CL408e/CL412e Printers

Service Manual

PN 9001078
Rev. B

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The information supplied in this manual was current at time of publication. If you come across procedures that need clarification or find errors or have suggestions contact us at qc@satoamerica.com

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

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1

Overview and Specifications

1.1 Overview

The SATO CL408e/CL412e Printers Service Manual provides information for installing and maintaining CL408e/CL412e Thermal Transfer printers. Step-by-step maintenance instructions are included in this manual with typical problems and solutions. It is recommended that you become familiar with each section in this manual before installing and maintaining the printer.

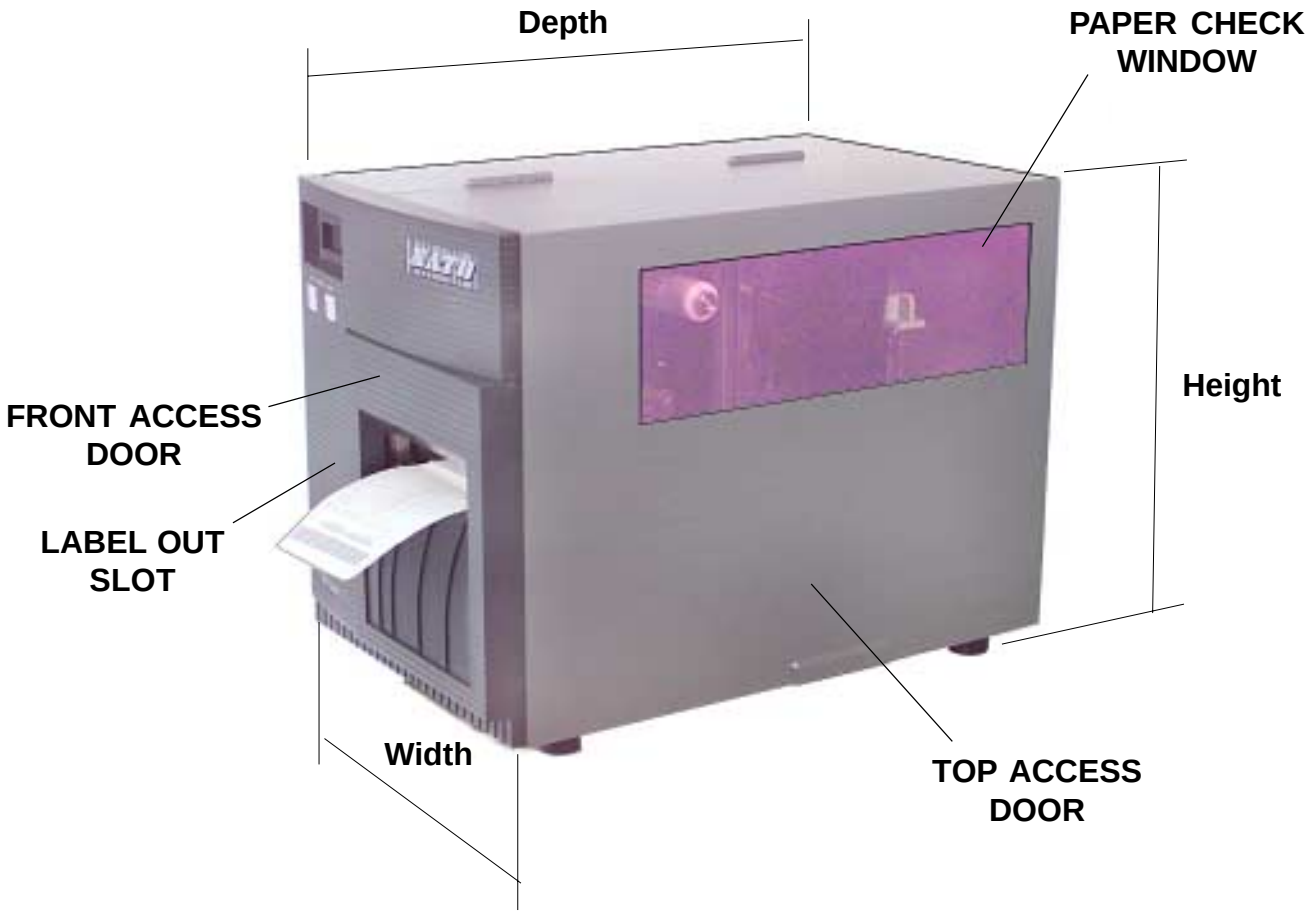
The major differences in the CL408e and the CL412e printers is the resolution of the head. The CL408e with its 203 dpi head provides an economical labeling solution for most applications. It can print labels up to 4.1 inches wide. The CL412e provides a higher print resolution, 305 dpi to give laser-quality printing. It is useful when higher resolution is needed for detailed graphic images.

The CL Series "e" printers use a subset of the standard SATO Command Language. The CL408e/CL412e share the same command set, the only differences are the allowable values representing the print positions on the label. These values are specified in "dots" and will vary depending upon the resolution of the printer and the amount of memory available for imaging the label. The allowable range for each printer is specified in a table for those command codes.

The sections in this manual cover the following:

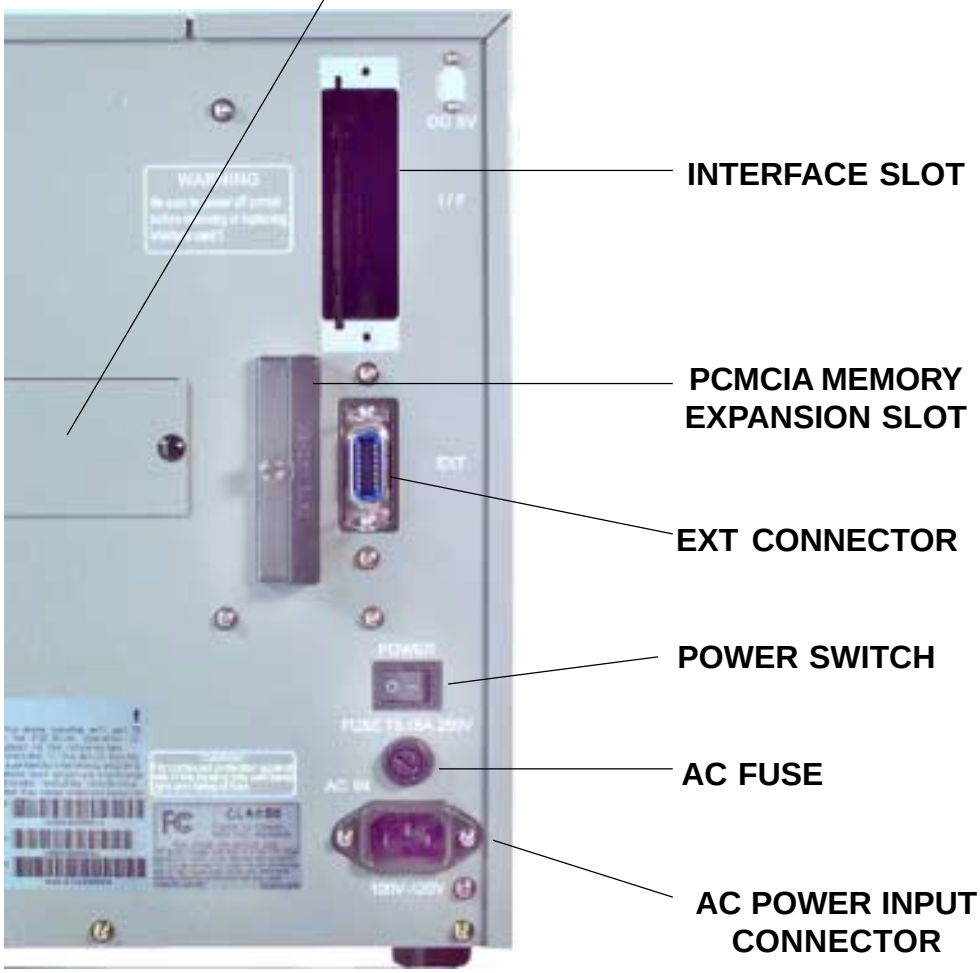
- *Section 1. Overview and Specifications*
- *Section 2. Configuration*
- *Section 3. Interface Specifications*
- *Section 4. Electrical Checks and Adjustments*
- *Section 5. Mechanical Adjustments*
- *Section 6. Replacement Procedures*
- *Section 7. Factory Resets*
- *Section 8. Troubleshooting*
- *Section 9. Optional Accessories*
- *Section 10. Parts list*
- *Index*

1.2 Physical Characteristics



Dimensions	CL408e CL412e
Wide	10.7 in. (271 mm)
Deep	16.9 in. (430 mm)
High	12.6 in. (321 mm)
Weight	28.7 lbs. (13 kg)
Power Requirements	
Voltage	115 -220 V (+/- 10%) 50/60 Hz (+/- 1%)
Power Consumption	50W idle 130W Operating

1.3 Printer Features



Rear Panel

INTERFACE SLOT — Slot to plug in an interface adapter. An adapter must be connected before the printer is operational. The adapter types available are:

RS232C Serial I/F Module, DB-25.
IEEE1284 Parallel I/F Module, AMP 57-40360
Universal Serial Bus I/F Module
Ethernet 10/100 BaseT I/F Module
RS-422/485 I/F Module, DB-9

MEMORY CARD SLOT — One slot for optional PCMCIA Memory Cards.

EXT CONNECTOR — External signal connector for Accessories, AMP 57-60140

POWER SWITCH — Turns power On/Off

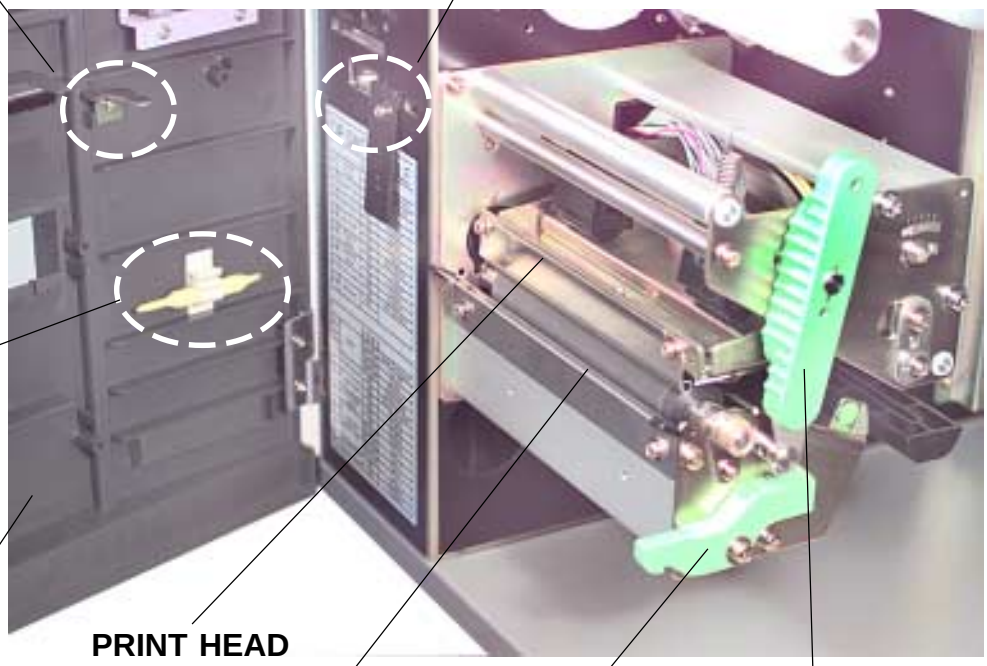
AC FUSE — Input power protection. Type 3A/250V.

AC POWER INPUT — Input 115V 50/60 Hz connector. Use the cable provided.

Printer Features

FRONT ACCESS DOOR INTERLOCK :
This switch prevents printer operation when the Front Access Door is open. The Top Access Door must be open before the Front Access Door can be opened or closed.

COVER OPEN SENSOR:
When this sensor is activated, the printer will not operate and ***Cover Open*** message will be displayed on the display panel.



TOOL FOR DARKNESS ADJUSTMENT

FRONT ACCESS DOOR OPENED

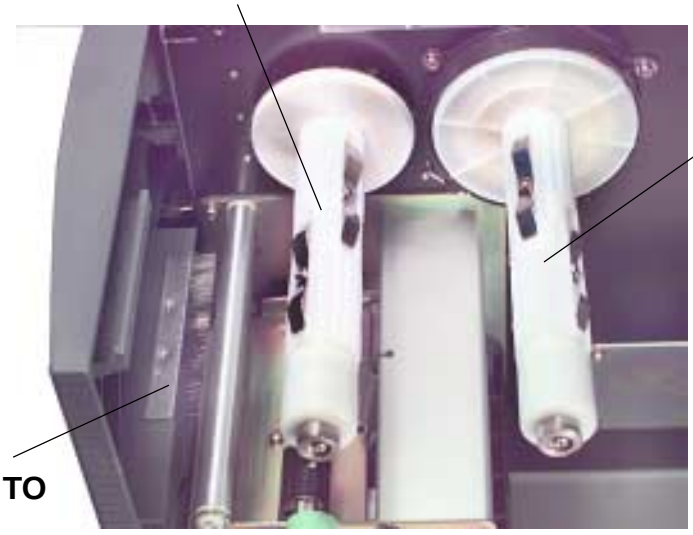
PRINT HEAD ASSEMBLY UNIT

TEAR OFF PLATE

FRONT ACCESS DOOR OPEN LEVER

HEAD OPEN LEVER:
When the print head is opened, this switch is activated and the printer will stop printing.

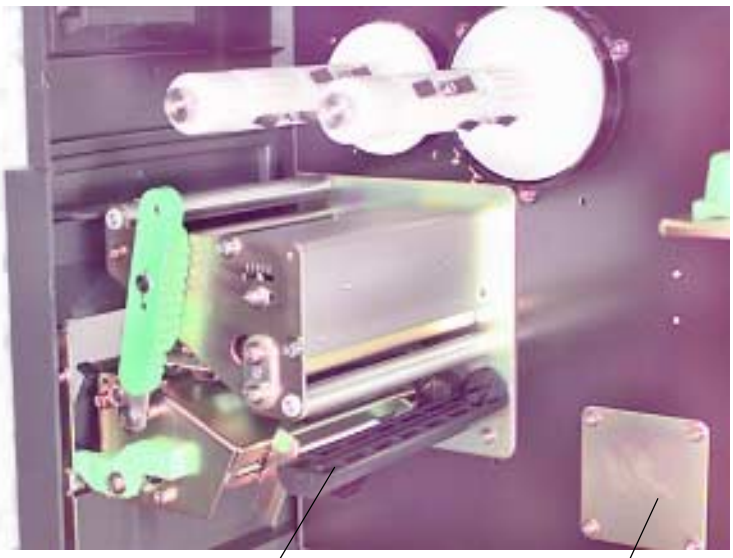
RIBBON REWIND SPINDLE



RIBBON SUPPLY SPINDLE

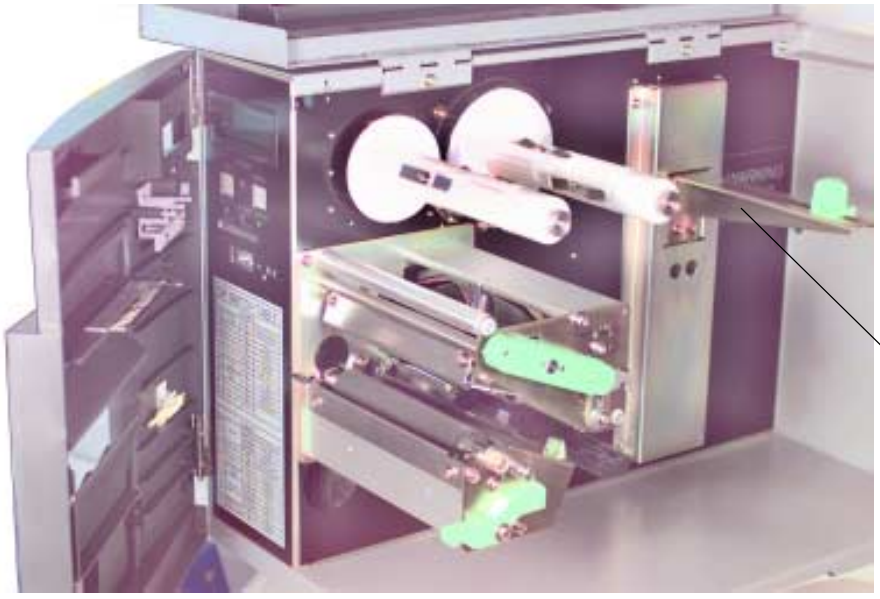
BRUSH (ATTACHED TO DOOR)

Printer Features



LABEL GUIDE

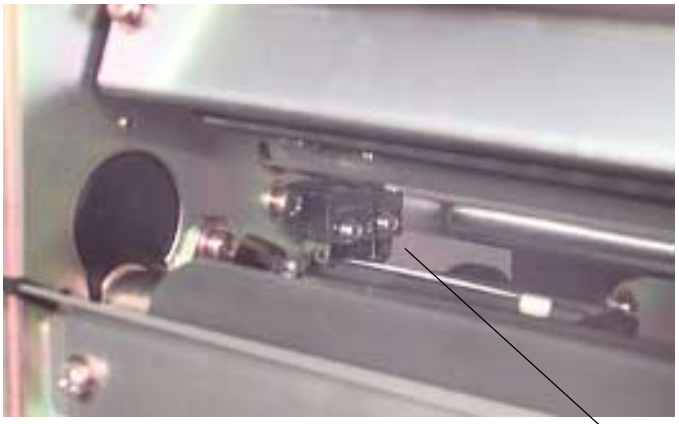
ACCESS PLATE FOR OPTIONAL LABEL DISPENSER



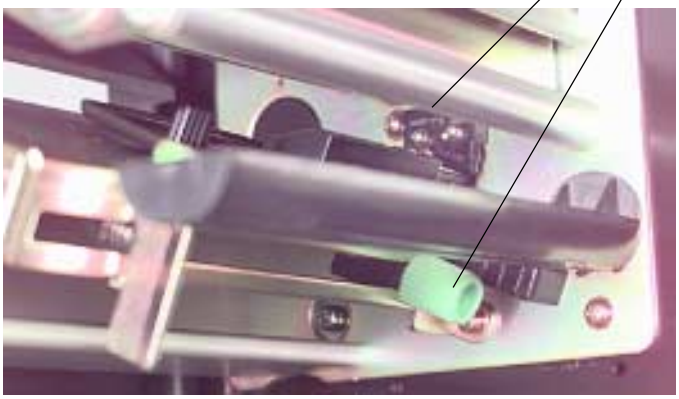
MEDIA HOLDER

1.4 Sensors

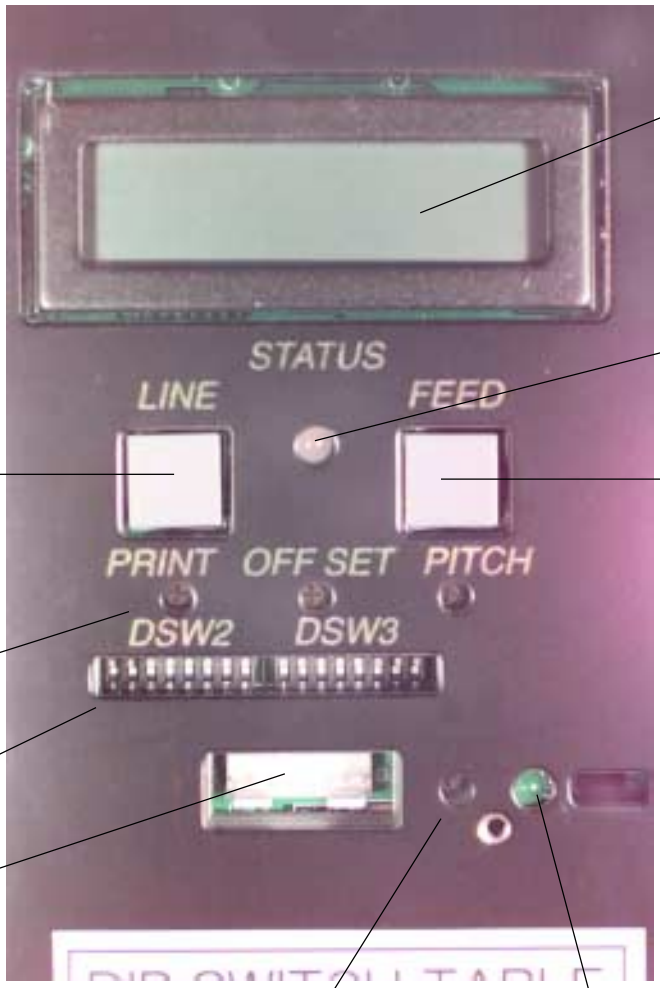
RIBBON MOTION SENSOR:
This sensor is a motion detector that signals the printer when the ribbon supply is turning. This sensor is used for both the ribbon end and ribbon near end sensing.



LABEL SENSOR:
Both the "Eye-Mark" (reflective) and Gap (transmissive) sensors can be adjusted over a limited range. They are both located in the label sensor unit. The assembly can be adjusted by loosening the green sensor knob located underneath the label transport assembly and sliding the label sensor unit to the desired position. The gap sensor can be adjusted from a minimum of 0.67 in. (17mm) to a maximum of 2.5 in. (64mm) and the "Eye-Mark" from a minimum of 0.25 in. (6mm) to a maximum of 2.1 in. (53mm) from the fixed position, "inside label guide".



1.5 Operation Panel



*NOTE: Optional RS232 Communication Card contains DSW1 switches which are configured when supplied with the printer.

The CL408e/CL412e Operator Panel consists of one two-color (red and green) LED indicator, two momentary contact switches, two DIP switches (a third is located on the RS232 interface card), four adjustment potentiometers and one LCD display. All of these are accessible from the front of the printer, however some are not accessible unless the front cover is open. They are used to set the printer operating parameters and to indicate the status of the printer to the operator.

Operation Panel

LCD DISPLAY PANEL — 2 Line x 16 Character LCD display. Used for setting operational parameters of the printer.

STATUS LED — Two-color (Red, Green) LED that indicates the following status conditions.

Green-Illuminated when printer is ready to receive data. It is turned on and off by toggling the LINE key.

Red-Illuminated when there is a system fault such as an open print head.

LINE KEY — Momentary switch. Pressing this key toggles the printer between the on-line and off-line mode. When the printer is on-line, it is ready to receive data from the host. This key acts as a pause during a print job by taking the printer off-line. It can also be used as a PAUSE function key to stop label during the printing process.

FEED KEY — Momentary switch. Pressing this key feeds one blank label through the printer when it is off-line. When the printer is on-line, there is a user selectable option in the Service Mode (see page 2-28) to either print a copy of the previously printed label or feed a blank label. The default is to feed a blank label.

POTENTIOMETERS

PRINT — Located behind the Front Access Door. Potentiometer is used to adjust print darkness (fine tuning).

OFFSET — Located behind the Front Access Door. Potentiometer is used to adjust amount of back/forward feed for dispenser/cutter/tear-off bar position (+/- 3.75mm).

PITCH — Located behind the Front Access Door. Potentiometer is used to adjust home position of the label (+/- 3.75mm). Affects stop position of label feed, print position and dispense position.

LABEL TAKEN THRESHOLD — Located behind the Front Access Door. Potentiometer is used to adjust the sensing level of the Label Taken Sensor. Active only when the Label Dispense option is installed.

DSW2 & DSW3 — Located behind the Front Access Door. DIP switch array to set operational parameters of the printer. DSW1 is used to set the RS232 parameters and is located on the RS232 interface board if installed in your printer.

OPTIONAL CONNECTOR — Located behind the Front Access Door. This connector is used for the cutter and dispenser optional accessories.

LABEL TAKEN LED — Located behind the Front Access Door. This LED is illiminated when a label is not present in the Label Taken Sensor. If it is not illuminated, a label has been detected in the sensor and printing will be inhibited until it is removed. This LED is active only when the Label Dispense option is installed.

1.6 Installation Considerations

Printer operation can be affected by the printer environment. The location of the printer should be free from dust, humidity and sudden vibrations. To obtain optimum results from the printer, avoid locations influenced by:

- Direct or bright sunlight, since bright light will make the label sensor less responsive and may cause the label to be sensed incorrectly.

- Warm temperatures which can cause electrical problems within the printer. (See Section 1-8 Environment.

1.7 Optional Accessories

ACCESSORY	CL408/CL412
Memory Expansion	One slot for PCMCIA Memory Cards (up to 16 MB Flash or 4 MB SRAM) and/or 4 MB internal Flash ROM. Can be used for graphic file storage, print buffer expansion, format storage and downloaded True Type fonts.*
Calendar	An internally mounted Date/Time chip that can be used to date/time stamp labels at the time of printing.*
Label Cutter	An internally mounted attachment allowing labels to be cut at specified internals. Controlled through programming.*
Label Dispenser	Internal attachment allowing labels to peeled from backing for immediate (on demand) application. Internal backing take-up.
Label Rewinder	External option that rewinds labels onto a roll after they are printed.
Parallel Interface	IEEE1284 Parallel Interface Module
Serial Interface	High Speed Serial RS232 Interface Module
Universal Serial I/F	USB Interface Module
Ethernet Interface	10/100BaseT Interface Module
Coax/Twinax Interface	Coax/Triax Interface Module. Coax I/F emulates an IBM 3287-2 printer with a standard Type A BNC connector. Twinax I/F emulates IBM 5224, 5225, 5226 or 4214 printers with auto-terminate/cable-thru capabilities

* Check with your software vendor to make sure these functions are supported.

1.8 Environment & Approvals

Environmental	**CL408e/CL412e**
Operating Temperature	41^0 to 104^0 F (5^0 to 40^0 C)
Storage Temperature	-0^0 to 104^0 F (-20^0 to 40^0 C)
Operating Humidity	15-85% RH, non-condensing
Storage Humidity	Max 90% RH, non-condensing
Electrostatic Discharge	8KV
Regulatory Approvals	
Safety	UL, CSA
RFI/EMI	FCC Class A

1.9 General Printer Specifications

Specification	**CL408e**	**CL412e**
Print		
Method	Direct or Thermal Transfer	
Speed (User Selectable)	2 to 6 ips - 50 to 150 mm/s	
Print Module (Dot Size)	.0049 in. - .125 mm	.0033 in. - .083 mm
Resolution	203 dpi - 8 dpmm	305 dpi - 12 dpmm
Maximum Print Width	4.1 in. - 104 mm	
Maximum Print Length	49.2 in. - 1249 mm	32.8 in. - 833 mm

Specification	**CL408e**	**CL412e**
Media		
Minimum Width	.87 in. (22 mm)	
Minimum Length	.24 in. (6 mm)	
Maximum Width	5.1 in. (131 mm)	
Type	Die Cut Labels, Fan-Fold, Tag Stock or Continuous	
Caliper	.010 in. (.25 mm)	
Roll OD (max)	8.6 in. (218 mm), Face-in Wind	
Core ID (min)	1.5 in. (38 mm)	
Core ID (Recommended)	3 in. (76 mm)	

General Printer Specifications

Specification	CL408e	CL412e
Sensing		
Transmissive See-thru	Movable	
Reflective Eye-Mark	Movable	
Continuous Form	Sensor not used	
Ribbon		
Maximum Width	4.4 in. (111 mm)	
Length	1475 ft. (450 m)	
Thickness	4.5 micron, Face in Wind	
Controls and Signals		
On-Line LED	Status = Green (1)	
Power LED	None	
Media Out LED	Status = Red (1)	
Ribbon Out LED	Status = Red (1)	
Error LED	Status = Red (1)	
LCD Panel	2 Line x 16 Character	
On/Off-Line Switch	Front Panel	
Label Feed Switch	Front Panel	
Power On/Off Switch	Rear Panel	
Potentiometer Adjustments		
Print Darkness	Front Panel	
Pitch	Front Panel	
Offset	Front Panel	
Display	None	

(1) Single two color (Red, Green) LED

General Printer Specifications

Specification	CL408e	CL412e
Interface Modules		
Parallel	IEEE 1284 Parallel	
Serial	RS232C (9600 to 57,600 bps) RS422/485 (9600 to 57,600 bps)	
Serial Protocol	Hardware Flow Control (Ready/Busy) Software Flow Control (X-On/X-Off) Bi-directional Status 2, 3 or 4	
Universal Serial Bus	USB Version 1.1	
Ethernet	10/100BaseT	
Data Transmission	ASCII Format	
Processing		
CPU	32 Bit RISC	
Flash ROM	2 MB	
SDRAM	16 MB	
Receive Buffer	2.95 MB	
Optional Flash ROM	4 MB	
Optional PCMCIA Memory	Up to 16 MB Flash or 4 MB SRAM	

1.10 Character Fonts

Specification	CL408e	CL412e
Matrix Fonts		
U Font	(5 dots W x 9 dots H)	
S Font	(8 dots W x 15 dots H)	
M Font	(13 dots W X 20 dots H)	
XU Font	(5 dots W x 9 dots H) Helvetica	
XS Font	(17 dots W x 17 dots H) Univers Condensed Bold	
XM Font	(24 dots W x 24 dots H) Univers Condensed Bold	
OA Font	(15 dots W x 22 dots H) OCR-A	(22 dots W x 33 dots H) OCR-A
OB Font	(20 dots W x 24 dots H) OCR-B	(30 dots W x 36 dots H) OCR-B
Auto Smoothing Fonts		
WB	WB Font (18 dots W x 30 dots H)	
WL	WL Font (28 dots W x 52 dots H)	
XB	XB Font (48 dots W x 48 dots H) Univers Condensed Bold	
XL	XL Font (48 dots W x 48 dots H) Sans Serif	
Vector Font		
	Proportional or Fixed Spacing Font Size 50 x 50 dots to 999 x 999 dots Helvetica, 10 Font Variations	
AGFA® Raster Fonts		
A Font	CG Times, 8 to 72 pt	
B Font	CG Triumvirate, 8 to 72 pt	
Downloadable Fonts		
	Bit Mapped TrueType Fonts with Utility Program	
Character Control		
	Expansion up to 12 X in either the X or Y coordinates Character Pitch control Line Space control Journal Print facility 0^0, 90^0, 180^0 and 270^0 Rotation	

1.11 Bar Codes

Specification	CL408e	CL412e
Symbologies		
	Bookland (UPC/EAN Supplemental) EAN-8, EAN-13 CODABAR Code 39 Code 93 Code 128 Interleaved 2 of 5 Industrial 2 of 5 Matrix 2 of 5 MSI POSTNET UCC/EAN-128 UPC-A and UPC-E	
Ratios	1:2, 1:3, 2:5 User definable bar widths	
Bar Height	4 to 600 dots, User programmable	
Rotation	0^0, 90^0, 180^0 and 270^0	
Other Features		
Sequential Numbering	Sequential numbering of both numerics and bar codes	
Custom Characters	RAM storage for special characters	
Graphics	Full dot addressable graphics, SATO Hex/Binary, .BMP or .PCX formats	
Form Overrlay	Form overlay for high-speed editing of complex formats	

Section

2

Configuration

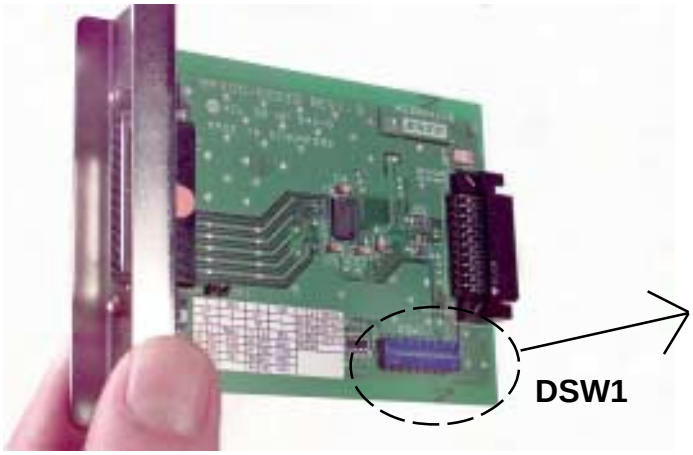
2.1 Dip Switch Settings

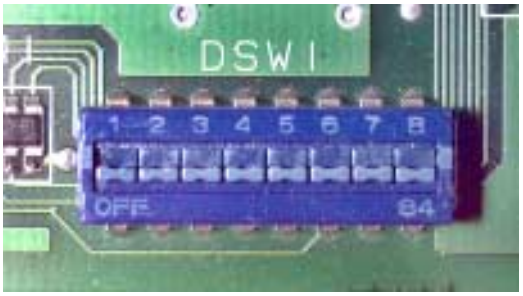
Two DIP switches (DSW2 & DSW3) are located inside the Front Access Door. These switches can be used to set:

- *Thermal transfer or direct thermal mode*
- *Head Check Mode*
- *Hex Dump Mode*
- *Label sensor enable/disable*
- *Single Job or Multi-Job Receive Buffer*
- *Operation Mode*

DIP SWITCHES

In addition, a third DIP switch (DSW1) is located on the optional RS232 Serial Adapter card and is used to set the RS232C transmit/receive parameters.





DSW1

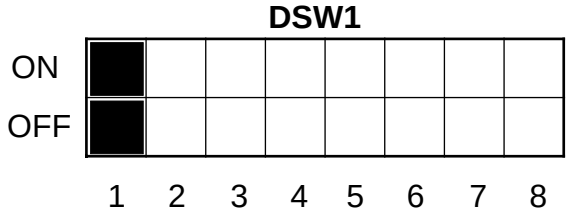
Each switch is an eight section toggle switch. The On position is always to the top. To set the switches, first power the unit Off, then position the DIP switches. Finally after placing the switches in the desired positions, power the printer back on. The switch settings are read by the printer electronics during the power-up sequence. They will not become effect until the power is cycled.

Dip Switch Settings

RS232 Transmit/Receive Setting (located on RS232 I/F Module)

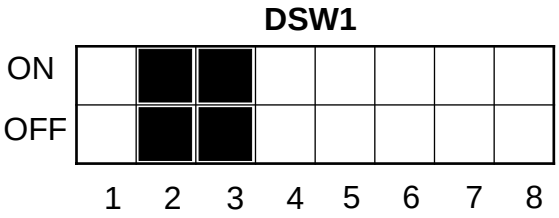
Data Bit Selection (DSW1-1): This switch sets the printer to receive either 7 or 8 data bits for each byte transmitted.

DSW1-1	SETTING
Off	8 data bits
On	7 data bits



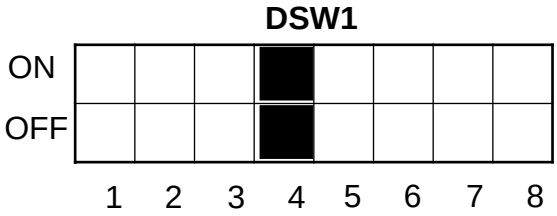
Parity Selection (DSW1-2, DSW1-3): These switches select the type of parity used for error detection.

DSW1-2	DSW1-3	SETTING
Off	Off	None
Off	On	Even
On	Off	Odd
On	On	Not Used



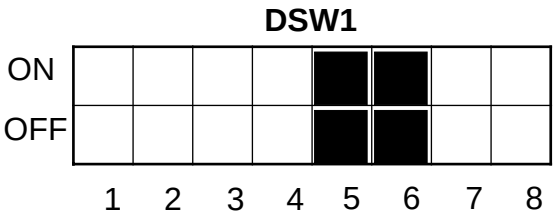
Stop Bit Selection (DSW1-4): Selects the number of stop bits to end each byte transmission.

DSW1-4	SETTING
Off	1 Stop Bit
On	2 Stop Bits



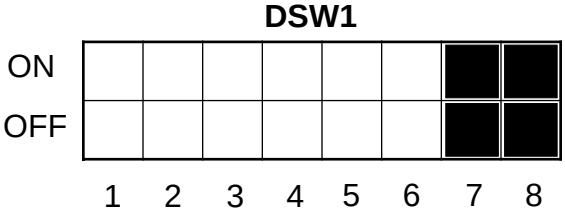
Baud Rate Selection (DSW1-5, DSW1-6): Selects the data rate (bps) for the RS232 port.

DSW1-5	DSW1-6	SETTING
Off	Off	9600
Off	On	19200
On	Off	38400
On	On	57600



Protocol Selection (DSW1-7, DSW1-8): Selects the flow control and status reporting protocols.
(* Will select protocol Bi-Com 2 for M-8400 if DSW2-8 is ON)

DSW1-7	DSW1-8	SETTING
Off	Off	Rdy/Bsy
Off	On	Xon/Xoff
On	Off	Bi-Com 3
On	On	Bi-Com 4*

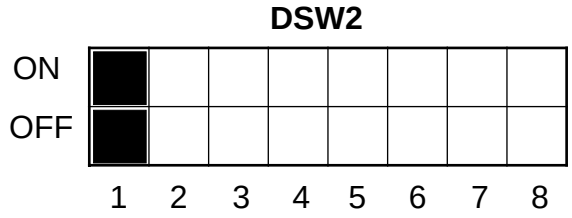


Dip Switch Settings

Printer Set up

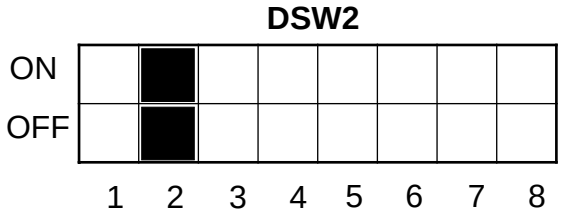
***Print Mode* Selection (DSW2-1):** Selects between direct thermal printing on thermally sensitive paper and thermal transfer printing using a ribbon

DSW2-1	SETTING
Off	Transfer
On	Direct Therm



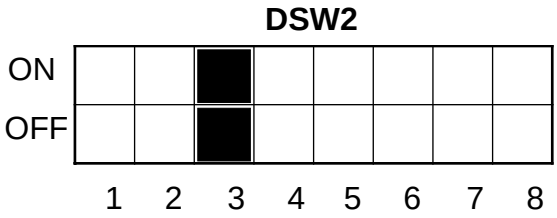
***Sensor Type* Selection (DSW2-2):** Selects between the use of a label gap or a reflective Eye-Mark.

DSW2-2	SETTING
Off	Gap
On	Eye-Mark



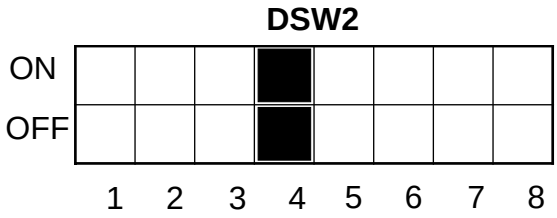
***Head Check* Selection (DSW2-3):** When selected, the printer will check for head elements that are electrically malfunctioning.

DSW2-3	SETTING
Off	Disable
On	Enable



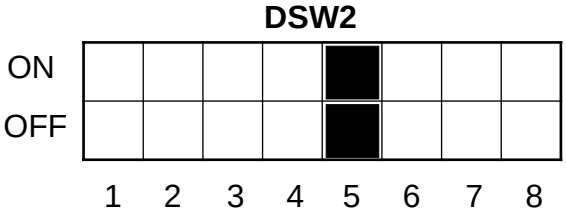
***Hex Dump* Selection (DSW2-4):** *Selects Hex Dump mode.*

DSW2-4	SETTING
Off	Disable
On	Enable



***Receive Buffer* Selection (DSW2-5):** Selects the operating mode of the receive buffer. See Section 3: Interface Specifications for more information.

