.7.16 Enabling Auto Feed On Error

The printer can be set to feed one label upon going into ONLINE state after an error has been corrected.

Press the ◀/▶ buttons to select YES or NO. The default setting is NO.

Press the **ENTER** button to confirm the setting and proceed to the next screen.



3.7.17 Specifying the Euro Code

Press the / / buttons to select the currency sign for the Euro. The default value is D5 (Hex).

Press the **ENTER** button to confirm the setting and proceed to the next screen.



3.7.18 Specifying the Protocol Code Format

The ESC sequence can be defined as standard (using non-printable code 1BH) or non-standard (some other user code).

Press the / buttons to select the STANDARD or NON-STANDARD option. The default setting is STANDARD.

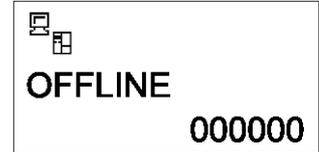
Press the **ENTER** button to confirm the setting and proceed to the next screen.



3.8 HEX DUMP MODE

3.8.1 Entering HEX Dump Mode

1. Press the **LINE** button to take the printer OFFLINE.
2. Pull down the cover of the Operation Panel and press **ENTER**. The ONLINE MODE screen appears.



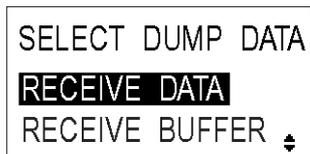
3. Press the arrow buttons until you see “HEX DUMP MODE”, then press **ENTER** to perform the first setting. At any time within this mode, pressing **CANCEL** takes you back one screen. Pressing the **FUNCTION** button returns you immediately to the main Hex Dump screen.



3.8.2 Selecting Data To Dump

Here you can choose to dump either incoming data (receive data) or print data already stored in the buffer (receive buffer) .

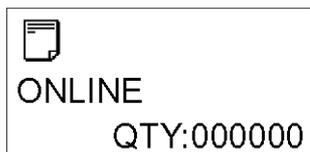
Press the buttons to choose RECEIVE DATA or RECEIVE BUFFER. Note that RECEIVE BUFFER cannot be selected when there is no received data.



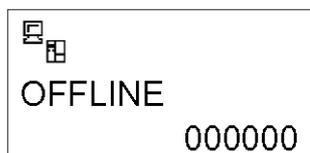
Press the **ENTER** button to confirm the setting and proceed to the next screen.

3.8.3 Controlling the Hex Dump Mode

During the HEX Dump, the following screen appears. The number of labels printed will be shown. When printing is done, press the **LINE** button to take the printer OFFLINE. The press **ENTER** to return to the main HEX DUMP Mode screen.



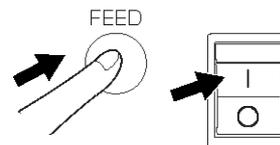
If you dumping the RECEIVE BUFFER, take the printer OFFLINE to stop any incoming data from affecting the buffer. Only then can the buffered data be printed. The printer goes ONLINE automatically after the printing.



3.9 TEST PRINT MODE

3.9.1 Entering Test Print Mode

1. Make sure the printer is turned OFF.
2. Press and hold down the **FEED** button while turning the printer ON. The display will show TEST PRINT MODE.
3. Press the ▲▼ buttons to choose from six options, as explained in the next sub-section.



At any time within this mode, pressing **CANCEL** takes you back one screen. Pressing the **FUNCTION** button returns you immediately to the main Test Print screen.

3.9.1 Choosing What The Test Print Contains

The six settings in this mode are as follows:

CONFIGURATION	The configuration settings of the printer will be printed.
BARCODE	The barcodes installed in this printer will be printed.
HEAD CHECK	The head check pattern of the selected paper size area will be printed.
FONT	The contents of the fonts installed in this printer will be printed.
FACTORY	The factory test print will be performed.

Press the ▲▼ buttons to choose any option to set the test print contents.

Press the **ENTER** button to confirm the setting and proceed to the next screen.

3.9.2 Setting Test Print Width for Configuration, Barcode and Head Check

If you chose test prints of Configuration, Barcode and Head Check in the previous menu, this screen lets you choose the width of the test print from “04” to “10” cm, in increments of 1 cm,



Press the ▲▼ buttons to choose the print size. Press the ENTER button to confirm the setting and proceed to the next screen.

3.9.3 Setting the Size of the Factory Test Print

For Factory test prints, this screen appears instead of the previous screen for setting print size. In this screen, you can choose only to print the test results in LARGE or SMALL print widths. The LARGE setting results in a 10 cm print width. The SMALL setting results in a 4 cm print width.



Caution

If you are using narrow labels, do NOT set this option to LARGE; otherwise, this may damage the print head.

Press the ◀▶ buttons to choose LARGE or SMALL. Press the ENTER button to confirm the setting and proceed to the next screen.

3.9.4 Starting the Test Print

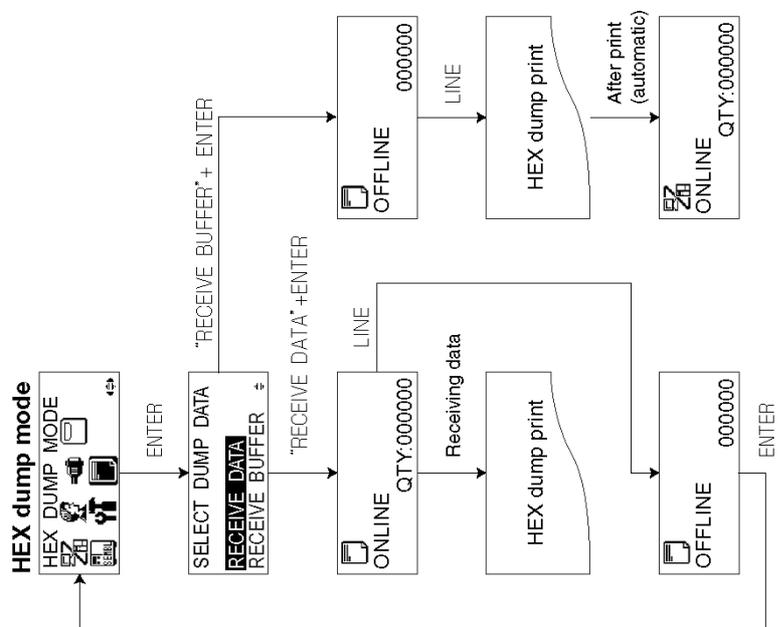
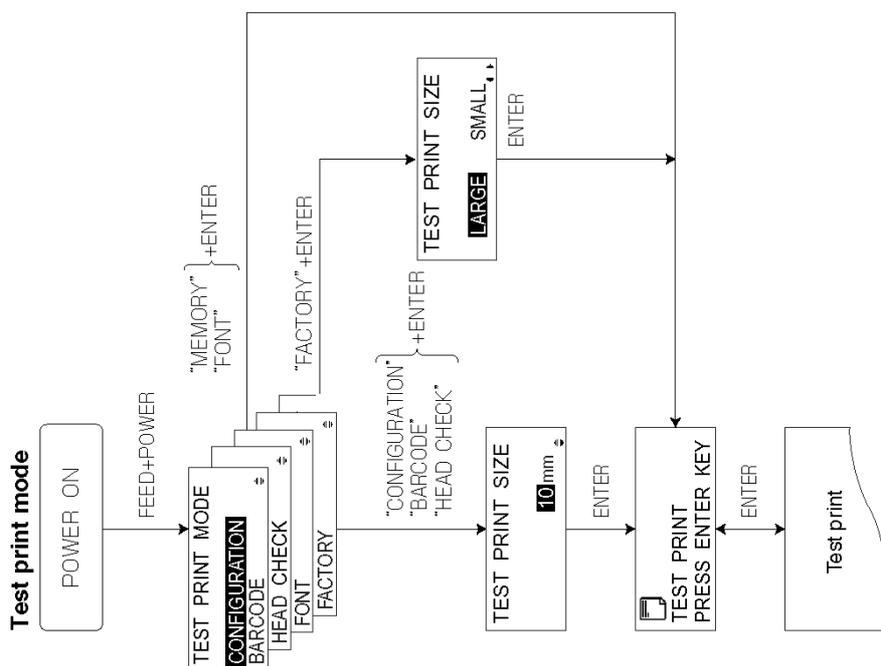
When you are ready to print out the test data, press the ENTER button. The test print will start, and it will cycle continuously.



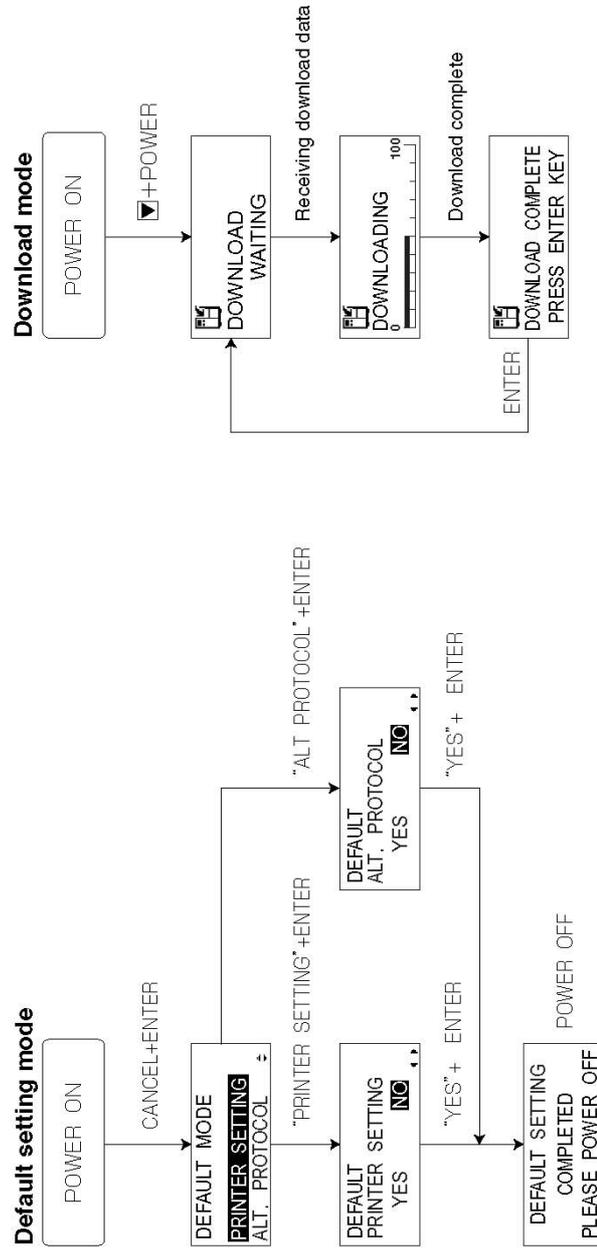
During printing, the ENTER button can be used to suspend and resume the test printing.

To exit the Test Print mode, turn off the printer.

3.10 OVERVIEW OF ALL MODES (CONT'D)

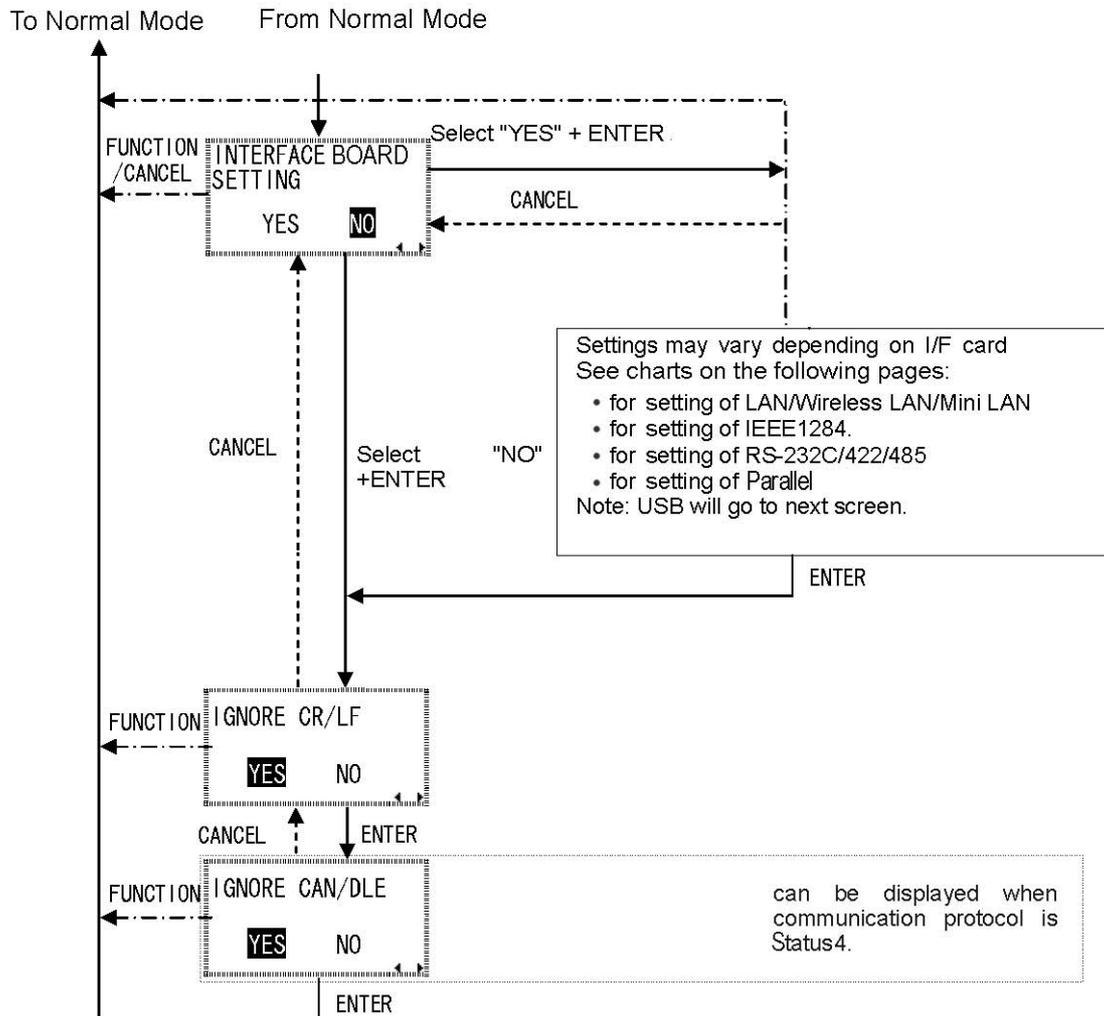


3.10 OVERVIEW OF ALL MODES (CONT'D)



3.10 OVERVIEW OF INTERFACE MODE CONFIGURATIONS

Interface Mode



3.10 OVERVIEW OF INTERFACE MODE CONFIGURATIONS (CON'TD)

Setting of LAN/Wireless LAN

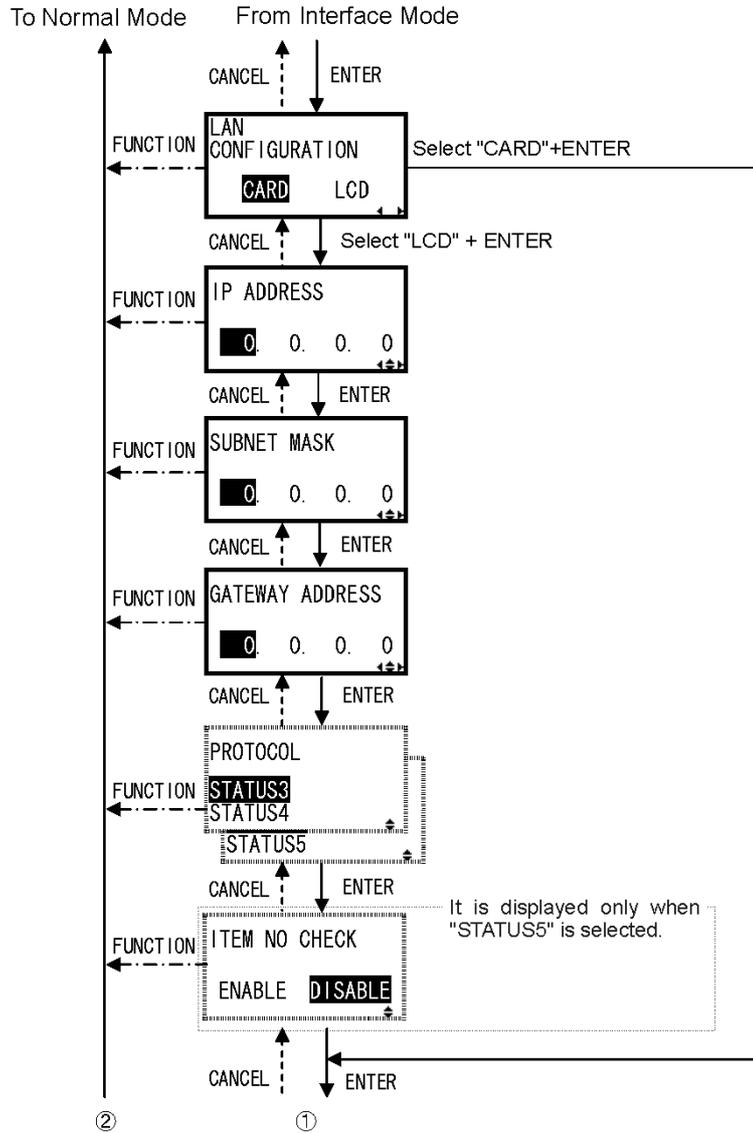
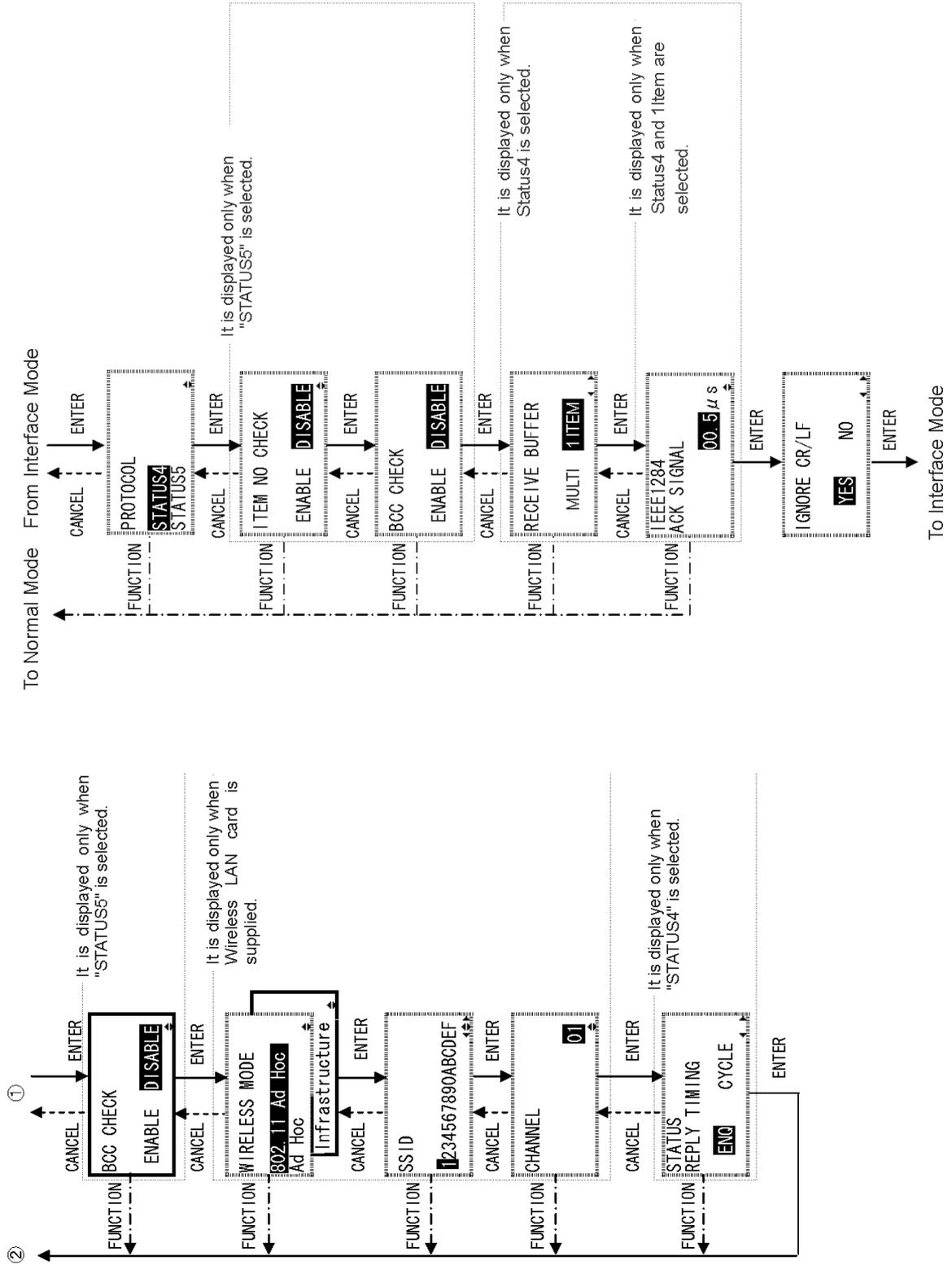


Chart continued on next page →

3.10 OVERVIEW OF INTERFACE MODE CONFIGURATIONS (CON'TD)

Setting of IEEE1284



3.10 OVERVIEW OF INTERFACE MODE CONFIGURATIONS (CON'TD)

Setting of RS-232C/422/485

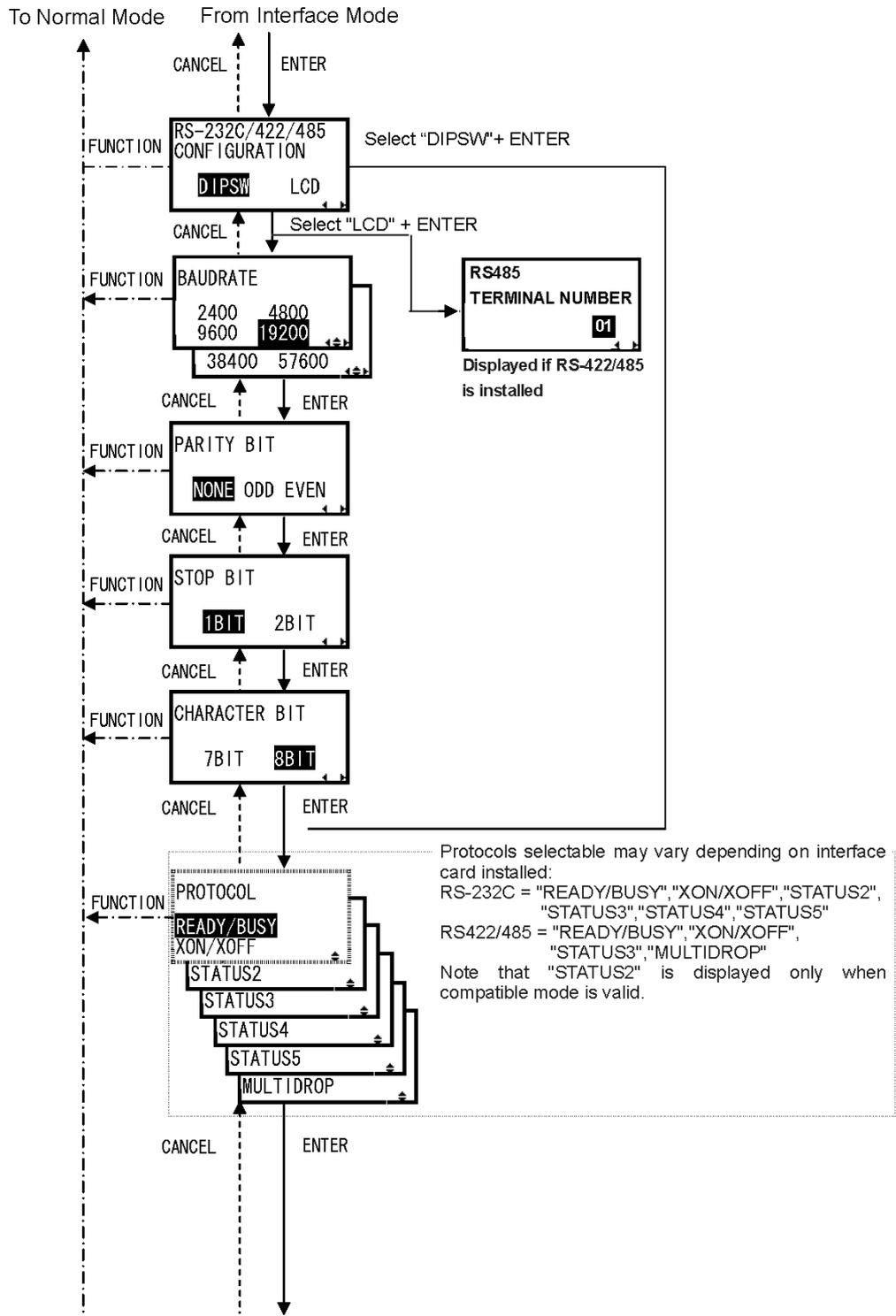
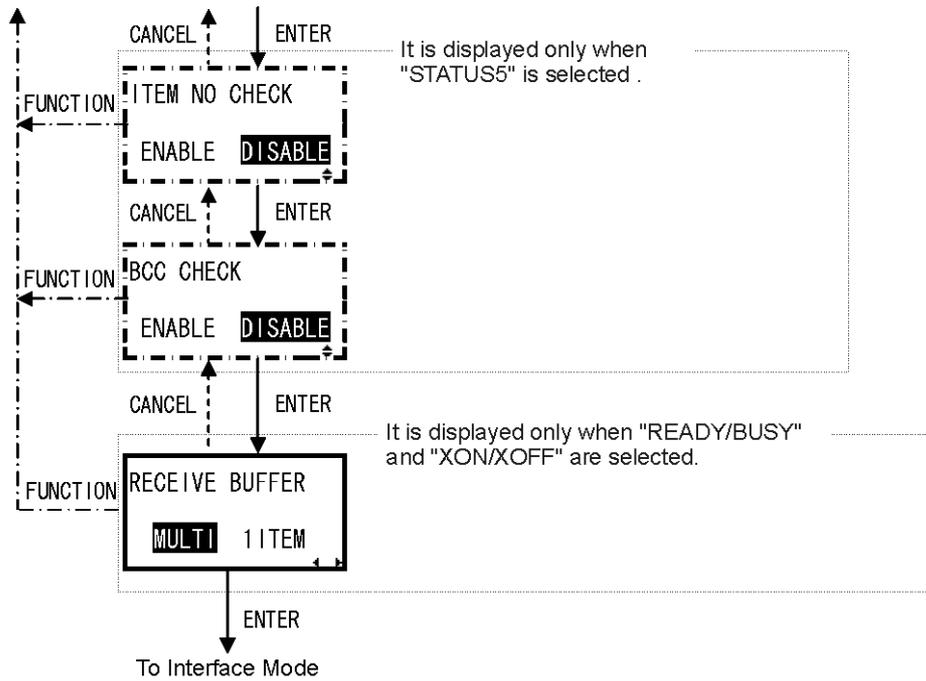
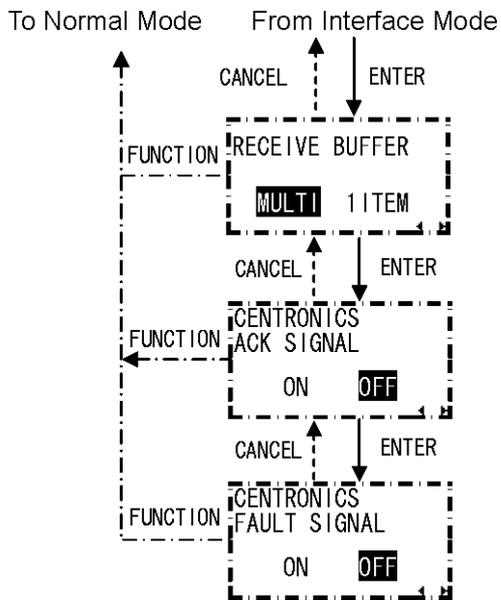


Chart continued on next page →

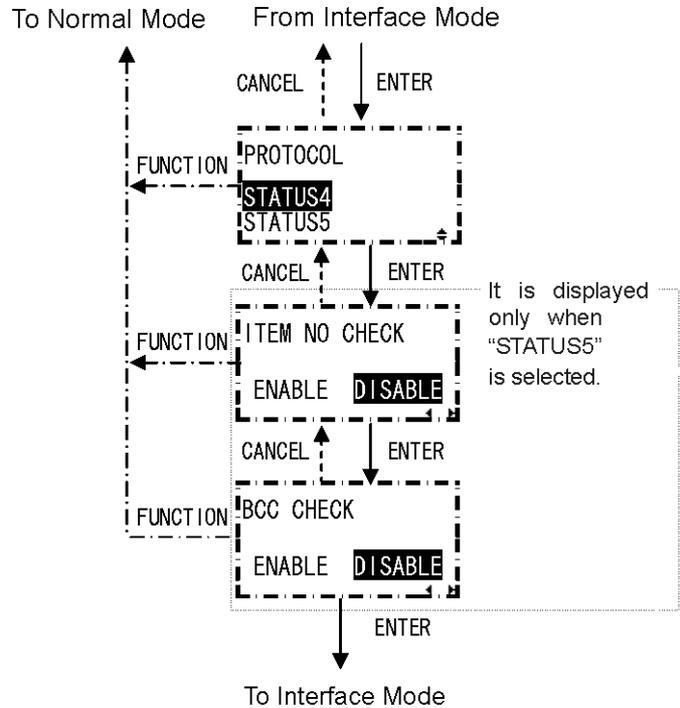
3.10 OVERVIEW OF INTERFACE MODE CONFIGURATIONS (CON'TD)



Setting of Parallel Port



Setting of USB



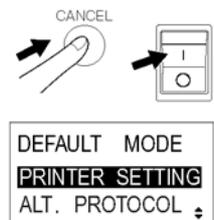
3.11 RESTORING FACTORY DEFAULT SETTINGS

The printer is configured with default settings at the factory. During use, some of the default settings may be changed in a way that causes the printer to act in an undesirable manner. However, there is special Default Mode in which you can quickly restore all printer settings to the original factory settings as shown here:

Setting	Printer
Print speed setting	04
Print density setting	3
Print position correction setting	+0000
Zero slash changeover setting	YES
Proportional pitch setting	PROPORTIONAL

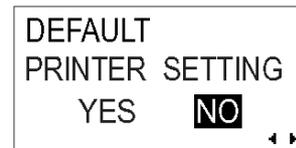
3.11.1 Entering Default Mode

1. Make sure the printer has been turned OFF.
2. Hold down the **CANCEL** button and turn the printer ON. The following DEFAULT MODE display should appear. At any time within this mode, pressing **CANCEL** takes you back one screen. Pressing the **FUNCTION** button returns you immediately to the main Hex Dump screen.
3. Press the   arrow buttons to choose between **PRINTER SETTING** and **ALT. PROTOCOL**. The first option resets all settings to the default, while the **ALT. PROTOCOL** option resets only the protocol code. Press the **ENTER** button to confirm the setting and proceed to the next screen.