DSW2-5	SETTING
Off	1 Item
On	Multi-Job

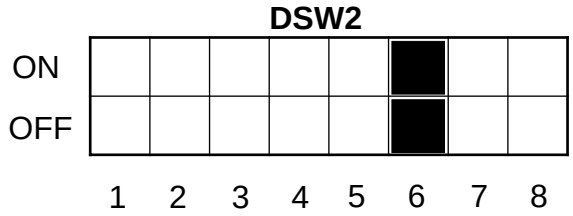


For more information about the cause of troubleshooting printer errors, see Section 8, Troubleshooting.

Dip Switch Settings

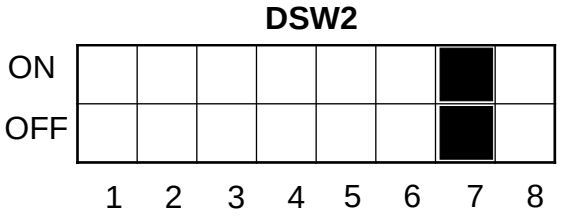
Firmware Download (DSW2-6): Places the printer in the Firmware Download mode for downloading new firmware into flash ROM.

DSW2-6	SETTING
Off	Disabled
On	Enabled



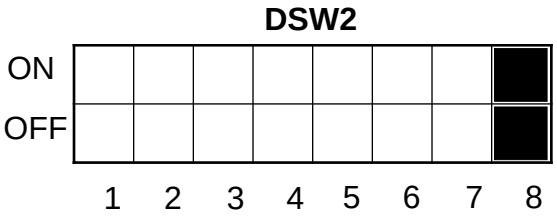
Protocol Code Selection (DSW2-7): Selects the command code set used.

DSW2-7	SETTING
Off	Standard
On	Non-Std.



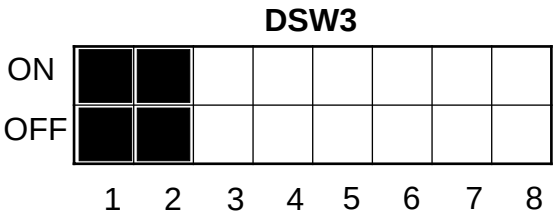
M8400 Emulation Mode (DSW2-8): For emulating earlier series software commands. Should be used only if problems are encountered when using existing software. This switch will also affect the setttings selected by DSW1-7 and DSW1-8.

DSW2-8	SETTING
Off	Disabled
On	Enabled



Mode Selection (DSW3-1 and DSW3-2): Selects the operating mode of the printer. Batch/Continuous disables the label taken (dispense option) sensor.

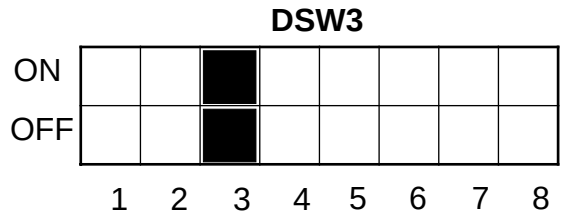
DSW3-1	DSW3-2	SETTING
Off	Off	Batch/Continuous
Off	On	Tear Off
On	Off	Cutter
On	On	Dispenser



Dip Switch Settings

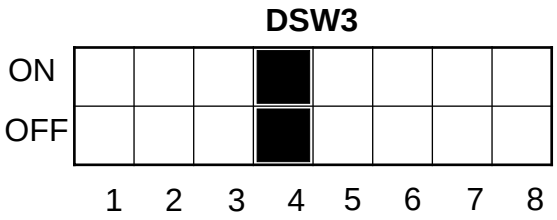
***Label Sensor* Selection (DSW3-3):** Enables or disables the Label Pitch sensor. If the sensor is enabled, it will detect the edge of the label and position it automatically. If it is disabled, the positioning must be under software control using Line Feed commands.

DSW3-3	SETTING
Off	Sensor Used
On	Sensor Not Used



***Back-Feed* Selection (DSW3-4):** When Back-Feed is enabled, the printer will position the label for dispensing/cutting and retract it before printing the next label. The amount of backfeed is adjustable.

DSW3-4	SETTING
Off	Enabled
On	Disabled

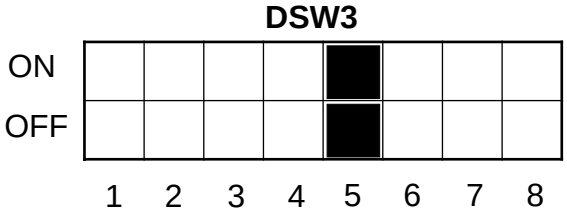


***External Signal* Interface**

The EXT connector on the printer rear panel is intended for use with the external printer accessories such as label rewinders or applicators. The 14-pin Centronics type connector provides a choice of four different output signals along with various error conditions.

EXT Print Start Signal Selection (DSW3-5): Allows an external device to initiate a label print for synchronization with the applicator. See Section 3: Interface Specifications for a description of the signal level and requirements. When DSW3-5 is On, the unit is in the Continuous print mode, Backfeed is disabled an External Signals are ignored.

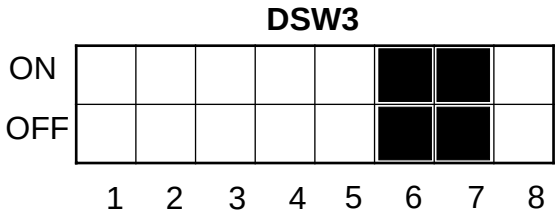
DSW3-5	SETTING
Off	Disabled
On	Enabled



Dip Switch Settings

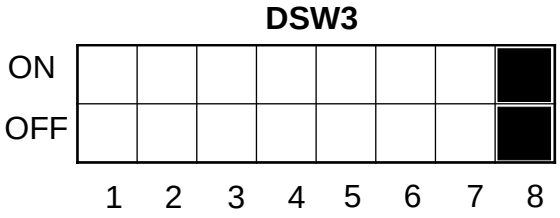
External Signal Type Selection (DSW3-6, DSW3-7): Both the polarity and signal type (level or pulse) of the external print synchronizing signal can be selected. See Section 3 for a definition of signal types.

DSW3-6	DSW3-7	SETTING
Off	Off	Type 4
Off	On	Type 3
On	Off	Type 2
On	On	Type 1



Repeat Print via External Signal (DSW3-8): Allows an applicator or other device to reprint the last label of the print job. See Section 3: Interface Specifications for a description of the signal requirements.

DSW3-8	SETTING
Off	Disabled
On	Enabled



2.2 Default Settings

Dip Switch Selections

All switches are placed in the Off position (default) except Receive Buffer for shipping. This will result in the following operating configuration:

Communications: (1)	8 data bits, no parity, 1 Stop bit, 9600 Baud (1)
Protocol: (1)	Ready/Busy
Sensor:	Gap Sensor
Receive Buffer:	Multi-Job
Mode:	Batch Continuous
Label Sensor:	Sensor Used
Backfeed:	Enabled
External Signals:	Disabled

(1) Applicable only if an RS232 Interface Card is installed in the printer.

Software Default Settings - The printer stores any software settings upon receipt from the host and uses them until they are again changed by receipt of a command containing a new setting. These settings are stored in non-volatile memory and are not affected by powering the printer off. The printer may be reset to use the default software settings by depressing the LINE and FEED keys simultaneously while powering the printer on. You will be asked to confirm that you want the printer default settings by selecting either YES or NO by using the LINE key to step the underline cursor to the desired setting. If you select YES and press the FEED key, the following default configuration will be stored:

	CL408e/CL412e
Print Darkness	3
Print Speed	4 in. per sec.
Print Reference	Vertical = 0000, Horizontal = 0000
Zero	Slash
Auto On-Line	Enabled

Once the default operation is completed, a **DEFAULT SETTING COMPLETED** message will be displayed on the LCD panel and a single "beep" will be heard. The printer should be powered off while this message is being displayed. This saves the default settings in the EEPROM where they will be automatically loaded the next time the printer is powered on.

2.3 LCD Panel Configuration

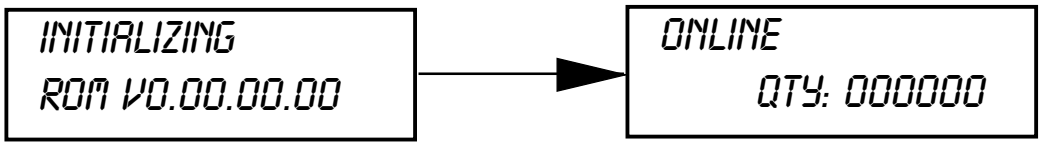
The LCD Panel on the CL408e/CL412e is used in conjunction with the **LINE** and **FEED** switches by the operator to manually enter printer configuration settings. Many of the settings can also be controlled via software commands and in the case of conflict between software and control panel settings, the printer will always use the last valid setting. If you load a label job that includes software settings and then enter a new setting via the LCD Panel, the manually set values will be used by the printer. If you set the values manually and then download a job with software settings, the software settings will be used.

There are 7 configuration and operation modes you can access from the LCD panel. To enter the desired mode, the KEY SEQUENCE combination listed in the table below must be performed. The initial LCD display message is shown for each mode.

MODE	KEY SEQUENCE	INITIAL DISPLAY	PAGE
Normal Mode	Power	ONLINE QTY:000000	2-9
Advanced Mode	LINE + POWER	ADVANCED MODE	2-13
Test Print Mode	FEED + POWER	TEST PRINT MODE CONFIGURATION	2-33
Default Setting Mode (Std Protocol)	LINE + FEED + POWER	DEFAULT SETTING YES NO	2-34
Maintenance Mode	DSW2-4 ON + LINE + FEED + POWER	MAINTENANCE MODE DIPSW2-4 ON->OFF	2-35
Hex Dump Mode	DSW2-4 ON + POWER	ONLINE QTY:000000	2-38
Firmware Download Mode	DSW2-6 ON + POWER	FLASH DOWNLOAD READY	2-39

LCD Panel — Normal Mode

When the printer is first powered on it displays the current ROM version of the printer then immediately displays the ONLINE mode.



The LCD Panel will display the ONLINE status on the top line of the display. The bottom line will contain the label quantity (QTY) status. The message will be changed to OFFLINE whenever the printer is switched offline by depressing the LINE key. As soon as a print job is received, the QTY message will indicate the number of labels to be printed. As soon as the label job begins to print, the display will indicate the number of labels remaining in the print job that remain to be printed. The user can access the User Settings using the following procedures.

User Settings

STEP	PROCEDURE
1.	The printer is first taken offline by pressing the **LINE** key once. The display will change to OFFLINE.
2.	Press the **LINE** and **FEED** keys simultaneously for more than one second. The printer now displays the first USER mode adjustment (Print Darkness).

OFFLINE
000000

Print Darkness Setting

There are five **Darkness** (or heat range) settings on the printer. The higher numbers represent darker settings. The current setting is indicated by a line under one of the range settings.

To change the setting perform the following steps:

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. 1 = Light 2 = Slightly Light 3 = Medium 4 = Slightly Dark 5 = Dark
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting and advance to the next adjustment.

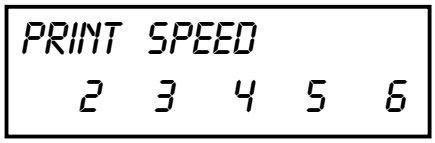
PRINT DARKNESS
1 2 3 4 5

LCD Panel — Normal Mode

Print Speed Adjustment

There are five **Speed** settings on the printer. The setting is listed on the bottom line of the display. The current setting is indicated by an underline under one of the speed settings. To change the setting:

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired speed setting. 2 = 2 in/s (50mm/s) 3 = 3 in/s (75mm/s) 4 = 4 in/s (100mm/s) 5 = 5 in/s (125mm/s) 6 = 6 in/s (150mm/s)
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting and advance to the next adjustment.



Pitch Offset Adjustment

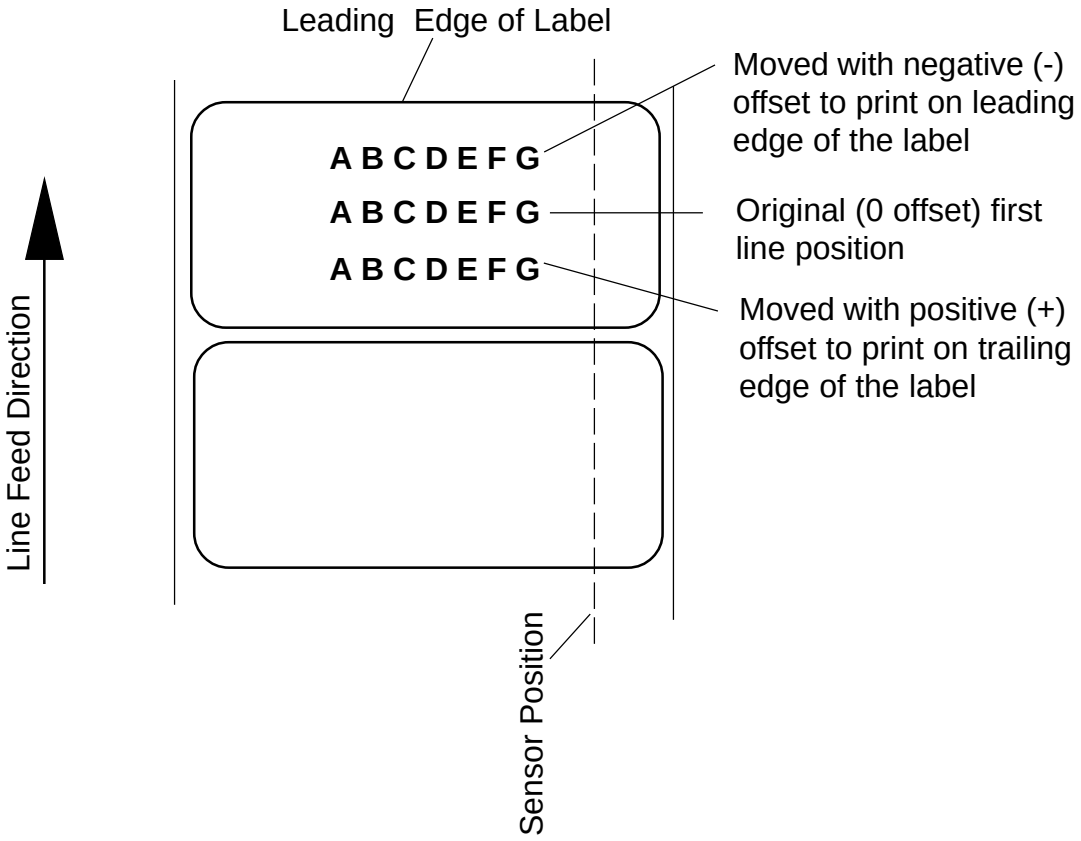
The label pitch is the distance from the leading edge (the edge that comes out of the printer first) of a label and the leading edge of the next label. The leading edge position of the label can be adjusted relative to the print head +/- 49mm in increments of 1mm. Once the position is set, it can be fine adjusted +/- 3.75mm using the PITCH potentiometer on the adjustment panel.

STEP	PROCEDURE
1.	The underline cursor will initially be positioned underneath the Pitch Direction setting. Use the **LINE** key to step the underline to either the positive (+) or negative (-) selection. A position selection moves the leading edge of the label forward (away from the print head) while a negative selection moves the leading edge of the label back into the mechansim.
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting and advance to the Offset adjustment.
3.	Use the **LINE** Key to step the first digit of the counter to the desired setting. The display will increment one step each time the **LINE** key is pressed. The reading will advance to a setting of 4 after which it will automatically wrap and start at 0 again.

LCD Panel — Normal Mode

Pitch Offset Adjustment

STEP	PROCEDURE
4.	Press the **FEED** key to accept the setting and advance the cursor to the second digit. Again use the **LINE** key to step to the desired setting. Once it is correct, press the **FEED** key to advance to the next adjustment. Print a test label after completing the adjustments to ensure it is correct.

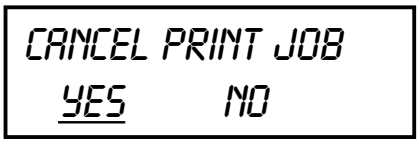


LCD Panel— Normal Mode

Cancel Print Job

If the printer has a print job(s) loaded in memory, selecting YES will cause the job(s) to be cleared. The default selection is NO. Make sure that you want to cancel the print job before selecting YES as the job cannot be recovered and will have to be retransmitted to the printer.

To cancel the print, perform the following steps:



STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to either **No** or **Yes.**
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting.
3.	After the print job(s) have been cleared from memory, the printer will display a COMPLETED message for 3 seconds and then return to the initial ONLINE Normal Mode.

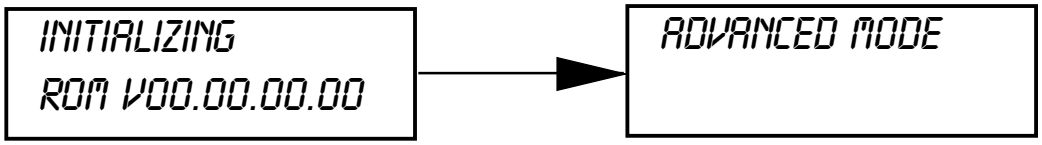
If you wish to change any of the settings, you must enter the User mode again by taking the printer OFFLINE and simultaneously pressing **FEED** and **LINE** keys.

LCD Panel— Advanced Mode

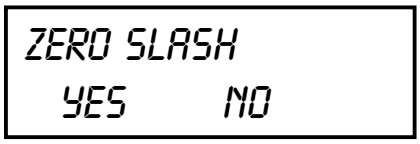
Advanced mode is provided to make adjustments that require only occasional adjustments. Since they affect the basic operation of the printer, the procedure for entering this mode is designed to prevent someone from accidentally changing the settings.

To Enter Advanced Mode:

STEP	PROCEDURE
1.	Press the **LINE** key while simultaneously turning the power on. When the printer emits one long beep, release the **LINE** key to display the first screen.
2.	Press the **FEED** key to display the Zero Slash display.



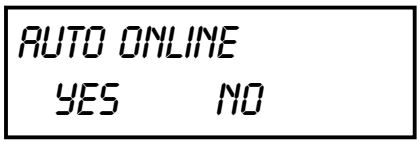
Zero Slash



This setting determines if a zero is printed with a slash or without a slash. This setting can also be controlled via software commands. When YES is selected, the printer internal fonts will have a slash through the center of the zero character.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to either **Yes** or **No.**
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting and advance to the Auto Online display.

AutoOnline



This setting determines the mode in which the printer powers up. If YES is selected the printer powers up in the ONLINE mode and is ready to print. If NO is selected, the printer powers up in the OFFLINE mode and must be manually placed in the ONLINE mode by pressing the LINE key before it is ready to print.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underline to either the **YES** or **NO** selection.
2.	Once the correct setting is underlined, press the **FEED** key to accept the setting and advance the display to the Offset display.

LCD Panel — Advanced Mode

Print Offset

Since the printer moves the label in discrete steps equal to the size of the print dot, the units of measure for Vertical and Horizontal Offset distance is dots.

Vertical Offset is the distance down from the leading edge in dots (the edge of the label that comes out of the printer first) to the first vertical print position. A positive setting moves the first print position down the length of the label while making it negative moves it up the length of the label. The maximum value that can be set is 823 dots.

Horizontal Offset is the distance that the label image is shifted either to the right or left on the label. For a positive setting the image is shifted to the left (towards the inside edge of the label). For a negative setting the image the image is shifted to the right (towards the outside edge of the label). This setting changes the base reference point for all subsequent label jobs. The effect is identical to the <ESC>A3 Base Reference point command. The maximum value that can be set is 1424 dots.

STEP	PROCEDURE
1.	Use the **LINE** key to step the first digit of the counter to the desired setting. The display will increment one step each time the **LINE** key is pressed.
2.	Press the **FEED** key to accept the setting and advance the cursor to the second digit. Again use the **LINE** key to step to the desired setting. Once it is correct, press the **FEED** key to advance to the next adjustment.
3.	Once the setting is correct, press the **FEED** key to accept the setting and advance to the next display. Print a test label after completing the adjustments to ensure it is correct. *Note: This setting can be overridden by the Base Reference Point Command in your software.*

Set Calendar

This message will only be displayed if the Calendar Option is installed in the printer.

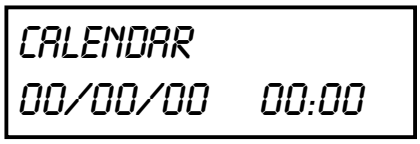
The Calendar is an optional feature in CL408e/CL412e printers allowing the date and time to be set manually using the LCD Display or via the <ESC>WT Calendar Set command. The last setting, set either manually via software command, received by the printer will be the value used. The format of the display is YY/MM/DD hh:mm (Year/Month/Day/ hours:minutes). The date format is fixed and cannot be changed.

To enable the Calendar feature (if installed), press the **LINE** key until the underline cursor is beneath the YES. If the Calendar feature is to be disabled, press the **LINE** key until the cursor is underneath the NO. When the desired setting is selected, Press the **FEED** key.

LCD Panel — Advanced Mode

Set Calendar (Continued)

Calendar
00/00/00 00:00



STEP	PROCEDURE
1.	**Year** - The first display shown will have the two digit year selection underlined. You can scroll through the dates by pressing the **LINE** key. The year number will increase by one each time the **LINE** key is pressed until it reaches its maximum leagal value (i.e., "99" for the year digits) at which point it will wrap around to the "00" setting.
2.	**Month** - After you have set the correct year, pressing the **FEED** key will advance the underline cursor to the two digit Month position. You can scroll through the numbers corresponding to the month by pressing the **LINE** key. The month number will increase by one each time the **LINE** key is pressed until it reaches a value of "12" at which point it will wrap around to the "01" setting.
3.	**Day** - After you have set the correct month, pressing the **FEED** key will advance the underline cursor to the two digit Day position. You can scroll through the numbers corresponding to the month date by pressing the **LINE** key. The date number will increase by one each time the **LINE** key is pressed until it reaches a value of "31" at which point it will wrap around to the "01" setting.
4.	**Hour** - After you have set the correct date, pressing the **FEED** key will advance the underline cursor to the two digit Hour position. You can scroll through the numbers corresponding to the hour (using a 24 hour clock) by pressing the **LINE** key. The hour number will increase by one each time the **LINE** key is pressed until it reaches a value of "24" at which point it will wrap around to the "01" setting.
5.	**Minute** - After you have set the correct hour, pressing the **FEED** key will advance the underline cursor to the two digit Minute position. You can scroll through the numbers corresponding to the hour by pressing the **LINE** key. The minute number will increase by one each time the line key is pressed until it reaches a value of "60" at which point it will wrap around to the "01" setting.
6.	After you have set the minutes, pressing the **FEED** key will accept the setting and advance to the Ignore CR/LF selection.

LCD Panel — Advanced Mode

Ignore CR/LF

This setting tells the printer to strip out all carriage return/line feed pairs (CRLF) from the data stream, including graphics and 2D bar codes. It is used primarily to maintain compatibility with earlier models of SATO printers.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to either YES or NO.
2.	Once the desired setting is underlined, press the **FEED** key to accept the setting and advance to the Character Pitch display.

Character Pitch

This setting allows you to set the default character pitch to either fixed character spacing or proportional character spacing.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting.
2.	Once the desired setting is underlined, press the **FEED** key to accept the setting and advance to Cover Open Sensor display. *Note: This command can be overriden by the <ESC>PR or <ESC>PS Character Pitch Commands.*

Cover Open Sensor

This setting allows the user to enable or disable the Cover Open Sensor. Selecting YES will enable the sensor and selecting NO will disable it.

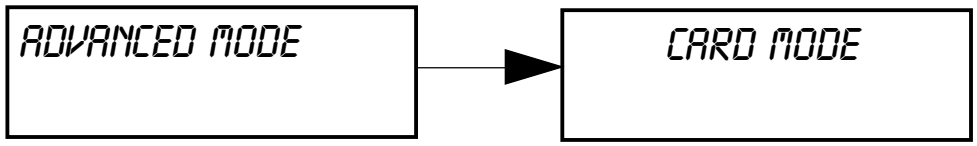
STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting.
2.	Once the desired setting is underlined, press the **FEED** key to accept the setting and return to the Advanced Mode Display.

LCD Printer — Card Mode

Exit Advanced Mode

To exit the Advanced mode, power off the printer then back on.

The Card Mode allows the operator to manage the Expanded Memory (PCMCIA Card or Internal Expanded Flash ROM). The Card Mode is entered from the Advanced Mode display by pressing the **LINE** key once.



The Card Mode display indicates that the printer is in the Card Mode. To advance to the Mem Select (CC1), press the **FEED** key.

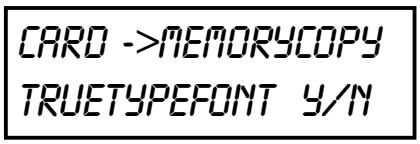
Mem Select (CC1)

This selection determines which type of optional expanded memory will be addressed as "CC1" in the command streams. The CARD selection specifies the optional PCMCIA card as CC1 and the optional Expanded Flash ROM as CC2.

STEP	PROCEDURE
1.	Use the **LINE** key to step the cursor to the desired setting (Card or Memory).
2.	Once the desired setting is underlined, press the **FEED** key to accept the setting and advance the display.

LCD Panel — Card Mode

Card ->MemoryCopy TrueTypeFont Y/N

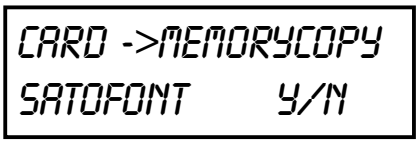


This selection allows you to copy TrueType fonts from the PCMCIA Memory card installed in the Memory Card slot (on the rear of the printer) to the optional Flash ROM.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to *Card to Memory Copy SATO Font* mode. Press the **FEED** key to accept the selection and advance the display.
2.	Confirm your selection by stepping the underline cursor to the Yes selection. If you select No, the display will return to the previous selection. 
3.	Press the **FEED** key to accept the selection. If Yes was selected, the copy process will start. 
4.	Once the copy process is completed, press the **FEED** key to advance the display. 
5.	If an error is encountered in the copy process, one of the following messages will be displayed on the second line.  R/W Error Indicates a Read/Write error occurred No Card Error Indicates no card was recognized Mem Full Error Indicates that there is insufficient memory available

LCD Panel — Card Mode

Card ->MemoryCopy SatoFont Y/N

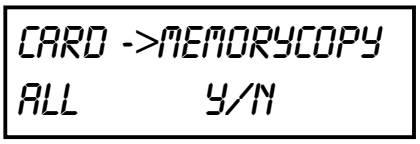


This selection allows you to copy SATO fonts from the PCMCIA Memory card installed in the Memory Card slot (on the rear of the printer) to the optional Flash ROM.

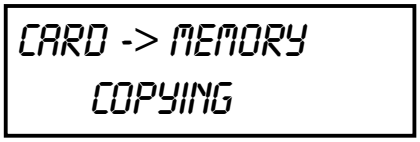
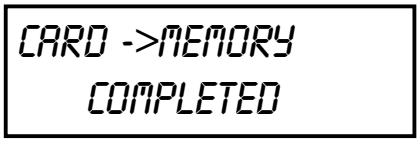
STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to Card->MemoryCopy All mode. Press the **FEED** key to accept the selection and advance the display.
2.	Confirm your selection by stepping the underline cursor to the Yes selection. If you select No, the display will return to the previous selection. 
3.	Press the **FEED** key to accept the selection. If Yes was selected, the copy process will start. 
4.	Once the copy process is completed, press the **FEED** key to advance the display. 
5.	If an error is encountered in the copy process, one of the following messages will be displayed on the second line.  R/W Error Indicates a Read/Write error occurred No Card Error Indicates no card was recognized Mem Full Error Indicates that there is insufficient memory available.

LCD Panel — Card Mode

Card ->MemoryCopy All Y/N



This selection allows you to copy the entire contents from PCMCIA Memory card installed in the Memory Card slot on the rear of the printer to the optional internal Expanded Memory.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to Card->MemoryCopy All mode.
2.	Confirm your selection by stepping the underline cursor to the Yes selection. If you select No, the display will return to the previous selection. 
3.	Press the **FEED** key to accept the selection. If Yes was selected, the copy process will start. 
4.	Once the copy process is completed, press the **FEED** key to advance the display. 
5.	If an error is encountered in the copy process, one of the following messages will be displayed on the second line.  R/W Error Indicates a Read/Write error occurred No Card Error Indicates no card was recognized Mem Full Error Indicates that there is insufficient memory available

LCD Panel — Card Mode

Memory->Card Copy All <XMB> Y/N

```
MEMORY ->CARDCOPY
ALL      <XMB> Y/N
```

This selection allows you to copy the entire contents of the optional Expanded Memory to the PCMCIA Memory card installed in the Memory Card slot on the rear of the printer.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to Card->MemoryCopy All mode.

2.	Confirm your selection by stepping the underline cursor to the Yes selection. If you select No, the display will return to the previous selection.
	`COPY START`
	`YES  NO`

3.	Press the **FEED** key to accept the selection. If Yes was selected, the copy process will start.
	`MEMORY-> CARD COPY`
	`COPYING`

4.	Once the copy process is completed, press the **FEED** key to advance the display.
	`MEMORY-> CARD COPY`
	`COMPLETED`

5.	If an error is encountered in the copy process, one of the following messages will be displayed on the second line.
	`CARD COPY/FORMAT`
	`XXXXXXX ERROR`
	R/W Error Indicates a Read/Write error occurred
	No Card Error Indicates no card was recognized
	Mem Full Error Indicates that there is insufficient memory available

LCD Panel — Card Mode

Card->Memory Copy Program Y/N

```
CARD ->MEMORYCOPY
PROGRAM      Y/N
```

This selection allows you to copy printer firmware from the PCMCIA Memory card to the printer.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the mode display.

2.	Confirm your selection by stepping the underline cursor to the Yes selection. If you select No, the display will return to the previous selection.
	`COPY START`
	`  YES      NO`

3.	Press the **FEED** key to accept the selection. If Yes was selected, the copy process will start.
	`CARD-> MEMORY COPY`
	`    COPYING`

4.	Once the copy process is completed, press the **FEED** key to advance the display.
	`CARD-> MEMORY COPY`
	`    COMPLETED`

5.	If an error is encountered in the copy process, one of the following messages will be displayed on the second line.
	`CARD COPY/FORMAT`
	`XXXXXXX ERROR`
	R/W Error Indicates a Read/Write error occurred
	No Card Error Indicates no card was recognized
	Mem Full Error Indicates that there is insufficient memory available

LCD Panel — Card Mode

Memory->Card Copy Program Y/N

```
MEMORY->CARDCOPY
PROGRAM      Y/N
```

This selection allows the user to copy the current firmware installed in the printer to a PCMCIA Memory Card.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will enter the Card Copy mode. If No is selected, the display will advance to the mode display.

2.	Confirm your selection by stepping the underline cursor to the Yes selection. If you select No, the display will return to the previous selection.
	`COPY START`
	`YES  NO`

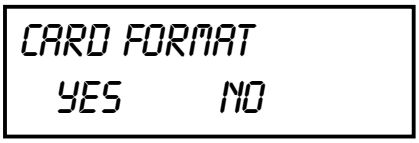
3.	Press the **FEED** key to accept the selection. If Yes was selected, the copy process will start.
	`MEMORY-> CARD COPY`
	`COPYING`

4.	Once the copy process is completed, press the **FEED** key to advance the display.
	`MEMORY-> CARD COPY`
	`COMPLETED`

5.	If an error is encountered in the copy process, one of the following messages will be displayed on the second line.
	`CARD COPY/FORMAT`
	`XXXXXXX ERROR`
	R/W Error Indicates a Read/Write error occurred
	No Card Error Indicates no card was recognized
	Mem Full Error Indicates that there is insufficient memory available

LCD Panel — Card Mode

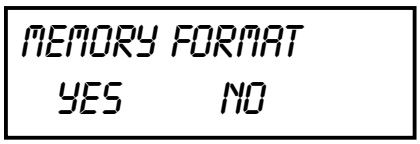
Card Format
Yes No



Before a PCMCIA card can be used, it must be formatted.
Note: Formatting a card destroys all data currently stored on the Card.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will enter the Card Format mode. If No is selected, the display will advance to the mode display.

Memory Format
Yes No



Before the internal Expanded Memory can be used, it must be formatted.
Note: Formatting the memory will destroy any stored data.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will enter the Memory Format mode. If No is selected, the display will advance to the mode display.

To exit the Card Mode, power off the printer, then back on.

LCD Panel — Service Mode

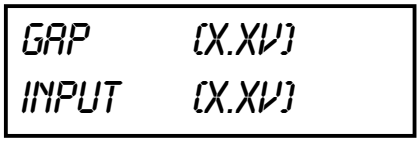
The Service Mode allows the operator to set up the basic operation parameters of the printer and is entered from the Advanced Mode.

***To Enter Advanced Mode*:**

STEP	PROCEDURE
1.	Press the **LINE** key while simultaneously turning the power on. When the printer emits one long beep, release the LINE key to display the first screen.
2.	Press the **LINE** key twice to enter the Service Mode.

The Service Mode display indicates that the printer is in the Card Mode. To advance to the first selection, press the **FEED** key.

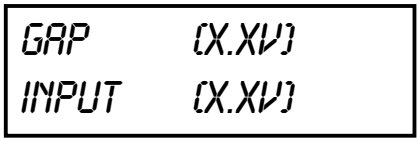
Gap [X.XV]
Input [X.XV}



The CL408/CL412e printers determine the location of the leading edge of the label by measuring the difference between light levels when it sees either a label gap or a black "EYE" mark. This adjustment allows you to manually set the threshold voltage level between the maximum and minimum light levels. DIP switch DSW2-2 selects the sensor type. If DSW2-2 is in the OFF position, the setting will be for a See-Thru (or Gap) sensor and the LCD will display "GAP" on the top line along with the current setting. If DSW2-2 is in the ON position, the LCD will display "EYE" on the top line with its current setting. If the value entered for the bottom line setting is "0.0V", then the printer will automatically calculate the setting when the first label is fed after the printer is powered on or the head is closed. There are some instances where the automatically calculated value must be adjusted to ensure reliable label feeding, such as when the backing opacity or the reflectance of the "EYE" mark varies significantly within a roll of labels or between label rolls. In these instances the value should be set using the following procedures.

LCD Panel — Service Mode

Gap [X.XV]
Input [X.XV}



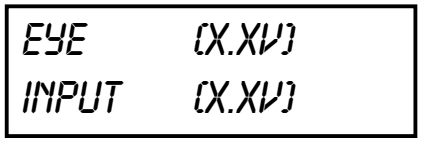
GAP - When setting the "GAP" threshold, the voltage shown on the top line of the display must be measured with nothing but the backing in the sensor and then again with a label still attached to the backing. The formula to be used for setting the threshold is:

(High Voltage Level + Low Voltage Level) x 0.5 = Start Value

STEP	PROCEDURE
1.	Insert a label still attached to the backing into the sensor and close the Label Hold-Down. Record the voltage shown on the top line of the LCD panel. This line should have the message "GAP" on the top line (DIP switch DSW2-2 = OFF). Make sure the label is all the way under the sensor.
2.	Strip the label from the backing and insert the backing strip under the sensor and close the Label Lid. Record the voltage shown on the top line of the LCD panel. The voltage ranges measured should be within the following range. Backing without label = 0.5V or less Backing with label = 1.0V above the low value If the measured values are outside this range, you may have trouble finding a value that will work properly under all conditions. If this is the case, a higher quality label may be needed to get adequate performance.
3.	Calculate the starting point voltage using the formula.
4.	Use the **LINE** key to step the counter to the desired setting. The display will increment one step for each time the **LINE** key is pressed. If the **LINE** key is held down for more than two seconds, it will automatically go into the fast scroll mode. The reading will advance to a setting of 3.3 (the maximum voltage) after which it will automatically wrap and start at "0.0" again. If a value of "0.0" is set, the printer will automatically set the level each time the printer is powered on with labels loaded or the head is closed.
5.	Once the setting is correct, pressing the **FEED** key will accept the setting and advance to the Online Feed display.

LCD Panel — Service Mode

Eye [X.XV]
Input [X.XV}



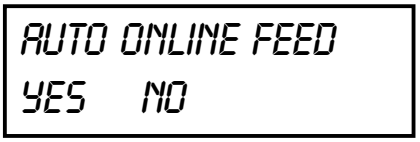
EYE - When setting the "EYE" threshold, the voltage must be measured with nothing but the label under the sensor and then again with the printed "eye" mark under the sensor. The formula to be used for this is:

(High Voltage Level + Low Voltage Level) x 0.5 = Start Value

STEP	PROCEDURE
1.	Insert a label into the sensor and close the Label Hold-Down. Make sure the printed "eye" mark in not under the sensor. Record the voltage shown on the top line of the LCD panel. This line should have the message "EYE" on the top line (DIP switch DSW2-2 = ON).
2.	Now pull the label forward until the "eye" mark is positioned under the sensor (the voltage reading shown on the top line of LCD panel). The voltage ranges measured should be within the following ranges: Label Only = 0.3 - 0.5V Eye-mark = Equal to or greater than 1.2V above the low value. If the measured values are outside this range, you may have trouble finding a value that will work properly under all conditions. If this is the case, a higher quality label may be needed to get adequate performance.
3.	Calculate the starting point voltage using the formula.
4.	Use the **LINE** key to step the counter to the desired setting. The display will increment one step for each time the **LINE** key is pressed. If the **LINE** key is held down for more than two seconds, it will automatically go into the fast scroll mode. The reading will advance to a setting of 3.3 (the maximum voltage) after which it will automatically wrap and start at "0.0" again. If a value of "0.0" is set, the printer will automatically set the level each time the printer is powered on with labels loaded or the head is closed.
5.	Once the setting is correct, pressing the **FEED** key will accept the setting and advance to the Auto Online Feed display.

LCD Panel — Service Mode

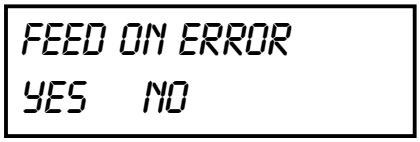
Auto Online Feed
Yes No



This selection specifies whether or not the printer will automatically feed a blank label when it is placed in the Online mode.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will feed a blank label anytime it enters the Online mode. If No is selected, the display will advance to the mode display.

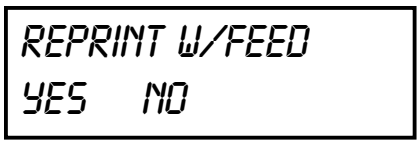
Feed on Error
Yes No



This selection specifies whether or not the printer will feed a blank label automatically when an error condition is cleared.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will feed a blank label anytime an error condition is cleared. If No is selected, the display will advance to the mode display.

Reprint W/Feed
Yes No



This selection specifies whether or not the printer will print the last printed label stored in memory when the FEED key is pressed in the Normal Online mode.

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired setting. IF Yes is selected, the printer will reprint the last label when the FEED key is pressed when the printer is Online. If the printer is Offline, pressing the **FEED** key will feed a blank label. If No is selected, the display will advance to the mode display.