3.11.2 If You Chose to Reset Printer Settings

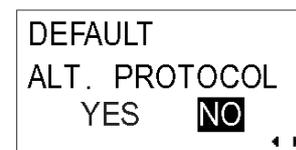
In the previous menu, if you chose PRINTER SETTINGS, the following screen appears.



4. Press the   arrow buttons to choose between YES and NO. If you select NO, you will return to the main DEFAULT MODE screen.
5. Press **ENTER** to proceed to reset printer settings.

3.11.2 If You Chose Alt Protocol Code

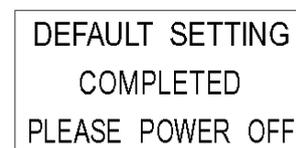
In the previous menu, if you chose the ALT. PROTOCOL option, the following screen appears.



4. Press the   arrow buttons to choose between YES and NO. If you select NO, you will return to the main DEFAULT MODE screen.
5. Press **ENTER** to proceed to reset the Alt. Protocol code.

3.11.3 Completion of Default Setting

After the settings chosen in the previous menus have been reset, the following screen appears.



Turn the printer OFF to exit the Default Mode.

3.12 UNDERSTANDING DISPENSER AND CONTINUOUS PRINT OPERATION

Two modes — Dispenser and Continuous Print operation — are available for use in the Lt408 print engine. The difference between the two operations is in the way the label paper is ejected. Here are the details:

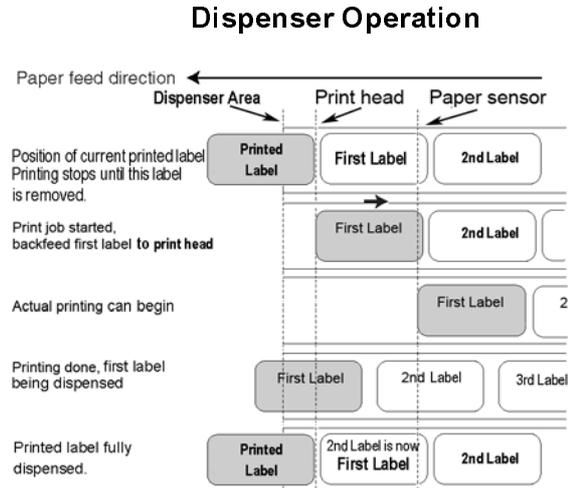
Dispenser Operation (Default)

In this method of operation, after printing, the printer feeds the first (outermost) label so that its bottom edge rests at the position of the dispenser area. This label can then be removed. Printing does not resume until this label is removed.

The label behind the dispensed label is now the first label. Its position has gone beyond the print head. Therefore, a backfeed is performed (optional). When the label is in position, printing begins.

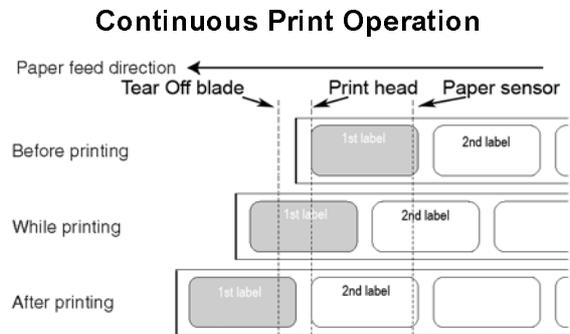
It is then dispensed and printing stops while the printer waits for the dispensed label to be removed. The option to set Backfeed is in the Advanced Mode->Backfeed Motion menu (See page 3-13).

You can disable the Backfeed or set it to occur BEFORE or AFTER print.



Continuous Print Operation

In this method of operation, whenever a print job has been completed (or when a sheet of paper is fed) the paper is ejected outwards until the second label from the front is placed just in front of the print head. The first label will not be completely ejected, and cannot be torn off neatly.



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4

CLEANING AND MAINTENANCE

4.1 INTRODUCTION

This section provides information on user maintenance for the Lt print engine. The following information is covered here:

- Cleaning the Print Head, Platen and Rollers
- Adjusting print quality

4.2 CLEANING THE PRINT HEAD, PLATEN AND ROLLERS

The print head not only generates printouts of barcodes, but also graphics and text. To produce optimal printing, it must be kept clean in spite of the dirt and adhesive that constantly accumulates on its print surface. Furthermore, dirt can accumulate along the label path, affecting parts like sensors and guides, and reducing their performance.

Therefore, it is important to clean these important components periodically. Depending on the region you are in, the Lt print engine may already come supplied with a cleaning kit or set of cleaning sheets. If any of the cleaning items need replacement, contact your authorized SATO dealer.

When to clean with a cleaning kit

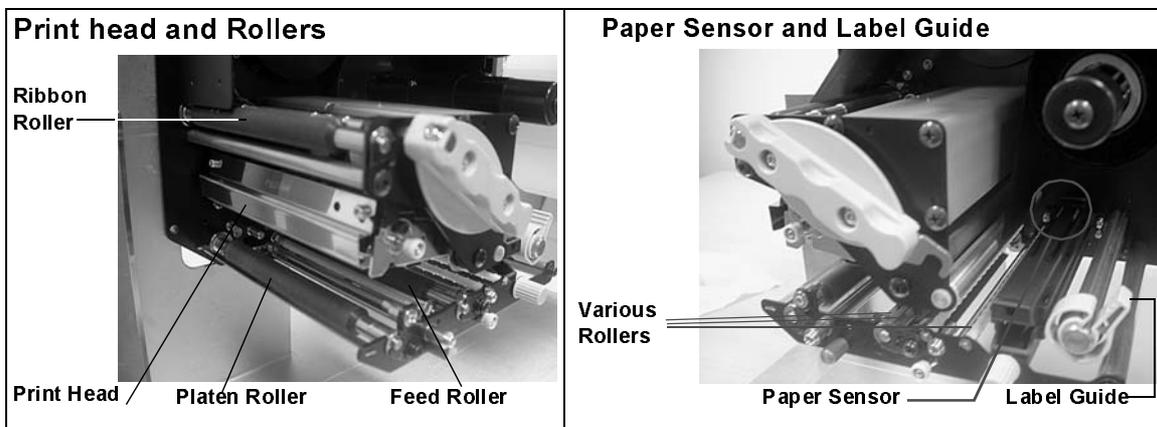
- ◆ For the print head, platen roller, paper sensor, and label guide: clean after using up every other roll of paper, or each time after printing 150 m.
- ◆ For other parts: clean after finishing every six rolls of paper, or every time after printing 900 m.

When to clean with the cleaning sheet

- ◆ For the print head, platen roller: clean after using every six rolls of paper, or every time after printing 900 m.

4.3 HOW TO CLEAN THE PRINTER (CLEANING SET)

If you are using a carbon ribbon, be sure to remove it before cleaning. Follow the instructions supplied with the cleaning set. Use the items to clean the following parts.



1. Lift up the main cover.
2. Unlatch the print head unit using the Head Lock Lever. The print head is now accessible.
3. Wipe off the dirt on the print head with a cleaning cloth or lint free cotton swab dabbed in an approved cleaning solution.
4. Moisten a cotton cleaning cloth with cleaning liquid, and use the cloth to wipe any dirt or accumulated adhesive off the platen roller. (See figure on the right). Repeat for the ribbon roller and other black rubber rollers as necessary.
5. If you are using linerless labels, also wipe off the dirt on the fixed cutter blade with a cleaning pen.

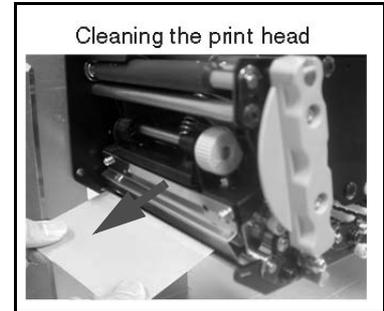


Clean the black rubber rollers:
From left: Ribbon Roller, Platen Roller, Feed Roller

4.4 HOW TO CLEAN THE PRINTER (CLEANING SHEET)

The cleaning sheet is used for cleaning the print head and platen roller.

1. Lift up the front cover.
2. Unlatch the print head unit using the purple Head Lock lever and head release latch. The print head is now accessible.
3. Remove the label and ribbon.
4. Put the head cleaning sheet between the print head and the platen roller. The coarse side of the cleaning sheet should face the surface of the print head elements.
5. Fasten the Head Lock lever to mount the print head.
6. Using both hands, pull the cleaning sheet outwards, toward your body. This will remove any dirt stuck to the print head. (See generic figure on the right)
7. When the cleaning sheet has been removed, perform steps 2 to 6 to repeat the cleaning procedure one or two more times.
8. When no more additional dirt appears on the cleaning sheet after it has been pulled out, you can stop cleaning with the sheet.
9. Unlatch the print head and use the cleaning cloth from the cleaning kit to gently remove any remaining dirt from the print head.



Caution

- Be sure to turn off the power before cleaning.
- The suggested cleaning schedule here are just guidelines. If necessary, clean as appropriate depending on the degree of contamination.
- Use a cleaning pen or cotton cloth to clean the printer units.
- Use only soft, lint-free materials for cleaning. Avoid using hard objects for the cleaning process, as they will damage the components.

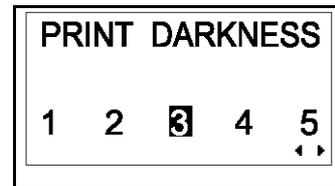
4.5 ADJUSTING PRINT QUALITY

Print quality can be optimized with regular cleaning and maintenance of the print head and components along the label path. Additionally, you can fine-tune print quality by adjusting print darkness and print speed settings.

4.5.1 Adjusting Print Darkness

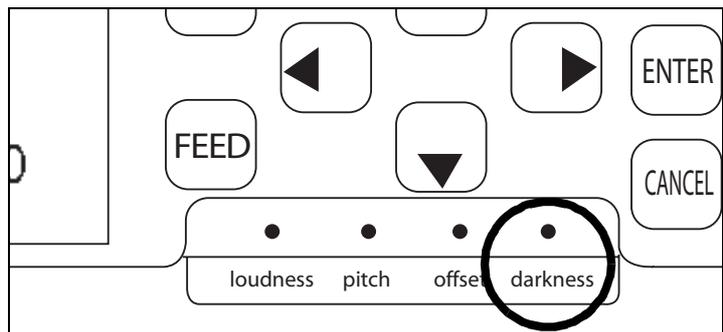
This adjustment allows the user to control (within a specified range) the amount of power applied to the individual print head heat elements. It is important to find a proper print darkness level based on your particular label and ribbon combination. The printed images should not be too light nor should the ink from the ribbon “bleed.” The edges of each image should be crisp and well defined.

LCD Panel — The Print Darkness can be set from the configuration panel or by sending the Print Darkness software command from a computer. There are five settings, from 1 (lightest) to 5 (darkest). The default setting is 3.



Once the range has been selected, the Darkness Potentiometer on the front panel can be used to make finer adjustments. For instructions on setting Print Darkness, refer to Section 3, Configuration.

Darkness Potentiometer — The fine adjustment for Print Darkness is the Darkness Potentiometer hidden behind the front panel. It provides a continuous range of adjustment, allowing you to make precise changes. Use a small cross-point screwdriver, turning clockwise for darker print and counterclockwise for lighter print. See **Section 3: Configuration** for instructions on performing potentiometer adjustments.



Note

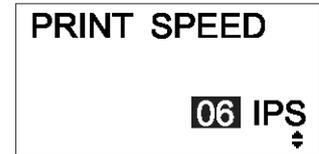
The PRINT potentiometer adjustment will affect the darkness in all of the command code speed ranges, i.e., if the PRINT potentiometer is adjusted for lighter print, the darkness will be lighter in all speed ranges selected by the command code.

4.5 ADJUSTING PRINT QUALITY (CONT'D)

4.5.2 Adjusting Print Speed

Besides varying the rate at which labels are printed, this adjustment can be used to regulate any changes in print quality.

LCD Panel — Print Speed can be set using the front panel LCD panel or by sending the Print Speed software command from a computer. There are five settings, from 02 ips (slowest) to 6 ips (faster). The default setting is 4.



For instructions on setting Print Speed, refer to page 3-7, Operation and Configuration.

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5

INTERFACE SPECIFICATIONS

5.1 INTERFACE TYPES

The Lt print engine is supplied with a single interface of the user's choice: typically a parallel interface is used for transmitting data to and from the host, and an optional external signal interface for connecting to other peripherals.

The following are the different types of interface boards available:

- 1) RS232C Interface Board
- 2) Parallel Interface Board
- 3) IEEE 1284 Interface Board
- 4) USB Interface Board (Ver. 1.1)
- 5) LAN Interface Board (10Base-T/100Base-T)
- 6) IEEE 802.11b Wireless LAN Interface Board

In addition, there is a choice of two External Signal Interface Boards (D-sub 25 pin or Amphenol 14-pin connector) that can be slotted into a separate connector on the Lt408. The EXT signal interface can be used to send printer status information to time the operation of external peripherals.

5.2 INTERFACE CARD DIP SWITCH SETTINGS (RS-232C)

The Lt408 super-speed serial interface card (optional) contains DIP switches for controlling communication conditions. The DIP switch functions are:

Switch No.	Function	Description	
1	Data length setting	ON: 7 Data Bits OFF: 8 Data Bits	
2	Parity bit setting	OFF — OFF: None	
3		OFF — ON: Even number ON — OFF: Odd number ON — ON: Not used	
4	Stop bit setting	ON: 2 Stop Bits OFF: 1 Stop Bit	
5	Baud rate setting	OFF — OFF: 9600 bps	
6		OFF — ON: 19200 bps ON — OFF: 38400 bps ON — ON: 37600 bps	
7	Communication Protocol setting	1-7 1-8 Compatibility mode OFF	Compatibility mode ON
8		OFF OFF: READY/BUSY OFF ON : XON/XOFF ON OFF : Driver specific protocol ON ON : Not used	READY/BUSY XON/XOFF Status 3 Status 2

Caution

Always turn the print engine OFF before attaching or detaching an interface card. Otherwise, severe electrical damage may be incurred, or bodily injury may be sustained.

Note:

Check the setting seal of the serial interface card.

The correct settings may vary depending on the type and revision of the board.

Any communication settings not controlled by the DIP switches can be set in the print engine's Interface Mode (See Section 3.6) using the operation panel.

5.3 INTERFACE CARD DIP SWITCH SETTINGS (LAN)

The Lt408 Local Area Network interface card (optional) contains DIP switches for initializing LAN configuration, LAN printing configuration, and LAN card self-diagnosis. The DIP switch functions are:

Switch No.	Lt408 LAN Interface Card function
1	Reserved
2	Initializes LAN card configuration information
3	Prints LAN card configuration information (configuration information such as the IP address will be printed)
4	Prints LAN card self-examination (results of LAN card examination will be printed)

5.4 INTERFACE CARD DIP SWITCH SETTINGS (WIRELESS LAN)

The Lt408 Wireless Local Area Network interface card (optional) contains DIP switches for initializing LAN configuration, LAN printing configuration, LAN card self-diagnosis and wireless mode settings. The DIP switch settings must be made before installing the card into the print engine. The DIP switch functions are:

Switch No.	Lt408 Wireless LAN Interface Card function	
1	Reserved	
2	Initializes LAN card configuration information	
3	Prints LAN card configuration information (configuration information such as the IP address will be printed)	
4	Prints LAN card self-examination (results of LAN card examination will be printed)	
5	Wireless Communication mode	OFF—OFF : 802.11 Ad hoc
6		OFF—ON : Infrastructure ON—OFF : Ad hoc ON—ON : Unused

5.5 EXTERNAL SIGNAL INTERFACE

The Lt print engine can be fitted with an EXT Signal Interface card which can be used to send printer status information status to any device or LAN. The status information can also be used to time the control of peripherals operating further down the production line.

There is a choice of two EXT Signal interface cards:

- 1) Interface card with 25-pin D-Sub connector
- 2) Interface card with 14-pin Amphenol connector

The EXT card operates in its own slot and does not interfere with the use of the main data interface card such as RS-232C or Parallel card.

For more information on purchasing an EXT card, contact your nearest authorized SATO representative. For more information on the status information obtainable from the EXT Signal Interface, see **Section 5.24 Driver Protocol**.

5.6 SERIAL INTERFACE SPECIFICATIONS (RS-232C)

The serial interface of this print engine conforms to the RS-232C standard.
 There are two types of receive modes: 1. Single Job Buffer 2. Multi Job Buffer
 These can be set using the dip switches.

Basic Specifications

Standard Interface	On the interface board																																																																																												
Dip Switch 1) Character configuration 2) Transmission speed 3) Protocol	<table border="1"> <tr> <td rowspan="2">1-1</td> <td rowspan="2">Data bit length</td> <td colspan="2">OFF</td> <td colspan="2">8 bits</td> </tr> <tr> <td colspan="2">ON</td> <td colspan="2">7 bits</td> </tr> <tr> <td rowspan="4">1-2</td> <td rowspan="4">Parity bit (2-3)</td> <td>DSW1-2</td> <td>DSW1-3</td> <td colspan="2"></td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td colspan="2">NONE</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td colspan="2">EVEN</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td colspan="2">ODD</td> </tr> <tr> <td rowspan="2">1-3</td> <td rowspan="2"></td> <td>ON</td> <td>ON</td> <td colspan="2">Not used</td> </tr> <tr> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td rowspan="2">1-4</td> <td rowspan="2">Stop bit</td> <td colspan="2">OFF</td> <td colspan="2">1 bit</td> </tr> <tr> <td colspan="2">ON</td> <td colspan="2">2 bits</td> </tr> <tr> <td rowspan="5">1-5</td> <td rowspan="5">Baud rate (5-6)</td> <td>DSW1-5</td> <td>DSW1-6</td> <td>DIPSW2-8 OFF*</td> <td>DIPSW2-8 ON</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>9600bps</td> <td>9600bps</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>19200bps</td> <td>19200bps</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>38600bps</td> <td>4800bps</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>57600bps</td> <td>2400bps</td> </tr> <tr> <td rowspan="5">1-7</td> <td rowspan="5">Protocol (7-8)</td> <td>DSW1-7</td> <td>DSW1-8</td> <td>DIPSW2-8 OFF*</td> <td>DIPSW2-8 ON</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>Ready/Busy</td> <td>Ready/Busy</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>X-on-Xoff</td> <td>X-on-Xoff</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>Status 3 echo</td> <td>Status 3 echo</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>Driver protocol</td> <td>Status2 echo</td> </tr> </table>	1-1	Data bit length	OFF		8 bits		ON		7 bits		1-2	Parity bit (2-3)	DSW1-2	DSW1-3			OFF	OFF	NONE		OFF	ON	EVEN		ON	OFF	ODD		1-3		ON	ON	Not used						1-4	Stop bit	OFF		1 bit		ON		2 bits		1-5	Baud rate (5-6)	DSW1-5	DSW1-6	DIPSW2-8 OFF*	DIPSW2-8 ON	OFF	OFF	9600bps	9600bps	OFF	ON	19200bps	19200bps	ON	OFF	38600bps	4800bps	ON	ON	57600bps	2400bps	1-7	Protocol (7-8)	DSW1-7	DSW1-8	DIPSW2-8 OFF*	DIPSW2-8 ON	OFF	OFF	Ready/Busy	Ready/Busy	OFF	ON	X-on-Xoff	X-on-Xoff	ON	OFF	Status 3 echo	Status 3 echo	ON	ON	Driver protocol	Status2 echo
	1-1			Data bit length	OFF		8 bits																																																																																						
		ON			7 bits																																																																																								
	1-2	Parity bit (2-3)	DSW1-2	DSW1-3																																																																																									
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			ON	OFF	ODD																																																																																								
	1-3		ON	ON	Not used																																																																																								
	1-4	Stop bit	OFF		1 bit																																																																																								
			ON		2 bits																																																																																								
	1-5	Baud rate (5-6)	DSW1-5	DSW1-6	DIPSW2-8 OFF*	DIPSW2-8 ON																																																																																							
			OFF	OFF	9600bps	9600bps																																																																																							
			OFF	ON	19200bps	19200bps																																																																																							
ON			OFF	38600bps	4800bps																																																																																								
ON			ON	57600bps	2400bps																																																																																								
1-7	Protocol (7-8)	DSW1-7	DSW1-8	DIPSW2-8 OFF*	DIPSW2-8 ON																																																																																								
		OFF	OFF	Ready/Busy	Ready/Busy																																																																																								
		OFF	ON	X-on-Xoff	X-on-Xoff																																																																																								
		ON	OFF	Status 3 echo	Status 3 echo																																																																																								
		ON	ON	Driver protocol	Status2 echo																																																																																								
Note: The switch between Single Job Buffer and Multi Job Buffer can be specified by software. *Valid if Compatible Mode is disabled in the printer via the Service Mode menu.																																																																																													
Synchronization mode	Asynchronous																																																																																												
Maximum Receivable Buffer capacity	2.95Mbyte 																																																																																												
Code used	ASCII(7 bit) Graphics(8 bit)																																																																																												
Connectors	Printer side DB-25S (Female) Cable side DB-25P (Male) Cable length 5 meters or less																																																																																												
Transmission format	<table border="1"> <tr> <td>Start</td> <td>b1</td> <td>b2</td> <td>b3</td> <td>b4</td> <td>b5</td> <td>b6</td> <td>b7</td> <td>b8</td> <td>Stop</td> </tr> </table> Note b8 is not applicable when using 7 bits.	Start	b1	b2	b3	b4	b5	b6	b7	b8	Stop																																																																																		
Start	b1	b2	b3	b4	b5	b6	b7	b8	Stop																																																																																				
Signal level	High level: +5 ~ +12V Low level: -5 ~ -12V																																																																																												

5.7 READY/BUSY

Ready / Busy is the hardware flow control method for the serial interface on the print engine. Data received cannot be guaranteed, when print data (ESC+"A"~ESC+"Z") is sent from the host, under the following conditions:

- 1) When the print engine is Offline
- 2) When an error has occurred in the print engine

Pin Assignments

1) DB-25 P			DB-25 P	
Printer			Host	
FG	1	————	1	FG
SD	2	————>	3	RD
RD	3	<————	2	SD
RS	4	————>	5	CS
CS	5	<————	4	RS
DR	6	<————	20	ER
SG	7	————	7	SG
ER	20	————>	6	DR

2) DB-25P			DB-9P	
Printer			Host	
FG	1	————		
SD	2	————>	2	RD
RD	3	<————	3	SD
RS	4	————>	8	CS
CS	5	<————	7	RS
DR	6	<————	4	ER
SG	7	————	5	SG
ER	20	————>	6	DR

When using Windows Hardware Control:

3) DB-25 P			DB-25 P	
Printer			Host	
FG	1	————	1	FG
SD	2	————>	3	RD
RD	3	<————	2	SD
CS	5	<————	20	ER
RS	4	————>	6	DR
DR	6	<————	4	RS
SG	7	————	7	SG
ER	20	————	5	CG

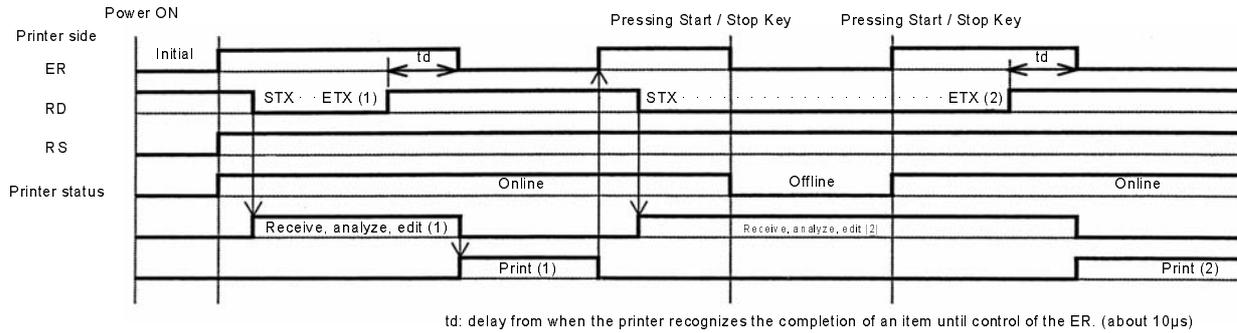
4) DB-25P			DB-9P	
Printer			Host	
FG	1	————		
SD	2	————>	2	RD
RD	3	<————	3	SD
CS	4	<————	4	ER
RS	5	————>	6	DR
DR	6	<————	7	RS
SG	7	————	5	SG
ER	20	————>	6	CS

Interface Signals

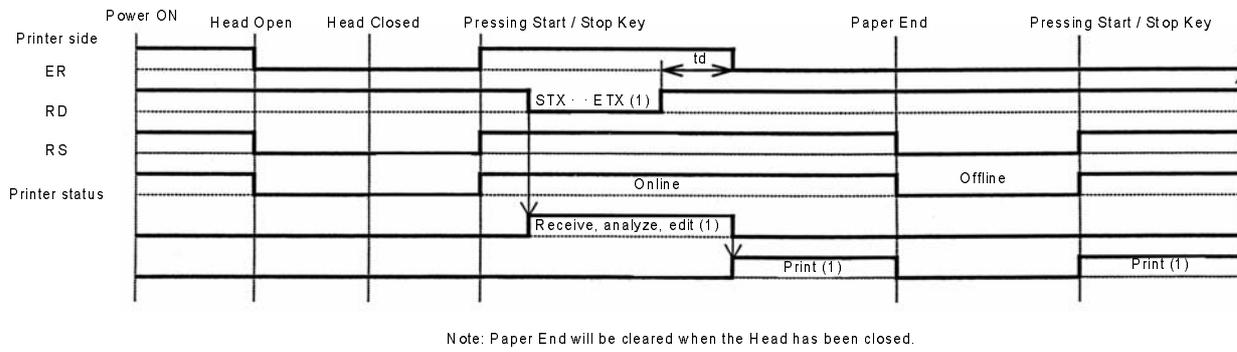
Pin no.	Signal Type	Direction	Contents
1	FG	-	Frame Ground
2	SD	Output	Send Data
3	RD	Input	Receive Data
4	RS	Output	Request to Send
5	CS	Input	Clear to Send
6	DR	Input	Data Set Ready
7	SG	-	Signal Ground
20	ER	Output	Eqpt Ready (also used for handling error status)

5.8 SINGLE JOB BUFFER

Timing Chart — Normal Processing

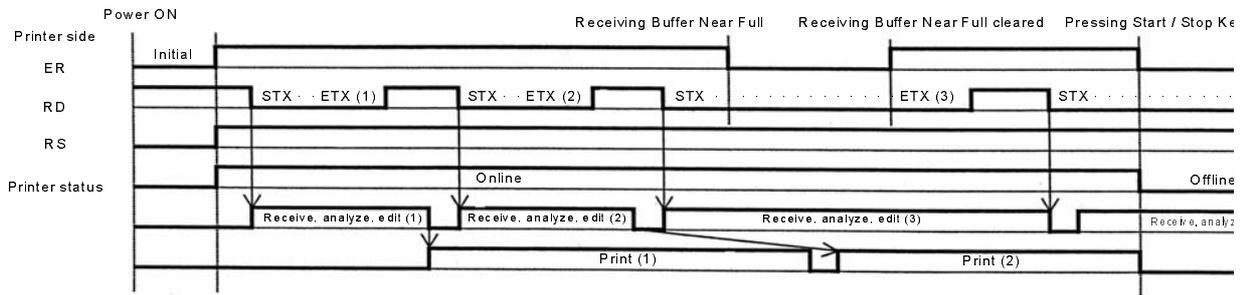


Timing Chart — Error Processing



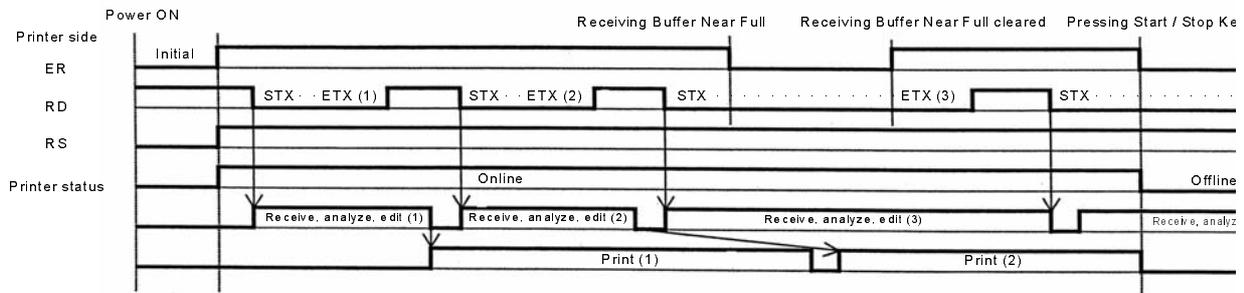
5.9 MULTI JOB BUFFER

Timing Chart — Normal Processing



Note: Data will be normally be received Online, during Multi-reception.

Timing Chart — Error Processing



Note: Data will be normally be received Online, during Multi-reception.

5.10 X-ON/X-OFF

This transmission protocol informs the host if the print engine can receive data or not, by sending the "XON" (Hex 11H) or "XOFF" (Hex 13H) code.