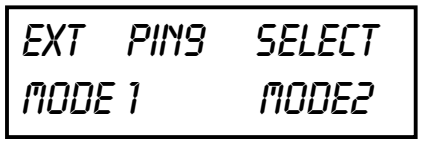
LCD Panel — Service Mode

Forward/Backfeed Distance Default

This display will only appear when Backfeed is enabled (DSW3-4 = OFF). The maximum backfeed distance is 255mm.

STEP	PROCEDURE
1.	Press the **FEED** key to use the default distance. This setting will be appropriate for use with standard labels with a 1/8" gap between labels and most tag stock applications.
2.	Press the **LINE** key to set your own backfeed distance up to 255mm. Each time you press the LINE key, the distance is advanced 1mm. CAUTION: A backfeed distance over 40mm may cause ribbon wrinkle and require ribbon tension adjustments. 
3.	Press the **FEED** key to accept the selected backfeed distance.

Ext Port Pin 9 Select



This selection allows user selection of when Pin #9 of the 14 pin EXT connector goes HIGH, to allow printer status to be determined without using Bi-Directional Communication Select Mode1 or Mod2, using the Line key. Press **FEED** key to save and exit.

MODE 1 = On-Line print job waiting.

MODE 2 = On-Line

LCD Panel — Service Mode

Euro Code D5

This selection allows the user to specify the hexadecimal code for the character which is replaced with the Euro Character. The default is D5 Hex.

STEP	PROCEDURE
1.	The underline cusor should be positioned underneath the first digit selection. Use the **LINE** key to step to the desired setting.
2.	Press the **FEED** key to advance the underline cursor to the second digit of the desired hexadecimal code.
3.	Press the **LINE** key to step to the desired setting.
4.	When the setting is correct, press the **FEED** key to accept the setting and advance to the next display.

Select LCD Display Language

This selection allows the user to select the language used in the LCD menu and error messages. The selections are English, French, German, Spanish, Italian and Portuguese.

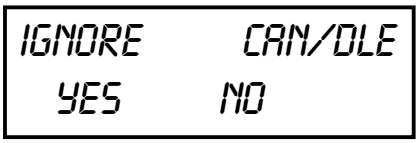
STEP	PROCEDURE
1.	Press the **LINE** key to advance to the desired language setting.
2.	When the setting is correct, press the **FEED** key to accept the setting and advance to the next display.

LCD Panel — Service Mode

Priority Setting LCD Command

This selection allows the user to assign a priority for Print Darkness, Print Speed and Print Offset.

STEP	PROCEDURE
1.	Use the **LINE** key to step to the desired priority. If LCD is selected, the setting established via the LCD display/menu system will be used for an incoming label job, regardless of any different command settings. If Command is selected, any commands in the label job will take precedence and be used for printing the job and the LCD Display will reflect the new setting.
2.	Once the desired setting is selected, press the **FEED** key to accept the setting and advance to the next display.



This function allows the user to disable:

<DLE> (Hex 10) the print stop command and

<CAN> (Hex 18) the cancel command.

Used for compatibility with some third party hardware and software. It is only displayed and functional when RS-232C HS serial interface is installed and configured for Status 4 Bi-direction operation.

This function is only displayed when a RS232 HS serial interface card is installed and configured for Status 3 Bi-direction operation. The disable function was added for compatibility with older non "e" version printers, where ribbon near end was not reported. Use the **LINE** key to select Enable or Disable and press **FEED** to save and exit.

Service Mode

To exit the Service Mode power the printer off, then back on.

LCD Panel — Counters Mode

The Counters Mode is provided to allow the user to access the internal printer counters and is entered from the Advanced Mode.

***To Enter Advanced Mode*:**

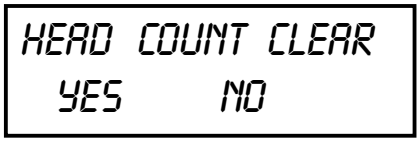
STEP	PROCEDURE
1.	Press the **LINE** key while simultaneously turning the power on. When the printer emits one long beep, release the LINE key to display the first screen.
2.	Press the **LINE** key 3X to advance to the Counters Mode.
3.	Press the **FEED** key to advance the display to the counters selections.

Counters
HD DSP CUT LIFE

The counters are identified in the display as:

HD: Head Counter (should be reset when print head is replaced)
DSP: Dispense Counter
CUT: Cutter Counter
LIFE: Life Counter (cannot be reset)

STEP	PROCEDURE
1.	Use the **LINE** key to step the underlined cursor to the desired counter, the Head (HD) counter or the LIFE counter. The default position is the Head Counter.
2.	Press the **FEED** key to display the current value (in meters) stored in the counter.
3.	Press the **FEED** key to advance to the next screen.



LCD Panel — Counters Mode

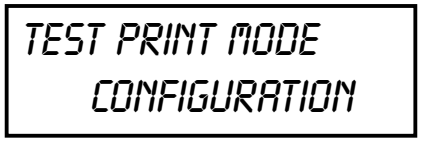
STEP	PROCEDURE
4.	Use the **FEED** key to select the desired setting. If you only want to read the counter value, select NO. If you want to read the counter and reset it to 0.0, place the underline cursor under YES. Once the desired setting is selected, press the **FEED** key to return to the Counter Mode display.

To exit the Counters Mode power the printer off, then back on.

Test Print Mode

The Test Print Mode offers four different printer status labels for troubleshooting. If DSW3-5 is ON, the Test Print cycle must be initiated with a Print Start signal.

Test Print Mode Configuration



This option allows you to print a test label. It is recommended that you print a test label after you have changed any of the settings in the Advanced Mode. The test label allows you to verify that you indeed did make the desired changes.

To enter the User Test Print Mode:

STEP	PROCEDURE
1.	Power on the printer while pressing the **FEED** key. Release the **FEED** key and the printer will display the Test Print Mode message on the LCD panel.
2.	Use the **LINE** key to step the underline cusror to the type of test label you wish to print. The choices are: Configuration Bar Code Head Pattern Memory Factory **See last pages in this section for test label sample print-outs**
3.	Once you have selected the type of test label to be printed, use the FEED key to accept the selection and advance to the Test Print Size display. This display allows you to select the label width.

LCD Panel — Test Print Mode

Test Print Size 10 CM

NOTE: This display does not appear when a Memory Test Print is chosen. Only a small Memory Test Print can be printed.

Once you have selected the type of test label to be printed, use the **FEED** key to accept the selection and the display advances to the Test Print Size display. This display allows you to select the label width.

STEP	PROCEDURE
1.	Use the **LINE** key to select the label width. Each time the **LINE** key is pressed, the label size advances 1 cm until it reaches a maximum width of 10 cm at which point it will wrap to the smallest size of 4 cm.
2.	Press the **LINE** key to accept the selection.
3.	Press the **FEED** key to start printing test labels continuously.
4.	Press the **FEED** key to stop the printer.

To exit the Test Print Mode, power the printer off, then back on.

Default Setting Mode

Occassionally it is desirable to reset all printer configuration settings to their original default conditions. This allows the operator to start the reconfiguration of the printer starting from a known set of conditions.

Default Setting Mode

To enter the Default Setting Mode press the **FEED** key while simultaneously powering on the printer. When the printer emits one long beep release the **FEED** and **LINE** keys.

STEP	PROCEDURE
1.	Use the **LINE** key to select either YES or NO.
2.	Once the desired setting is selected, press the **FEED** key to accept the selection and the printer will reset to the original default conditions.
3.	When the printer has completed the reset process, the Default Setting Completed display will appear. The printer is now in the default configuration.

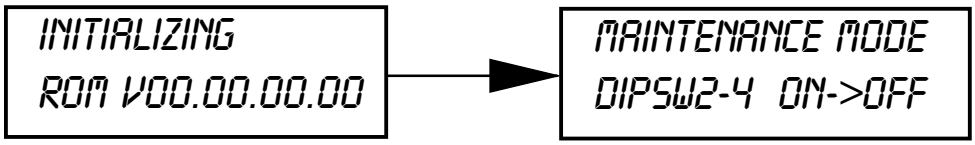
To exit the Default Setting Mode, power the printer off, then back on.

LCD Panel — Maintenance Mode — Factory Mode

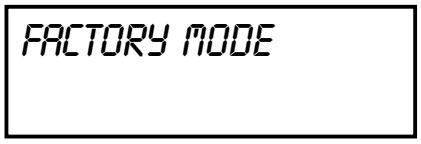
This function is used to clear counters and reset the printer's firmware.

This procedure is used after upgrading the flash firmware or installing a new memory module.

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position.
2.	Place the **DSW2-4** in the **ON** or up position.
3.	Press the **LINE and FEED** key while simultaneously turning **ON** the power switch. When the printer beeps, release the keys. The following screens will appear.

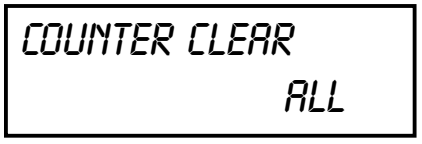


4.	Place the **DSW2-4** in the **OFF** position and the following screen will appear.



5.	Press the **FEED** key to display the next screen.

6.	Press the **LINE** key once to change the message to the proper selection. The counters are identified in the display as: HD: Head Counter (should be reset only when a print head is replaced). DSP: Dispense Counter - meters of label stock dispensed. CUT: Cutter Counter - number of cutter cycles. LIFE: Life Counter (cannot be reset) meters of label stock run through the printer. ALL: Clears all counters and resets firmware and returns printer to factory default setting. This setting is used when upgrading firmware.



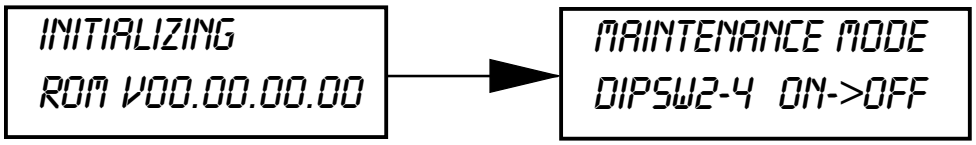
7.	Press the **FEED** key to clear the selected function. After a pause, the next screen will appear.

8.	Select the print label size by pressing the **LINE** key. The default is LARGE.
9.	Press the **FEED** key for a test print. Press the **FEED** key again to stop printing.

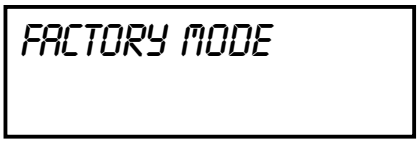
LCD Panel — Maintenance Mode
All Clear Mode

This function is used to clear counters and reset the firmware and doesn't produce a test label.

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position.
2.	Place the **DSW2-4** in the **ON** or up position.
3.	Press the **LINE and FEED** key while simultaneously turning **ON** the power switch. When the printer beeps, release the keys. The following screens will appear.

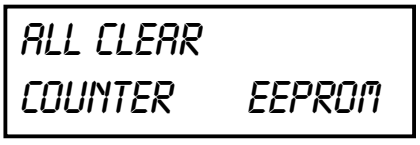


4.	Place the **DSW-4** in the OFF position and the following screen will appear.



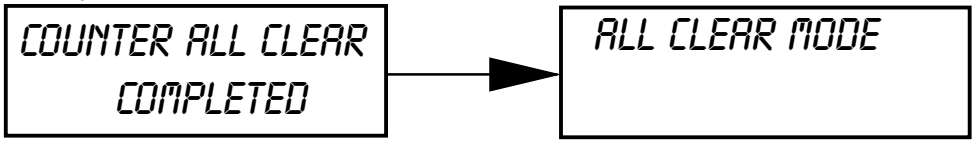
5.	Press the **LINE** key to display the next screen.

6.	Press the **FEED** key to display the next screen.



7.	Press the **LINE** key to select either COUNTER or EEPROM. Select Counter to clear all counters. Select EEPROM to clear/reset the firmware to factory default setting
8.	Press the **FEED** key to display the next screen.

9.	Press the **LINE** key to select **YES** or **NO**. If **YES** is selected press the **FEED** key to clear your selection.



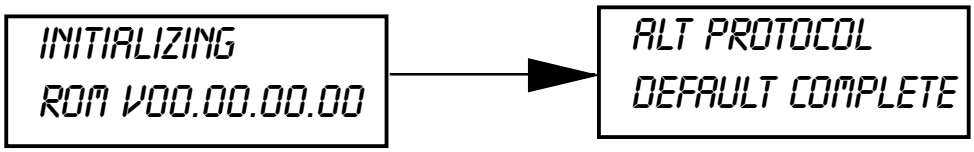
10.	The printer will beep three times signaling the competion of the process.
11.	Power off the printer to exit Maintenance Mode.

LCD Panel — Clear Non-Standard Protocol

The standard protocol codes used by the printer can be modified to accomodate the requirements of different host systems. However, if the printer is to be used with a system that does not use the custom protocol codes, they can be cleared and the default protocol codes reactivated.
The default values are:

$STX = 7B_{H,}$ $ETX = 7D_{H,}$ $ESC = 5E_{H,}$ $ENQ = 40_{H,}$ $NULL = 7E_{H,}$
$CAN = 21_{H}$ and $OFFLINE = 5D_{H.}$

Alt. Protocol Default Complete



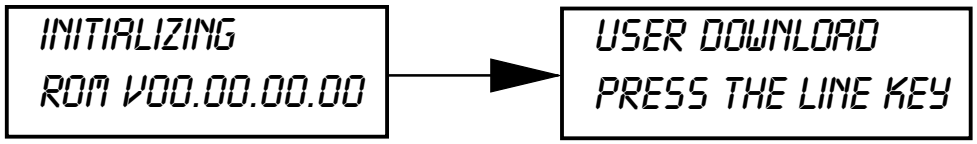
To Clear Non-Standard protocol codes, place **DSW2-7** in the **ON** position and power on the printer while simultaneously pressing the **LINE** and **FEED** keys.

STEP	PROCEDURE
1.	When the printer emits one long beep release the **LINE** and **FEED** keys.
2.	When the keys are released, the printer will replace the Alternate protocol codes with the default values.
3.	After the default setting is complete, the printer will emit three short beeps indicating that the process is complete.
	To exit the mode, power the printer off, then back on.

Download User Defined Protocol Codes

The user can define a set of custom protocol codes and download them to the printer using the <ESC>LD command.

User Download Press the Line Key



To enter the User Download mode, place DSW2-7 in the **ON** position and power on the printer while simultaneously pressing the **LINE** key. When the printer emits one long beep release the **LINE** key.

STEP	PROCEDURE
1.	Set **DSW2-7** to the **OFF** position to replace the Standard protocol codes or **ON** to replace the Alternate set of protocol codes.
2.	Press the **LINE** key. The printer is now waiting for the data to be sent.

LCD Panel — Download User Defined Protocol Codes

User Download

Press the Line Key (Countinued)

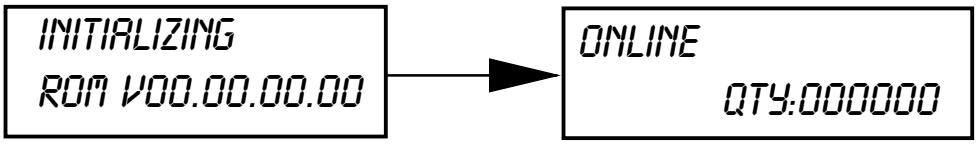
STEP	PROCEDURE
3.	Transmit the download data command stream to the printer.
4.	After the data has been received, the printer will beep and print a status label. If it does not beep and print a status label, the printer did not accept the data.
5.	If the printer did not beep and print a status label, turn the printer off and check you data stream for errors snd start the download process over.
6.	If the custom codes are correct, press the **FEED** key to accept them and terminate the download process. If they are incorrect, turn the printer off without pressing the **FEED** key and begin the process again.

Refer to the Operator and Technical Reference Manual for the data stream command structure required.

Hex Dump Mode

In addition to the User Test Print Labels, the printer can print the contents of the receive buffer in a hexadecimal format to allow the data stream to be examined for errors and troubleshooting.

Online

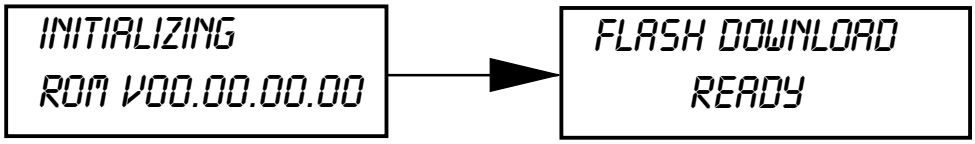


To enter the Hex Dump mode, place **DSW2-4** in the **ON** position and power on the printer.

STEP	PROCEDURE
1.	The printer is now ready to receive data.
2.	Send the data stream to the printer.
3.	The receive data will be printed in a hexadecimal format.
4.	To return the printer to normal position, place **DSW2-4** in the **OFF** position and power the printer **OFF** and then back ON.

LCD Panel —Firmware Download Mode

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position.
2.	Place the **DSW2-6** in the **ON** or up position.
3.	Turn **ON** the power switch. The following screens will appear.



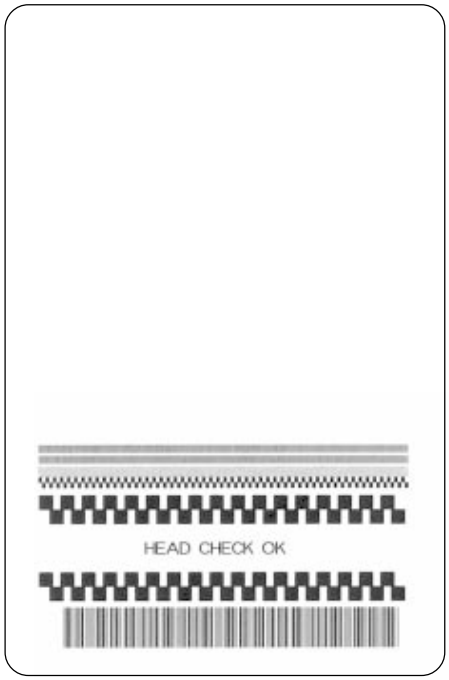
Refer to the specific instructions provided with the flash firmware files provided by SATO America Technical Support or downloaded from the SATO America Web Site.

www.satoamerica.com

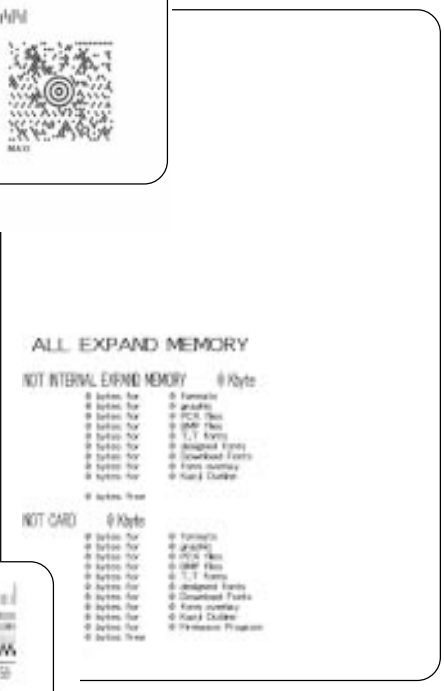
2.4 Sample Test Labels

CONFIGURATION

BAR CODE



HEAD CHECK



MEMORY

FACTORY

Section 3

Interface Specifications

3.1 Overview

This section presents the interface specifications for the CL408e/CL412e printers.

CL408e/CL412e printers utilize a Plug-In Interface Module for maximum printer configuration flexibility.

The following information is presented in this section.

- Interface Types
- The Receive Buffer
- IEEE1284 Parallel Interface
- RS232C Serial Interface
- BI-Directional Communications using the RS232C Serial Interface
- Universal Serial BUS (USB)
- Local Area Network (LAN)
- Ext Connector

3.2 Interface Types

The parallel interface for CL408e/CL412e printers is a high speed, bi-directional parallel interface that conforms to the IEEE 1284 specification. (ECP mode on some computers). The interface is also compatible with the older Centronics parallel interface standard. If it does not detect the correct IEEE 1284 signals in the interface connection, it will automatically operate in the standard Centronics mode which is much slower. To use the IEEE 1284 parallel interface to its fullest capability requires that the host also have an IEEE 1284 compatible interface and that the two be connected with a cable that meets the IEEE 1284 specification. If either of these two are not present, the data rate is severely compromised.

Interface Types

In order to provide flexibility in communicating with a variety of host computer systems, CL408e/412e printers use a Plug-In Interface Module. The IEEE1284 Interface module is shipped with the printer unless another interface type is specified at the time of the order. The other interfaces available are a high speed (to 57.6K bps) serial interface, an Ethernet interface or an optional Universal Serial Bus (USB) interface.

The Parallel interface will probably be the most useful in communicating with IBM PCs and compatibles. The RS232C Serial interface allows connectivity to a number of other hosts. The USB interface allows the printer to be connected to a computer that supports peripherals attached to a USB bus.

WARNING: Never connect or disconnect interface cables (or use a switch box) with power applied to either the host or the printer. This may cause damage to the interface circuitry in the printer/host and is not covered warranty.

CENTRONICS PARALLEL INTERFACE | **RS232C SERIAL INTERFACE** | **USB INTERFACE** | **ETHERNET INTERFACE**

Available Interfaces

3.3 The Receive Buffer

The CL408e/CL412e printers have the ability to receive a data stream from the host in one of two ways. The receive buffer may be configured to accept one print job at a time or multiple print jobs. The single job print buffer is generally used by software programs that wish to maintain control of the job print queue so that it can move a high priority job in front of ones of lesser importance. The multiple job buffer on the other hand prints all jobs in the order they are received by the printer and the order of printing cannot be changed.

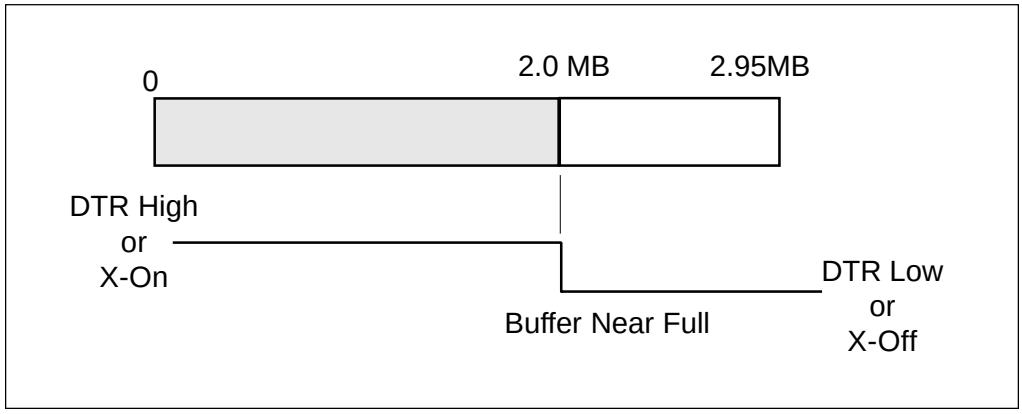
Single Job Buffer

The printer receives and prints one job at a time. Each job must not exceed 2.95MB.

Multi Job Buffer

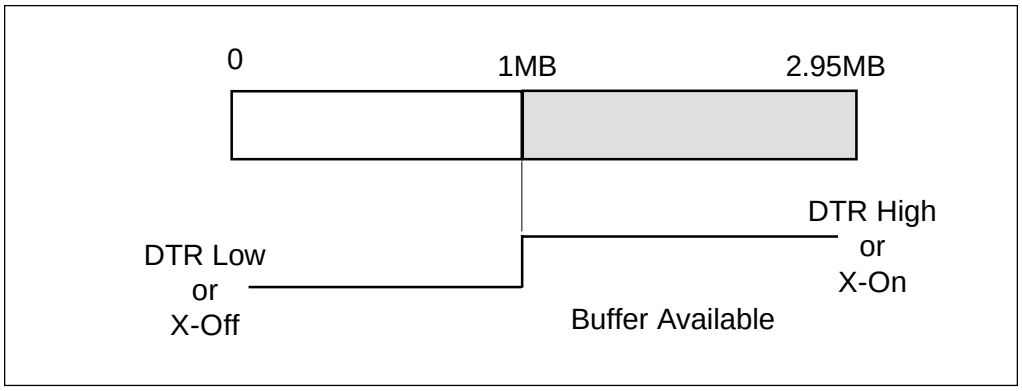
The printer is able to continuously receive print jobs, compiling and printing other jobs at the same time. It acts much like a "print buffer" ot maximize the performance of the host and the printer.

When using the RS232 Serial interface, the Multi Job Buffer uses either the **Ready/ Busy** with **DTR** (pin 20) or **X-On/X-Off** flow control protocols. See these sections for more details. With an empty receiving buffer, the status of **DTR** is "high" (or an **X-On** status if using **X-On/X-Off**), meaning the printer is ready to receive data. When the receive buffer is holding 2.0MB of data (1MB from being full), **DTR** will go "low" (or an **X-Off** is sent) indicating the printer can no longer receive data. This condition is called "Buffer Near Full"



The receiving buffer will not be able to receive more data again until a "Buffer Available" condition occurs. This takes place when the receiving buffer has emptied so that only 1MB bytes of data are being held (2.0MB bytes from being full). At this time, DTR will go "high" or an X-On is sent to tell the host that it can again receive data.

The Receive Buffer



All printer error conditions (i.e., label out, ribbon out) will cause the printer to go busy (**DTR** "low" or **X-Off**) until the problem is corrected and the printer is placed online. The printer will also be busy if taken offline from the front panel.

3.4 IEEE 1284 Parallel Interface

The parallel interface for the CL408e/CL412e printers is a Plug-In Interface Module that can be installed by the user. It conforms to the IEEE 1284 specification. It will automatically detect the IEEE 1284 signals and operate in the high speed mode. If it does not detect the IEEE 1284 signals, it will operate in the standard Centronics mode, which is significantly slower. *For this reason, an interface cable and host interface conforming to the IEEE 1284 specification must be present to fully utilize the speed capabilities.* This interface also operates bi-directionally and can report the status of the printer back to the host.

Electrical Specifications:

Printer Connection	AMP 57-40360 (DDK) or equivalent
Cable Connection	AMP 57-30360 (DDK) or equivalent
Cable	IEEE1284 Parallel, 10 ft. (3 m) or less
Signal Level	High = +2.4V to +5.0V Low = 0V to -0.4V

Data Streams:

<ESC>A .. Job#1 .. <ESC>Z<ESC>A .. Job#n .. <ESC>Z

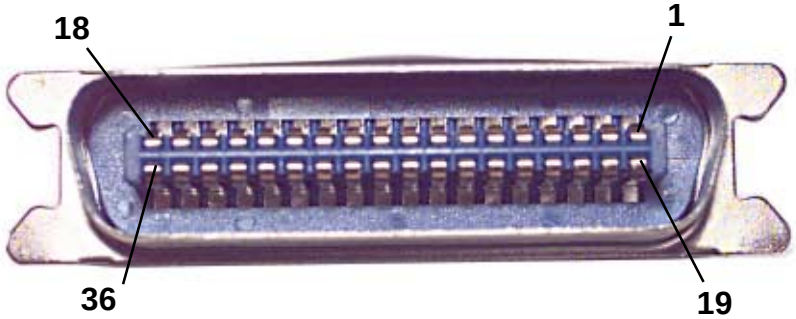
Please Note:
SATO does not recommend the use of mechanical data switches commonly called A/B switches, as they are known to damage both the computer and printer parallel ports.

IEEE 1284 Parallel Interface

PIN	SIGNAL	DIRECTION	PIN	SIGNAL	DIRECTION
1	$\overline{\text{STROBE}}$	To Printer	19	STROBE Return	Reference
2	DATA 1	To Printer	20	DATA 1 Return	Reference
3	DATA 2	To Printer	21	DATA 2 Return	Reference
4	DATA 3	To Printer	22	DATA 3 Return	Reference
5	DATA 4	To Printer	23	DATA 4 Return	Reference
6	DATA 5	To Printer	24	DATA 5 Return	Reference
7	DATA 6	To Printer	25	DATA 6 Return	Reference
8	DATA 7	To Printer	26	DATA 7 Return	Reference
9	DATA 8	To Printer	27	DATA 8 Return	Reference
10	$\overline{\text{ACK}}$	To Host	28	ACK Return	Reference
11	Busy	To Host	29	BUSY Return	Reference
12	Printer Error	To Host	30	PE Return	Reference
13	SELECT	To Host	31	$\overline{\text{INIT}}$	From Host
14	$\overline{\text{AUTOFD}}$(1)	To Host	32	$\overline{\text{FAULT}}$	To Host
15	Not Used		33	Not Used	
16	Logic Gnd		34	Not Used	
17	FG	Frame Ground	35	Not Used	
18	+5V(Z=24K ohm)	To Host	36	$\overline{\text{SELECTION}}$(1)	From Host

(1) Signals required for IEEE 1284 mode.

PIN ASSIGNMENTS - IEEE 1284 CABLE END



3.5 RS232C Serial Interface

The High Speed Serial Interface is a Plug-In Interface Module that can be installed in the printer by the user.

General Specifications:

Asynchronous ASCII Half-duplex communication

Ready/Busy Hardware Flow Control
Pin 20, DTR Control
Pin 4, RTS Error Condition

X-On/X-Off Software Flow Control

Bi-Directional Communication

Data Transmission Rate 9600, 19200, 38400, 57600 bps

Character Format
1 Start Bit (fixed)
7 or 8 data bits (selectable)
Odd, Even or No Parity (selectable)
1 or 2 Stop bits (selectable)

Electrical Specifications:

Connector DB-25S (Female)

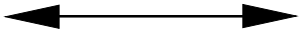
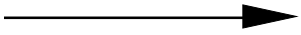
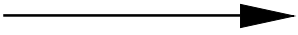
Cable DB-25P (Male), 50 ft. maximum length. For cable configuration, refer to Cable Requirements appropriate to the RS232C protocol chosen.

Signal Level
High = +5V to +12V
Low = -5V to -12V

PIN ASSIGNMENTS - RS232C PRINTER END

RS232C Serial Interface

Cable Requirements

DB9	DB25	HOST	INTERCONNECTION	DB25	PRINTER
1	1	FG		1	FG (Frame Ground)
2	3	RD		2	TD (Transmit Data)
3	2	TD		3	RD (Receive Data)
8	5	CTS		4	RTS (Request to send)
7	4	RTS		5	CTS (Clear to Send)
4	20	DTR		6	DSR (Data Set Ready)
6	6	DSR*		20	DTR (Data Terminal Ready)
5	7	SG		7	SG (Frame Ground)

* This connection at the host side of the interface would depend upon the pin that is being used as the Ready/Busy signal by the driving software. Typically on a PC, it would be either CTS (pin 5) or DSR (pin 6) on a DB-25 connector.

Please Note:
SATO does not recommend the use of mechanical data switches commonly called A/B switches, as they are known to damage both the computer and printer serial ports.

RS232C Interface Signals

PIN	DIRECTION	SIGNAL DESCRIPTION
1	Reference	FG (Frame Ground)
2	To Host	TD (Transmit Data) - Data from the printer to the host computer. Sends X-On/X-Off characters or status data (Bi-Directional protocol).
3	To Printer	RD (Receive Data) - Data to the printer from the host computer.
4	To Host	RTS (Request to Send) - Used with Ready/Busy flow control to indicate an error condition. RTS is high and remains high unless the print head is open (in this case, RTS would return to the high state after the print head is closed and the printer is placed back on-line) or an error condition occurs during printing (e.g. label out).
5	To Printer	CTS (Clear to Send) - When this line is high, the printer assumes that data is ready to be transmitted. The printer will not receive data when this line is low. If this line is not being used, it should be tied high (to pin 4).
6	To Printer	DSR (Data Set Ready) - When this line is high, the printer will be ready to receive data. This line must be high before data is transmitted. If this line is not being used, it should be tied high (to pin 20).
7	Reference	SG (Signal Ground)
20	To Host	DTR (Data Terminal Ready) - This signal applies to Ready/Busy flow control. The printer is ready to receive data when this pin is high. It goes low when the printer is off-line either manually or due to an error condition, and while printing in the Single Job Buffer mode. It will also go low when the data in the buffer reaches the Buffer Near Full level.

Ready/Busy Flow Control

Ready/Busy is the hardware flow control for the serial interface on the CL408e/CL412e printers. By raising/lowering the voltage level on Pin 20 of the RS232 port, the printer notifies the host when it is ready to receive data. Pin 4 (**RTS**) and pin 20 (**DTR**) are the important signals on the printer for this method of flow control. The host must be capable of supporting this flow control method for it to function properly.

X-On/X-Off Flow Control

X-On/X-Off flow control must be used whenever hardware (Ready/Busy) flow control is not available or desirable. Instead of a voltage going high/low at pin 20, control characters representing "Printer Ready" (**X-On** = 11 hexadecimal) or "Printer Busy" (**X-Off** = 13 hexadecimal) are transmitted by the printer on pin 2 (Transmit Data) to the host. In order for this method of flow control to function correctly, the host must be capable of supporting it. **X-On/X-Off** operates in a manner similar to the function of pin 20 (**DTR**) as previously explained. When the printer is first powered on and goes on-line, an **X-On** is sent out. In the Single Job Buffer mode, when the printer receives a viable job, it transmits an **X-Off** and begins printing. When it is done printing, it transmits an **X-On**. In the Multi Job Buffer mode, the printer sends an **X-Off** when the when the "Buffer Near Full" level is reached and a **X-On** when the data level of the buffer drops below the "Buffer Available" mark. When the printer is taken off-line manually, it transmits an **X-Off** indicating it cannot accept data. When it is placed back on line manually, it sends an **X-On**, indicating it is again available for receipt of data. If an error occurs during printing (paper out, ribbon out), the printer sends nothing in the Single Job Buffer mode since the last character transmitted was an **X-Off**. When the error is cleared and the printer is resumes printing, no **X-On** is sent until the current job is completed and the printer is once again ready to receive the next job. If it is in the Multi-Job Buffer mode, it sends an **X-Off** as soon as an error condition is detected. When the error is cleared and the printer is placed back on-line, it transmits as **X-On** indicating it is again ready to accept data.

Upon power up if no error conditions are present, the printer will continually send **X-On** characters at five millisecond intervals until it receives a transmission from the host.

Data Streams

The data streams for **X-On/X-Off** and **Ready/Busy** flow control are constucted in the same way as they are for Ready/Busy flow control.

<ESC>A .. Job#1 .. <ESC>Z<ESC>A .. Job#n .. <ESC>Z

Example: <ESC>A .. Job#1 .. <ESC>Z

NOTE: All characters are in ASCII.

3.6 Universal Serial Bus (USB) Interface

The Universal Serial Bus (USB) interface is a Plug-In Interface Module that can be installed by the user. It requires a driver (shipped with each printer that has the interface installed) that must be loaded on your PC and the PC must be configured to support USB peripherals using Windows 98 or above. Details for loading the USB driver are contained in the USB Interface Manual that is shipped with each printer with a USB Optional interface installed. Up to 127 devices may be connected to a USB port.

Universal Serial Bus (USB) Interface (Cont)

General Specifications:

Connector:	USB Type B Plug
Cable:	10ft (3 m) max.
Host:	Windows 98 USB Port

Electrical Specifications:

Power Supply:	Bus Power through cable
Power Consumption::	+5V@80ma

3.7 Ethernet Interface

The Ethernet interface is a Plug-In Interface Module that can be installed by the user. It requires a driver (shipped with each printer) that has the interface installed. The driver must be loaded on your PC and the PC must be configured to run one of the supported network protocols using a 10/100BaseT LAN connection. Details for loading the Ethernet driver are contained in the Ethernet Interface Manual that is shipped with each printer with a Ethernet interface installed.

General Specifications:

Type:	10/100BaseT
Connector:	RJ-45 Receptical
Cable:	Category 5

Electrical Specifications:

Power Supply: Powered from printer

Refer to the manual & CD supplied with the interface card.

3.8 Bi-Directional Communications

This is a two-way communications protocol between the host computer and the printer, thus enabling the host to check printer status. When Bi-Com 4, Bi-Com 3 or Bi-Com 2 communications is selected on the serial interface card, there is no busy signal from the printer. The host must request the complete status from the printer, including ready/busy.

Refer to the Operator's and Technical Manual for complete information.

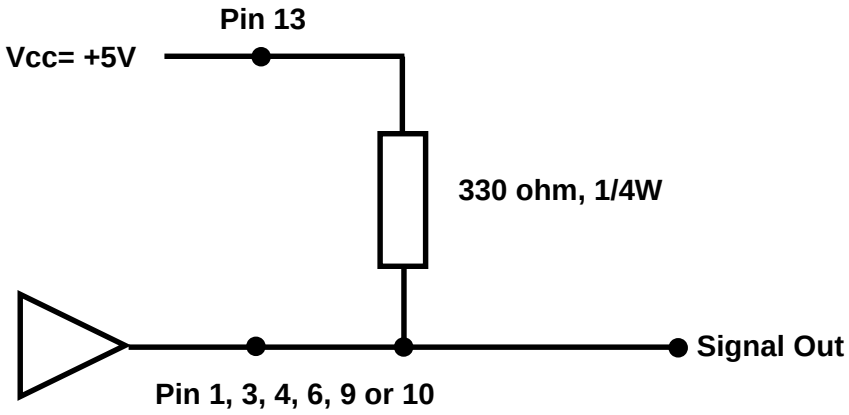
3.9 Accessory (EXT) Connector

The EXT connector on the rear panel of the CL408e/CL412e printers is intended for use with external printer accessories such as label rewinders or applicators. The 14 pin Centronics type connector provides a choice of four different output signals along with various error conditions. A DB-9 to 14 pin Centronics adapter cable is provided for legacy applications.