Data received cannot be guaranteed, when print data (ESC+"A"~ESC+"Z") is sent from the host, under the following conditions:

- 1) When the print engine is Offline
- 2) When an error has occurred in the print engine

Pin Assignments

1) DB-25 P			DB-25 P	
Printer			Host	
FG	1	————	1	FG
SD	2	————▶	3	RD
RD	3	◀————	2	SD
RS	4		5	CS
CS	5		4	RS
DR	6		20	ER
SG	7	————	7	SG
ER	20		8	DR

2) DB-9P			DB-9P	
Printer			Host	
FG	1			
SD	2	————▶	2	RD
RD	3	◀————	3	SD
RS	4		8	CS
CS	5		7	RS
DR	6		4	ER
SG	7	————	5	SG
ER	20		6	AR

Caution!

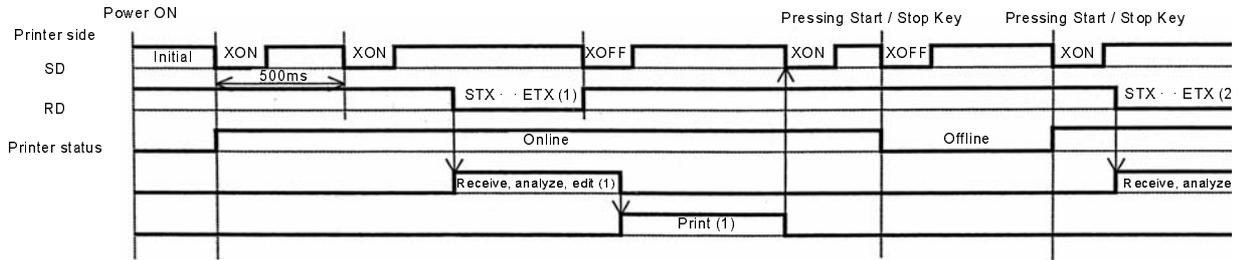
In the connections, it may be necessary to loop (usually kept "High") CS and RS on the host side depending on the type of host. Therefore, make sure to re-check the host before use.

Input/Output Signals

Pin no.	Signal Type	Direction	Contents
1	FG	-	Frame Ground
2	SD	Output	Send Data
3	RD	Input	Receive Data
7	SG	-	Signal Ground

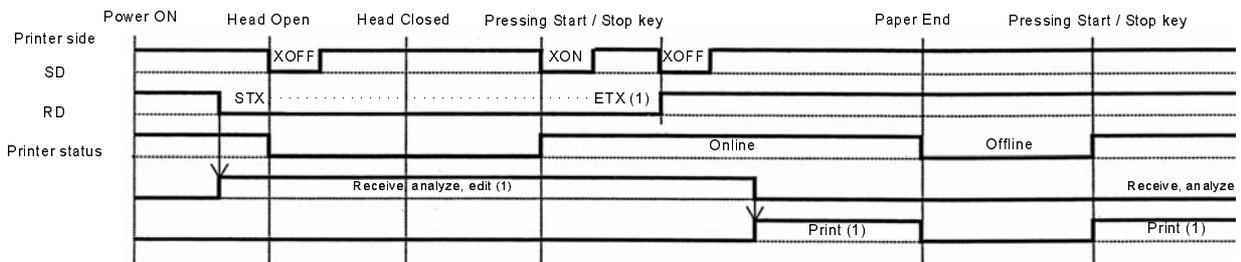
5.11 SINGLE JOB BUFFER

Timing Chart — Normal Processing



Note: This protocol will execute an "XON" polling at an interval of 500ms, from the moment the power is turned on until the receipt

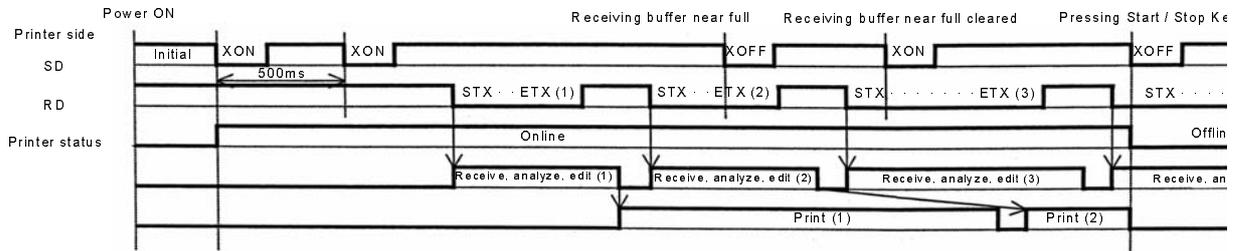
Timing Chart — Error Processing



Note: Paper End will be cleared when the Head has been closed.

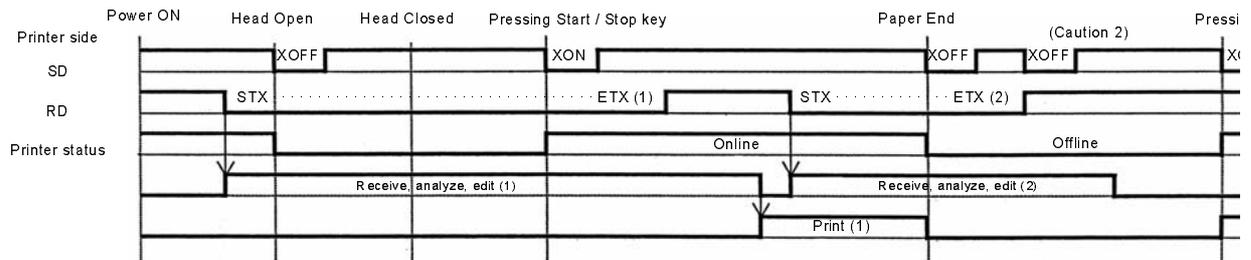
5.12 MULTI JOB BUFFER

Timing Chart — Normal Processing



Note: This protocol will execute an "XON" polling at an interval of 500ms, from the moment the power is turned on until the receipt

Timing Chart — Error Processing

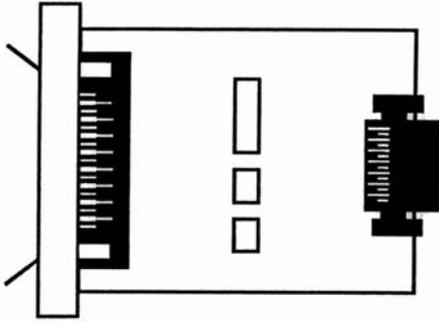
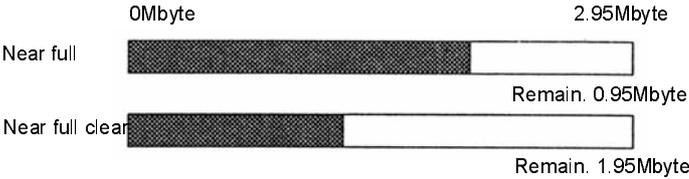
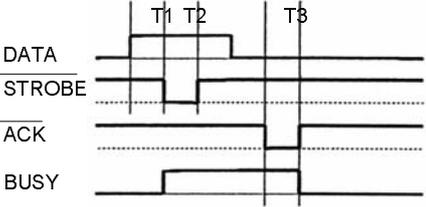


Note: Paper End will be cleared when the Head has been closed.
 Note 2: An "XOFF" transmission will be executed when receiving data during the occurrence of an error.

5.13 PARALLEL INTERFACE SPECIFICATIONS (CENTRONICS)

The parallel interface of this print engine conforms to Centronics standards.

Basic Specifications

Interface board							
Connector	<table border="0"> <tr> <td>Printer</td> <td>Amphenol (DDK) 57 to 40360 (Equivalent)</td> </tr> <tr> <td>Cable</td> <td>Amphenol (DDK) 57 to 30360 (Equivalent)</td> </tr> <tr> <td>Cable length</td> <td>Under 3 meters</td> </tr> </table>	Printer	Amphenol (DDK) 57 to 40360 (Equivalent)	Cable	Amphenol (DDK) 57 to 30360 (Equivalent)	Cable length	Under 3 meters
Printer	Amphenol (DDK) 57 to 40360 (Equivalent)						
Cable	Amphenol (DDK) 57 to 30360 (Equivalent)						
Cable length	Under 3 meters						
Signal level	<table border="0"> <tr> <td>High level</td> <td>: + 2.4 to + 5.0 V</td> </tr> <tr> <td>Low level</td> <td>: - 0.0 to - 0.4 V</td> </tr> </table>	High level	: + 2.4 to + 5.0 V	Low level	: - 0.0 to - 0.4 V		
High level	: + 2.4 to + 5.0 V						
Low level	: - 0.0 to - 0.4 V						
Communication settings	<p>One item or Multi communication can be selected using DSW2-5.</p> <table border="1"> <thead> <tr> <th>DIPSW2-5</th> <th>Set Range</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>Multi-reception</td> </tr> <tr> <td>OFF</td> <td>One Item</td> </tr> </tbody> </table>	DIPSW2-5	Set Range	ON	Multi-reception	OFF	One Item
DIPSW2-5	Set Range						
ON	Multi-reception						
OFF	One Item						
Maximum Reception buffer capacity	<p>2.95Mbyte</p> 						
Timing chart	 <p>* $1\mu s < T1, T2$ $7\mu s < T3 < 9\mu s$</p>						

5.13 PARALLEL INTERFACE (CONT'D)

Pin Assignments

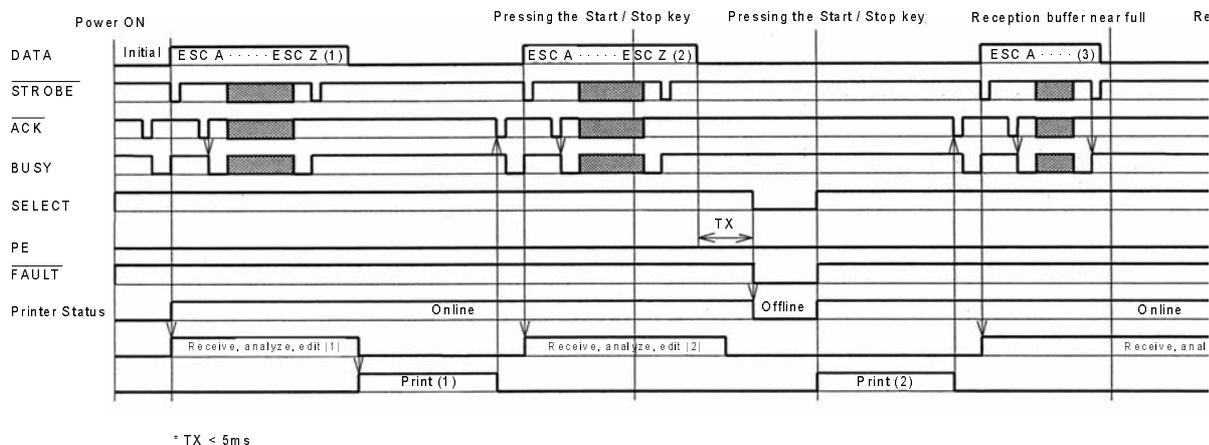
Pin no.	Signal Type	Contents	Pin no.	Signal Type	Contents
1	nSTROBE	Input	19	STROBE-RETURN	SG
2	DATA 1	Input	20	DATA 1 - RETURN	SG
3	DATA 2	Input	21	DATA 2 - RETURN	SG
4	DATA 3	Input	22	DATA 3 - RETURN	SG
5	DATA 4	Input	23	DATA 4 - RETURN	SG
6	DATA 5	Input	24	DATA 5 - RETURN	SG
7	DATA 6	Input	25	DATA 6 - RETURN	SG
8	DATA 7	Input	26	DATA 7 - RETURN	SG
9	DATA 8	Input	27	DATA 8 - RETURN	SG
10	nACK	Output	28	ACK - RETURN	SG
11	BUSY	Output	29	BUSY - RETURN	SG
12	PE	Output	30	PE - RETURN	SG
13	SELECT	Output	31		
14			32	nFAULT	Output
15			33		
16			34		
17	FG	Frame Ground	35		
18	24Ω (+5V)		36		

Interface Signals

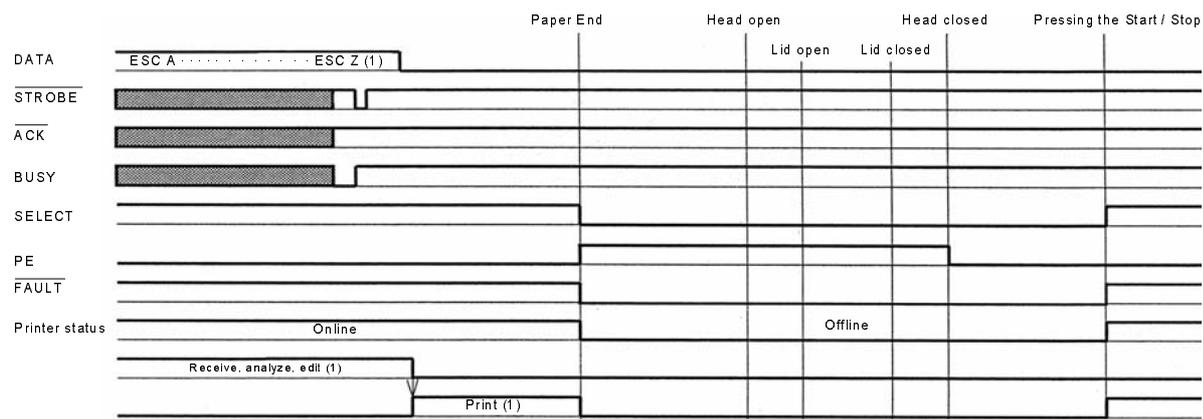
Pin no.	Signal Type	Direction	Contents
1	nSTROBE	Input	To scan data, make sure that the pulse width of the strobe pulse is set to more than 1 μs. The regular status is "High", however, if it is "Low", the data will be scanned in the first transition.
2 to 9	DATA 1 to DATA 8	Input	DATA1=LSB DATA8=MSB Positive logic code ASCII or JIS7 as well as 8.
10	nACK	Output	A low level pulse signal will be output when data scanning is complete to inform the host.
11	BUSY	Output	"High" will be maintained when the Reception buffer has reached full or when an error occurs in the printer, and "Low" will be output when the printer is ready to receive.
12	PE	Output	The level will become "High" when labels have run out and none have been set.
13	SELECT	Output	The signal will be in "High" level when reception is possible, otherwise it will be "Low" level.
32	nFAULT	Output	The signal will be in "High" level when reception is possible, otherwise it will be "Low" level.

5.14 SINGLE JOB BUFFER

Timing Chart — Normal Processing



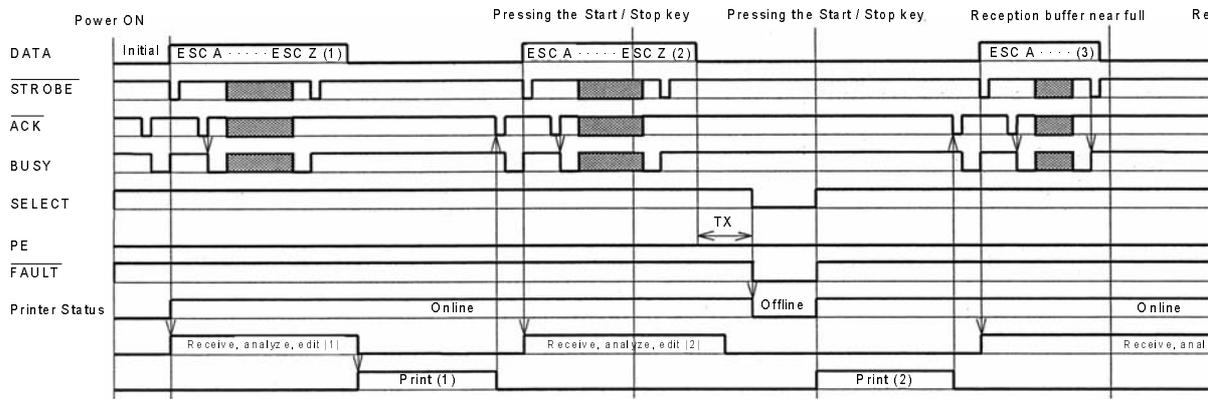
Timing Chart — Procedure during Paper End



Note: Paper End is cleared by closing the Head.

5.14 SINGLE JOB BUFFER (CONT'D)

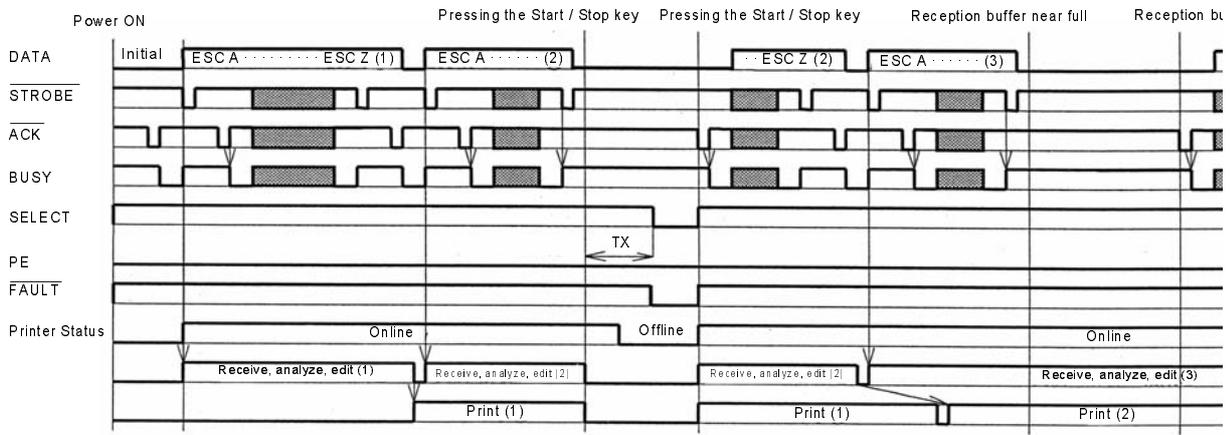
Timing Chart — Error Processing



* TX < 5ms

5.15 MULTI JOB BUFFER

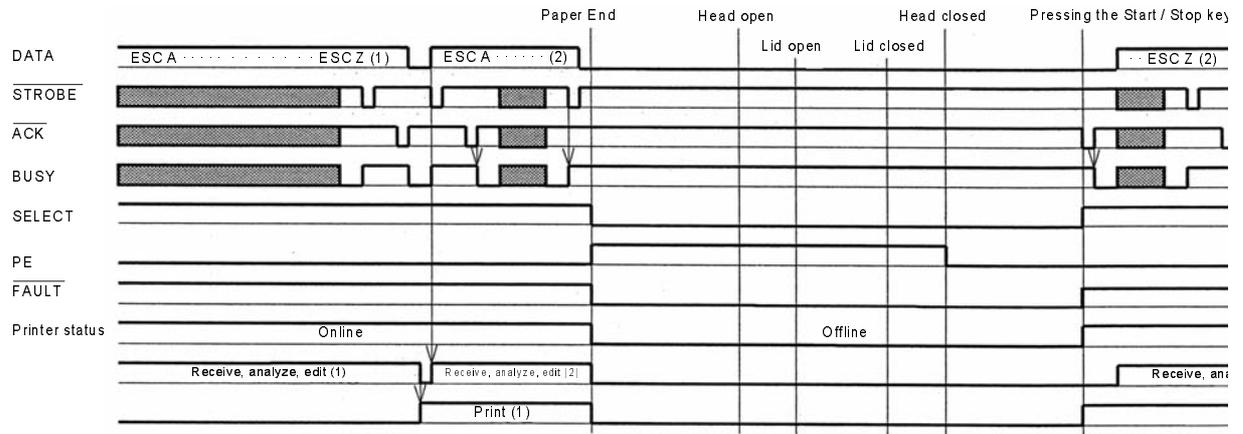
Timing Chart — Normal Processing



* TX < 5ms

5.15 MULTI JOB BUFFER (CONT'D)

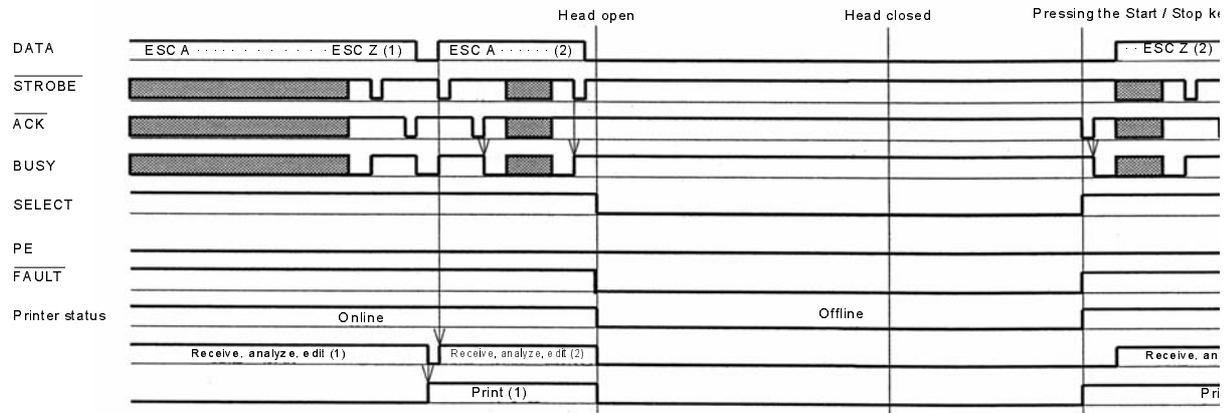
Timing Chart — Procedure during Paper End



Caution! Paper End is cleared by closing the Head

5.15 MULTI JOB BUFFER (CONT'D)

Timing Chart — Error Processing



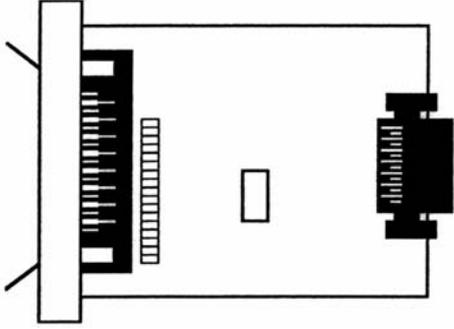
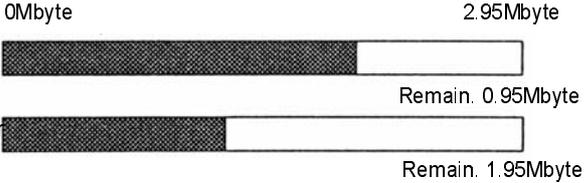
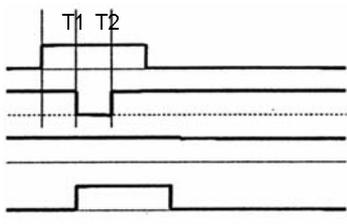
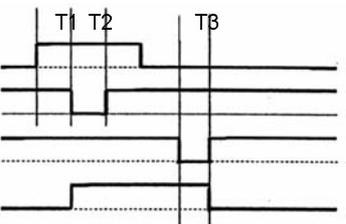
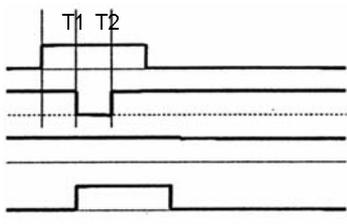
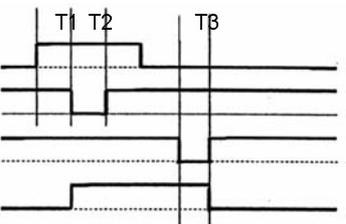
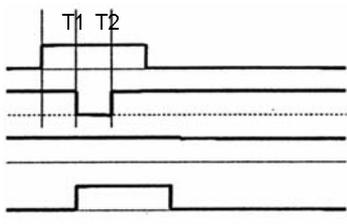
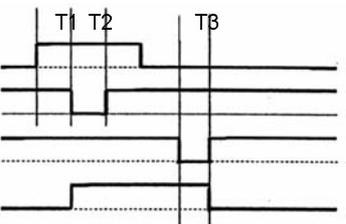
5.16 IEEE 1284 INTERFACE

The IEEE 1284 Interface on the print engine complies with IEEE1284 standards.

The ECP mode is recommended for LPT1 port settings.

Make sure to change the LPT1 port settings through the BIOS settings.

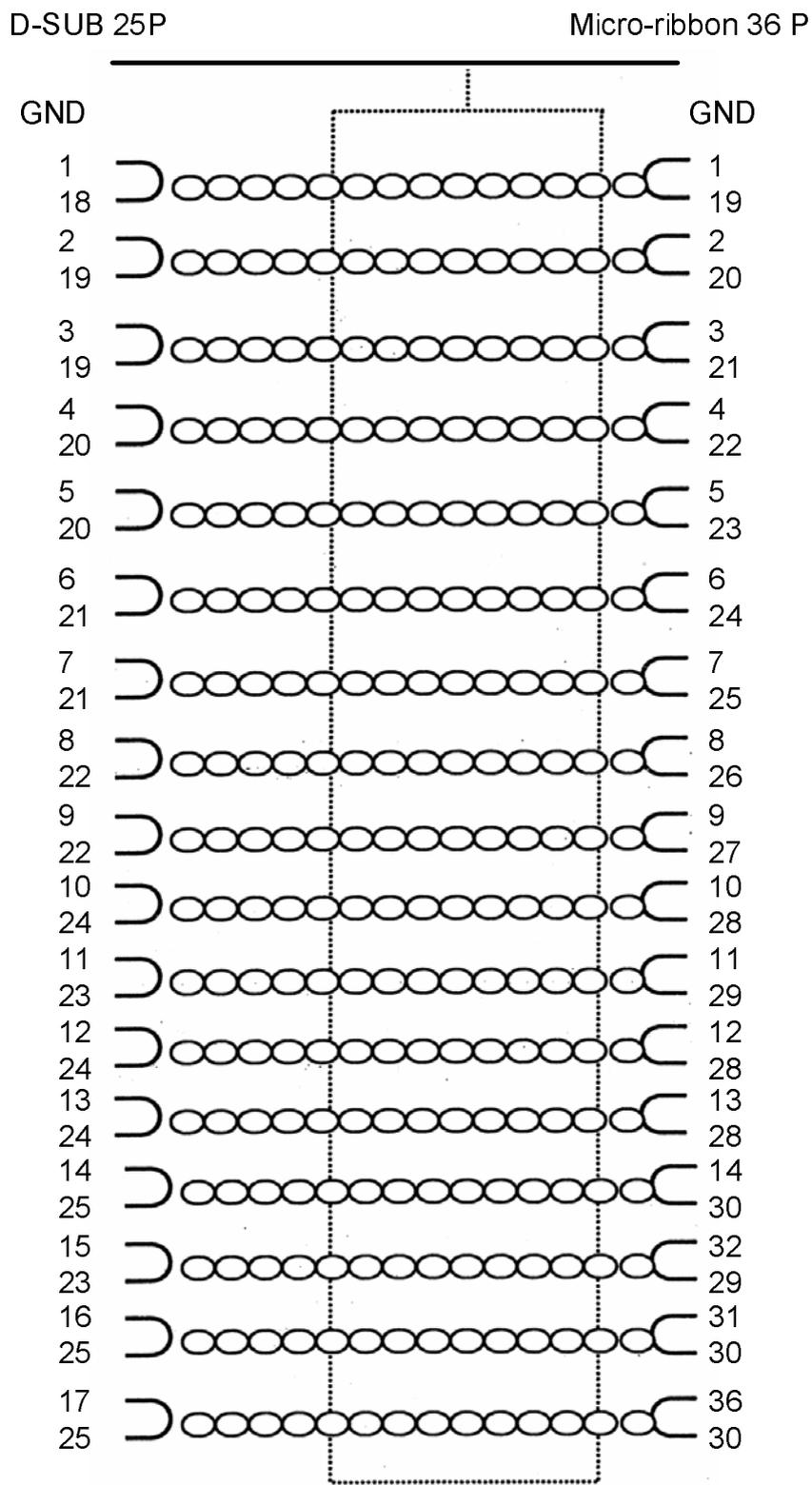
Basic Specifications

Interface board							
Connector	Printer Amphenol (DDK) 57 to 40360 (Equivalent) Cable Amphenol (DDK) 57 to 30360 (Equivalent) Cable length Under 3 meters						
Signal level	High level : + 2.4 to + 5.0 V Low level : - 0.0 to - 0.4 V						
Communication settings	One item or Multi communication can be selected using DSW2-5. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>DIPSW2-5</th> <th>Set Range</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>Multi-reception</td> </tr> <tr> <td>OFF</td> <td>One Item</td> </tr> </tbody> </table>	DIPSW2-5	Set Range	ON	Multi-reception	OFF	One Item
DIPSW2-5	Set Range						
ON	Multi-reception						
OFF	One Item						
Maximum Receive buffer capacity	2.95Mbyte <div style="margin-left: 40px;">  </div>						
Timing chart	<table border="0" style="width: 100%;"> <tr> <td></td> <td style="text-align: center;">ECP mode</td> <td style="text-align: center;">Centronics compatible mode</td> </tr> <tr> <td style="vertical-align: top;"> DATA STROBE ACK BUSY </td> <td style="text-align: center;">  </td> <td style="text-align: center;">  </td> </tr> </table> <p style="margin-left: 40px;"> * $1\mu s < T1, T2$ * $0.6\mu s < T3 < 1.2\mu s$ * It is possible to set the ACK width settings (0.5 – 10 μs) in the Advanced mode, in the case of One Item reception. </p>		ECP mode	Centronics compatible mode	DATA STROBE ACK BUSY		
	ECP mode	Centronics compatible mode					
DATA STROBE ACK BUSY							

5.16 IEEE 1284 INTERFACE (CONT'D)

Pin Assignment

Make sure to use a IEEE1284 compliant cable



5.16 IEEE 1284 INTERFACE (CONT'D)

Pin Assignment

With Centronics standards, each signal pin placement is as follows:

However, the IEEE 1284-B type connector is compliant when connecting the IEEE1284 standard.