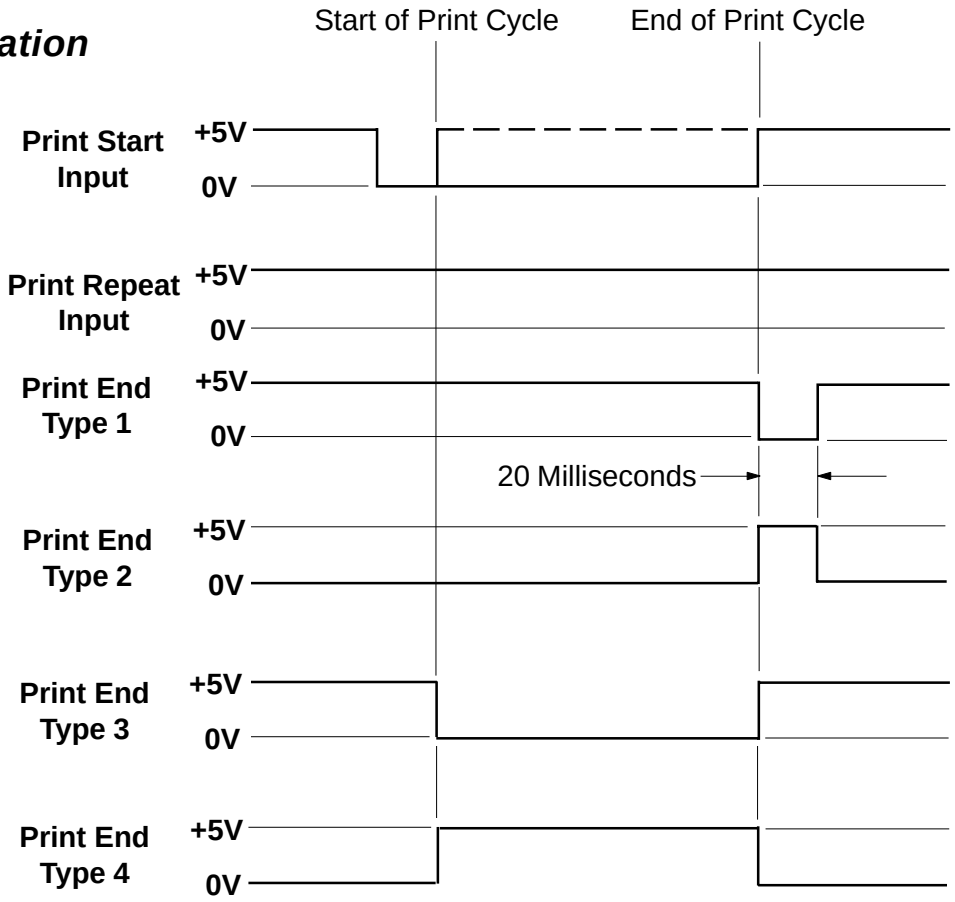
Pin Assignments

Old DB-9 PIN	14 Pin Centronics PIN	DIRECTION	SIGNAL DESCRIPTION
1	13	To Host	Vcc -/+5V
2	10	To Host	Ribbon Near End - This pin goes high when the amount of ribbon on the unwind shaft is approximately 46 feet (14 m). The output will be low when the ribbon is completely out.
3	4	To Host	Error - This pin goes low when the printer detects an error condition such as head open or receiving buffer is full.
4	7	To Printer	Reprint - A duplicate of the last label in a print job will be reprinted when this signal is received.
5	5	To Printer	Print Start - The printer will print one label when this pin is pulled to ground. This signal must be enabled by placing switch DSW3-5 on the Control Panel in the OFF position.
6	6	To Host	End Print - It is used to drive an applicator or other external device requiring synchronization with the print cycle. You may choose between four types of output signals using control panel DSW3-6 and DSW3-7 selections. See timing charts on next page.
7	1	To Host	Label Out - This pin goes low (0V) when a label error exists.
8	3	To Host	Ribbon Out - This pin goes low (0V) when ribbon is out.
9	2	Reference	Signal Ground
	8	To Printer	Isolated Power Source for signal input.
	9	To Host	When Mode 1 in LCD selected High Voltage = On-Line Print Job waiting. When Mode 2 in LCD selected High Voltage = On-Line. This goes low (0V) when printer Off-Line.
	11		Reserved
	12	To Host	+24V +/- 10% @2A - Power for external devices
	14		Frame Ground

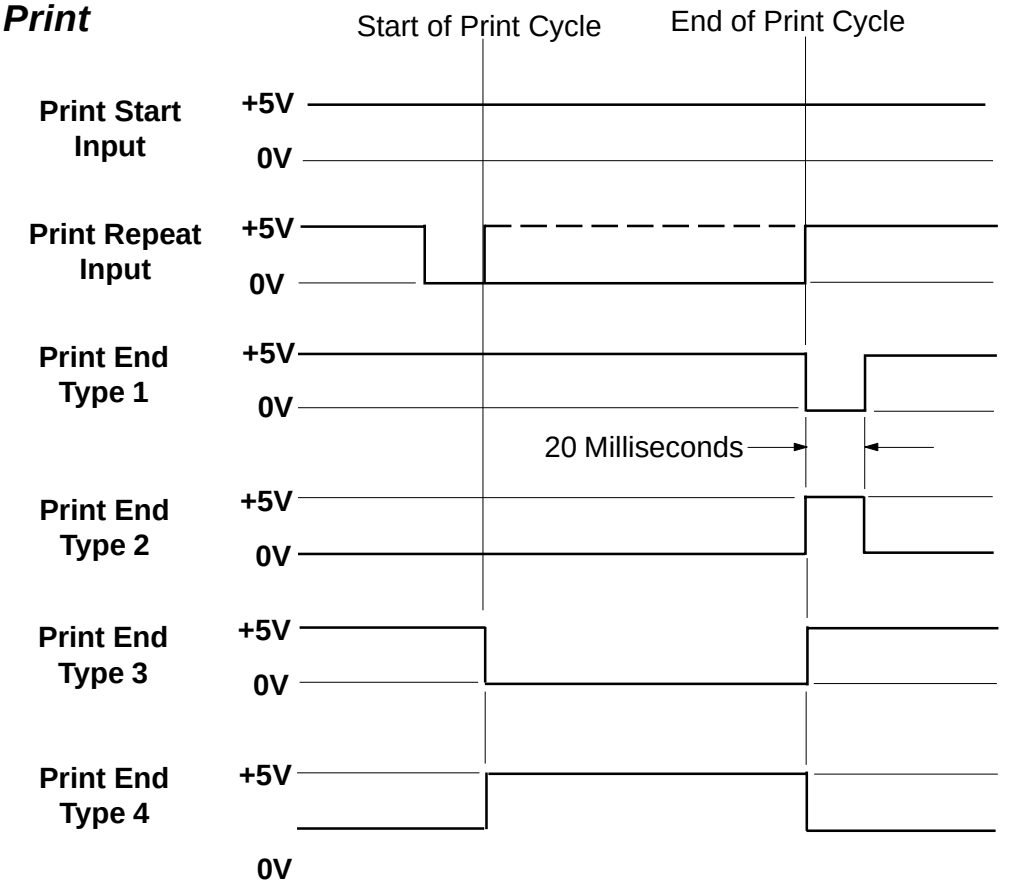
NOTE: The signals on pins 1, 3, 4, 6, 9 and 10 each have an open collector output. These pins normally measure +.07V maximum when a true condition exists. If a false condition occurs, the voltage will drop to 0V. To achieve a signal level of +5V, you must add a 330 ohm, ¼ W pull-up resistor between the open collector output pin and Vcc (pin 13) as illustrated. This will provide a signal level of +5V for a true condition and 0V when a false condition exists. The maximum voltage that can be applied to these pins is +50V and the maximum current they can sink is 500 milliamps.



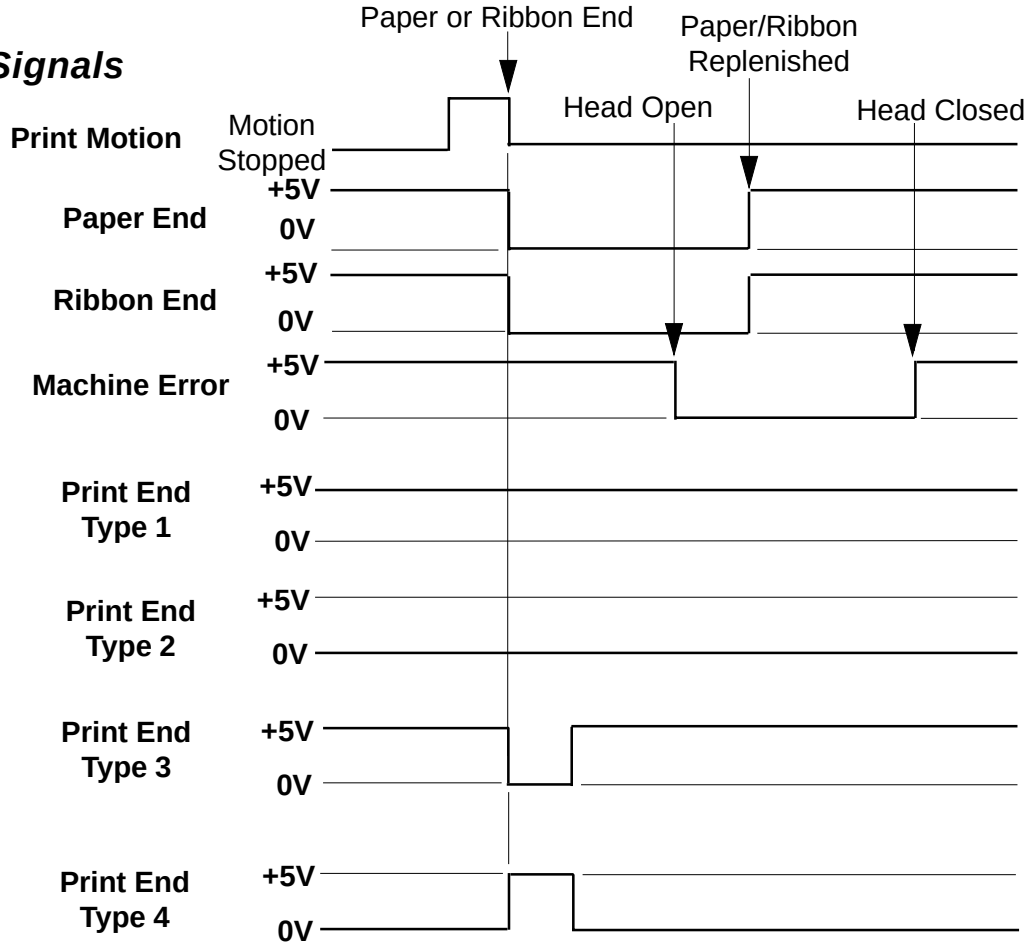
Standard Operation



Repeat Print



Error Signals



Section

4

Electrical Checks and Adjustments

4.1 Overview

This chapter describes how to check CL408e/CL412e Printers voltage levels and adjust threshold sensor voltages.

The power supply converts 125 VAC into regulated DC voltages. The printer uses: +5V and +24V. These DC voltages are not adjustable, however you can measure these DC voltages at test points located on the PCB. Section 4.2 contains procedures for measuring DC voltage levels.

You can adjust threshold voltage levels for label sensors. These adjustments are made to allow for variations in the characteristics of the labels used with the printer. If you cannot calibrate the label sensor voltage level within the specified voltage range, you should reposition the label sensor by following the adjustment procedures included in this section. After completing the label sensor adjustment procedures, perform the label sensor voltage level adjustment procedure.

You can check or adjust:

- *Power Supply*
- *Label Sensors*
- *Ribbon Sensor*
- *Pitch Offset*
- *Label Positions*

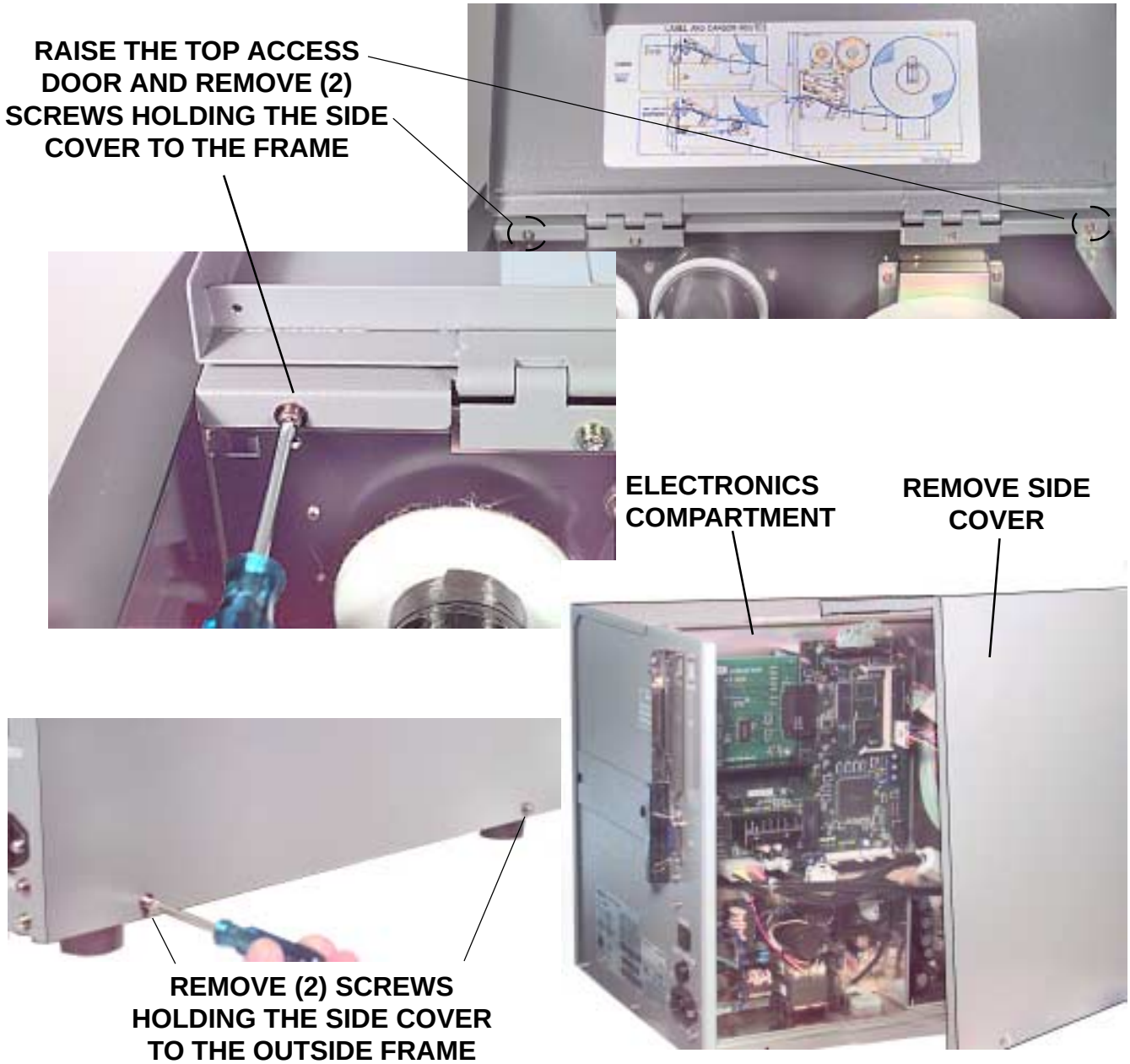
Checks and adjustments in this section require standard metric tools. Also required:

Digital Multimeter required for use with SATO TP Test Module (Voltage Checker) Part # RH1773100 and is required for most electrical adjustments.

4.2 Steps Prior to Some Procedures

Some adjustments in this section require access to potentiometers and the test point connector located on the main PCB. Raise the door and remove the LH cover for accessing the main PCB.

STEP	PROCEDURE
1.	Turn the printer OFF and disconnect the AC power cord.
2.	Raise the access door and remove (2) screws holding the electronics side cover to the inside frame.
3.	Remove (2) screws holding the electronics side cover to the outside frame. Lift off the cover to expose the main PCB. Refer to the appropriate section to begin adjustments.

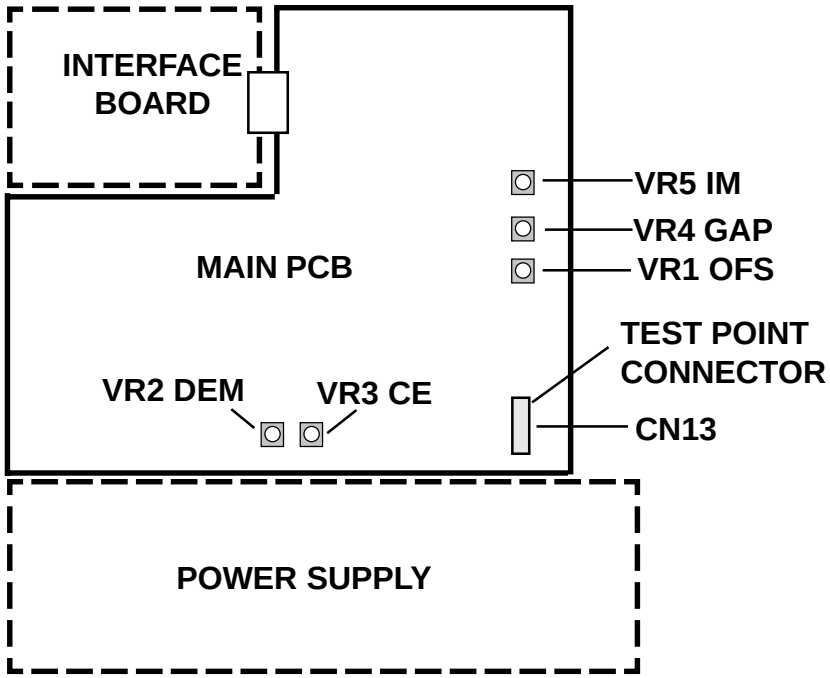


4.3 DC Power Voltage Checks

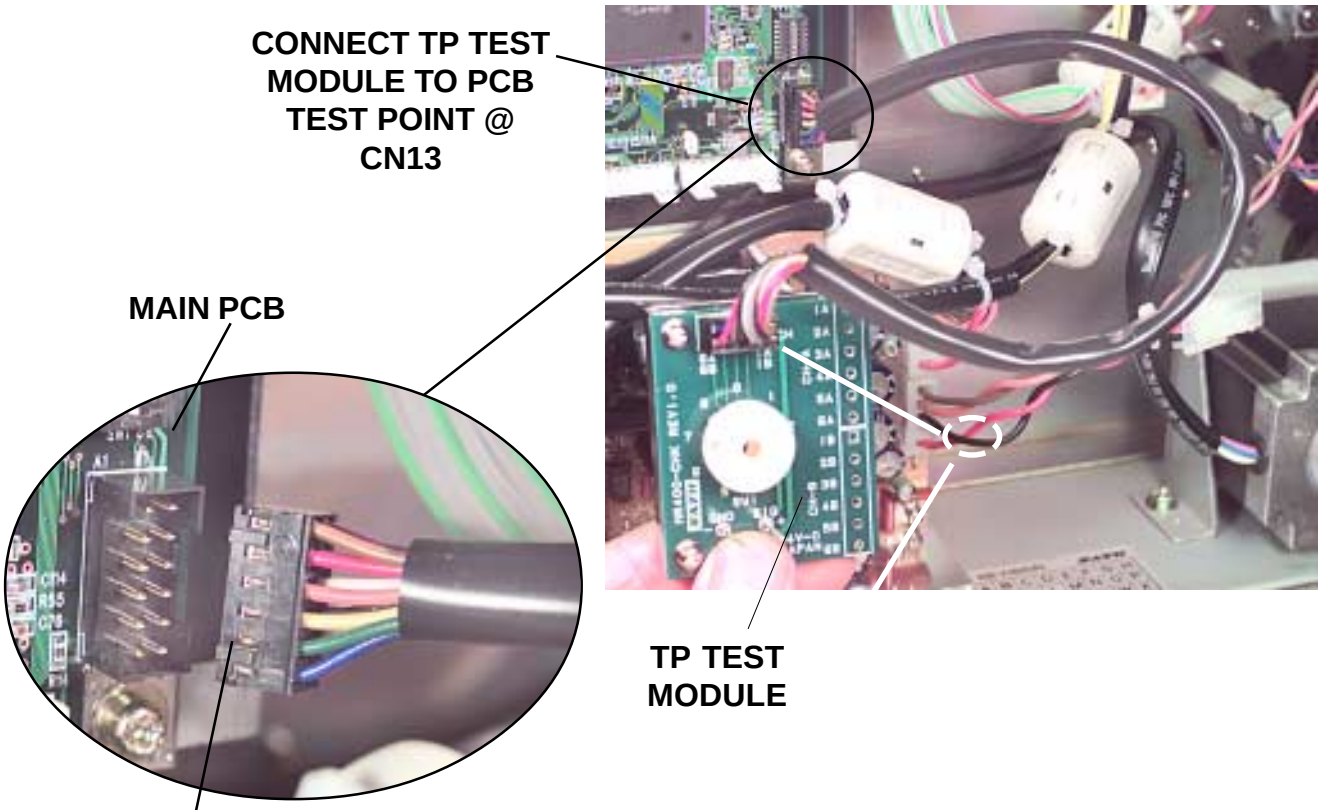
To check voltage levels, first check the fuses (Section 6.3) and replace if necessary. Then remove the LH cover, (Section 4.2) and perform the following steps.

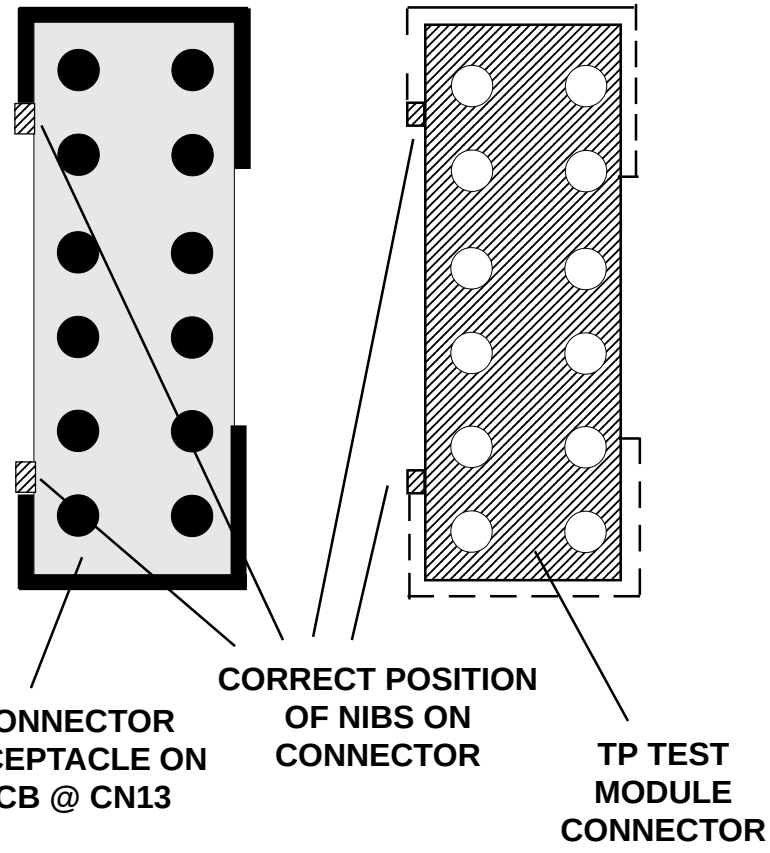
Addtional equipment required:	TP Test Module Digital Multimeter

STEP	PROCEDURE
	Refer to illustrations on pages 4-3 through 4-5.
1.	Attach the connector from the TP Test Module to the test port on the main PCB. Note correct positioning of connector. Nibs on the connector are placed down in the receptacle on the PCB in the forward position.
2.	Attach the ground probe of the multimeter to the TP Test Module Gnd pin.
3.	Attach the positive probe of the multimeter to the +SIG pin on the TP Test Module terminal.
4.	Turn printer on and rotate the dial to a dial POS on the TP Test Module. Record the values from the Multimeter LCD.
5.	Confirm voltages are correct. If not, then replace power supply. Refer to Section 6.4.
6.	After performing tests, replace the LH cover to the printer.

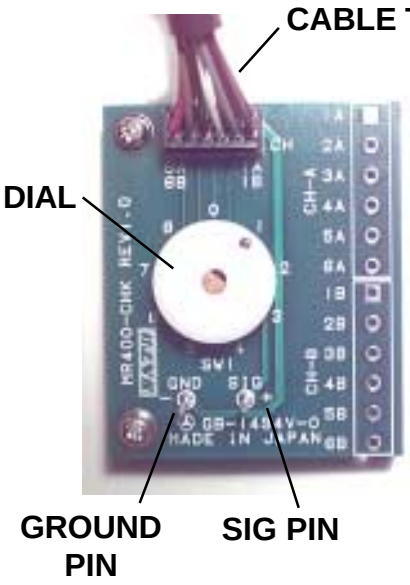


DC Power Voltage Checks

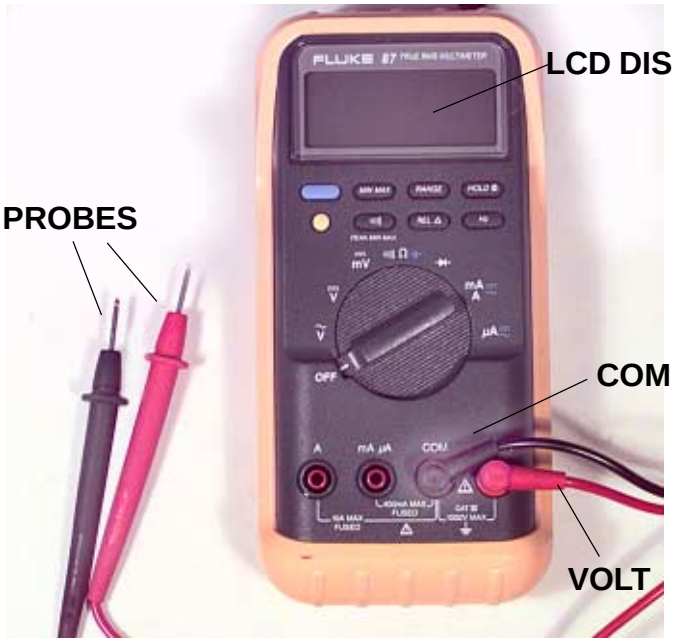




DC Power Voltage Checks



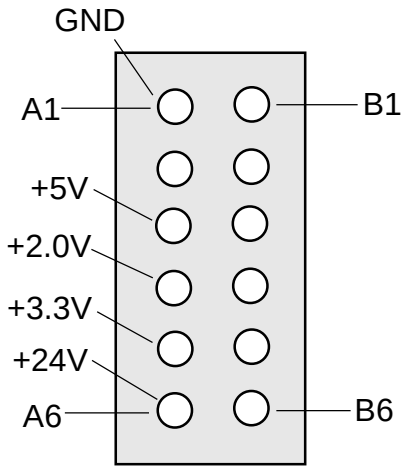
TP TEST MODULE



DIGITAL MULTIMETER

Dial POS	DISC	VOLTAGE RANGE	TP TEST MODULE
	SG		
	NC		
0	+5V	+4.8 to +5.2V	CHA3 (+5V) - CHA1 (GND)
1	+2.0V	+1.90 to +2.1V	CHA4 (+2.0V) - CHA1 (GND)
2	+3.3V	+3.1V to +3.5V	CHA5 (+3.3V) - CHA1 (GND)
3	+24V	+23.5V to +24.5V	CHA6 (+24V) - CHA1 (GND)

TEST POINT CHART



NOTE: The power supply voltages are not adjustable. All voltages must read within +/- 10% of the nominal value for correct operation of the printer.

4.4 Potentiometer Assignments & Adjustments

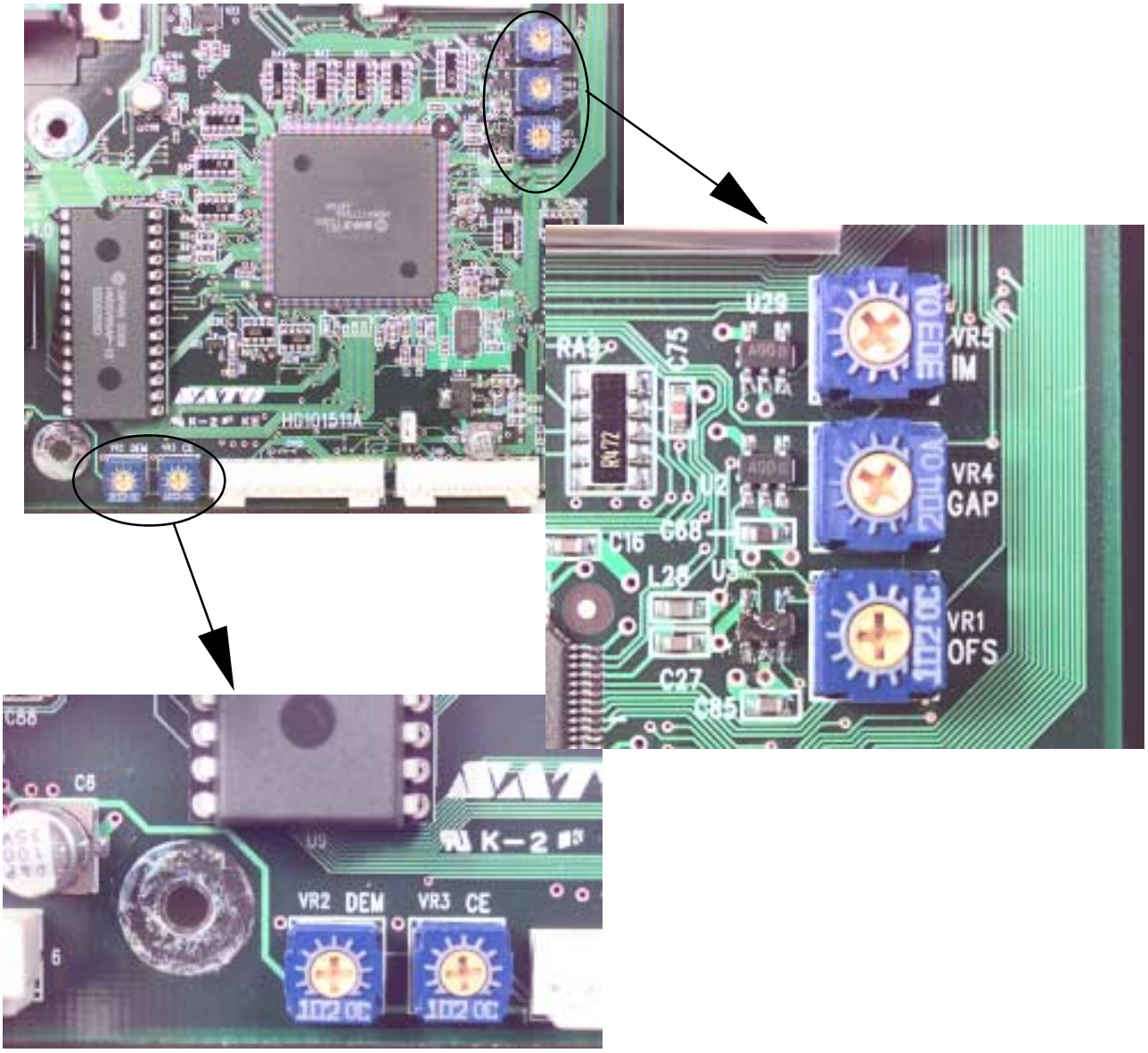
VR to Adjust	ITEM	POSITION DIAL
	5V	0
	24V	3
VR1	PITCH OFFSET	
VR4	GAP	5
VR5	EYE-MARK	4
VR2	Not Used DEM	NOT USED On CL408e/412e
VR3	Not Used CE	NOT USED On CL408e/412e

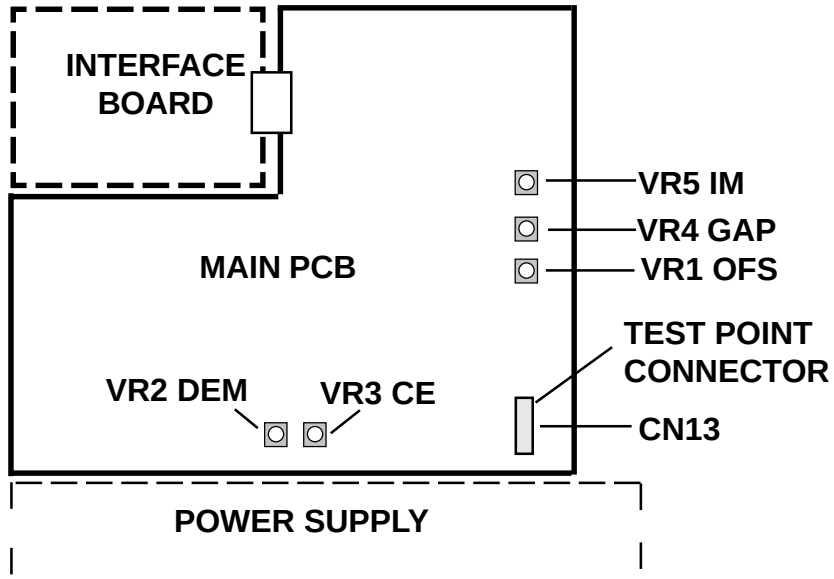
POTENTIOMETERS ARE LOCATED ON MAIN PCB

VR to Adjust	ITEM
VR1	PRINT
VR2	OFFSET
VR3	PITCH
Label Take Sensor	Dispenser

POTENTIOMETERS ARE LOCATED ON FRONT PANEL

Potentiometer Assignments & Adjustments

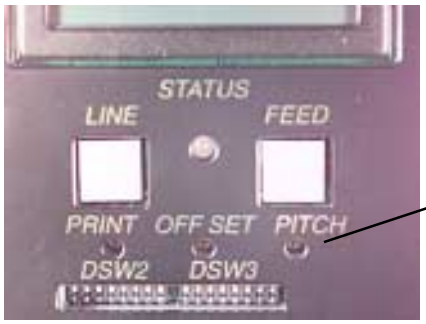




4.5a Print Position Adjustment

Print Position is adjusted with the Pitch potentiometer on the Front Panel or VR1 potentiometer on the main PCB board to change print position.

The following instructions are for adjusting the potentiometer on the Front Panel. Refer to Section 4.5b for making adjustments using the potentiometer on the PCB board.



Note: The print position can be changed with the PITCH-VR but the stop position cannot be changed. The stop position can be changed with the OFFSET VR.

PITCH-VR adjustment range is +/- 3.75mm.

STEP	PROCEDURE
1.	Open the Front Door for access to Pitch-VR.
2.	Turn Pitch-VR to the center position.
3.	Press the **FEED** key while simultaneously turning **ON** the power switch.
4.	When the printer beeps, release the key. The following screens will appear.

```
INITIALIZING          TEST PRINT MODE
ROM V00.00.00.00  ->      CONFIGURATION
```

5.	Press the **FEED** key to display the next screen.

```
TEST PRINT SIZE
        10CM
```

6.	Use the **LINE** Key to step to the second digit of the counter to the desired setting. The display will increment one step each time the **LINE** key is pressed. After the reading will advances to a setting of 09, it will automatically wrap and start at 10 CM again.
7.	Press the **FEED** key for a test print. Press the **FEED** key again to stop printing.

```
PRESS FEED KEY
TO STOP PRINTING
```

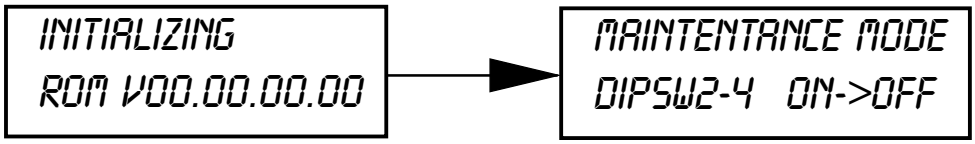
8.	Adjust the position using the potentiometer and feed another label. When the adjustment is correct, turn the printer off. If the print position can't be adjusted replace the Display Panel PCB. Refer to Section 6.

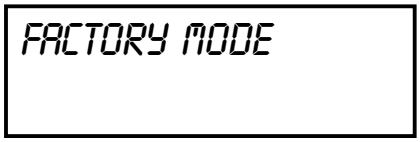
4.5b Print Position Adjustment

Using the VR1 potentiometer on the main PCB board.

VR1 adjustment range is +/- 3.75mm.

STEP	PROCEDURE
	Refer to Section 4.2 for access to main PCB
1.	Record all current dip switch positions, then place all switches in the **OFF** position and the power switch **OFF**.
2.	Turn VR1 on the main PC Board to the center position.
3.	Place DSW2-4 in the **ON** (up) position.
4.	Press the **LINE** and **FEED** key while simultaneously turning the power switch **ON**.
5.	When the printer beeps, release the keys. The following screens will appear.
6.	Place DSW2-4 in the **OFF** (down) position and the screen will display the next screen.
7.	Press the **FEED** key to display the next screen.
8.	Confirm "None" then press the **FEED** key to display the next screen.
9.	Press the **FEED** key for a test print. Press the **FEED** key again to stop printing.
10.	Adjust the position using the VR1 potentiometer and feed another label. When the adjustment is correct, turn the printer off. If the print position can't be adjusted with the VR1, replace the Main PCB. Refer to Section 6.





The default is Large.

4.6 Label Gap Adjustment

Additional equipment required:	TP Test Module Digital Multimeter

STEP	PROCEDURE
	Refer to Section 4.2 for access to main PCB
1.	Turn **VR4 (GAP)** potentiometer on the main PCB all the way to the left.
2.	Refer to Section 4.3. Set the digital multimeter to DC voltage measurement mode. Attach the connector from the TP Test Module to the test port on the main PCB. Note correct positioning of connector. Nibs on the connector are placed down in the receptacle on the PCB in the forward position. Set the dial to 5.
3.	Connect (+) probe of the multimeter to Sig+ and (-) probe to pin GND.
4.	For Low level (Label Gap part with backing only) adjustment, put label gap part in the sensor. Then adjust the electrical level with **VR4** on the main PCB so that it will measure less than 0.5 V.
5.	For High level (paper part) adjustment, put paper part in the sensor and check the electrical level. If the level difference is +1.0 V more than the Low level, it is acceptable. If it is lower than 1.0V repeat STEPS 4 & 5 and readjust **VR4**.
6.	Standard values: Low level (gap): below 0.5 V High level (paper part): Low level +1.0 V or higher. If these values do not result, try the following: a) Repeat the process b) Clean the sensor c) Verify sensor is operational d) Replace labels with higher quality labels e) Perform factory reset

4.7 Eye-Mark Adjustment

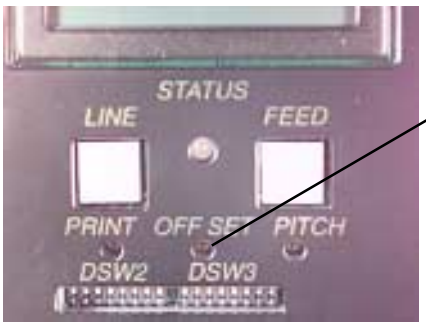
Additional equipment required:	TP Test Module Digital Multimeter

STEP	PROCEDURE
	Refer to Section 4.2 for access to main PCB
1.	Turn **VR5 (IM)** potentiometer on the main PCB all the way to the left.
2.	Refer to Section 4.3. Set the digital multimeter to DC voltage measurement mode. Attach the connector from the TP Test Module to the test port on the main PCB. Note correct positioning of connector. Nibs on the connector are placed down in the receptacle on the PCB in the forward position. Set the dial to 4.
3.	Connect (+) probe of the multimeter to Sig+ and (-) probe to pin GND.
4.	For Low level (no "Eye-Mark" part) adjustment, put paper part in the sensor. Then adjust the electrical level with **VR5** on the main PCB so that it will measure less than 0.5 V.
5.	For High level ("Eye-Mark" part) adjustment, put paper part with the "Eye-Mark" part in the sensor and check the electrical level. If the level difference is +1.0 V more than the Low level, it is acceptable. If not, return to STEP 4 and readjust **VR5**.
6.	Standard values: Low level (no "Eye-Mark" part): +0.5 V or less. High level ("Eye-Mark"): Low level +1.0 V or higher. If these values do not result, try the following: a) Repeat the process b) Clean the sensor c) Verify sensor is operational d) Replace labels with higher quality labels e) Perform factory reset

4.8 Offset Label Stop Position Adjustment

Used for fine adjustment of label stop position for Tear Off, Cutter and Dispense Modes.

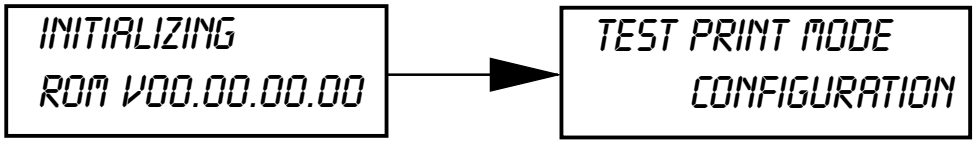
The Label Stop Position is adjusted with the Offset potentiometer on the Front Panel.



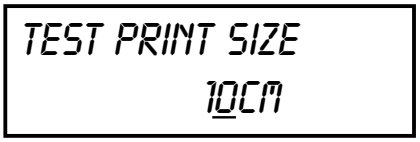
Note: The stop position only is changed with the Offset-VR. The print position is changed with the Pitch-VR.

The OFFSET-VR adjustment range is +/- 3.75mm.

STEP	PROCEDURE
1.	Open the Front Door for access to Offset-VR.
2.	Turn Offset-VR to the center position.
3.	Press the **FEED** key while simultaneously turning **ON** the power switch.
4.	When the printer beeps, release the key. The following screens will appear.



5.	Press the **FEED** key to display the next screen.

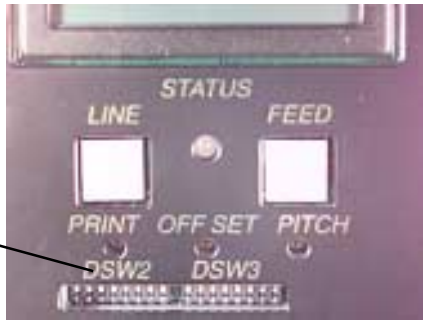


6.	Use the **LINE** Key to step to the second digit of the counter to the desired setting. The display will increment one step each time the LINE key is pressed. After the reading will advances to a setting of 09, it will automatically wrap and start at 10 CM again.
7.	Press the **FEED** key for a test print. Press the **FEED** key again to stop printing.

8.	Adjust stop the position using the Offset-VR and feed another label. When the adjustment is correct, turn the printer off. If the print position can't be adjusted replace the Display Panel PCB. Refer to Section 6.

4.9a Ribbon Sensor Operation Verification

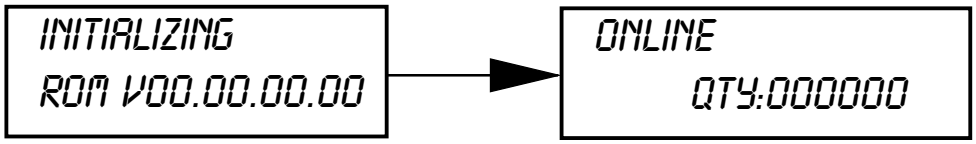
PLACE DSW2-1 IN THE OFF POSITION



No adjustment is provided for this sensor

SEE PAGE 1-6 FOR SENSOR LOCATION

STEP	PROCEDURE
1.	Open the Front Door for access to DIP Switches.
2.	Record all dip switch positions, then place DSW2-1 in the **OFF** position and the power switch **OFF**.
3.	Remove the ribbon from the printer and close the Head Open Lever.
4.	Turn the power switch **ON** to initialize the printer. The following screens will display.
5.	Press the **LINE** key to place the printer off-line.
6.	Press the **FEED** key. The printer will beep and the following screen will display to confirm that the ribbon is not in position and confirm the sensor is functioning.
7.	Turn off the printer and reinstall the ribbon.
8.	Turn **ON** the printer. The printer will initialize as in Step 4. Be sure to place the printer off line. Press the **FEED** key to generate a blank label and confirm ribbon has been installed and is in position.



4.9b Ribbon Sensor Voltage Checking

There is no adjustment POT for the ribbon sensor on the CL408e/412e. The CE POT on the main logic board has no effect on the voltage values. The voltage values only can be taken off the connector SEN4 on the display.

Refer to illustrations below.

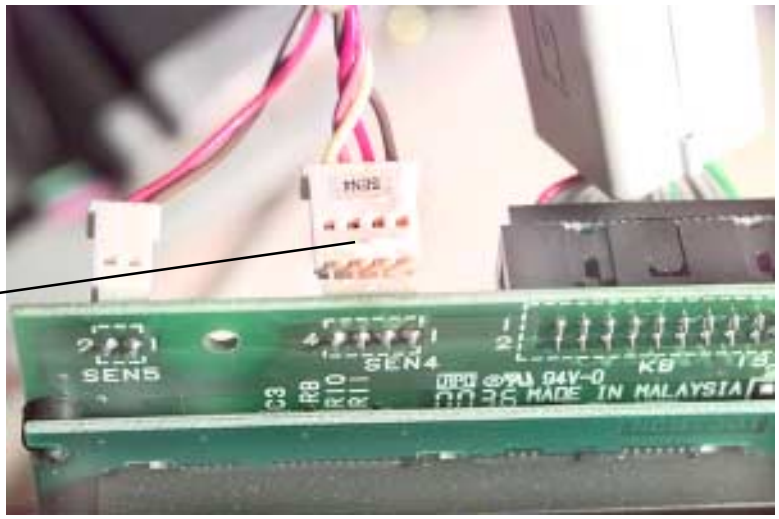
PIN 1 = Brown
PIN 2 = Red
PIN 3 = Orange
PIN 4 = Yellow

PIN 3 (Signal) and PIN 4 (Ground) are the test pins. Low value when the carbon assembly is rotated is around 0.16V. High value is around 4.8V.

If the voltages you monitor are at or close to these voltages, the ribbon out problem is being caused by improper ribbon tension adjustment.

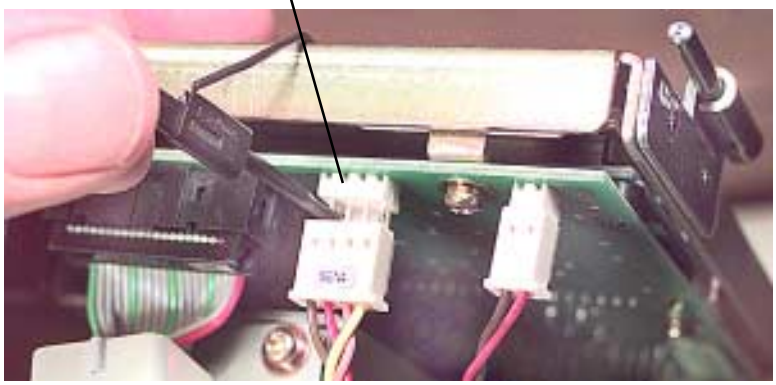
If the voltages are not at or close to these values, it indicates a component problem. The order suggested for component replacement trouble shooting is ribbon sensor first, display panel next, and finally the main logic board.

PULL SEN4 CONNECTOR SLIGHTLY AWAY FROM DISPLAY PANEL CONNECTIOR SO THAT VOLTAGE PROBES CAN BE ATTACHED TO THE EXPOSED PINS



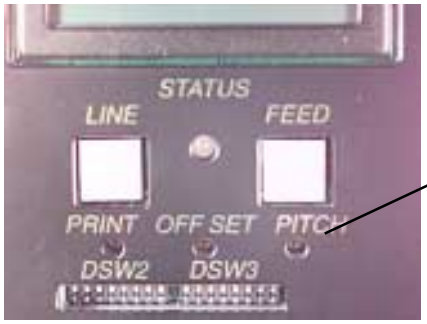
Ribbon Sensor Voltage Checking

ATTACH THE GROUND (BLACK) PROBE FROM THE MULTIMETER TO PIN 4 (GROUND) AND THE SIGNAL (WHITE) PROBE TO PIN 3



TO CHECK VOLTAGE RANGE FOR RIBBON SENSOR, ROTATE CARBON UNWIND SPINDLE.
LOW VALUE ~/- 1.6V
HIGH VALUE ~/- 4.8V

4.10 Print Darkness Adjustment



ADJUST PITCH POTENTIOMETER FOR OPTIMUM PRINT

STEP	PROCEDURE
1.	Open the Front Door for access to Pitch Potentiometer.
2.	Turn the power switch **ON**.
3.	Send print data from your PC and confirm the result.
4.	Adjust the Pitch Potentiometer to obtain optimum print quality. If quality is still lacking, refer to Section 2 Configuration, Print Darkness Setting, page 2-9.

Section 5

Mechanical Adjustments

5.1 Overview

The SATO CL408e/CL412e contain adjustable sub-assemblies. This means that during your regular maintenance, your service technicians are able to make adjustments to reset the printer to factory specifications therby ensuring optimum performance of your printer

The main mechnaical sub-assemblies are:

- *Ribbon Unwind/Rewind Assembly's*
- *Ribbon Guide Roller Assembly*
- *Print Head Assembly*
- *Drive Belt Assembly*

In this section you will find procedures for:

- *Ribbon Clutch Adjustments*
- *Ribbon Guide Plate Adjustment*
- *Tear Plate Adjustment*
- *Print Head Position Alignment*
- *Print Head Balance Adjustment*
- *Print Head Alignment Adjustment*
- *Timing Belt Tension Adjustment*

Checks and adjustments in this section require standard metric tools. Other equipment is listed where needed.

5.2 Ribbon Clutch Adjustments

Excessive ribbon and rewind tension will result in variable ribbon motion and could be the cause of print quality problems.

Follow the procedures 5.2.1 and 5.2.2 to verify that the ribbon rewind and unwind tensions are within specifications or if adjustment of either clutch is necessary.

Required Equipment:	• 1 Kg Tension Gauge • Ribbon Core, empty • String • 12mm Wrench • #2 Pozidrv Screwdriver

5.2.1 Ribbon Rewind Clutch Adjustment

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the top access door and open the front access door. Remove the ribbon and label stock if installed. ***Fig. 5-1***
3.	Attach string to an empty ribbon core and place on the Ribbon Rewind Spindle. Wind the string tightly around the ribbon core in a single layer and in in clockwise direction. Attach the free end of the string to the tension gauge. ***Fig. 5-2***
4.	Gradually lift the tension gauge, pulling the string to unwind it from the core. Once the spindle gegins to move, the gauge should indicate 950 to 1050 grams of tension. Excessive or insufficient tension must be corrected by adjusting the Ribbon Rewind Clutch.
5.	To adjust the clutch, loosen the locking screw and move the adjust nut CW for more tension and CCW for less tension. Tighten the locking screw and repeat steps 3 and 4 until the correct tension is achieved.

Fig. 5-1

Ribbon Clutch Adjustments

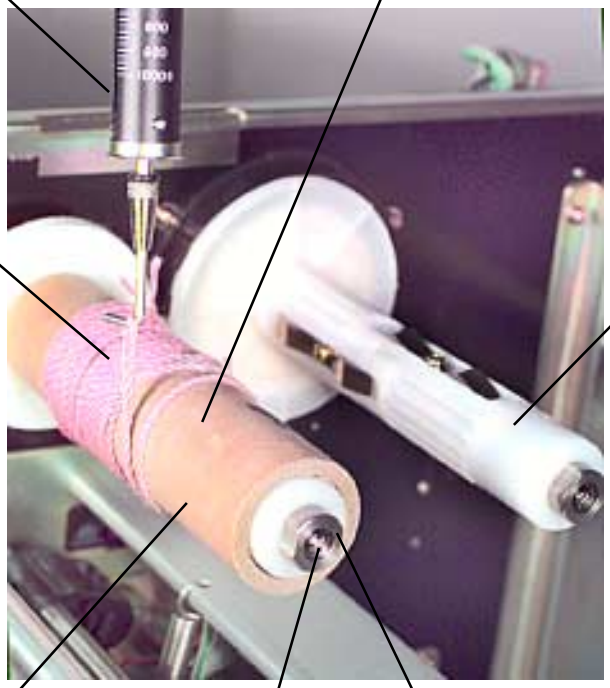


Fig. 5-2

REWIND CLUTCH

Fig. 5-3

UNWIND CLUTCH

Ribbon Clutch Adjustments

5.2.2 Ribbon Unwind Clutch Adjustment

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the top access door and open the front access door. Remove the ribbon and label stock if installed. ***Fig. 5-1***
3.	Attach string to an empty ribbon core and place on the Ribbon Unwind Spindle. Wind the string tightly around the ribbon core in a single layer and in in counter-clockwise direction. Attach the free end of the string to the tension gauge. ***Fig. 5-3***
4.	Gradually lift the tension gauge, pulling the string to unwind it from the core. Once the spindle begins to move, the gauge should indicate 450 to 550 grams of tension. Excessive or insufficient tension must be corrected by adjusting the Ribbon Unwind Clutch.
5.	To adjust the clutch, loosen the locking screw and move the adjust nut CW for more tension and CCW for less tension. Tighten the locking screw and repeat steps 3 and 4 until the correct tension is achieved.

5.3 Ribbon Guide Plate Adjustment

If the ribbon is not smooth across the guide plate (ribbon wrinkle) adjustment is required. To remedy the problem perform the Print Head Balance Adjustment (Section 5.6) before doing the Ribbon Guide Plate Adjustment.

Required Equipment:	• #2 Pozidrv Screwdriver

STEP	PROCEDURE
1.	Check for even ribbon tension by watching the ribbon movement under the guide plate as it moves upward toward the ribbon rewind spindle. If it appears uneven, proceed to next step.
2.	Loosen the mounting screws and reposition the plate. ***Fig. 5-4***
3.	Tighten the mounting screws.

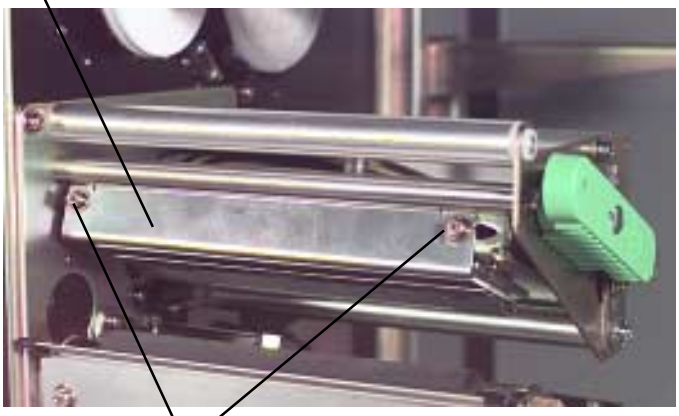
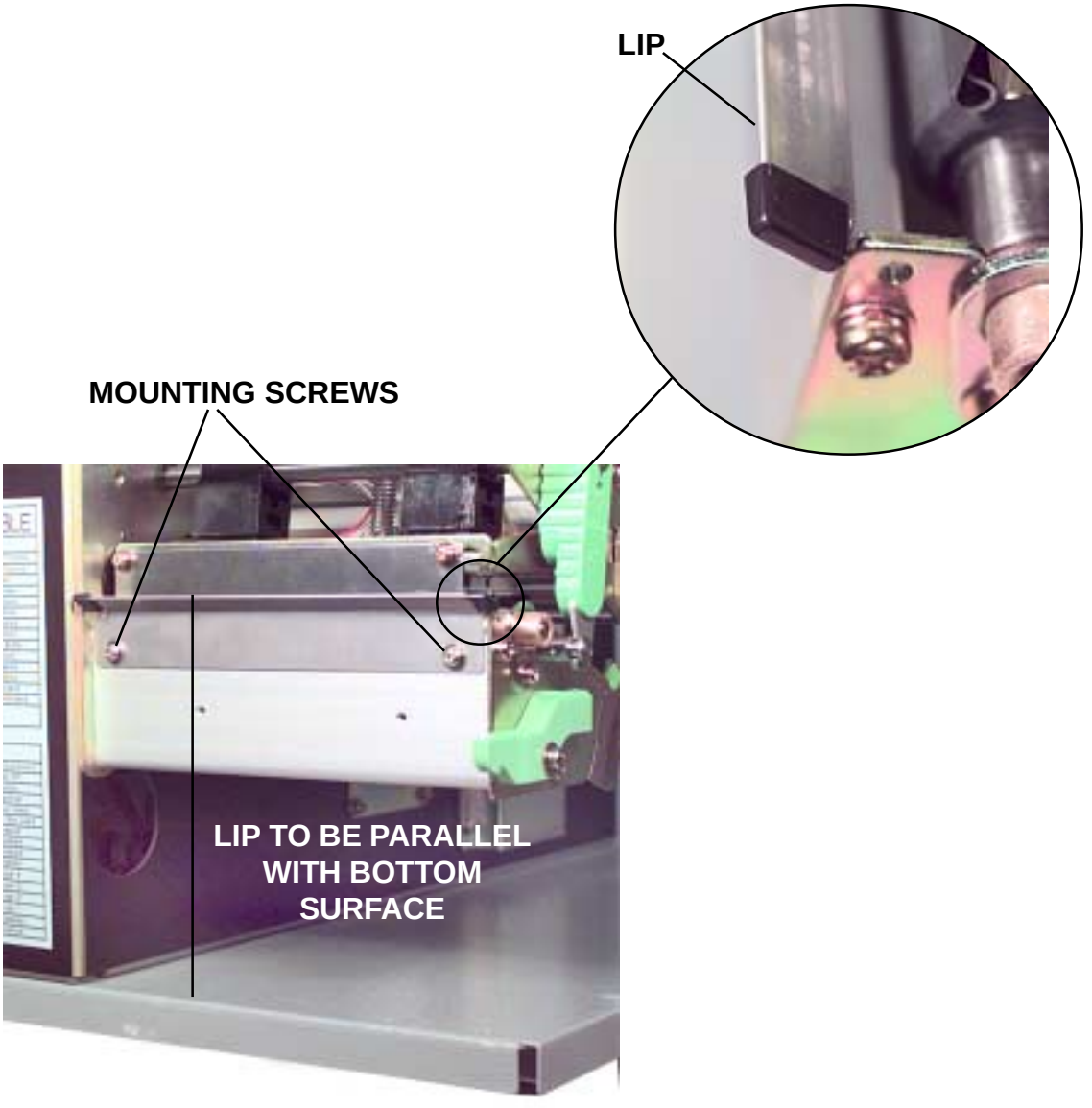


Fig. 5-4

5.4 Tear Plate Adjustment

Required Equipment:	• #2 Pozidrv Screwdriver

STEP	PROCEDURE
1.	Loosen the Tear Plate mounting screws and position plate so that the lip is parallel to the bottom of the printer assembly. ***Figs. 5-5***
2.	Tighten the mounting screws.



Figs. 5-5

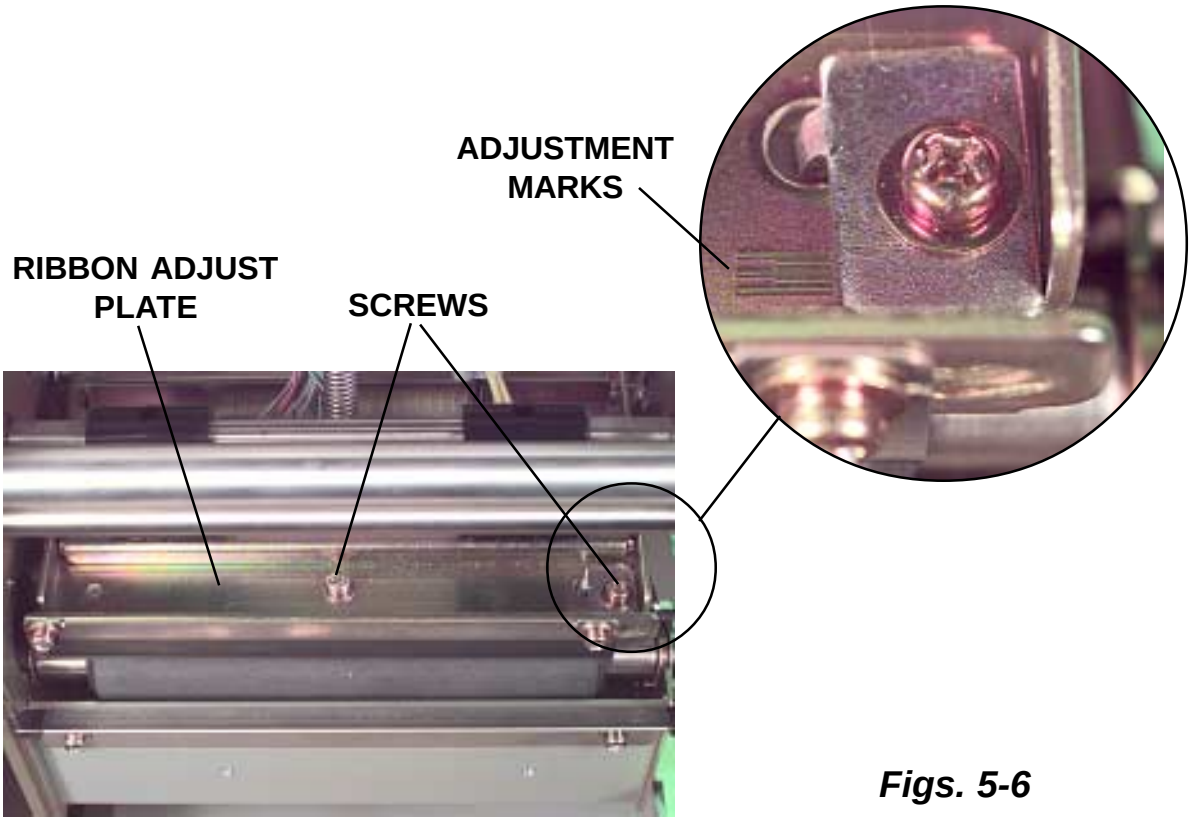
5.5 Print Head Position Alignment

MINOR ADJUSTMENT

Required Equipment:	• 10mm Open End Wrench • #2 Pozidrv Screwdriver

To adjust the print head alignment and make print quality consistent across label, perform the following steps:

STEP	PROCEDURE
1.	Loosen the center and right screw on the ribbon adjustment plate. Print a user test pattern (Section 8.9). Realign the right side of print head by prying adjust plate forward or backward with a flat blade screwdriver. Refer to illustrations and note adjustment marks. ***Figs. 5-6***
2.	Tighten the screws.



Figs. 5-6

5.6 Print Head Balance Adjustment

Required Equipment:	• 10mm Open End Wrench • #2 Pozidrv Screwdriver

To optimize print quality, perform the following steps to adjust the Print Head Balance using head pattern as a guide. Proper adjustment is necessary to avoid ribbon wrinkle.

STEP	PROCEDURE
1.	Load the ribbon and label stock into the printer.
2.	Hold eccentric nut along flats with 10mm box wrench and loosen holding screw. ***Fig. 5-7***
3.	Adjust eccentric nut by rotating CW or CCW. Rotating CW increases print density on left side of label. CCW decreases print density on the right side of label. Note indexing marks on plate. Allowable range is between 7-11 o'clock.
4.	Tighten screw to secure eccentric nut in place.
5.	Loosen and adjust screw along slot to move indexing pointer for maximum print quality.

Fig. 5-7

5.7 Print Head Alignment Adjustment

MAJOR ADJUSTMENT

Required Equipment:	• #2 Pozidrv Screwdriver

To further optimize print quality, especially when using thick label stock, additional adjustments are possible. Perform the following steps using head pattern as a guide.

STEP	PROCEDURE
1.	Load the ribbon and label stock into the printer.
2.	Loosen and adjust screw along slot to move indexing pointer for maximum print quality. ***Fig. 5-8***

Fig. 5-8

5.8 Timing Belt Tension Adjustment

Required Equipment:	• 1 Kg Tension Gauge • #2 Pozidrv Screwdriver

To adjust the Timing Belt Tension, perform the following steps:

STEP	PROCEDURE
1.	Press in the center of each timing belt with the tension gauge and note the tension reading when the belt is moved 1 to 2mm.
2.	If the tension reading of each belt is not within range of 80 - 120g, adjust the position of the pulley by loosening the (4) stepper motor mounting screws and moving motor to achieve the required range. After adjusting motor, tighten but do not over tighten screws. Belts should have some movement. ***Fig. 5-9***

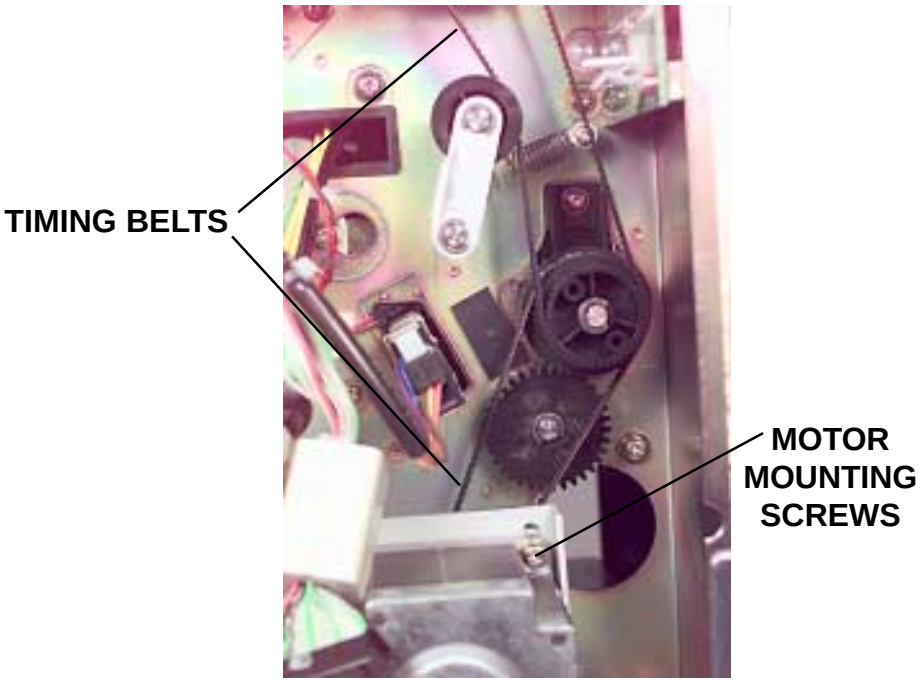


Fig. 5-9

Section 6

Replacement Procedures

6.1 Overview

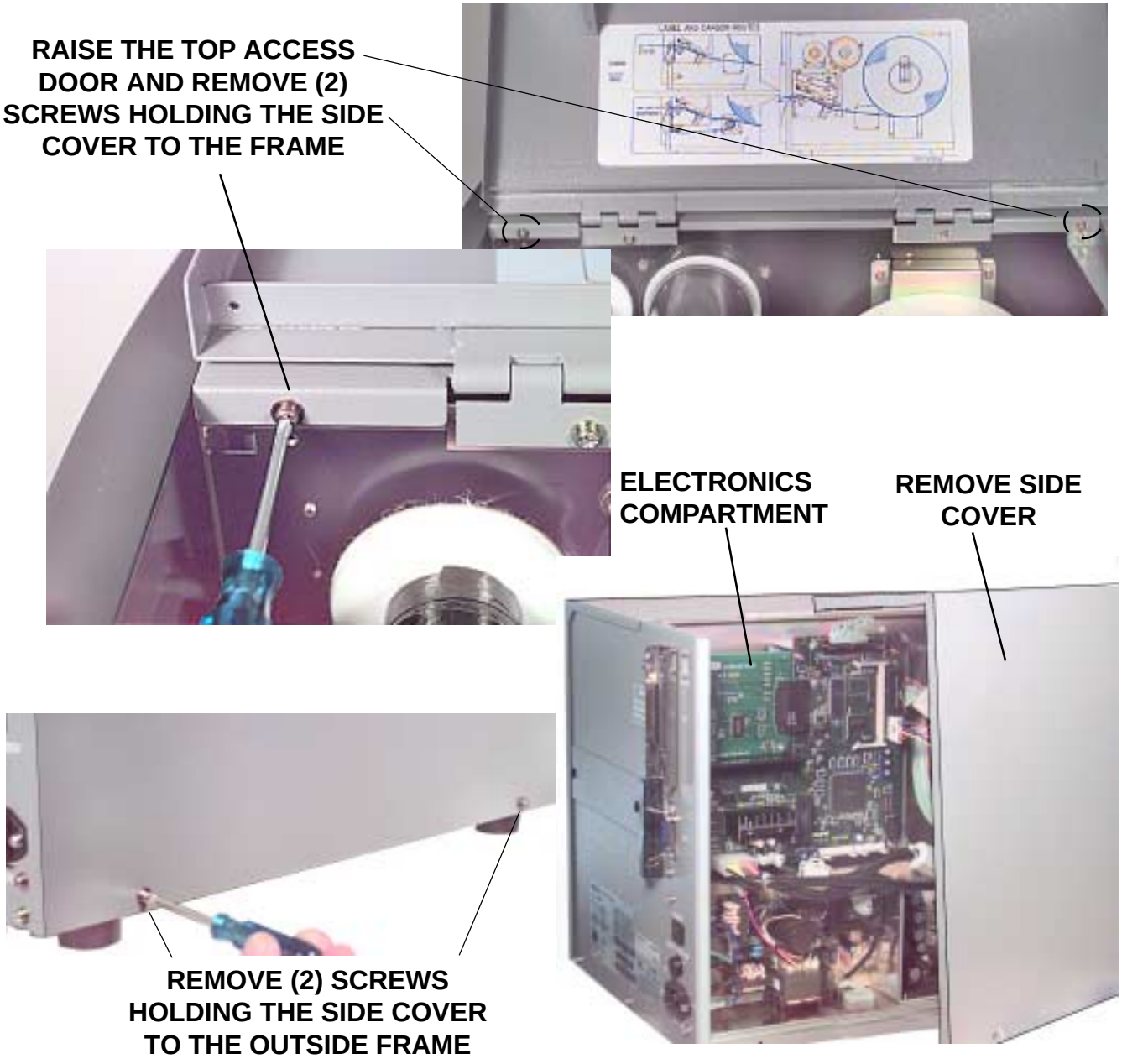
SATO CL408e/CL412e Printers contain replaceable components and sub-assemblies. This section contains step-by-step instructions for removing and replacing the following components and sub-assemblies.

- *Main Circuit Board*
- *Fuse(s)*
- *Power Supply*
- *Stepper Motor*
- *Timing Belts*
- *Print Head*
- *Platen*
- *Ribbon Drive Clutch Washers*
- *Ribbon Motion Sensor*
- *Label Sensor & Module*
- *Head Open Switch*
- *Display Panel*

6.2 Replacing the Main Circuit Board

The Main Circuit Board contains the control electronics for the printers and is located behind L.H. cover of the printer. The I/O PCB interface and optional memory card unit if installed, which are attached to the main circuit board must first be removed.

STEP	PROCEDURE
1.	Switch the printer OFF and disconnect the AC power cord.
2.	Raise the access door and remove (2) screws holding the electronics side cover to the inside frame. ***Figs. 6-1***
3.	Remove (2) screws holding the electronics side cover to the outside frame. Remove the cover to expose the electronics.



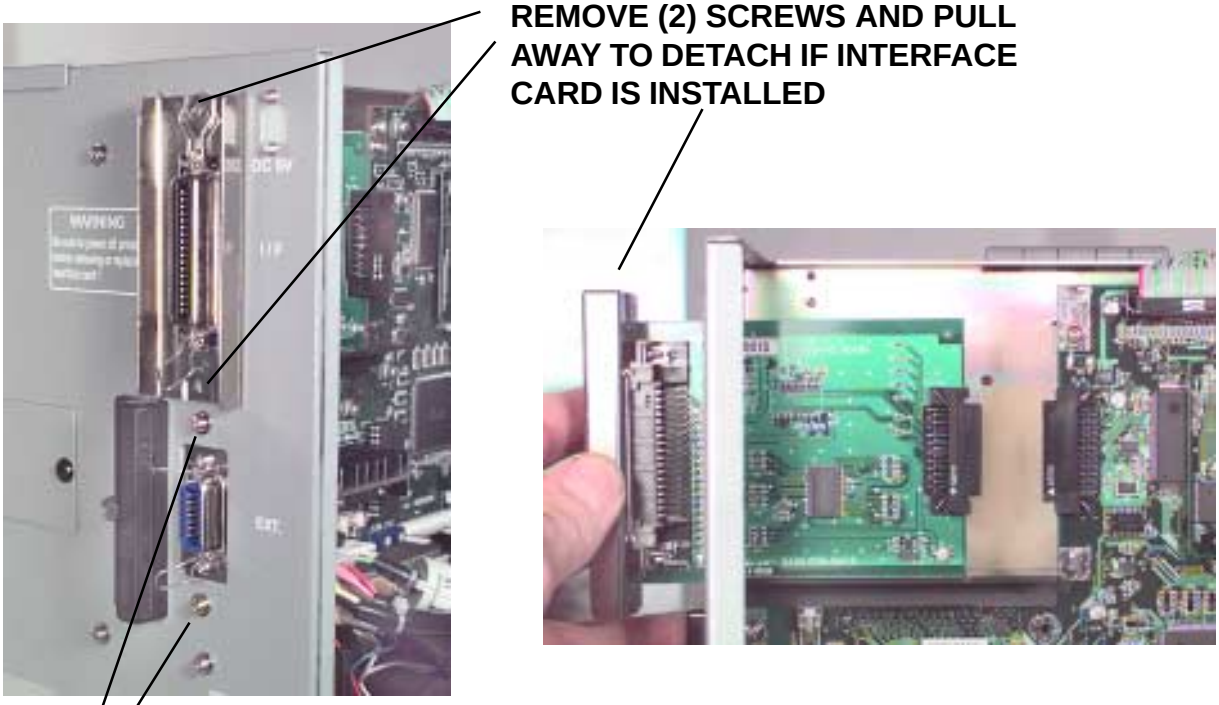
Figs. 6-1

Replacing the Main Circuit Board

NOTE: Many of the components on this board are susceptible to damage by static electricity. To avoid damage from static electricity, do not unpack new circuit boards from anti-static bags until instructed to do so and use a wrist grounding strap.

STEP	PROCEDURE
4.	If an interface card is installed remove (2) screws holding the card to the rear cover and pull away to detach the card from the PCB Board. ***Figs. 6-2***
5.	Remove (2) screws holding EXT Connector to cabinet. ***Figs. 6-2***
6.	Note cable connection locations, then disconnect all cables from the PCB Board. ***Fig. 6-3***
7.	Remove (3) screws holding the PCB Board to the frame. Remove the board from the printer. ***Fig. 6-4***
8.	Locate the Flash Memory Module on the Main PCB Board. ***Fig. 6-4*** Carefully press outward on the tabs on both ends of the Main PCB Board Memory Frame to release the Memory Module PCB. The module should lift by itself when released. Remove the module from the frame. Note the indexing notches. ***Figs. 6-5*** Set the Memory Module PCB aside for installing on the replacement Main PCB.
9.	Install the Memory Module on the replacement Main PCB. Note the indexing notches. Insert the module into the Main PCB Memory Frame at approximately 45^0 away from the Main PCB Board. Gently push down to snap into position. ***Figs. 6-6***
11.	Reinstall the replacement PCB reversing steps 1 through 7.
12.	Complete the Factory Reset Procedure.