Pin no.	Signal Type	Content	Pin no.	Signal Type	Content
1	HOST CLK	Input	19	SIGNAL GROUND	
2	DATA 1	Input	20	SIGNAL GROUND	
3	DATA 2	Input	21	SIGNAL GROUND	
4	DATA 3	Input	22	SIGNAL GROUND	
5	DATA 4	Input	23	SIGNAL GROUND	
6	DATA 5	Input	24	SIGNAL GROUND	
7	DATA 6	Input	25	SIGNAL GROUND	
8	DATA 7	Input	26	SIGNAL GROUND	
9	DATA 8	Input	27	SIGNAL GROUND	
10	PERIPH CLK	Output	28	SIGNAL GROUND	
11	PERIPH ACK	Output	29	SIGNAL GROUND	
12	nACK REVERSE	Output	30	SIGNAL GROUND	
13	XFLAG	Output	31	NREVERSE REQUEST	Input
14	HOST ACK	Input	32	nPERIPH REQUEST	Output
15			33		
16	LOGIC GND		34		
17	CHASSIS GND		35		
18	PERIPHERAL LOGIC HIGH	Input	36	1284ACTIVE	Input

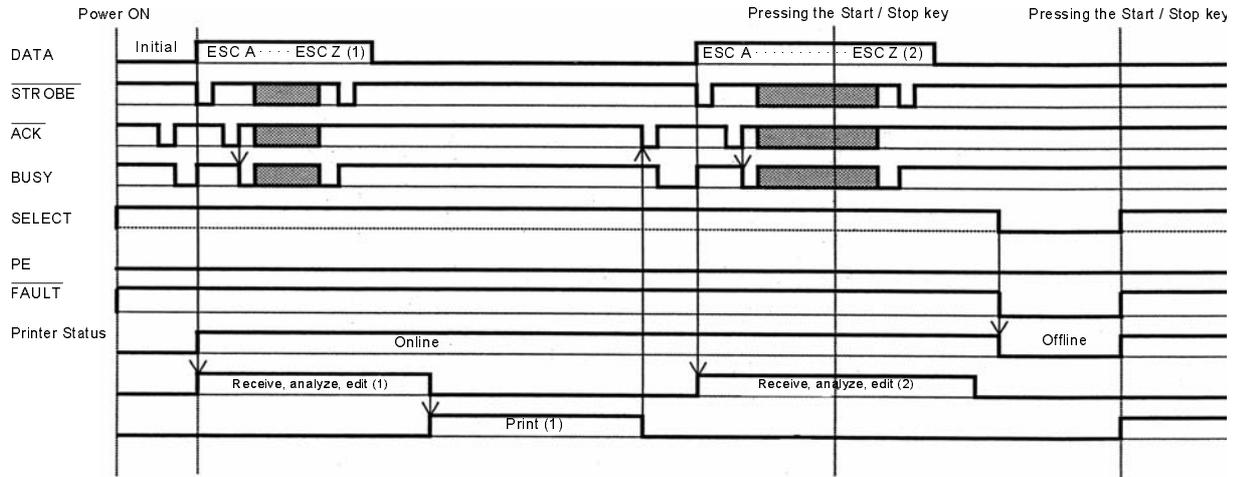
5.17 INTERFACE SIGNALS

With Centronics standards, the content of each signal type is as follows. However, each signal line used with IEEE1284 standards is compliant with IEEE1284 standards.

Pin no.	Signal Type	Direction	Contents
1	HOST CLK	Input	A low active pulse is necessary in synchronized signals for scanning Data 1 to Data 8.
2 to 9	DATA 1 to DATA 8	Input	When entering 8 bit parallel Data, Data 1 is the LSB (least significant bit) and Data 8 is the MSB (most significant bit)
10	PERIPH CLK	Output	This is the LOW active pulse signal that indicates the completion of received data scanning.
11	PERIPH ACK	Output	HIGH active signal which indicates that the printer cannot receive data.
12	nACK REVERSE	Output	HIGH active signal which indicates that the media has run out.
13	XFLAG	Output	HIGH active signal which indicates that data can be received.
14	HOST ACK	Input	Signal for when using the IEEE1284 standard.
17	CHASSIS GND		Connects to the Frame Ground
18	PERIPHERAL LOGIC HIGH	Output	The +5V voltage on the printer side.
19 to 30	SIGNAL GROUND		Connects to the ground for each signal
31	nREVERSE REQUEST	Input	LOW active signal that requests printer initialization.
32	nPERIPH REQUEST	Output	LOW active pulse signal that indicates a printer error.
36	1284ACTIVE	Input	Signal for when using the IEEE1284 standard.

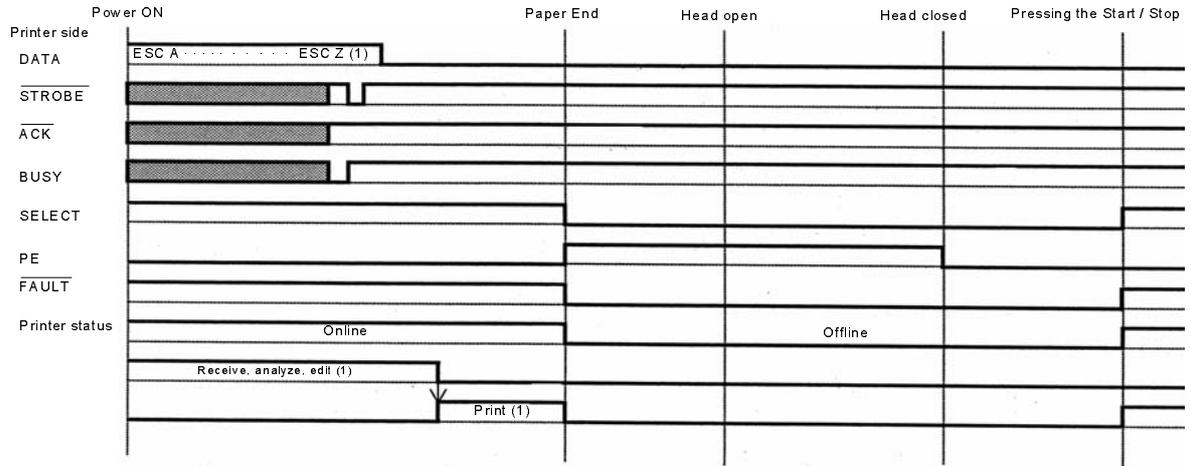
5.18 SINGLE JOB BUFFER

Timing Chart — Normal Processing



5.18 SINGLE JOB BUFFER (CONT'D)

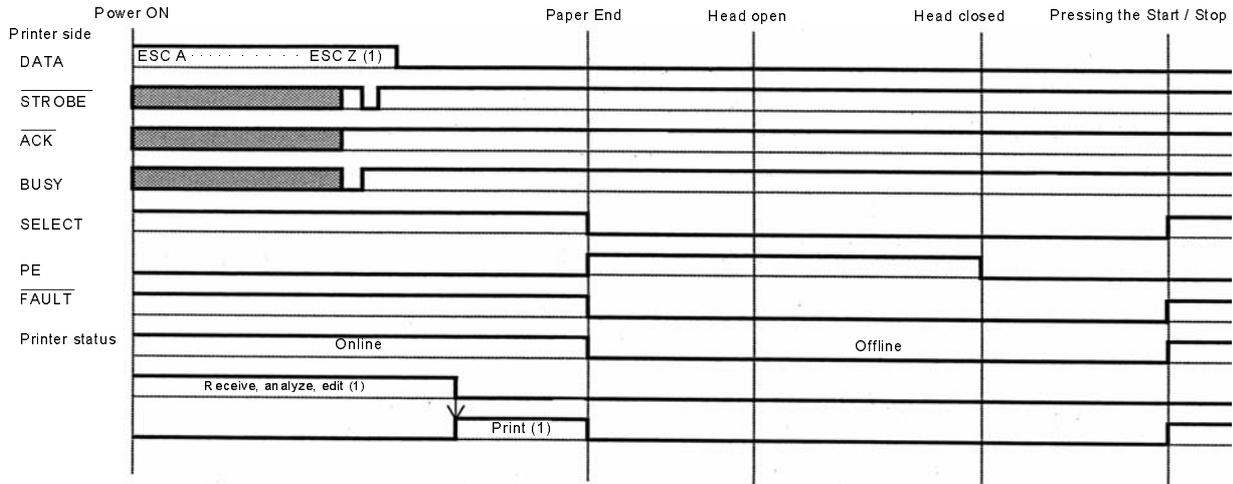
Timing Chart — Procedure during Paper End



Note: Paper End is cleared by closing the Head.

5.19 MULTI JOB BUFFER

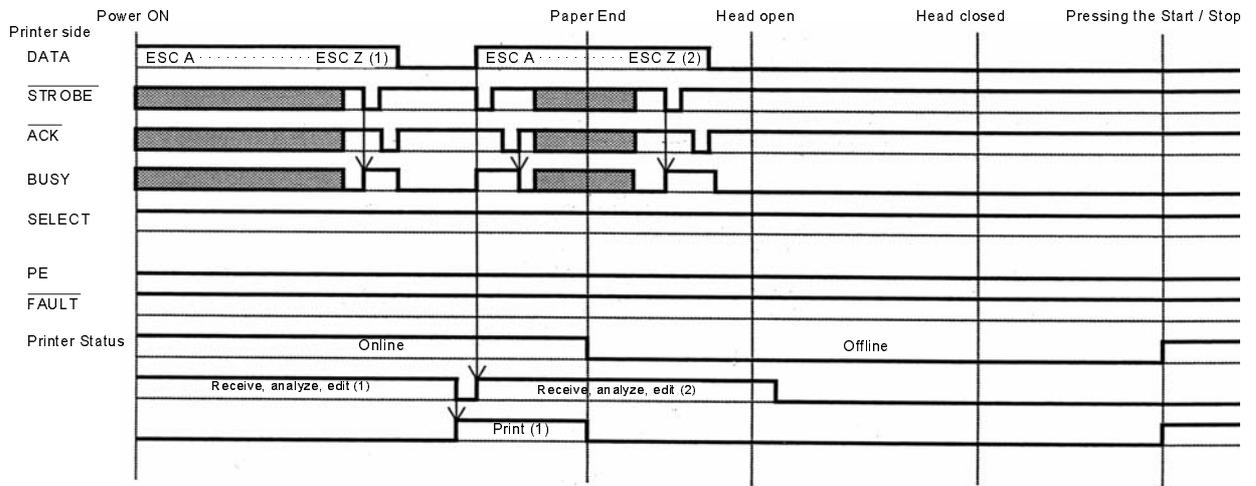
Timing Chart — Normal Process



Note: Paper End is cleared by closing the Head.

5.19 MULTI JOB BUFFER (CONT'D)

Timing Chart — Procedure during Paper End



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6

TROUBLESHOOTING

If you are unable to produce printouts on the LT Series print engine, use this section to make sure the basics have been checked, before deciding you are unable to proceed any further. The section is divided into seven parts:

- Initial Checklist
- Checklist for the Centronics Parallel Interface
- Checklist for the RS232C Serial Interface
- Understanding ON LINE, RIBBON, LABEL indicators
- Understanding the LCD error messages
- Understanding the LCD warning messages
- General Troubleshooting Guide

6.1 INITIAL CHECKLIST

1. Is the print engine powered up and ON LINE?
2. Is the ERROR light on the front panel OFF? If this light is ON, it may mean the print head assembly is open or another error condition is present.
3. Are the Label Hold-Down and Print Head Assembly in the latched position?

6.2 USING THE CENTRONICS (PARALLEL) INTERFACE

1. Is the IBM parallel printer cable connected securely to your parallel port (DB-25S Female) on the PC and to the parallel port on the print engine?
2. Is there more than one parallel interface port on your PC (LPT1, LPT2, etc.)? If so, make sure you are sending data out the correct port.
3. When you send the print job to the print engine, and it does not respond, do you get an error message on your PC that says "Device Fault" or something similar? This may mean that the computer doesn't know the print engine is there. Verify that:
 - a. Both ends of the cable are securely inserted into their respective connectors.
 - b. The print engine is ONLINE.
 - c. The cable is not defective. There are other things that can cause this error message on your computer, but at this stage, a defective cable may be one of the reasons.

Observations

6.2 USING THE CENTRONICS (PARALLEL) INTERFACE (CONT'D)

Observations

4. When you send the print job to the print engine and it does not respond, and there is no error message on the PC:
 - A. Check your data stream for some of the basics. Is your job framed as follows?
`<ESC>A—DATA—<ESC>Z`
 - B. Verify that you've included all required parameters in the data stream.
 - C. Verify the following:
 - You have not typed a "0" (zero) for an "O" (letter) or vice-versa.
 - You have not missed any <ESC> characters where they're needed.
 - Make sure all print engine command codes are capital letters.
 - Your protocol codes are set for Standard or Non-Standard and your data stream is consistent with these.
5. If you've checked all of the above and the print engine still isn't printing, you may want to try a Receive Buffer Hex Dump to determine what (if anything) the print engine is receiving from your computer. To print Hex Dumps see page 3-19, Configuration and Operation.

The parallel port is now listening for incoming data. Send your print job. The print engine will now print (only once) a Hexadecimal (Hex) Dump of everything it received from the host computer. Each 2-digit hexadecimal character represents a character the print engine received. It may be tedious, but now you can analyze and troubleshoot the data stream.
6. While checking the Hex Dump printout, look out for the sequence 0D 0A, which is a combination of Carriage Return and Line Feed characters. The command string should be continuous, and you should not see CR or LF characters between the Start Command (<ESC>A) and the Stop Command (<ESC>Z).

If you are using BASIC, it may be adding these characters automatically as the line wraps. Adding a "width" statement to your program can help to suppress these extra 0D 0A characters by expanding the line length up to 255 characters. See the beginning of the Programming Reference, under Command Codes, for details on writing a program in BASIC.

If you are not programming in BASIC, check to see if you have an equivalent statement in the language you're using, to suppress extra carriage returns and line feeds from your data being sent out to the print engine. The data stream should be one complete line going to the print engine.

6.3 USING THE RS232C (SERIAL) INTERFACE

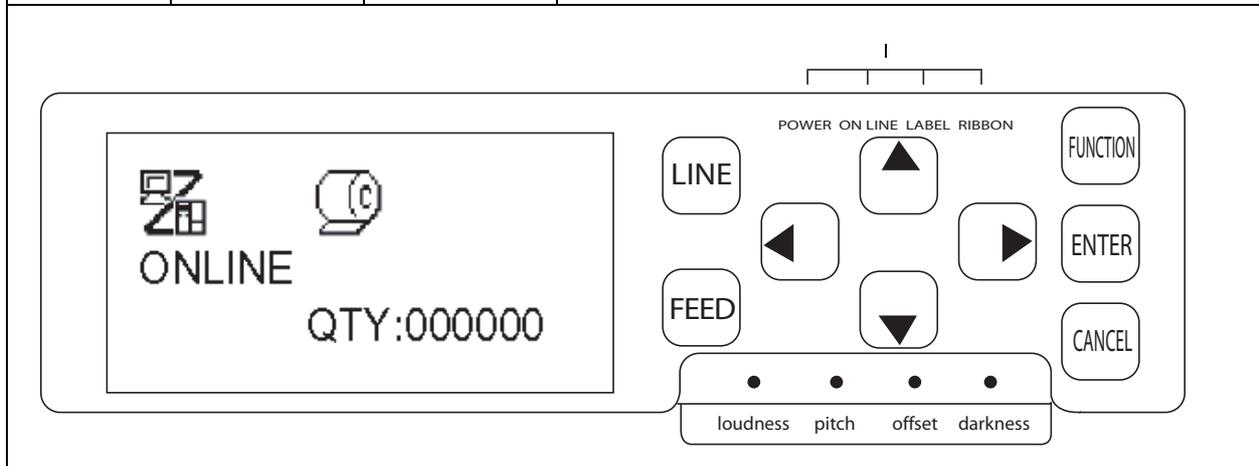
1. Is the RS232C Serial cable connected securely to your serial port on the PC (DB- 25S Male) and to the RS232C connector on the print engine?
2. Is the cable defective? At the very least, you should be using a "Null Modem Cable," which crosses pins in a specific manner. This should enable your print engine to print. But we recommend that you eventually use a cable built to specifications as described in **Section 5: Interface Specifications**
3. Check for obvious errors in the data stream. Remember that all print jobs for serial data must be framed by an **STX** and **ETX**. Again, see the **Section 5: Interface Specifications** if necessary.
4. If after sending your job to the print engine, it only "beeps" indicating a "framing error" message, you may have a configuration problem. There may be some inconsistencies with the Baud Rate, Parity, Data Bits, or Stop Bits in relation to your host computer. If you are confused as to what the print engine's current RS232 settings are, you may choose the SATO defaults (all DIP switches in the OFF position) to achieve 9600 baud, no parity, 8 data bits, and 1 stop bit.