Replacing the Main Circuit Board



Figs. 6-2

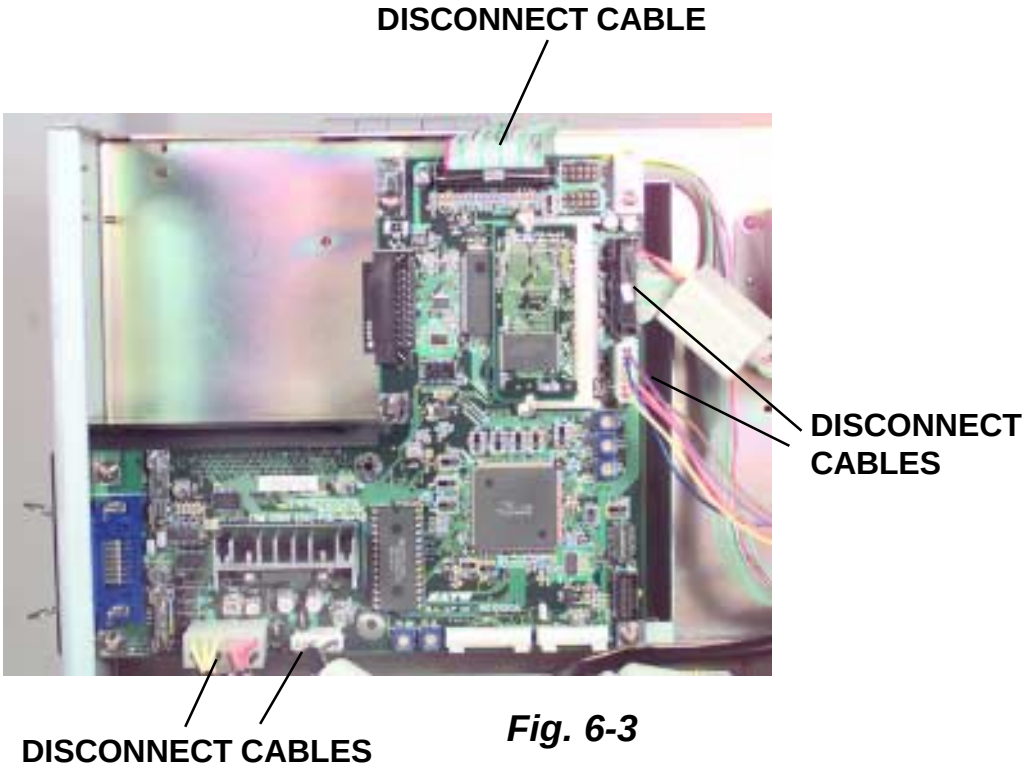
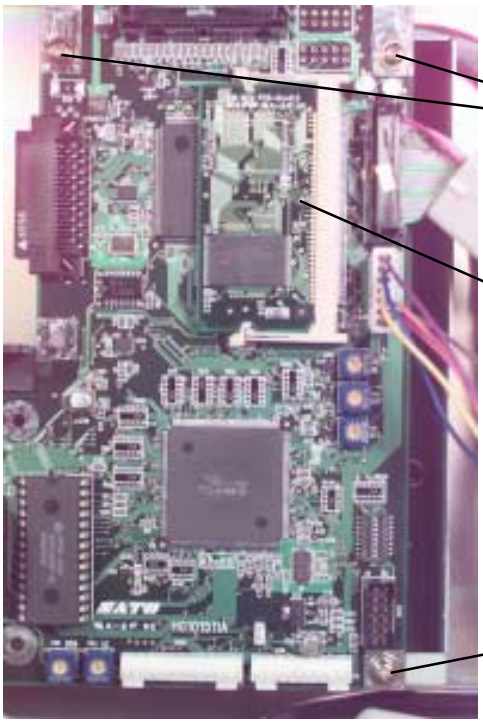


Fig. 6-3

Replacing the Main Circuit Board

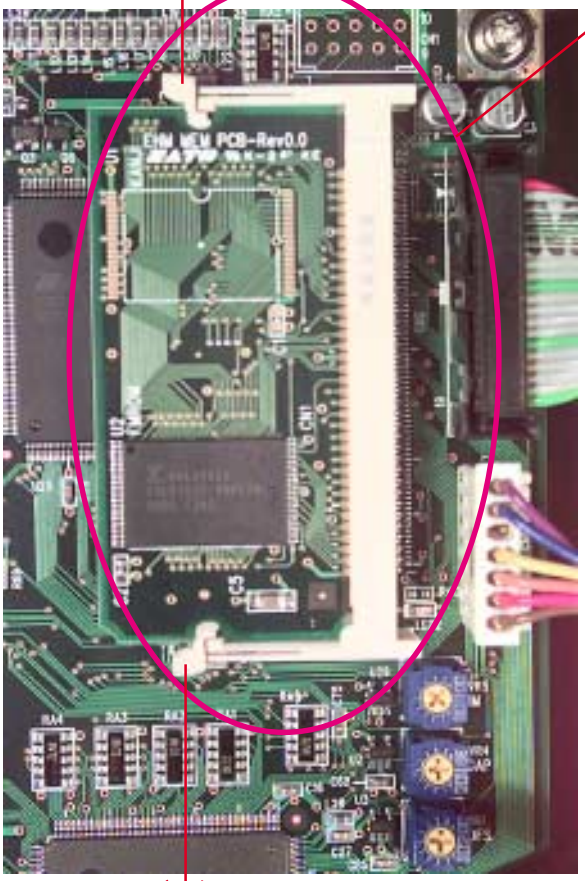


REMOVE (2) SCREWS

FLASH MEMORY MODULE

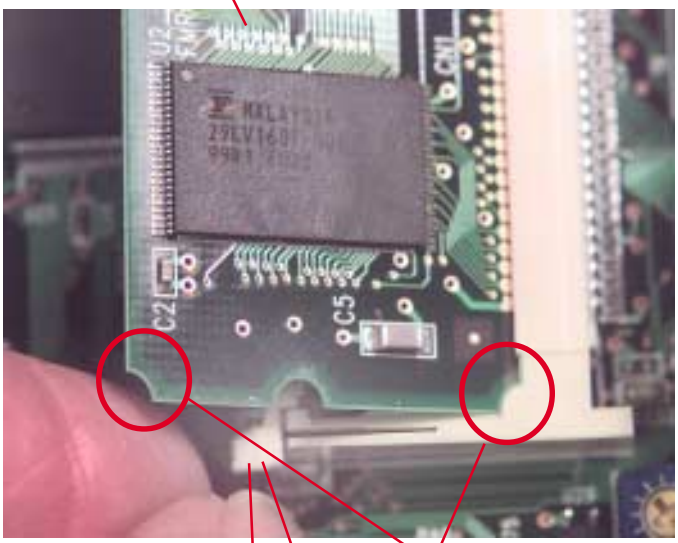
REMOVE SCREW

Fig. 6-4



* PRESS OUTWARD

MEMORY MODULE PCB IN THE MAIN PCB MEMORY FRAME



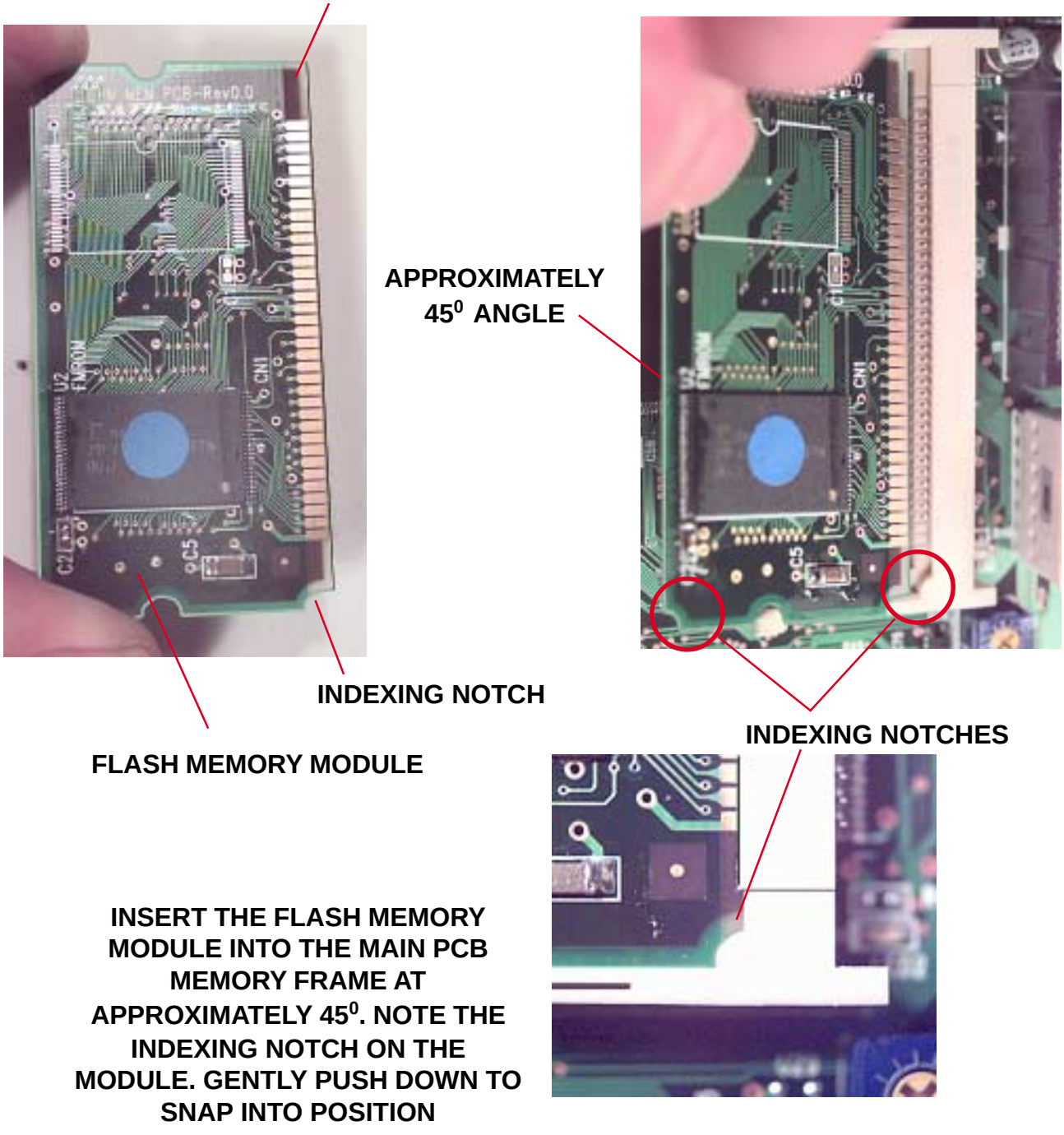
INDEXING NOTCHES

* PRESS OUTWARD

Figs. 6-5

* CAREFULLY PRESS OUTWARD ON TABS ON BOTH ENDS OF THE FRAME TO RELEASE THE MEMORY PCB.

Replacing the Main Circuit Board



Figs. 6-6

6.3 Replacing the Fuses

Fuse replacement is described in the following section.

- *6.3.1 Removing and Replacing the Main Power Fuse*
- *6.3.2 Removing and Replacing the Internal Fuse*

> NOTE: Before replacing a fuse, determine the cause of the overload condition.

6.3.1 Removing and Replacing the Main Power Fuse

> Required: F15A, 250V Fuse Fuse

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Locate the fuse cap on the back of the printer. Unscrew the cap and remove the defective fuse. ***Fig. 6-7***
3.	Replace the fuse with one of equal rating (15A, 250V). **Do not use a fuse with a higher rating.**
4.	Screw the fuse cap back and connect the power cable.

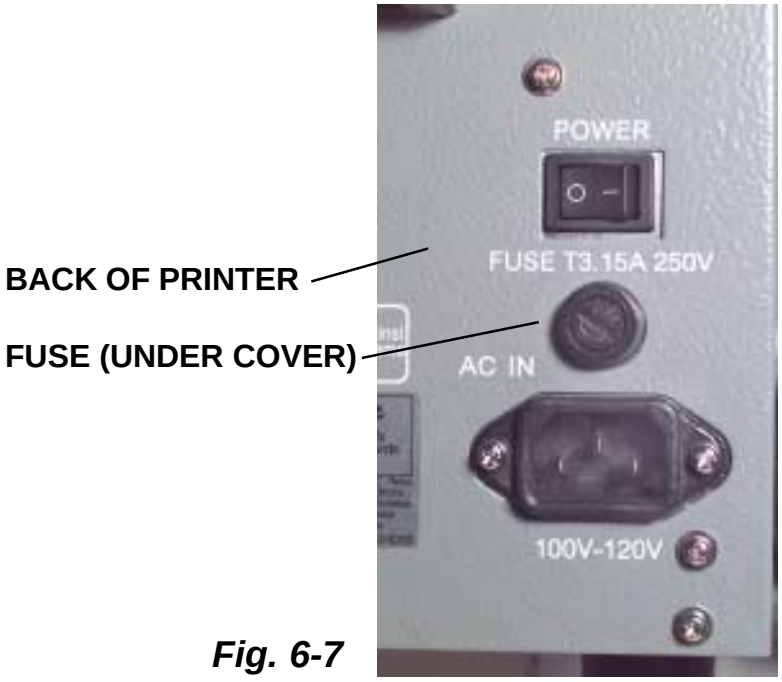


Fig. 6-7

Replacing the Fuses

6.3.2 Removing and Replacing the Internal Fuse(s)

Required:	T3.15A, 250V Fuse or T1 Amp 250V Fuse

To remove and replace these fuse(s) do the following:

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the access door and remove (2) screws holding the side cover to the inside frame. ***Figs. 6-1***
3.	Remove (2) screws holding the side cover to the outside frame. Remove the cover to expose the electronics.
4.	Refer to ***Fig. 6-8*** and locate the appropriate fuse on the PCB.
5.	Remove and replace the fuse(s) with one of equal rating. **Do not use a fuse with a higher rating.**
6.	Replace the cover and replace the screws.
7.	Return the printer to service by reconnecting the power cable.

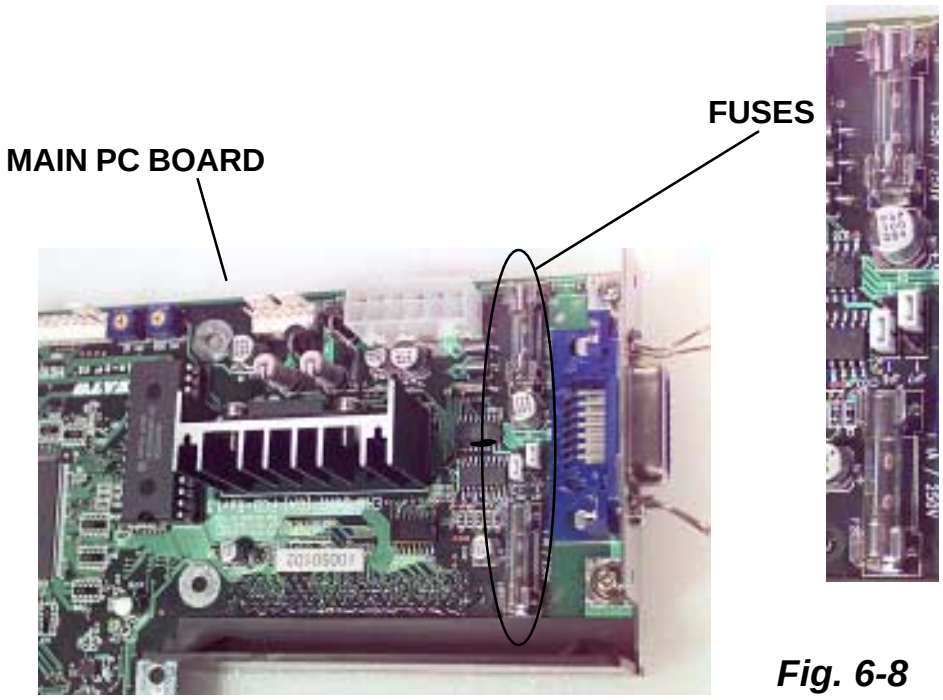


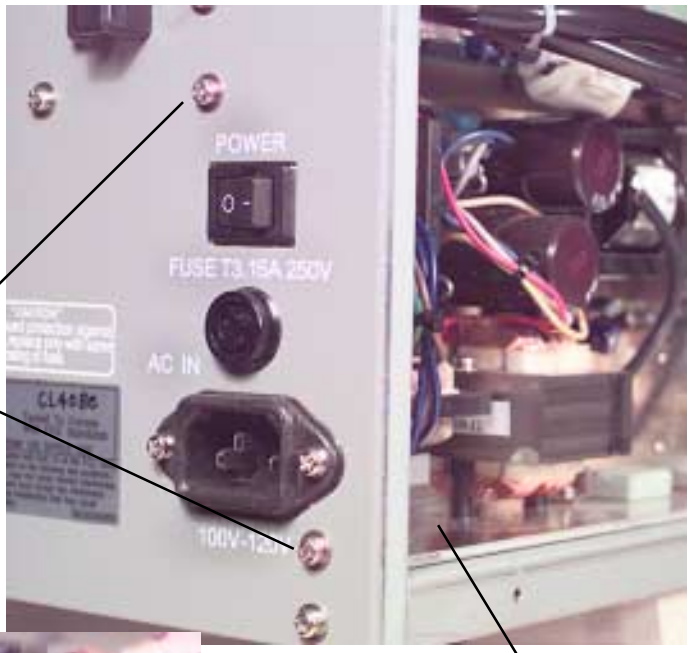
Fig. 6-8

6.4 Replacing the Power Supply

The Power Supply is a non-repairable component with no service parts and is replaced as a complete assembly.

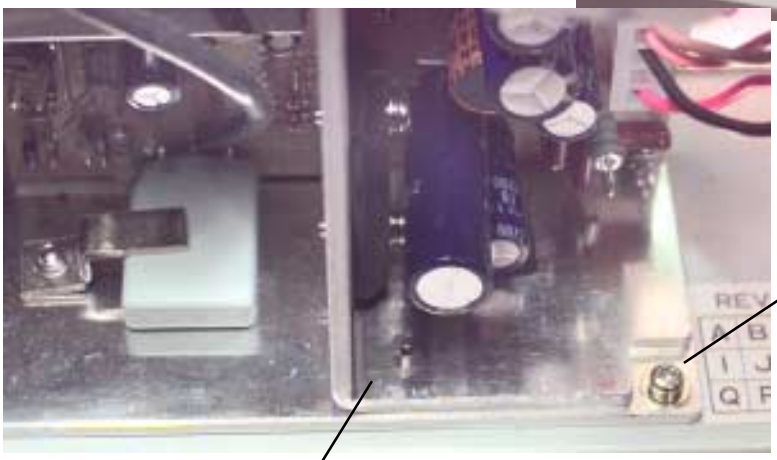
STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the access door and remove (2) screws holding the side cover to the inside frame. ***Figs. 6-1***
3.	Remove (2) screws holding the side cover to the outside frame. Remove the cover to expose the electronics.
4.	Remove (2) screws holding the power supply to the back of the cabinet and (1) screw from inside the cabinet. Detach the connections. ***Figs. 6-9***
5.	Remove and replace the defective power supply.
6.	Replace the cover and reconnect the power cable.
7.	Check the DC power voltages. Refer to Section 4.3.

Replacing the Power Supply



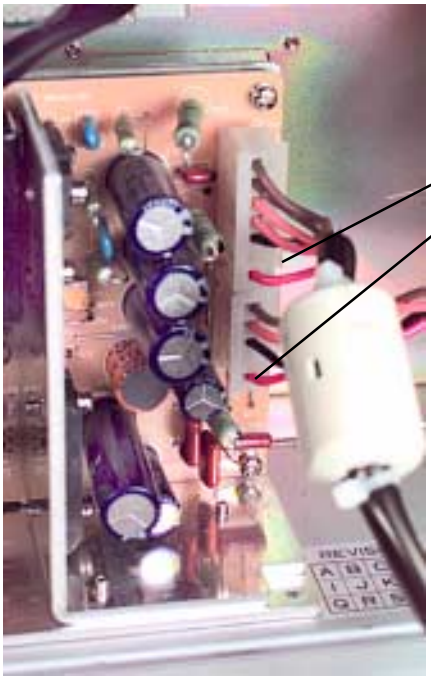
REMOVE (2) SCREWS

POWER SUPPLY



REMOVE SCREW

POWER SUPPLY



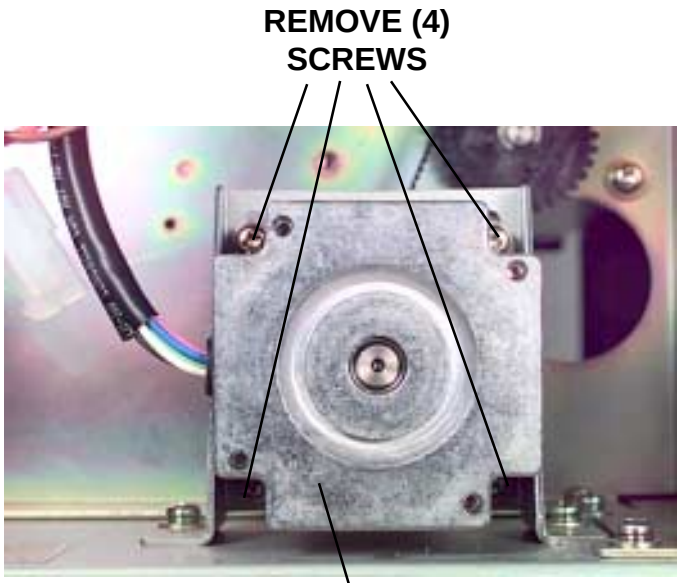
DETACH CONNECTORS

Figs. 6-9

6.5 Replacing the Stepper Motor

The stepper motor is used to transmit motion to the print mechanism for precise print positioning. The stepper motor transmits torque to the label feed roller, the platen roller, the ribbon feed roller and the ribbon rewind spindle via a series of toothed pulleys and timing belts.

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the access door and remove (2) screws holding the side cover to the inside frame. ***Figs. 6-1***
3.	Remove (2) screws holding the side cover to the outside frame. Remove the cover to expose the electronics.
4.	Detach the connector from the motor to the main PCB.
5.	Remove (4) mounting screws attaching the stepper motor to the motor bracket. Disengage the belt. ***Figs. 6-10***
6.	Remove and replace the stepper motor.
7.	Check belt tension and adjust as necessary per Section 5.8.
8.	Replace the cover and reconnect the power cable.



Figs. 6-10

6-6 Replacing the Timing Belts

Timing Belt "A" is used to transmit torque from the stepper motor to the platen pulley via a set of toothed pulleys.

Timing Belt "B" is used to transmit torque from the platen pulley to the ribbon roller via another set of toothed pulleys.

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the access door and remove (2) screws holding the side cover to the inside frame. ***Figs. 6-1***
3.	Remove (2) screws holding the side cover to the outside frame. Remove the cover to expose the electronics.
4.	Detach the connector from the main PCB to the display panel PCB. ***Fig. 6-11***
5.	Remove tension from Belt "B" by loosening (4) stepper motor mounting screws. Move the motor up in the bracket so belt slides from the motor shaft. Remove the belt. ***Fig. 6-12***
6.	Remove the center screw holding the shaft supporter to the ribbon frame (and connects to the ribbon rewind shaft)while using a wrench on the opposite end of the shaft (in the mechanical section) to prevent the shaft from slipping. Pull the shaft back towards the mechanical section just enough so that belt "A" slides off the end of the shaft. Remove the belt. ***Figs. 6-13***
7.	Replace the belts reversing steps 4-6.
8.	Check belt tension and adjust as necessary per Section 5.8.
9.	Replace the cover and reconnect the power cable.

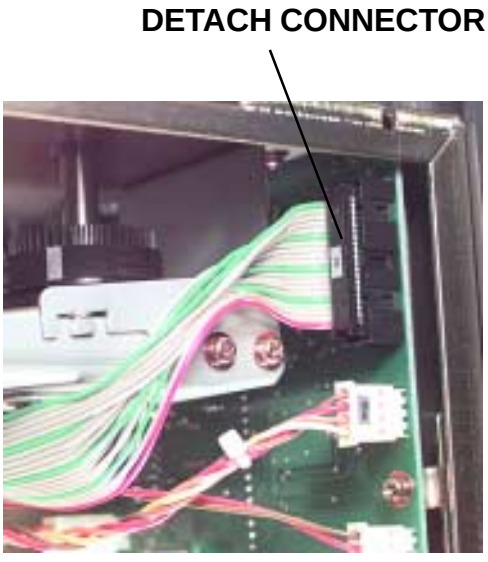


Fig. 6-11

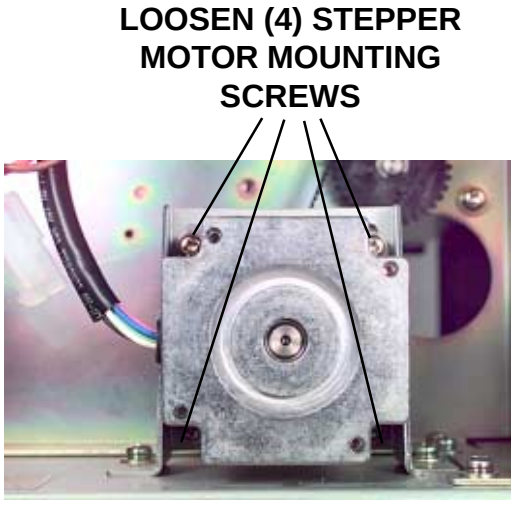


Fig. 6-12

Replacing the Timing Belts

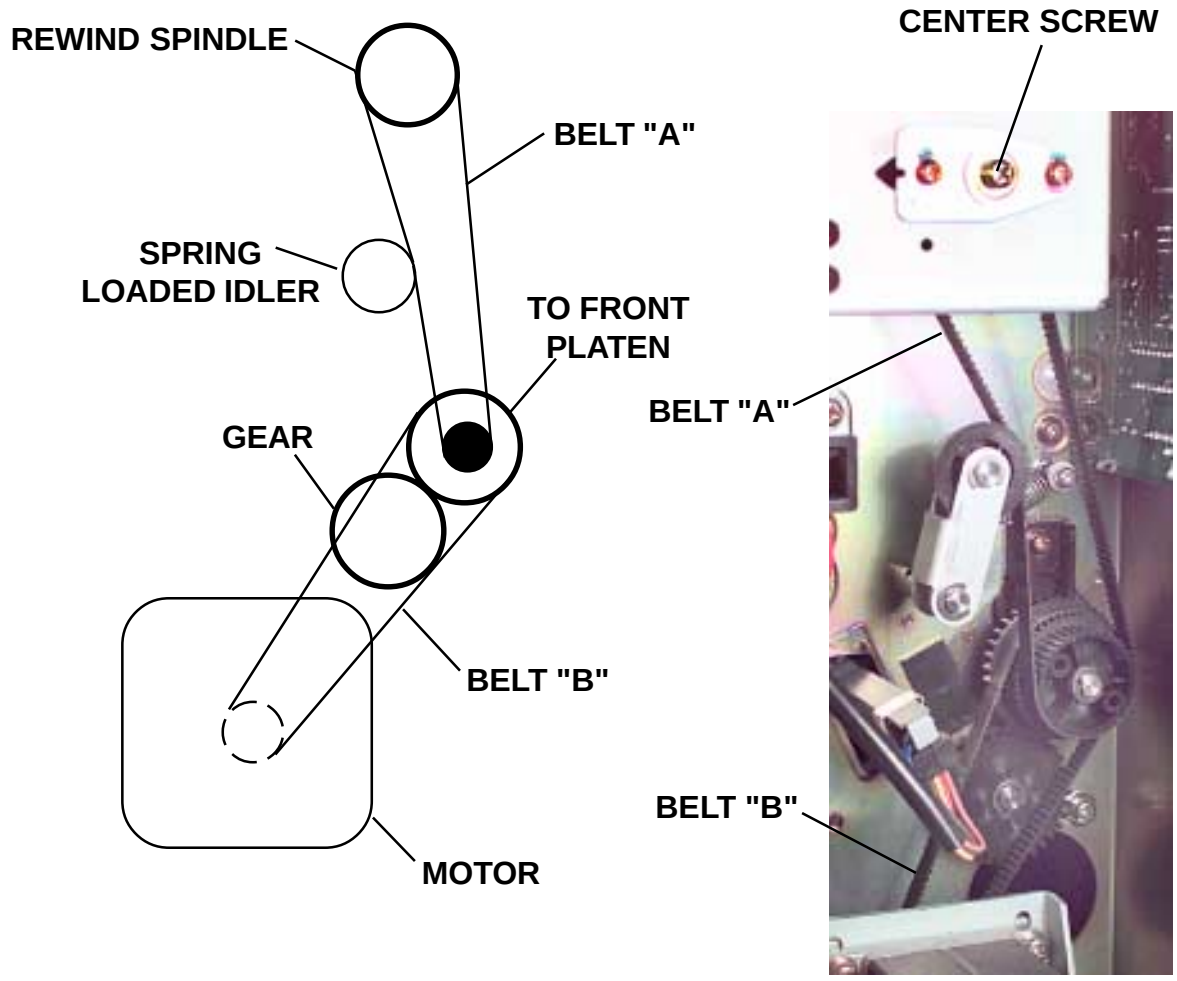


Fig. 6-13

6.7 Replacing the Print Head

If the print head becomes damaged, it can be easily removed and replaced. No critical adjustments are required. Before you replace the print head, check the head counter values by printing a test pattern (Refer to Section 2.4).

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the top access door and open the front access door. Remove the ribbon and label stock if installed. ***Fig. 6-14***
3.	Close the Head Latch Lever to facilitate removal of the Print Head. Remove (2) screws to detach the ribbon guide plate. ***Fig. 6-15***
4.	Remove center screw to detach print head. ***Fig. 6-16***
5.	Carefully open the head latch lever so that the print head will drop down. ***Fig. 6-17***
6.	Carefully disconnect the cables and remove the print head. ***Fig. 6-18***
7.	Install the print head by reconnecting the print head data cable and print head power cable to the print head. Position the print head so it aligns properly with the alignment pins and ribbon guide plate. Close the head latch lever and reinstall the center screw. ***Figs. 6-16 & 6-17***
8.	Reattach the ribbon guide plate. ***Fig. 6-15***

Before you return the printer to normal service, you should perform the following procedures.

- Clear Counter Heads (Refer to Section 7.3).
- Confirm that head cables are connected and that they do not touch the head opening spring. Also confirm that you can open and close the head without restriction.
- Print test pattern (Refer to Section 2.4).

Replacing the Print Head

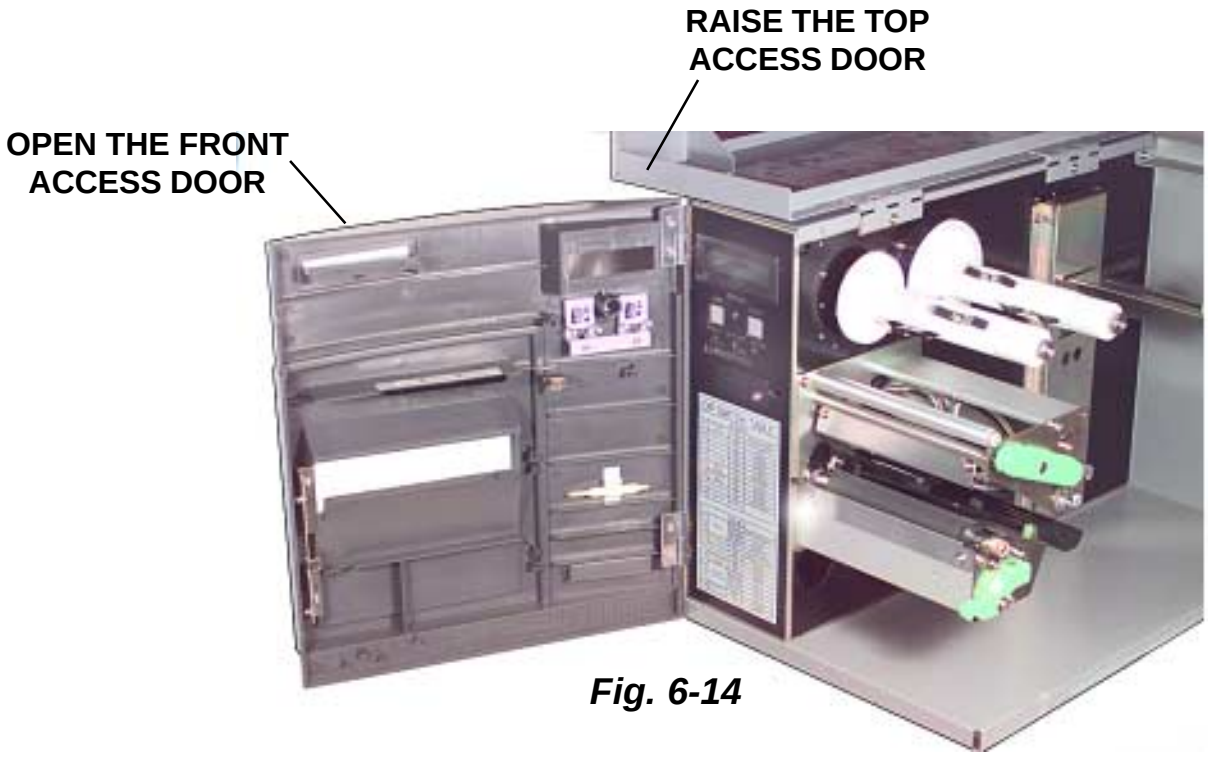


Fig. 6-14

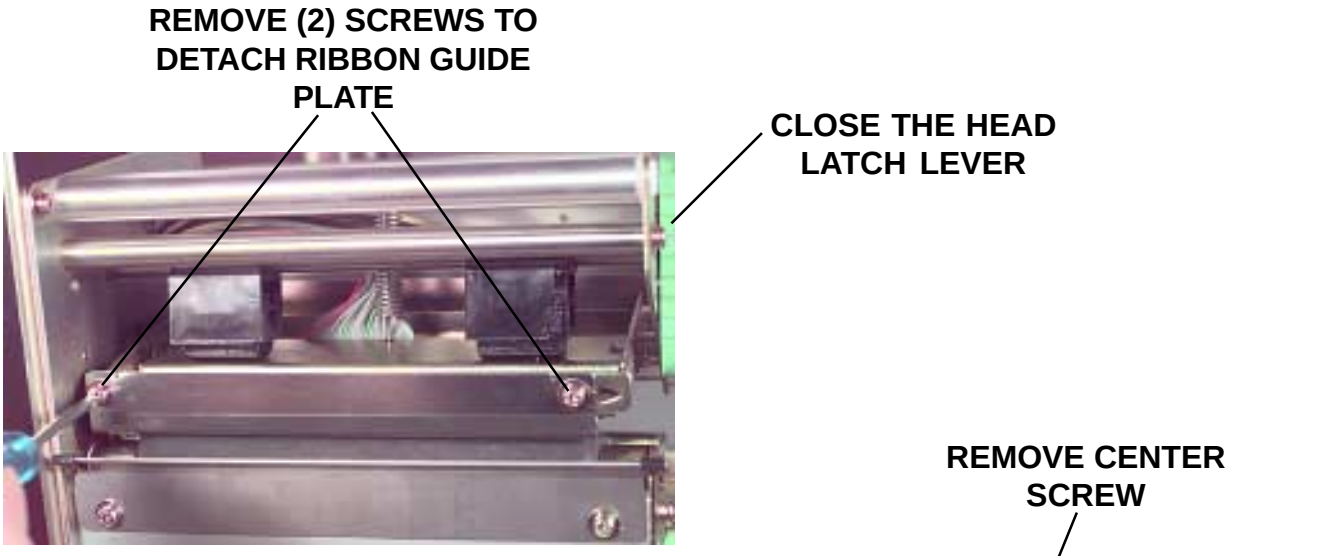


Fig. 6-15

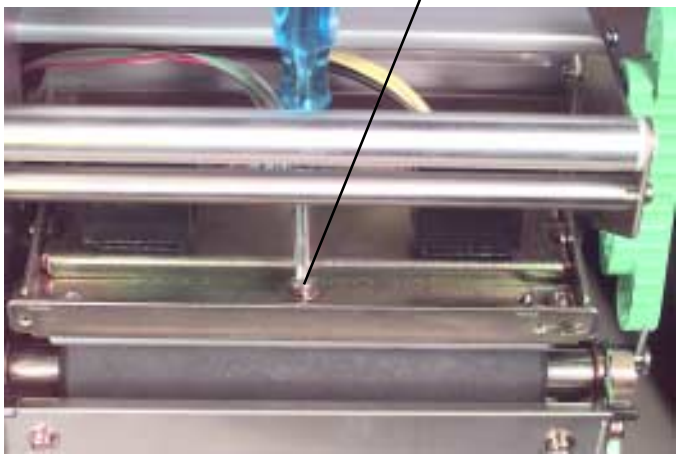


Fig. 6-16

Replacing the Print Head

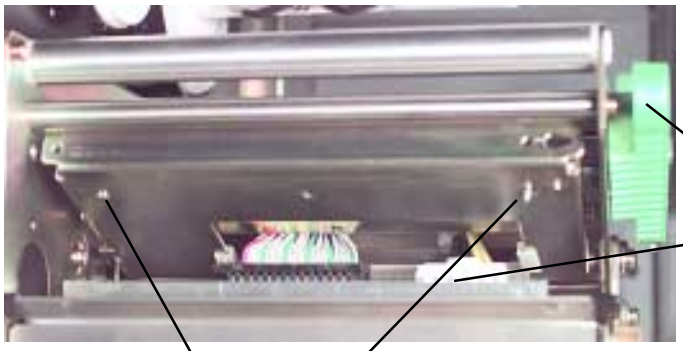


Fig. 6-17

Fig. 6-18

6.8 Replacing the Platen

Before removing and replacing the platen, timing belts A & B must first be removed from pulleys, but do not need to be fully removed from the carbon rewind shaft gear.

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the top access door and open the front access door. Remove the ribbon and label stock if installed. ***Fig. 6-14***
3.	Remove tension from Belt "B" by loosening (4) stepper motor mounting screws. Move the motor up in the bracket so belt slides from the motor shaft. Remove the belt. ***Fig. 6-19***
4.	Remove the E-Ring from the end of the platen shaft and remove the gears from the shaft. ***Fig. 6-20***
5.	Remove the screw holding the clamp and platen components to the side frame. ***Fig. 6-21***
6.	Tilt the platen up and pull away from the frame. Separate the platen and planten components for replacing.
7.	Install the bushing to the new platen. ***Fig. 6-21***
8.	Insert the platen through the frame. Guide the flats on the bushing into the cutout on the side frame. ***Fig. 6-21***
9.	Attach the clamp to the side frame with the screw.
10.	Reassemble the gears to the platen and replace the E-ring. ***Figs. 6-20 — 6-22***
11.	Reattach the belts.
12.	Check belt tension and adjust as necessary per Section 5.8.
13.	Replace the cover and reconnect the power cable.

Replacing the Platen

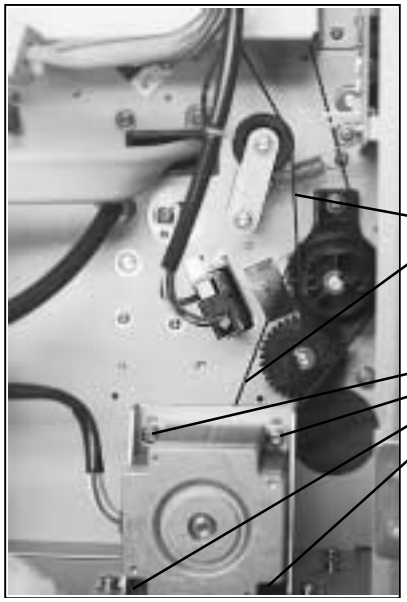


Fig. 6-19

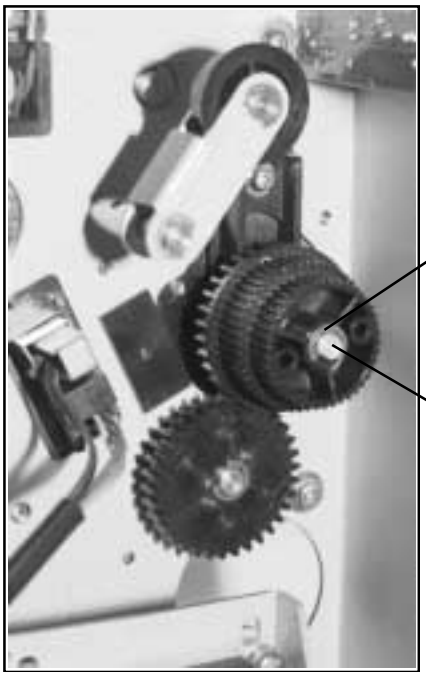


Fig. 6-20

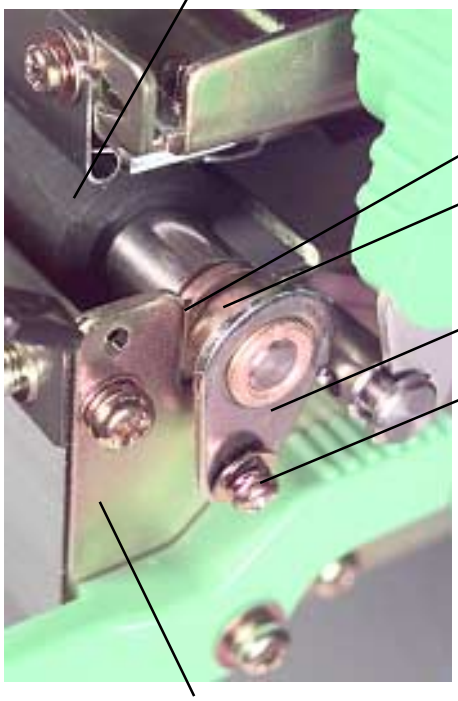


Fig. 6-21

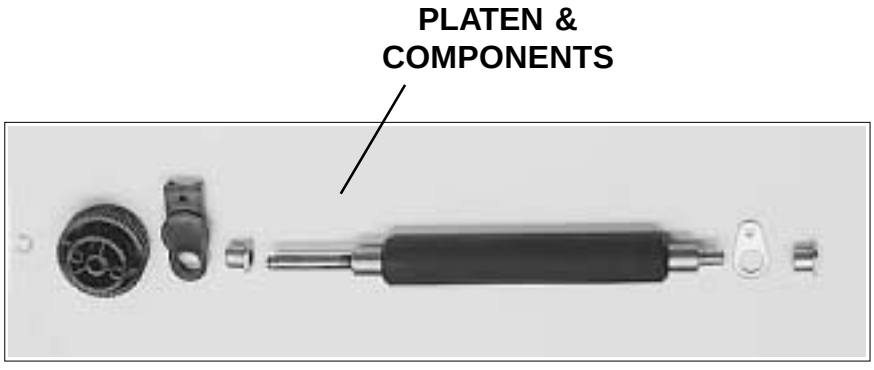


Fig. 6-22

6.9 Replacing the Ribbon Drive Clutch Washers

Both the ribbon unwind and the rewind drive spindles incorporate a friction clutch assembly to control tension. The friction washers within these clutch assemblies are replaceable. The procedure is identical for both the rewind and the unwind clutch assemblies.

DISASSEMBLE:

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the top access door and open the front access door. Remove the ribbon and label stock if installed. ***Fig. 6-23***
3.	Remove the following parts from the two spindle shafts (in order). ***List 6A and Figs. 6-24*** NOTE: Disassemble one spindle at a time so that the other can be used for reference.

ITEM NO.	DESCRIPTION	QTY EACH ASSY
1	Locking Screw	1
2	Adjustment Nut	1
3	Stopper Collar	1
4	Spring	1
5	Disc	1
6	Oil-less Dry Metal Washer	1
7	Collar	2
8	Ribbon Boss	1
9A & 9B	Disc Plate (Different for 9A & 9B)	1
10	Friction Washer	1
11	Hold Plate	1

List 6A

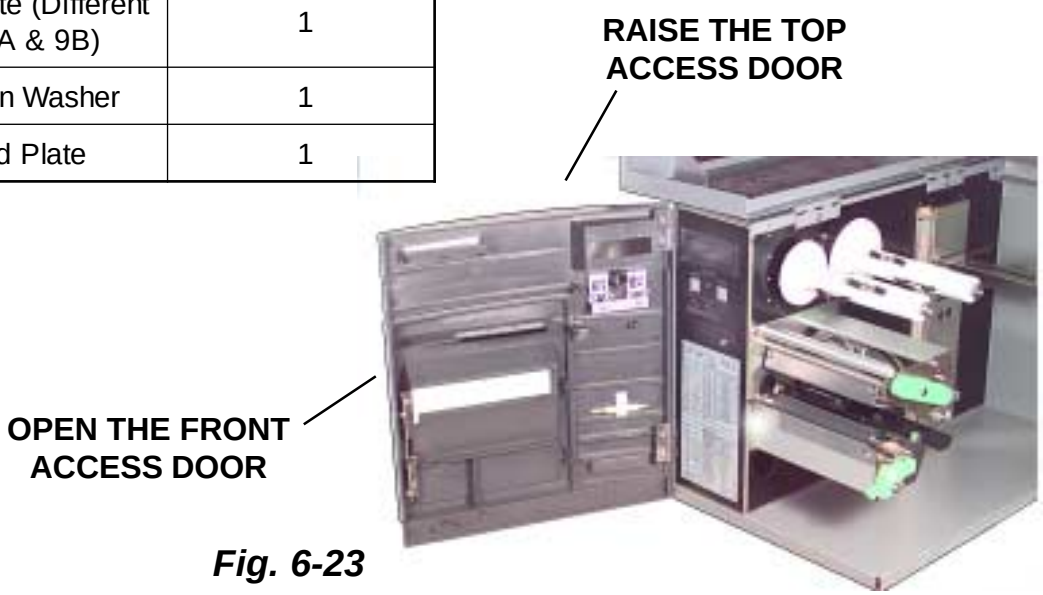
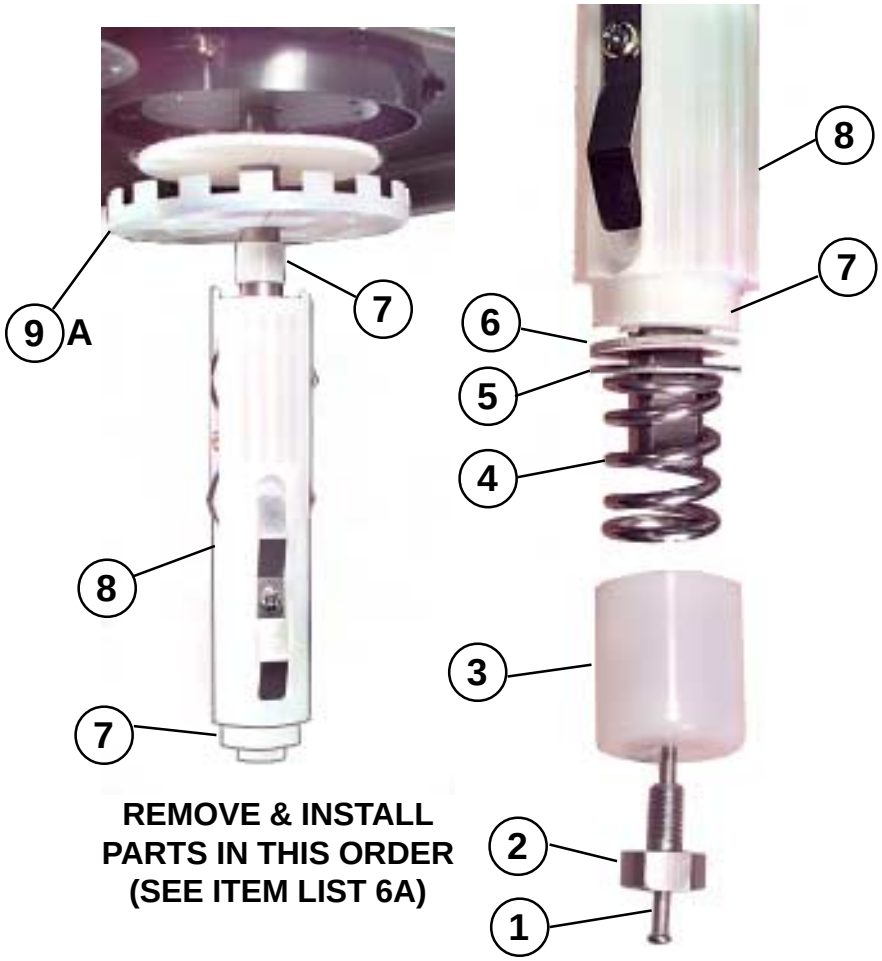


Fig. 6-23

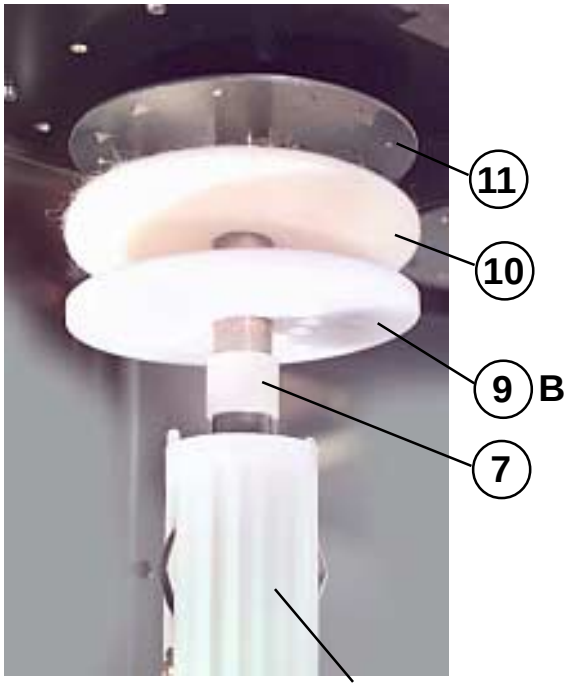
Replacing the Ribbon Drive Clutch Washers

USE 12mm OPEN END WRENCH AND PHILLIPS SCREW DRIVER TO REMOVE LOCKING SCREW AND ADJUSTMENT NUT

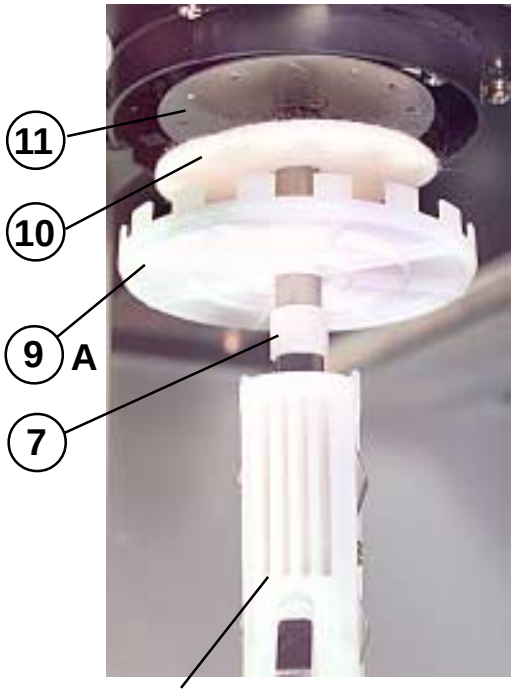


REMOVE & INSTALL PARTS IN THIS ORDER (SEE ITEM LIST 6A)

Figs. 6-24



REWIND SPINDLE



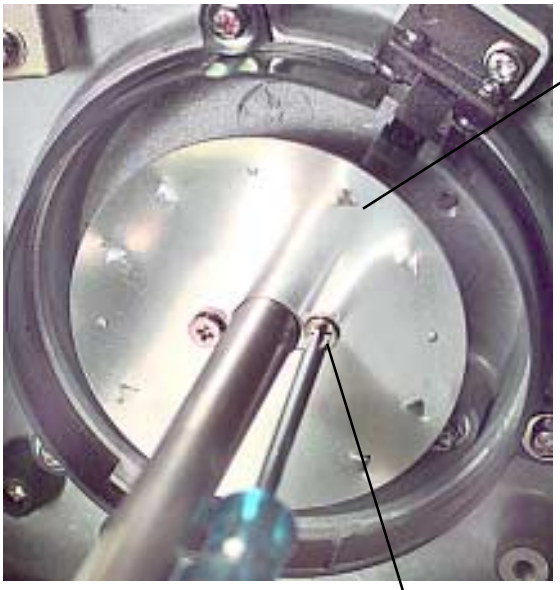
UNWIND SPINDLE

Replacing the Ribbon Drive Clutch Washers

ASSEMBLE

STEP	PROCEDURE
1.	For each spindle, position and fasten Item 11 Plate, with teeth facing outward with (2) screws. Except for Item 9, all items are the same for the ribbon unwind and ribbon rewind assemblies, ***List 6-A and Figs. 6-24***
2.	Install Item 10 Felt Friction Washer onto the Ribbon Shaft and slide it against Item 11 Plate. The jagged teeth on Item 11 Plate will "dig into" the felt washers. Slide (1) Item 9a or 9b Wind or Unwind Disc Plates onto each Ribbon Shaft. The teeth/slots on the unwind disc plate must be face towards felt washer. ***Fig. 6-25 & 6-26***
3.	Slide (2) Item 7 Collars onto the Ribbon Shaft and against Item 9a or 9b Wind or Unwind Disc Plates. **NOTE:** The collars may still be inside the ribbon boss. ***List 6-A & Figs. 6-24***
4.	Slide Item 8 Ribbon Bosses onto the Ribbon Shaft. Align the pegs on Item 8 with the location holes on the Item 9a/9b disc plates. Slide the 2nd Item 7 Collar onto the shaft and into Item 8 Ribbon Boss. ***List 6-A, Figs. 6-24 & Fig. 6-27***
5.	Install Item 6 Oil-less Dry Metal Washer onto the ribbon shaft with the frictionless coated side facing outward away from Item 8. Align the hole on Item 6 Washer with the peg on Item 8 Ribbon Boss. ***List 6-A, Figs. 6-24 & Fig. 6-28***
6.	Install Item 5 Disc onto the ribbon shaft with the smooth side facing Item 6 Washer, (one side of the disc is smooth and the other side has rough edges). ***List 6-A & Figs. 6-24***
7.	Place Item 4 Spring next on the shaft, then Item 3 Stopper Collar. ***List 6-A & Figs. 6-24***
8.	Screw Item 2 Adjustment Nut clockwise into the end of the ribbon shaft until it just touches the stopper collar. ***Figs. 6-24*** **NOTE:** Do not over-tighten the adjustment nut since this screw is used to adjust the clutch tension. Adjust the clutch tension as outlined in Section 5.2.
9.	Install Locking screw. Hold Adjust nut with 12mm wrench while tightening screw to avoid changing clutch adjustment.
10.	Reconnect the power cable.

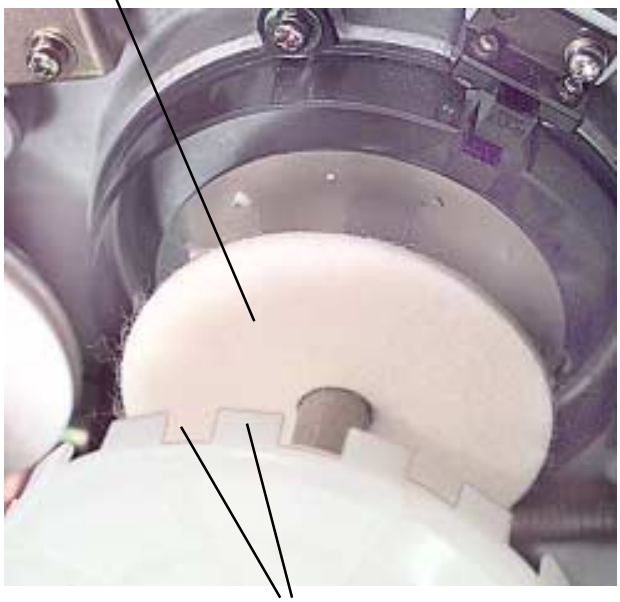
Replacing the Ribbon Drive Clutch Washers



ITEM 11 TEETH FACING OUTWARD TO ENGAGE ITEM 10 FELT WASHER

FASTEN ITEM 11 WITH (2) SCREWS

Fig. 6-25

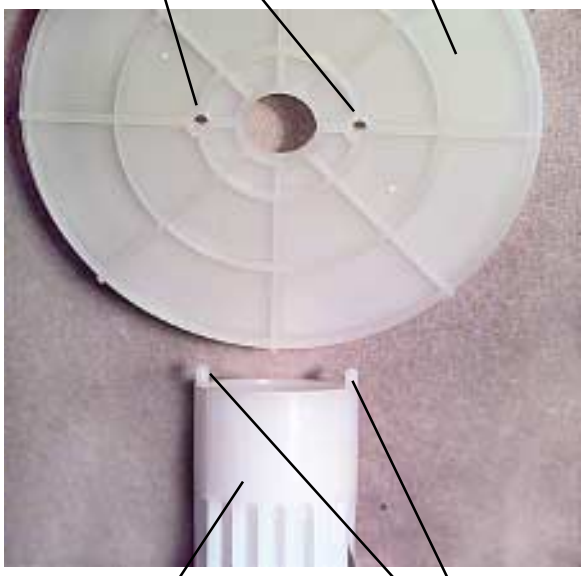


TEETH/SLOTS ON ITEM 9a DISC PLATE FACING TOWARDS FELT WASHER

Fig. 6-26

LOCATION HOLES

ITEM 9A/9B DISK PLATE



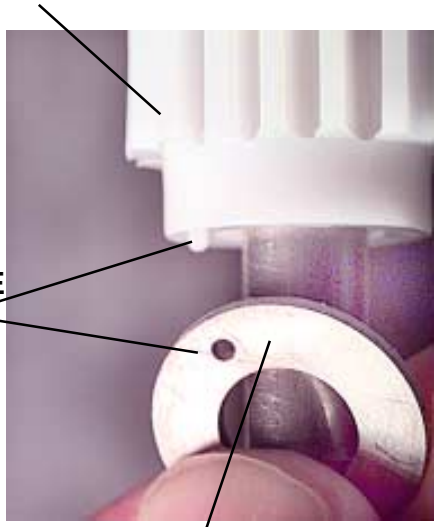
ITEM 8 RIBBON BOSS

INSERT PEGS INTO LOCATION HOLES

Fig. 6-27

ITEM 8 RIBBON BOSS

ALIGN HOLE WITH PEG



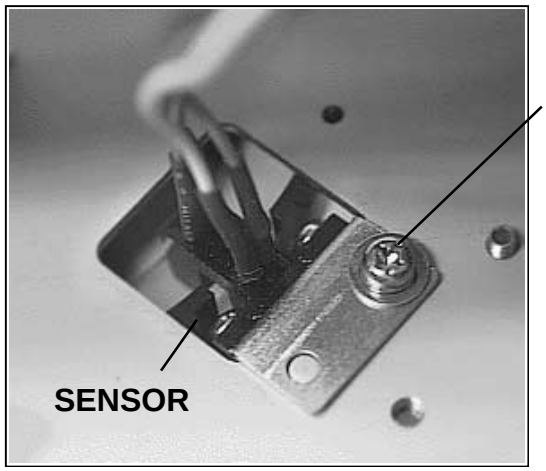
ITEM 6 OIL-LESS WASHER

Fig. 6-28

6.10 Replacing the Ribbon Motion Sensor

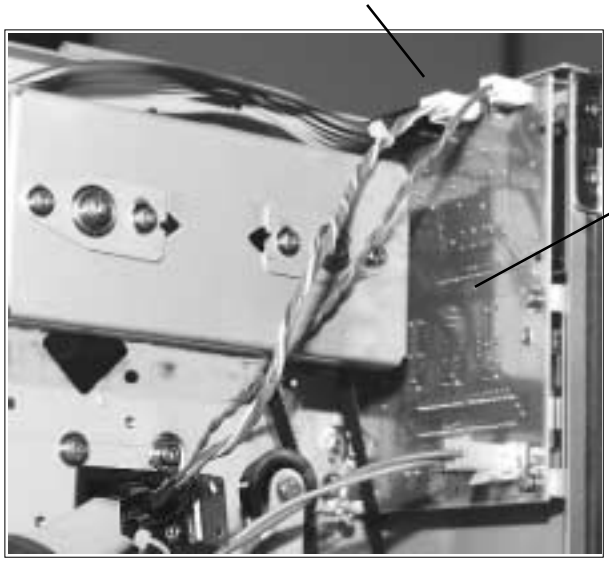
The Ribbon Motion Sensor is easily replaced for service.

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the access door and remove (2) screws holding the side cover to the inside frame. ***Figs. 6-1***
3.	Remove (2) screws holding the side cover to the outside frame. Remove the cover to expose the electronics.
4.	Remove (1) screw which attaches the sensor to the frame. ***Figs. 6-29***
5.	Detach the SEN4 connector from the display panel PCB.
6.	Remove the sensor unit from the printer.
7.	Replace the sensor.
8.	Reconnect the power cable.



LEFT SIDE OF PRINTER

RIGHT SIDE OF PRINTER

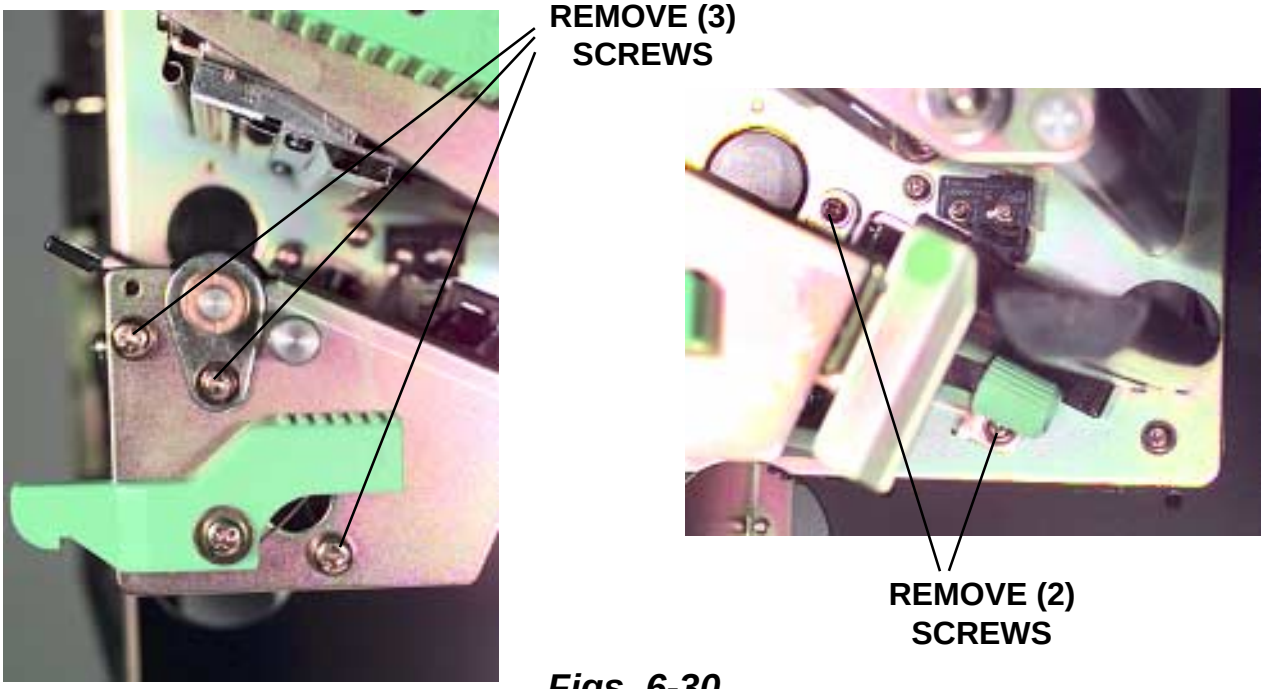


Figs. 6-29

6.11 Replacing the Label Sensor

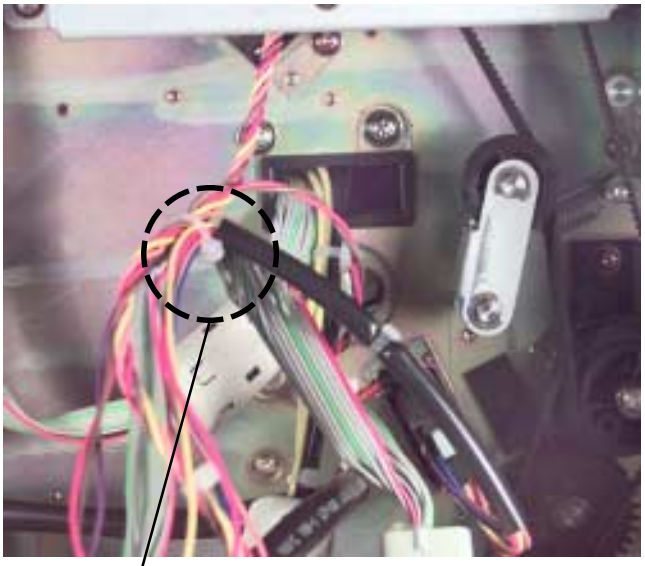
The Label Sensor can be removed from the printer to clear label fragments and for service. No critial alignment is required when replacing the sensor.

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the access door and remove (2) screws holding the side cover to the inside frame. ***Figs. 6-1***
3.	Remove (2) screws holding the side cover to the outside frame. Remove the cover to expose the electronics.
4.	Remove (3) screws in front which goes into the side frame and (2) screws in back which attaches the sensor to the center frame. ***Figs. 6-30***
5.	Cut the tie wrap that secures the SEN1 cable assembly and detach the cable connector from the main PCB. ***Fig. 6-31***
6.	Remove the sensor unit by guiding the cable through the hole in the center frame. ***Fig. 6-32***
7.	Install new sensor unit reversing steps 4-6.
	If the Sensor Module needs replacing see Section 6.12.
8.	Reconnect the power cable.



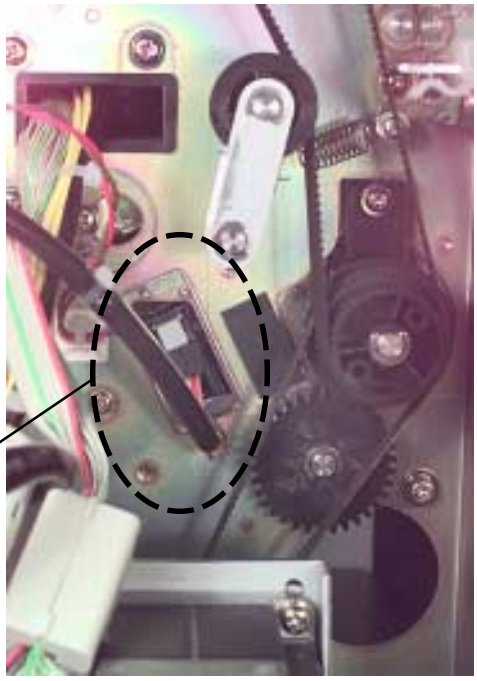
Figs. 6-30

Replacing the Label Sensor



CUT TIE WRAP

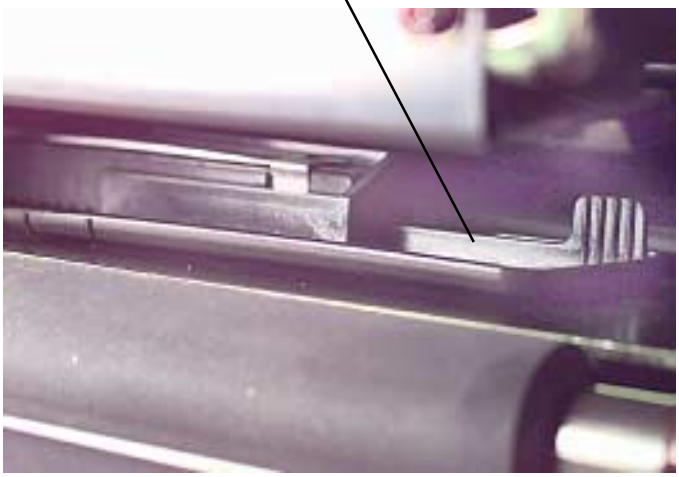
Fig. 6-31



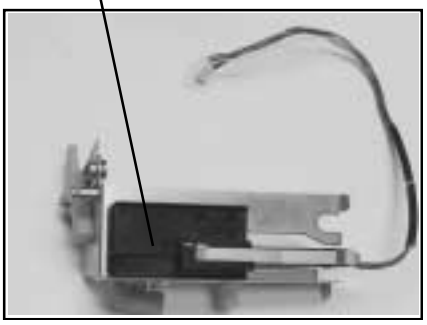
SLIDE CABLE THROUGH HOLE IN CENTER FRAME

Fig. 6-32

LABEL SENSOR WITH PAPER GUIDE SHOWN INSTALLED IN PRINTER



PAPER GUIDE

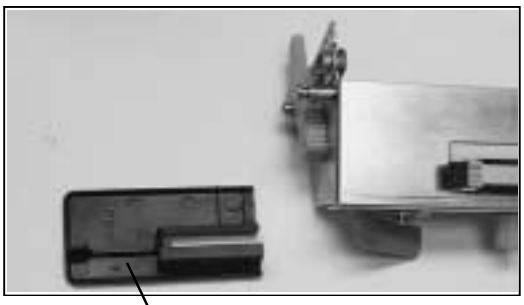


LABEL SENSOR ASSEMBLY

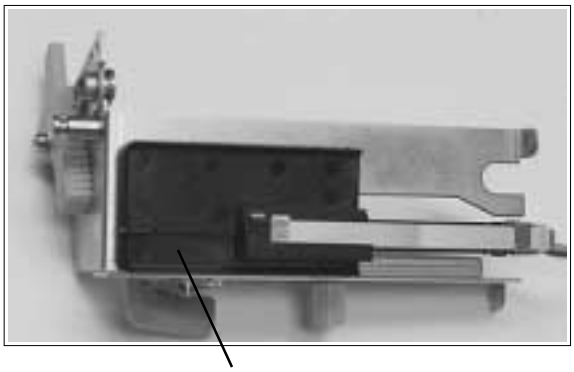
6.12 Replacing the Label Sensor Module

After removing the Label Sensor Assembly from the printer, if the sensor module needs to be replaced, do the following:

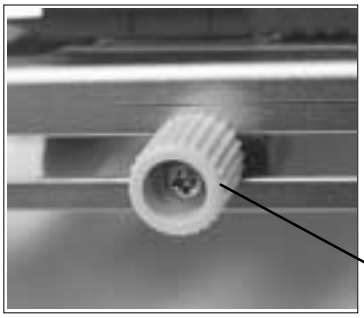
STEP	PROCEDURE
1.	Detach the paper guide from the side frame. ***Figs. 6-33***
2.	Remove the center screw holding the collar, spring, and washer to the sensor mechanism.
3.	Remove and replace the defective sensor module.
4.	Reattach the label sensor assembly using steps in Section 6.11.



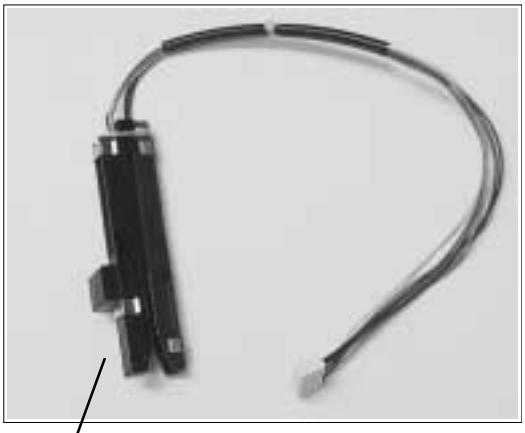
PAPER GUIDE



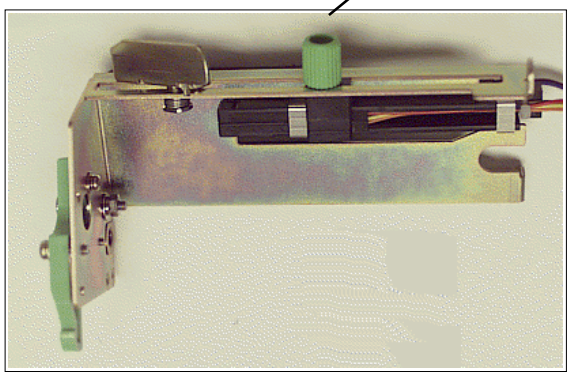
PAPER GUIDE INSTALLED



COLLAR, SPRING AND WASHER



SENSOR MODULE

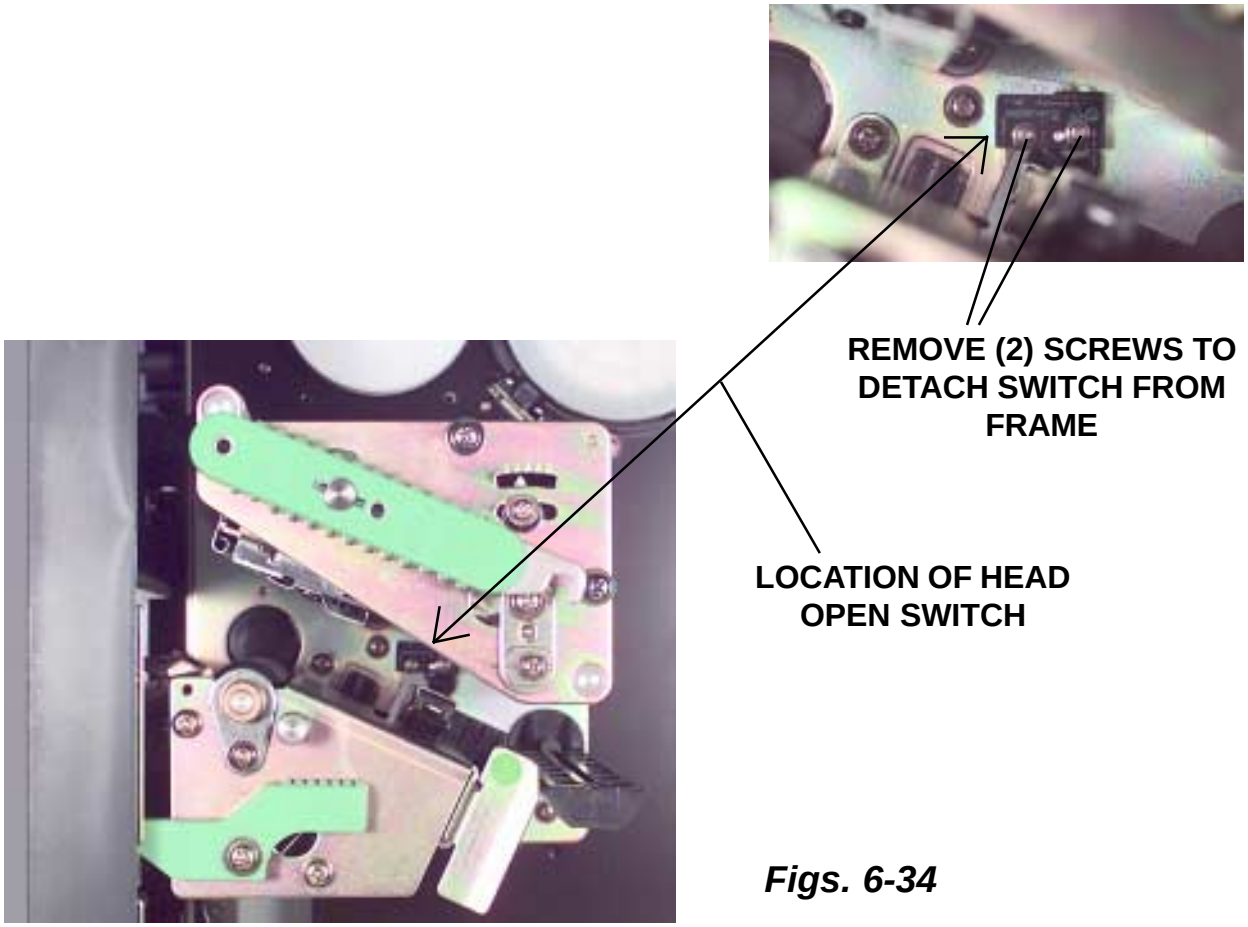


Figs. 6-33

6.13 Replacing the Head Open Switch

The Head Open Switch is easily replaced for service.

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the access door and remove (2) screws holding the side cover to the inside frame. ***Figs. 6-1***
3.	Remove (2) screws holding the side cover to the outside frame. Remove the cover to expose the electronics.
4.	Remove (2) screw which attaches the Head Open Switch to the frame. ***Figs. 6-34***
5.	Detach the connector from the display panel PCB.
6.	Remove the swich unit from the printer.
7.	Replace the switch.
8.	Reconnect the power cable.



Figs. 6-34

6.14 Replacing the Display Panel PCB

The Display Panel PCB is mounted inside the printer.

STEP	PROCEDURE
1.	Switch the printer **OFF** and disconnect the power cable.
2.	Raise the access door and remove (2) screws holding the side cover to the inside frame. ***Figs. 6-1***
3.	Remove (2) screws holding the side cover to the outside frame. Remove the cover to expose the electronics.
4.	Note cable connection locations, then detach the connectors from the display panel PCB. ***Fig. 6-35***
5.	Remove (3) screws and detach the display panel.
6.	Replace the display panel and reattach connectors.
7.	Reconnect the power cable.

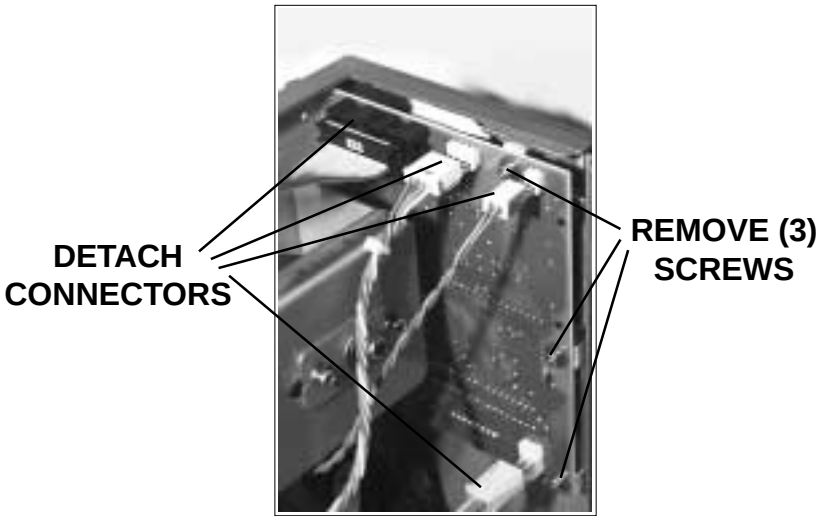


Fig. 6-35

Section 7

Factory Resets

7.1 Overview

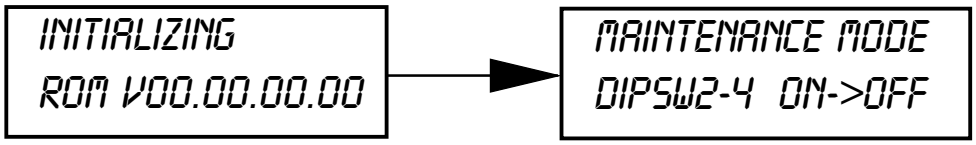
The Factory Reset Mode allows you to:

- *Factory Settings/Test Print*
- *Clear Head Counters*
- *Clear Dispenser Counter*
- *Clear Cutter Counter*
- *Clear EEPROM*

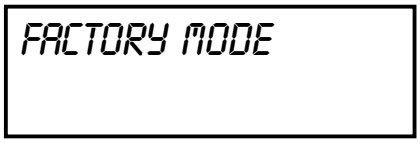
7.2 Factory Settings/Test Print

To reset the printer to the factory settings, perform the following steps.
Caution: Resetting the printer will clear all registers.

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position.
2.	Place the **DSW2-4** in the **ON** or up postion.
3.	Press the **LINE and FEED** key while simultaneously turning **ON** the power switch. When the printer beeps, release the keys. The following screens will appear.



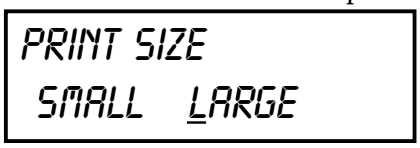
4.	Place the DSW-4 in the OFF postion and the following screen will appear.



5.	Press the **FEED** key to display the next screen.

6.	Press the **LINE** key once to change the message from **NONE** to **ALL**.

7.	Press the **FEED** key to clear the EEPROM. After a pause, the next screen will appear.



8.	Select the print label size by pressing the **LINE** key. The default is LARGE.
9.	Press the **FEED** key for a test print. Press the **FEED** key again to stop printing.

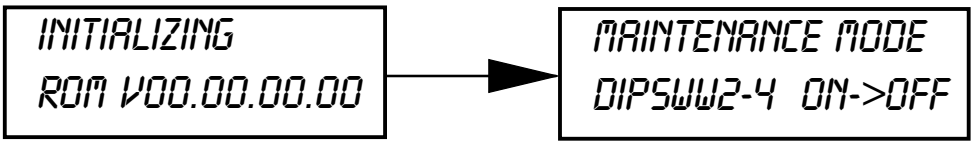
Warning: This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.

10.	Verify that the counters on the test print have reset to 0.0 km.
11.	Power OFF the printer and confirm that all switches are in the OFF or down position.

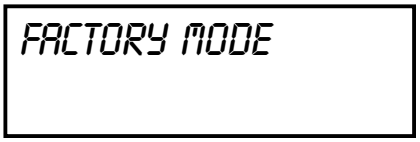
7.3 Clear Head Counters

To reset the printer to the factory settings, perform the following steps.
Caution: Resetting the printer will clear all registers.

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position.
2.	Place the **DSW2-4** in the **ON** or up postion.
3.	Press the **LINE and FEED** key while simultaneously turning **ON** the power switch. When the printer beeps, release the keys. The following screens will appear.



4.	Place the DSW-4 in the OFF postion and the following screen will appear.

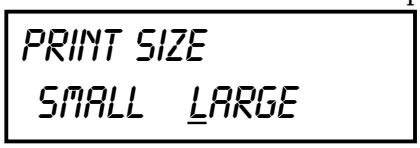


The Head Counter will be cleared by the following steps:

5.	Press the **FEED** key to display the next screen.

6.	Press the **LINE** key twice to change the message from **NONE** to **HEAD**.

7.	Press the **FEED** key to clear the Head Counter. After a pause, the next screen will appear.



8.	Select the print label size by pressing the **LINE** key. The default is LARGE.
9.	Press the **FEED** key for a test print. Press the **FEED** key again to stop printing.

Warning: This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.