Observations

6.4 UNDERSTANDING THE LED INDICATORS

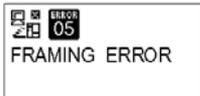
The LED indicators light up or flash to indicate the current status of the print engine. Another indicator is the built-in buzzer which sounds audible beeps to alert the user.

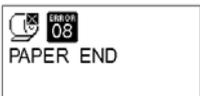
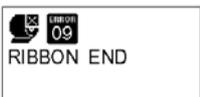
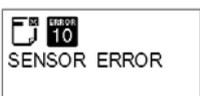
Indicator	Activity	Cause	Remedy
RIBBON	Flashes (red)	The ribbon reel is running low on ribbon.	<p>LED Indicators</p> <p>You can continue using the printer. Replace the ribbon if the Ribbon End error message appears during printing.</p>
LABEL	Lights up (red)	The label reel is running low on label.	<p>You can continue using the printer. Replace the label reel if the Label End error message appears during printing.</p>
BUZZER	Beeps	There is an error in an incoming printer command or print area specification setting.	<p>Correct the printer command or print area settings.</p>

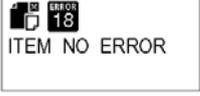


For information on error messages and icons, proceed to the next section.

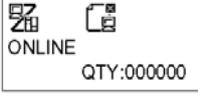
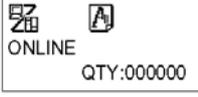
6.5 UNDERSTANDING THE LCD ERROR MESSAGES

Error No.	LCD Message	Description
01		Machine Error
		Cause: Circuit board problem Remedy: Contact a sales outlet, dealer, or service center Alarm sound: One long beep External signal: Machine error
02		Flash ROM Error
		Cause(s): 1. Flash ROM cannot be accessed 2. Illegal firmware operation requested by software Remedy: Contact a sales outlet, dealer, or service center Alarm sound: One long beep External signal: Machine error
03		Parity Error
		Cause(s): 1. RS-232C communication settings fail parity checking 2. Error in cable connection Remedy: Check and correct communication cables and settings Alarm sound: Three short beeps External signal: Machine error
04		Overrun Error
		Cause(s): 1. RS-232C communication settings exceed legal values 2. Error in cable connection Remedy: Check and correct communication cables and settings Alarm sound: Three short beeps External signal: Machine error
05		Framing Error
		Cause(s): 1. RS-232C communication settings are not in the correct frame size 2. Cable connection trouble. Remedy: Check and correct communication cables and settings Alarm sound: Three short beeps External signal: Machine error
06		Buffer Overflow error
		Cause(s): 1. Size of received data exceeds size of receiving buffer 2. Mismatch in sending/receiving communication protocols Remedy: Modify the system to establish the correct communication protocol Alarm sound: Three short beeps External signal: Machine error

Error No.	LCD Message	Description
07		Head Open error
		<p>Cause(s):</p> <ol style="list-style-type: none"> 1. The head unit is not properly locked in place 2. The micro switch that detects the head lock status is malfunctioning <p>Remedy: Lock the head unit properly. If the same error message persists, contact a sales outlet, dealer, or contact the service center</p> <p>Alarm sound: Three short beeps</p> <p>External signal: Machine error</p>
08		Paper End error
		<p>Cause(s):</p> <ol style="list-style-type: none"> 1. The media supply has run out 2. The media is not set correctly <p>Remedy: Set the media correctly</p> <p>Alarm sound: Three short beeps</p> <p>External signal: Paper end</p>
09		Ribbon End error
		<p>Cause(s):</p> <ol style="list-style-type: none"> 1. The ribbon supply has run out 2. The ribbon has been damaged <p>Remedy:</p> <ol style="list-style-type: none"> 1. Set the ribbon correctly 2. Clean the ribbon path <p>Alarm sound: Three short beeps</p> <p>External signal: Ribbon end</p>
10		Sensor error
		<p>Cause(s):</p> <ol style="list-style-type: none"> 1. The sensitivity level of paper sensor is incorrect 2. The sensor type selection is incorrect for the media used <p>Remedy:</p> <ol style="list-style-type: none"> 3. The paper flow is erratic 1. Re-adjust the sensitivity level of paper sensor 2. Choose the correct sensor type to match the media being used 3. Clean the paper path to establish a smooth paper flow. If the same error message is still displayed, contact a sales outlet, dealer, or service center <p>Alarm sound: Three short beeps</p> <p>External signal: Machine error</p>
11		Head related error
		<p>Cause: There is a problem with the print head</p> <p>Remedy: Replace the head. Clean the head and recheck. If the same error message is still displayed, contact a sales outlet, dealer, or service center</p> <p>Alarm sound: One long beep</p> <p>External signal: Machine error</p>

Error No.	LCD Message	Description
13		<p>Download Data Error</p> <p>Cause(s): 1. Received invalid download 2. There is no download area</p> <p>Remedy: 1. Check the download data 2. Check the download data size</p> <p>Alarm sound: One long beep</p> <p>External signal: Machine error</p>
14		<p>BCC Check error</p> <p>Cause: BCC attached to sending data (for an item) is different</p> <p>Remedy: Check the settings controlling data communication</p> <p>Alarm sound: Three short beeps</p> <p>External signal: Machine error</p>
15		<p>Item Number error</p> <p>Cause: The sequence number of print data (for an item) does not match the sequence number of the previously printed data</p> <p>Remedy: Check the settings controlling data communication</p> <p>Alarm sound: Three short beeps</p> <p>External signal: Machine error</p>

6.6 LCD WARNING MESSAGES

Error No.	LCD Message	Description	
01		Warning: Label Near End	
		Cause: Remedy: Alarm sound: External signal:	The label supply roll is almost running out Be ready to replenish the label roll One long beep No output
02		Warning: Ribbon Near End	
		Cause: Remedy: Alarm sound: External signal:	The amount of ribbon remaining in the print engine is low Be ready to replenish the ribbon One long beep Ribbon near end
03		Warning: Receive Buffer Near Full	
		Cause: Remedy: Alarm sound: External signal:	The free space in the buffer memory is running low Regulate the sending of data to the print engine until received data has been processed. Three short beeps No output
04		Warning: Command Error	
		Cause: Remedy: Alarm sound: External signal:	A command error has been detected Review the print data Three short beeps No output
05		Warning: Head Check Error	
		Cause: Remedy: Alarm sound: External signal:	The normal head check function detected an error in the print head, but by setting the head check function to Barcode instead of Normal check mode, printing was able to resume, as the error does not affect the quality of barcodes being printing Although the print head can still be used for now, immediate attention should be given to correct the head error or replace the print head before the situation worsens Three short beeps No output

6.7 TROUBLESHOOTING GUIDE

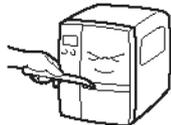
Symptom: The display remains blank when the power switch is pressed.

No.	What to check	Remedy
1	Has the power cable been inserted into the power outlet securely?	Insert the power cable securely into the outlet.
2	Is the power cable damaged?	Inspect the power cable for signs of damage. If possible, try using another printer power cable. Purchase a new power cable specifically designed for this print engine, from the sales outlet or dealer where you bought the print engine from. Never use any other power cable but the power cable specifically designed for this print engine.
3	Is electricity coming to the power outlet feeding the print engine?	Connect another electrical appliance to the power outlet to check for power. If there is a problem with the main power, check if electricity is coming to the building. Also check if power failure has occurred.
4	Has the power fuse of the building blown, or has the circuit breaker been tripped?	Replace the power fuse and reset the circuit breaker.

Caution

Do not operate the power switch or handle the power cable with a wet hand. You may suffer electric shocks as a result.

Symptom: Paper is fed but not printed

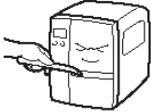
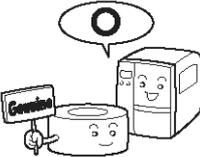
No.	What to check	Remedy
1	Is the print engine head dirty, or is there any label stuck to the print head?	If the print head is dirty, wipe off the dirt with the supplied cleaning set. If a label is stuck to the print head, take it away. * Do not use metallic object to remove it (the print head may be damaged). If glue of the label is stuck to the print head, wipe it off with the supplied cleaning set. 
2	Are you using genuine SATO paper and carbon ribbons for the Lt408?	Be sure to use genuine paper and carbon ribbon specifically designed for the print engine.
3	Is the paper sensor dirty?	If the paper sensor is dirty, wipe off the dirt with the supplied cleaning set. See Section 4: Cleaning and Maintenance.
4	Is the carbon ribbon wound correctly?	If the knob of the ribbon-winding unit is not set to its original position, remove the carbon ribbon already wound, and return the knob to its original position.
5	Is the data/signal sent from the computer correct?	Turn on the power switch again. If the message still appears, check the software on the computer or the configuration for connections.

Caution

Disconnect the power cable before cleaning the print engine.

6.7 TROUBLESHOOTING GUIDE (CONT'D)

Symptom: Low quality print

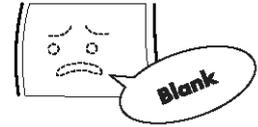
No.	What to check	Remedy
1	Are the paper and carbon ribbon set correctly?	Check if the paper and carbon ribbon are securely fixed. Also, lower the head-open lever of the print head unit, and check if the paper and carbon ribbon are in the normal position.
2	Are the paper and carbon ribbon set correctly?	Check the paper and carbon ribbon. Set the print density again.
3	Is the platen roller dirty?	If the platen roller is dirty, wipe off the dirt with the supplied cleaning set.
4	Is the print head dirty, or is a label on the head?	<p>If the print head is dirty, wipe off the dirt with the attached cleaning set. If a label is on the head, take it away.</p> <p>* Do not use a metallic object to remove it (the print head may be damaged). If glue of the label is stuck to the print head, wipe it off with the supplied cleaning set.</p> <p>See Section 4: Cleaning and Maintenance.</p> 
5	Are you using stained paper?	Use clean paper.
6	<p>Are you using genuine paper and carbon ribbon specifically designed for the print engine?</p> 	<p>Be sure to use genuine paper and carbon ribbon specifically designed for the print engine.</p> 

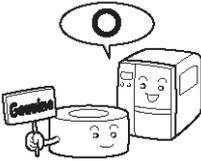
Caution

Pull out the power cable before cleaning the print engine.

6.7 TROUBLESHOOTING GUIDE (CONT'D)

Symptom: Print position is misaligned



No.	What to check	Remedy
1	Are the paper and carbon ribbon set correctly?	Fix the paper and carbon ribbon securely. Also, release the print head unit, then set the paper and carbon ribbon to the normal position again. Finally, latch the print head back in place.
2	Is the platen roller dirty?	If the platen roller is dirty, wipe off the dirt with the supplied cleaning set.
3	Is the paper/carbon ribbon you are using deformed?	If the edges of the paper/carbon ribbon are deformed, the paper cannot be fed normally. Use new paper/carbon ribbon which are not deformed.
4	Are you using genuine SATO paper and carbon ribbons specifically designed for the print engine? 	Be sure to use genuine paper and carbon ribbon specifically designed for the print engine. Generic supplies may cost less, but can result in poor printing quality or shortened equipment life, leading to voiding of warranty and/or higher operating costs in the long run. 
5	Is the paper sensor dirty?	If the paper sensor is dirty, wipe off the dirt with the supplied cleaning set. See Section 4: Cleaning and Maintenance .
6	Is the data/signal sent from the computer correct?	Turn on the power switch again. If the error message still appears, check the software on the computer or the configuration of the connections.
7	Are the pitch correction (variable potentiometer) or base point correction (User Mode setting) settings correct?	Set the pitch correction (variable potentiometer) or base point correction (User Mode setting) again.

 **Caution**

Pull out the power cable before cleaning the print engine.

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7

OPTIONAL ACCESSORIES

7.1 INTRODUCTION

This section contains details of the optional accessories available for the Lt printer engine:

- Interface boards
- Calendar IC
- Linerless Kit

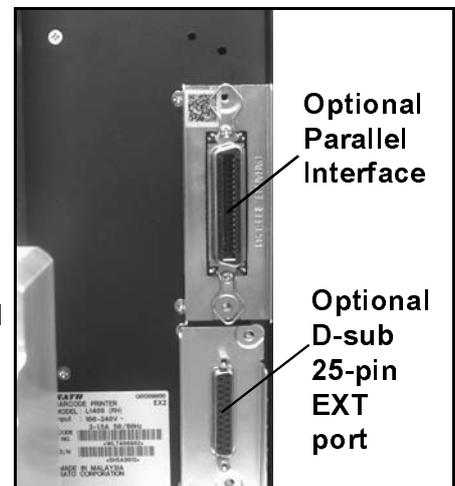
7.2 AVAILABLE INTERFACE BOARDS

Interface boards enable the printer to exchange data with computers, computer networks and related input/output devices. By installing a different interface board, you can adapt the Lt print engine to fit in a wide range of related equipment and usage scenarios.

At the time of purchase, the Lt print engine includes ONE interface board of your choice, from the following interface boards available for the Lt:

- ✕ Parallel interface board (IEEE1284)
- ✕ Serial interface board (RS-232C)
- ✕ High Speed RS-232C
- ✕ USB 1.1 interface board
- ✕ 10BaseT/100Base-TX LAN interface board
- ✕ Wireless LAN IEEE802.11b interface board
- ✕ RS-422/485 for long distance serial communication
- ✕ External Signal (EXT) port (D-Sub 25-pin or Amphenol 14-pin) for interfacing with peripherals

For more advanced details on interfaces, see **Section 5: Interface Specifications**.



Caution

Before installing or removing interface boards, be sure to turn off the printer first. Discharge static electricity from your body before touching any of the electronic parts. Failure to observe these precautions can result in severe damage to the components.

7.3 OPTIONAL ACCESSORIES

▪ **Calendar IC (option)**

Incorporates a real-time clock for providing time and date information for label printing and other timing-related functions.

▪ **Linerless Option**

Adds support for printing of linerless labels with the LT print engine.

For more information on any of the accessories available for the LT print engine, please contact an authorized SATO dealer near you.

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