10.	Verify that the counters on the test print have reset to 0.0 km.
11.	Power OFF the printer and confirm that all switches are in the OFF or down position.

7.4 Clear Dispenser Counter

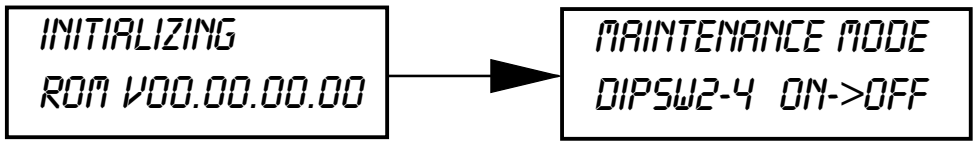
To reset the printer to the factory settings, perform the following steps.
Caution: Resetting the printer will clear all registers.

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position.
2.	Place the **DSW2-4** in the **ON** or up postion.
3.	Press the **LINE and FEED** key while simultaneously turning **ON** the power switch. When the printer beeps, release the keys. The following screens will appear. `INITIALIZING` `ROM V00.00.00.00` → `MAINTENANCE MODE` `DIPSW2-4 ON->OFF`
4.	Place the DSW-4 in the OFF postion and the following screen will appear. `FACTORY MODE`
5.	Press the **FEED** key to display the next screen. `COUNTER CLEAR` `NONE`
6.	Press the **LINE** key trice to change the message from **NONE** to **DIS**. `COUNTER CLEAR` `DIS`
7.	Press the **FEED** key to clear the DISPENSER Counter. After a pause, the next screen will appear. `PRINT SIZE` `SMALL LARGE`
8.	Select the print label size by pressing the **LINE** key. The default is LARGE.
9.	Press the **FEED** key for a test print. Press the **FEED** key again to stop printing. `TEST PRINT` `PRESS FEED KEY` **Warning:** This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.
10.	Verify that the counters on the test print have reset to 0.0 km.
11.	Power OFF the printer and confirm that all switches are in the OFF or down position.

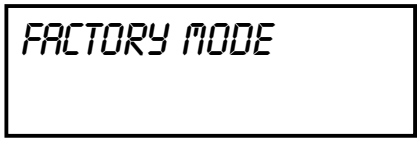
7.5 Clear Cutter Counter

To reset the printer to the factory settings, perform the following steps.
Caution: Resetting the printer will clear all registers.

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position.
2.	Place the **DSW2-4** in the **ON** or up postion.
3.	Press the **LINE and FEED** key while simultaneously turning **ON** the power switch. When the printer beeps, release the keys. The following screens will appear.



4.	Place the DSW-4 in the OFF postion and the following screen will appear.



5.	Press the **FEED** key to display the next screen.

6.	Press the **LINE** key four times to change the message from **NONE** to **CUT**.

7.	Press the **FEED** key to clear the Cutter Counter. After a pause, the next screen will appear.

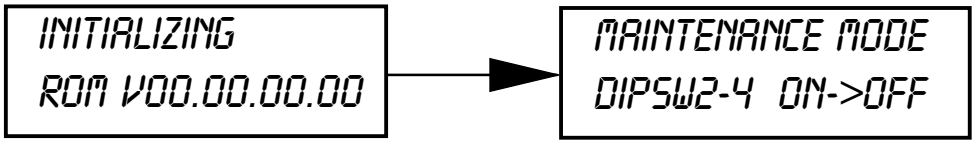
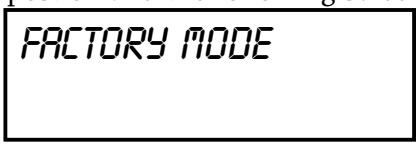
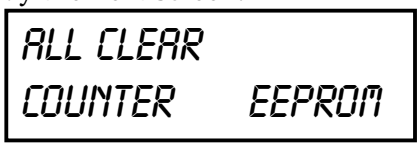
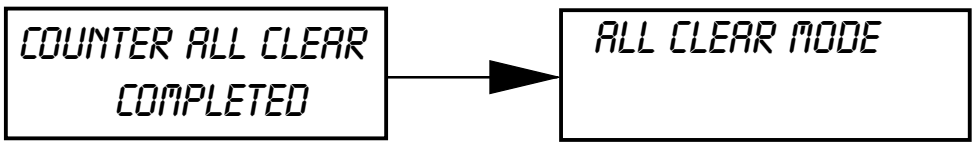
8.	Select the print label size by pressing the **LINE** key. The default is LARGE.
9.	Press the **FEED** key for a test print. Press the **FEED** key again to stop printing.

Warning: This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.

10.	Verify that the counters on the test print have reset to 0.0 km.
11.	Power OFF the printer and confirm that all switches are in the OFF or down position.

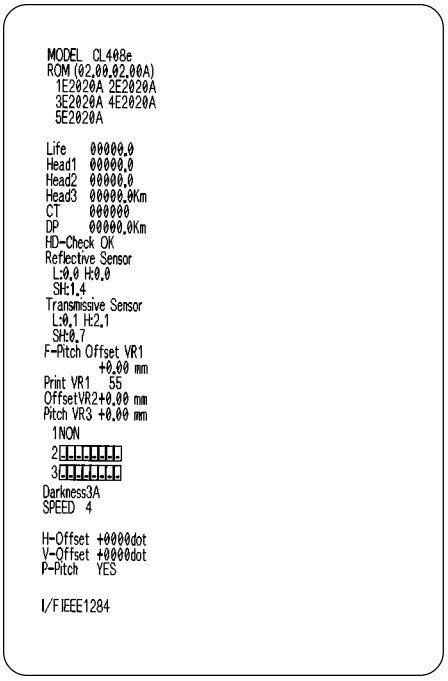
7.6 Clear EEPROM

To clear the EEPROM, perform the following steps.
Caution: Resetting the printer will clear all registers.

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position.
2.	Place the **DSW2-4** in the **ON** or up postion.
3.	Press the **LINE and FEED** key while simultaneously turning **ON** the power switch. When the printer beeps, release the keys. The following screens will appear. 
4.	Place the DSW-4 in the OFF postion and the following screen will appear. 
5.	Press the **LINE** key to display the next screen. 
6.	Press the **FEED** key to display the next screen. 
7.	Press the **FEED** key to display the next screen. 
8.	Press the **LINE** key to select **YES** or **NO**. If **YES** is selected press the **FEED** key to clear the EEPROM . 
9.	Power OFF the printer and confirm that all switches are in the OFF or down position.

7.7 Sample Test Prints

LARGE TEST PRINT



SMALL TEST PRINT

ILLUSTRATIONS SHOWN ARE EXAMPLES ONLY AND MAY NOT EXACTLY MATCH YOUR OUTPUT

Section

8

Troubleshooting

8.1 Overview

This section has been devised to help you if you are unable to produce output on the CL408e/CL412e printers. Use this section to make sure the basics have been checked before deciding you are unable to proceed further. The design of the SATO CL408e/CL412e printers is based upon proven technology and reliable components. When a problem occurs, the solution can be easily traced using the troubleshooting tables in this section. These tables list symptoms, probable causes, and suggested corrective actions. Many of the suggested corrective actions include references to a section or paragraph found elsewhere in this manual where more complete descriptions and procedures may be found.

To help you, this section has been divided into the following parts.

- *Initial Checklist*
- *IEEE1284 Parallel Interface*
- *RS232C Serial Interface*
- *Universal Serial Bus Interface*
- *LAN Ethernet Interface*
- *Error Signals*
- *Troubleshooting Tables*
- *Head Pattern Examples*

8.2 Initial Check List

If you are unable to produce output on your printer, check the following before deciding you're unable to proceed any further.

1. Is the printer 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 or the Label Hold-Down is not closed and latched in position.
3. Are the Label and Ribbon lights on the front panel Off? If these lights are On, the labels or ribbons may be incorrectly loaded.

8.3 The IEEE1284 Parallel Interface

1. Is the IEEE1284 printer cable connected securely to your parallel port (DB25S Female) on the PC and to the Centronics connector on the printer?

   WARNING: Never connect or disconnect interface cables (or use a switch box) with power applied to either the printer or the host. This may cause damage to the interface circuitry and is not covered by warranty.
2. Does the Parallel Interface cable used meet IEEE1284 specifications? If it does not and you are connected to an IEEE1284 or ECP parallel port on the computer, the printer may not be able to communicate correctly.
3. 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.
4. Is the IEEE1284 Interface Module installed in the printer? Older versions of the Parallel Interface module will not work correctly in the CL408e/CL412e printers.
5. When you send the print job to the printer 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 printer is there. Verify that:

   a. Both ends of the cable are securely inserted into their respective connectors.

   b. The printer is ON-LINE.

   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.
6. When you send the print job to the printer 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.

The IEEE1284 Parallel Interface (Cont)

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 printer command codes are capital letters.
- Your protocol codes are set for Standard or Non-Standard and data stream is consistent with these.

7. If you've checked all the above and the printer still isn't printing, you may want to try a Receive Buffer Hex Dump to determine what (if anything) the printer is receiving from your computer. See Hex Dump Mode in Section 8-10.

   The Parallel port is now listening for incoming data. Send your print job. The printer 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 printer received. It may be tedious, but now you can analyze and troubleshoot the data stream.

   WARNING: A small label may produce a large amount of data when printed in Hex Dump.

8. While checking the Hex Dump printout, look for $0D_H$ $0A_H$ (Carriage Return and Line Feed) characters throughout. The command string should be continuous. CR or LF characters are not allowed 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 $0D_H$ $0A_H$ characters by expanding the line length up to 255 characters.

   If you're 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 printer. We want the data stream to be one complete line going to the printer.

8.4 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 printer?

   Warning: Never connect or disconnect interface cables (or use a switch box) with power applied to either the printer or the host. This may cause damage to the interface circuitry and is not covered by warranty.

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 printer to print. We recommend that you use a cable built to specifications described in Section 3, Interface Specifications.
3. Is the RS232 Interface Module installed in the printer?
4. Check for obvious errors in the data stream. Is the data properly framed with the <ESC> A and <ESC>Z commands?
5. If after sending your job to the printer, it only "beeps" and displays an error message on the LCD display, 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 unsure as to what the printer's current RS232 settings are, print a Configuration Test Label. It will list all of the current printer configuration settings.
6. If you are still unable to get printer output, try the Hex Dump as described Step 7 under IEEE1284 Parallel Interface Troubleshooting. In this case, the printer monitors the RS232C interface for incoming data.
7. From the Hex Dump, if you are seeing extra $0D_H$ $0A_H$ (CR and LF) characters, and are using BASIC, refer to the beginning of the Command Code section in the Operator and Technical Reference Manual.

8.5 The Universal Serial BUS (USB)

If nothing prints when doing a test print you will need to verify that the device drivers have been successfully installed by doing the following:

1. Click on Start, then Settings and then Control Panel.
2. Within the new Window, you should have an Icon listed as System. Double click on this.
3. Click on the Device Manager tab.
4. Make sure that the View Device by type is checked. Scroll down until you get to SATO-USB device.
5. Verify that it does not have any errors next to it. If it shows an error, remove the device and then reinstall it.
6. Reboot the PC and the Printer.
7. Consult the Windows 98 Troubleshooting guide or contact technical support for further assistance.

8.6 Lan Ethernet Interface

Installation Problems (Printer Does Not Come Up Ready)

If you cannot print to the SATO enhanced ethernet adapter after you install it, check the following:

1. Make sure that the printer is powered on, all cables are securely plugged in, and that the printer is on-line.

2. Make sure there is a secure connection between the hub and the printer.

Installation Problems (Printer Comes up Ready but You Cannot Print)

If the printer starts up OK but you cannot print, the problem could one of the following:

- You've installed the wrong driver for your printer model type.

- There is a problem with the network connection or cabling.

- There is a queue setup problem, a print server setup problem, or other protocol-related problem.

Checking the Network Connection and Cabling

Check the network connection and cabling.

1. The LINK LED (Green LED) will come on solid if there is a valid 10baseT or 100baseTX connection. If the appropriate LEDs are not on, there is probably a bad 10baseT/ 100baseTX cable or the hub port is bad. If possible, try a different cable and hub port, or try connecting a different device (such as a PC) to the cable.

2. If you are using a repeater or hub, make sure that SQE (heartbeat) is turned off at the hub (this is the default setting for most hubs). Also, if you have a hub or multiport repeater, verify that the hub or repeater port is good by trying the print server on a different port.

3. If you have a bridge or router located between the SATO enhanced ethernet adapter and the host computer, make sure that the device is set up to allow the print server to send and receive data from the host. For example, a bridge can be set up to only allow certain types of Ethernet addresses to pass through (a process known as filtering); therefore, such a bridge must be configured to allow SATO enhanced ethernet adapter addresses. Likewise, a router can be set up to pass only certain protocols, so be sure that the desired protocol can be passed through to the SATO enhanced ethernet adapter. In the case of routers, also make sure that the protocol is routable (NetBEUI, and DLC/LLC are not routable).

4. If the job exits the queue but does not print, make sure that you have the correct driver installed. If you do, turn DSW2-4 on and cycle power. Try resending your print job. If something prints out at this point than we now that the connection is there but that the data is not correct.

5. Check the individual protocol troubleshooting sections in this chapter for additional causes of intermittent printer problems.

Intermittent Problems

If the print server and the printer start up OK, but you intermittently have problems printing, check the following:

1. Excessive NetWare polling can be a big cause of intermittent problems. Make sure that you have only enabled the NetWare file servers that you need for printing (do a SHOW NETWARE command from the print server console to see the enabled file servers). If you are not using NetWare, you can disable NetWare entirely with the command SET NETWARE DISABLED.

2. Check the individual protocol troubleshooting sections in this chapter for additional causes of intermittent printer problems.

TCP/IP Troubleshooting

If you are using TCP/IP and cannot print to the print server and you have checked the hardware and network as described in the previous steps, then check the following (*note that it is always a good idea to try creating a another print queue to eliminate the possibility of setup errors*):

l. The problem may be the result of mismatched or duplicate IP addresses. Verify that the IP address is correctly loaded into the SATO enhanced ethernet adapter and make sure that no other nodes on the network have this address (DUPLICATE IP ADDRESSES ARE THE BIGGEST CAUSE OF TCP/IP PRINTING PROBLEMS). If the address is not correct, then check whether the loading procedure was properly executed.

2. If you used NCP, XCONFIG, or ccr to enter the IP address, make sure that you exited the remote console properly with a CTRL-D or EXIT command.
3. If you used rarp, make sure that you started the rarp daemon using the rarpd, rarpd -a, in.rarpd -a, or equivalent command. Verify that the /etc/ethers file contains the correct Ethernet address and that the SATO enhanced ethernet adapter name matches the name in the /etc/hosts file.

4. If you used bootp, make sure that bootp is enabled (i.e., the "#" is removed from the bootp entry) in the
/etc/inetd.conf file. Verify that /etc/bootptab file is correctly configured.

5. Also verify that the host computer and the print server are either on the same subnet (for example, if the print server has a subnet mask of 255.255.255.0, the host must have the same subnet mask) or that the router is properly configured to pass data between the two devices.

6. If you are using a Berkeley-based UNIX, make sure that the daemon is started on Berkeley based systems with the command lpc start *printer*, where *printer* is the name of the local print queue.

7. If you are using an AT&T-based UNIX, make sure the printer is enabled (enable *printer*, where *printer* is the name of the local print queue).

8. Make sure that the lpr/lpd remote line printer service are running on the host computer (refer to your host computer documentation for information on how to do this).

9. If you cannot print from DEC TCP/IP Services for VMS (UCX), make sure that you have version 2.0B or later of this software, because earlier versions will not work with the SATO enhanced ethernet adapters.

10. If you are using the raw TCP port and are experiencing intermittent queue stalling problems, make sure that queueing is enabled on the service (do a SHOW SERVICE command from the remote console, and note if "Q" is listed in the OPT column for the desired service). If it is not, enable queueing with the command SET SERVICE *servicename* QUE ENA command.

11. If the wrong IP address is loaded, check your network for file servers that have DHCP, BOOTP, or rarp enabled, and make sure that these file servers are not set up to load IP addresses into the print server. Also, make sure that you do not use the command SET IP BOOT 0 to disable TCP/IP broadcasts; instead, you should use the command SET IP METHOD STATIC (unpredictable results will occur otherwise).

12. If you have problems with queues locking up when the active print job is deleted, try setting the IP timeout to one minute with the console command SET IP TIMEOUT 1.

NetWare Troubleshooting

If you cannot print from NetWare and you have checked the hardware and network as described in the previous steps, first verify that the print server is attached to the server queue by going to PCONSOLE, selecting PRINT QUEUE INFORMATION, and then CURRENTLY ATTACHED SERVERS. If the SATO enhanced ethernet adapter does not appear in the list of attached servers, then check the following (*note that it is always a good idea to try deleting and recreating the print server and creating a new print queue in order to eliminate the possibility of setup errors*):

1. If you cannot create a print queue, make sure that you have sufficient NetWare privileges. With NetWare 3.12 and earlier, you MUST be logged in as SUPERVISOR (not someone with Supervisor privileges). If you are having problems creating queues with NetWare 4.xx and later, try logging in as ADMIN. Also, make sure that you are not trying to run XAdmin32 with the Microsoft NetWare client (you must use the Novell 32-bit client).

2. If you changed the login password, you must change the password in *both* the SATO enhanced ethernet adapter (using the SET NETWARE PASSWORD command) and in the file server (using the PCONSOLE Print Server Information Change Password command).

3. Make sure that you have enabled at least one NetWare file server using the SET NETWARE SERVER *servername* ENABLED command.

4. Have you exceeded your NetWare user limit?

5. Make sure that the print server name you used in PCONSOLE *exactly* matches the name that is configured in the print server, and make sure it is defined as a Queue Server for the print queue.

6. If you are running both 802.3 and Ethernet II frames on different file servers on your network, there is a possibility that the print server may not make a connection to the desired file server. Try forcing the frame type to the desired one using the SET NETWARE FRAME command from the SATO enhanced ethernet adapter remote console.

7. If you are losing portions of your print job and you are using the DOS NetWare drivers, try setting the TIMEOUT parameter in your CAPTURE statement to a higher value (at least 50 seconds for Windows).

9. Because of a bug in the vendor's software driver, file servers equipped with certain models of SMC Ethernet controllers may crash when an SATO enhanced ethernet adapter is connected to the network. This problem, which primarily affects EISA-based controllers made in 1993 or earlier, is not specific to SATO enhanced ethernet adapters, and can be fixed by upgrading the file server with the latest SMC drivers. Contact SMC technical support at (516) 435-6250 for additional information and instructions on how to download the new drivers from the SMC bu*lletin board.*

Windows NT/LAN Server Troubleshooting

If you are having trouble printing with Windows NT or LAN Server, check the following:

1. Make sure that you can ping the SATO enhanced ethernet adapter using the DOS or OS/2 command PING *ipaddress*, where *ipaddress* is the IP address of the SATO enhanced ethernet adapter. If you cannot ping the print server, you will not be able to print.

Windows NT/LAN Server Troubleshooting

2. Make sure that TCP/IP and lpr printing are installed and running on the Windows NT system or the LAN Server file server.

3. If you are having problems printing to the SATO enhanced ethernet adapter from a client PC that is connected to a Windows NTAS or LAN Server file server, verify that you can print a job directly from the DOS or OS/2 prompt on the file server. If you can print from the file server but not from the client, then the problem is probably with the NetBEUI

   communications rather than with the TCP/IP link to the SATO enhanced ethernet adapter. Check your file server network setup (for example, make sure that you can print from the client to other printers on the network.

4. If you have problems with Windows NT queues locking up when the active print job is deleted, try setting the IP timeout to one minute with the console command SET IP TIMEOUT 1.

Windows 95/98 Peer-to-Peer Troubleshooting

If you are having trouble printing on a Windows 95 Peer-to-Peer network, check the following:

1. If the print server does not show up under HP JetAdmin on a Windows 95/98 Peer-to-Peer network, try removing all of the Windows 95 network software from the Network Control panel and then reinstalling them as follows:

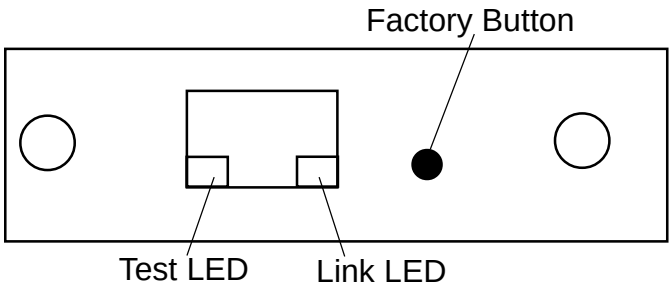
   - First install the **IPX/SPX-Compatible Protocol**, the **Client for Microsoft Networks**, and the network adapter card driver.

   - Restart the system, and then add the **HP JetAdmin** service.

   2. Because of the many changes that have been incorporated in Windows 95/98 Peer-to-Peer printing since its introduction, it is a good idea to upgrade to the latest version of JetAdmin (available on the HP web site at http://www.hp.com).

Resetting the Print Server

Press the Factory button for at least 5 seconds. Please wait approximately 1 minute before trying the factory test print.



8.7 Error Signals

The LCD display, Front Panel LED Indicators and Buzzer provide a visual/audio indication of the type of error encountered.

LED	LCD Message	Audible Beep	Error Condition	To Clear
Error On	Machine Error	1 Long	Machine Error	Cycle Power ON/OFF
Error On	EEPROM Error	1 Long	EEPROM Read/Write	Cycle Power ON/OFF
Error On	Head Error	1 Long	Print Head is damaged	Replace Print Head Cycle Power ON/OFF
Error On	Sensor Error	3 Short	Sensor	Cycle Power ON/OFF
Error Blinks	Card R/W Error	1 Long	Memory Card Read/Write	Format Memory Card Cycle Power ON/OFF
Error Blinks	Card Low Battery	1 Long	Memory Card Battery Low	Replace MC Battery Cycle Power ON/OFF
Error Blinks	Head Open	3 Short	Head Open	Close Head Lever
Error On Line Blinks	Parity Error	3 Short	RS232 Parity Error	Correct parity to match system
Error On Line Blinks	Overrun Error	3 Short	RS232 Overrun Error	Verify RS232 Settings
Error On Line Blinks	Framing Error	3 Short	RS232 Framing Error	Verify RS232 Settings
Error On Line Blinks	Buffer Over	3 Short	Buffer Overflow	Verify RS232 Settings
Error On Line Blinks	Paper End	3 Short	Media End or Misselected Media Type	Replenish Media Select Correct Media Type Open/Close Head Lever Open/Close Media Hold Down
Error Blinks Ribbon On	Ribbon End	3 Short	Ribbon End Ribbon Broken	Replace Ribbon Open/Close Head Lever Open/Close Media Hold Down
Error Blinks Label Blinks	Media Error	3 Short	Media Error	Open/Close Head Lever
Ribbon Blinks		None	Ribbon Near End	Replace ribbon with full roll
Line Blinks		None	Buffer Near Full	Slow down transmission rate

8.8 Troubleshooting Tables

The troubleshooting table below includes the following general symptoms descriptions:

- Image Voids
- Ribbon Wrinkle
- Light Images
- Smearing
- No Ribbon Movement
- No Label Movement
- No Printed Image
- Display Problem
- POWER LED not on
- ERROR LED on
- ON LINE LED not on
- No Label Drive

Print Quality Problems

Symtom	Probable Cause	Suggested Corrective Action
Image Voids	Poor quality labels	Use thermal transfer compatible stock
	Poor quality ribbons	Use genuine SATO ribbons
	Ribbon not matched to label stock	Check with media suppliers
	Damaged electronics	Replace circuit board (Sec. 6.2)
	Damaged platen	Replace platen
Ribbon Wrinkle	Poor head alignment	Adjust head balance (Sec. 5.6) Adjust ribbon roller Adjust head alignment
	Poor ribbon tension	Adjust ribbon tension (Sec. 5.2)
	Worn platen	Replace platen (Sec. 6.8)
	Foreign material on head/platen	Clean head and platen
	Foreign material on labels	Use high quality label stock
	Damaged print head	Replace print head (Sec. 6.7)
Light Images	Poor quality labels	Use thermal transfer compatible stock
	Poor quality ribbons	Use genuine SATO ribbons
	Low print head energy/darkness	Adjust darkness control (See Operator Manual)

Print Quality Problems

Symtom	Probable Cause	Suggested Corrective Action
Light Images	Low print head pressure	Adjust head balance (Sec. 5.6)
	Ribbon not matched to label stock	Use Premier II ribbon with a "1C" thermal transfer ribbon stock or equivalent for optimum results
	Low ribbon drive torque No ribbon movement	Adjust ribbon drive clutch (Sec. 5.2)
	Foreign material on head	Clean head and platen
	Poor head alignment	Align print head (Sec. 5.5)
	Excessive print speed	Reduce print speed setting
Smearing	Poor quality labels	Use high quality label stock
	Poor quality ribbons	Use genuine SATO ribbons
	Foreign material on head/platen	Clean head and platen
	Foreign material on labels	Use high quality label stock
	Excessive print head energy	Adjust darkness control
	Excessive print speed	Adjust print speed
	Excessive head pressure Carbon tension wrong	Adjust head balance (Sec. 5.6)
No Ribbon Movement	Incorrect ribbon core size	Use genuine SATO ribbons
	Loose drive clutch	Adjust drive clutch tension (Sec. 5.2)
	Loose platen drive belt	Adjust/replace belt (Sec. 6.6)
	No +24 volt output	Test power supply and replace if required (Sec. 6.4)
	Damaged electronics	Replace circuit board (Sec. 6.2)

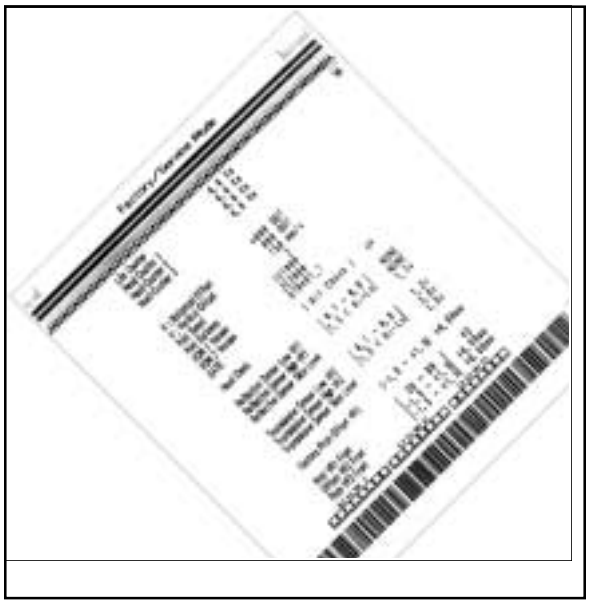
Print Quality Problems

Symtom	Probable Cause	Suggested Corrective Action
No Label Movement	Loose/broken platen drive belt	Adjust/replace belt Sec. 6.6)
	Incorrect label pitch sensor selected	Select correct label sensor type (DSW2-2)
	No +24 volt output	Replace fuse on main PCB (Sec. 6.3) Test power supply and replace if necessary (Sec. 6.4)
	Loose set screw on platen pulley/stepper motor	Tighten set screws
No Printed Image	Print head not connected	Verify print head connector fully seated at head and main PCB (Sec. 6.7)
	Ribbon upside down	Use genuine SATO ribbons
	No + 24 volt output	Test power supply and replace if necessary (Sec. 6.4)
	Damaged print head	Replace print head (Sec. 6.7)
	Damaged electronics	Replace circuit board (Sec. 6.2)
Back light but no words on display or no display	The most likely cause is the ribbon cable has fallen out or not seated fully into connector.	Verify that the cable and connector are properly seated. Display POT not positioned properly.
POWER LED not on	AC power cable not connected	Verify that the cable is connected to the printer and the AC outlet
	Main power fuse defective	Replace fuse (Sec. 6.3)
	Defective power supply	Test power supply and replace if defective (Sec. 6.4)
ERROR LED on	Head not locked	Close and latch head release
LABEL LED on	Label supply roll empty	Replenish label supply
	Label stock not routed through sensor	Reload labels
	Label sensor not positioned correctly	Adjust sensor position

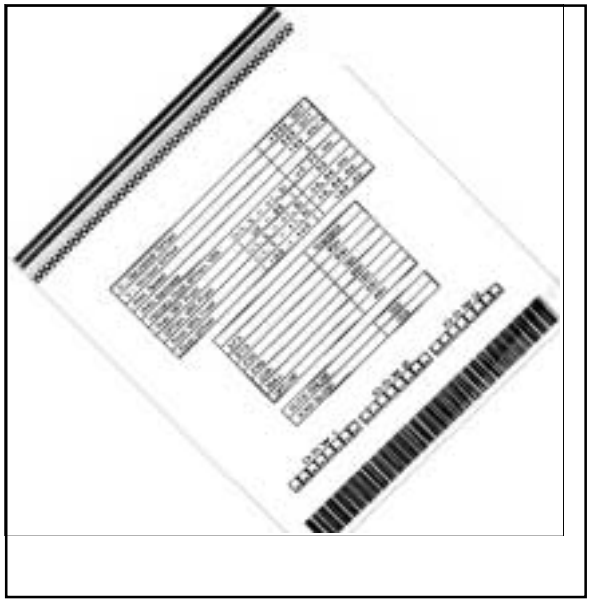
Print Quality Problems

Symtom	Probable Cause	Suggested Corrective Action
LABEL LED 0n	Label sensor blocked	Clean label sensor
	Incorrect label sensor threshold setting	Adjust label sensor threshold (Sec. 4.6 & 4.7)
	Platen drive malfunction	See Section 6.8
Ribbon LED on	Ribbon supply roll empty	Replenish ribbon supply
	Ribbon supply out of alignment	Realign ribbon sensor
	Ribbon sensor blocked	Clean ribbon sensor
	No cardboard core on ribbon rewind	Use cardboard core on ribbon rewind

8.9 Head Pattern Examples



FACTORY DEFAULT



GOOD ADJUSTMENT
CLEAR, DARK,
EVEN TEXT

FEED
DIRECTION

POOR HEAD
ALIGNMENT, BALANCE
OUT OF ADJUSTMENT

POOR HEAD
ALIGNMENT, BALANCE
OUT OF ADJUSTMENT

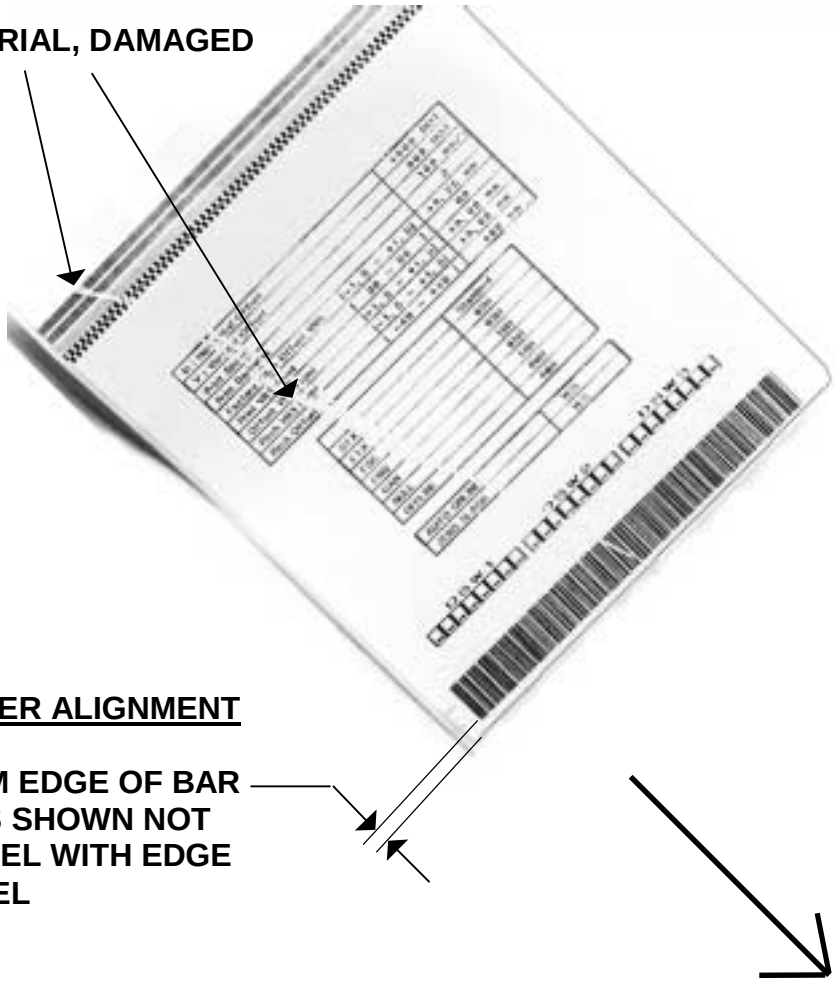
IRREGULAR UNEVEN
TEXT

ILLUSTRATIONS SHOWN ARE EXAMPLES ONLY AND WILL NOT EXACTLY MATCH YOUR OUTPUT

Head Pattern Examples

DIAGONAL VOIDS (WHITE STREAKS) THAT "WALK" ACROSS LABEL

RIBBON WRINKLE
POOR HEAD ALIGNMENT, POOR RIBBON TENSION,
WORN PLATEN,
FOREIGN MATERIAL, DAMAGED PRINT HEAD



IMPROPER ALIGNMENT

BOTTOM EDGE OF BAR CODE IS SHOWN NOT PARALLEL WITH EDGE OF LABEL

FEED DIRECTION

8.10 Hex Dump Diagnostic Labels

In addition to the User Test Print Labels, the printer contents of the receive and print buffers can be examined using the Hex Dump Test Labels.

Print Buffer Hex Dump

The contents of the Print Buffer can be examined using the Hex Dump mode. The label numbers each line of data received in the left hand column, the data in hexadecimal format in the center columns, followed by the same data in ASCII format in the right hand column.

STEP	PROCEDURE
1.	Turn on the printer.
2.	Send and print a label.
3.	Place the printer in the Off-Line mode by pressing the **LINE** key. The LINE LED should go out.
4.	Place **DSW2-4** in the On position.
5.	Press the **LINE** key to place the printer back On-Line.
6.	Press the **FEED** key.
7.	A label should be printed containing the contents of the print buffer in Hexadecimal format.
8.	Return **DSW2-4** to the Off position.
9.	Turn the printer off and then back on to place it back in the normal print mode.

Receive Buffer Hex Dump

The data that is being received by the printer (before it is placed in the Print Buffer) can be examined by using the Hex Dump Mode. The label numbers each line of data received in the left hand column, the data in hexadecimal format in the center columns, followed by the same data in ASCII format in the right-hand column.

STEP	PROCEDURE
1.	Turn off the printer.
2.	Place **DSW2-4** in the On position.
3.	Turn on the printer.
4.	Transmit the data to the printer.
5.	The data received is printed on a label in hexadecimal format.
6.	Return **DSW2-4** to the Off position.
7.	Turn the printer off and then back on to place it back in the normal print mode.

Section

9

Optional Accessories

9.1 Overview

This section contains instructions for installing the following optional accessories:

- *Label Cutter Kit*
- *Label Dispenser Kit*
- *PCMCIA Memory Expansion*
- *Flash Memory Expansion*
- *Real Time Clock*

9.2 Label Cutter Kit Installation - Guillotine Type

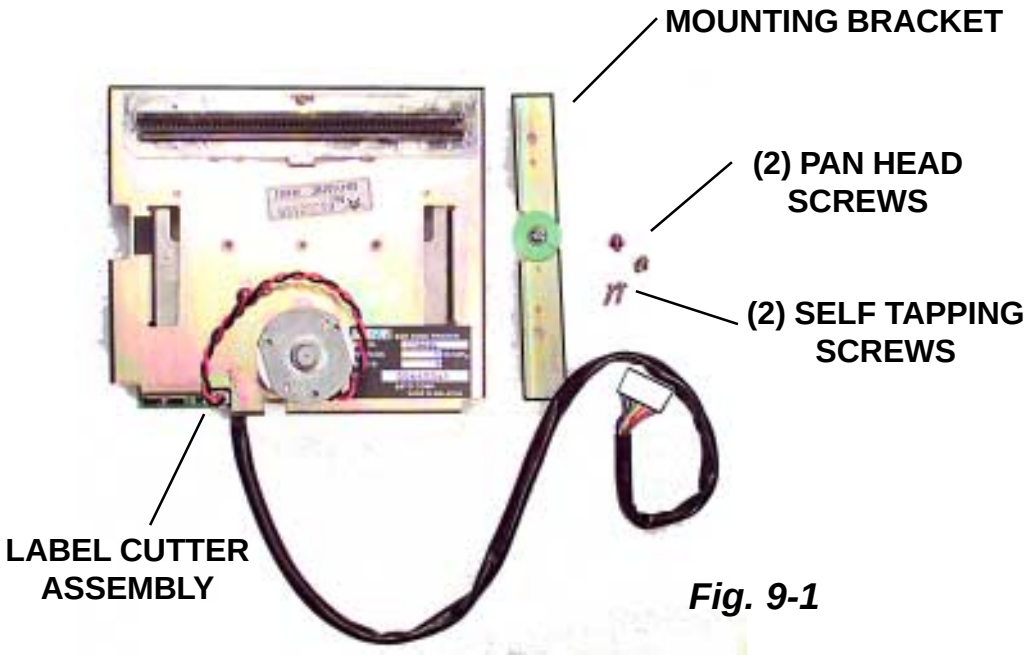


Fig. 9-1

LABEL CUTTER KIT

STEP	PROCEDURE
1.	Switch the printer OFF but keep the power cable plugged in to discharge any possible static charges.
2.	Remove the front door from the CL408/412e Printer. ***Fig. 9-2***
3.	Attach the mounting bracket using (2) self tapping screws. Verify that the mounting bracket is correctly oriented. There are two small holes that should fit on the small guide posts on the front door. The upright section of the bracket should be facing towards the cutter assembly. ***Figs. 9-3 & 9-4***
4.	Slide the cutter assembly between the mounting brackets. Verify that the two mounting slots on the left side of the cutter assembly are oriented correctly over the guide screws. ***Fig. 9-5***
5.	Attach the cutter assembly to the mounting bracket using (2) pan head screws. ***Fig. 9-6*** Route the interface cable from the cutter as shown in ***Fig. 9-5.***
6.	Remove (2) screws and detach the label tear off plate from the front of the label exit area of the printer. ***Fig. 9-7*** Reinstall the front cover onto the printer.

Label Cutter Kit Installation - Guillotine Type

STEP	PROCEDURE
7.	Remove the connector cover (located under the DSW2 and DSW3 switches) and install the interface cable to the connector. The connector is keyed and should easily slide onto the pins. If it does not, verify that you are installing the cable correctly and that there are no bent pins on the connectors. ***Fig. 9-8***
8.	Set switch location of DSW3-1 to the ON position.
9.	Load the label stock and gently close the printer front door whnile feeding the labels through the cutter assembly and the front door. Verify that the labels feed through the cutter assembly without jamming. Take care that while closing the front door the interface cable is properly routed to avoid crimping. Close the right side cover.
10.	Power up the printer and verify cutter operation. Run several labels and adjust the pitch offset so that the cutter activates at the desired location. If necessary, turn the adjusting wheel on the cutter to produce correctly oriented labels that are parallel with top label opening. ***Fig. 9-1***

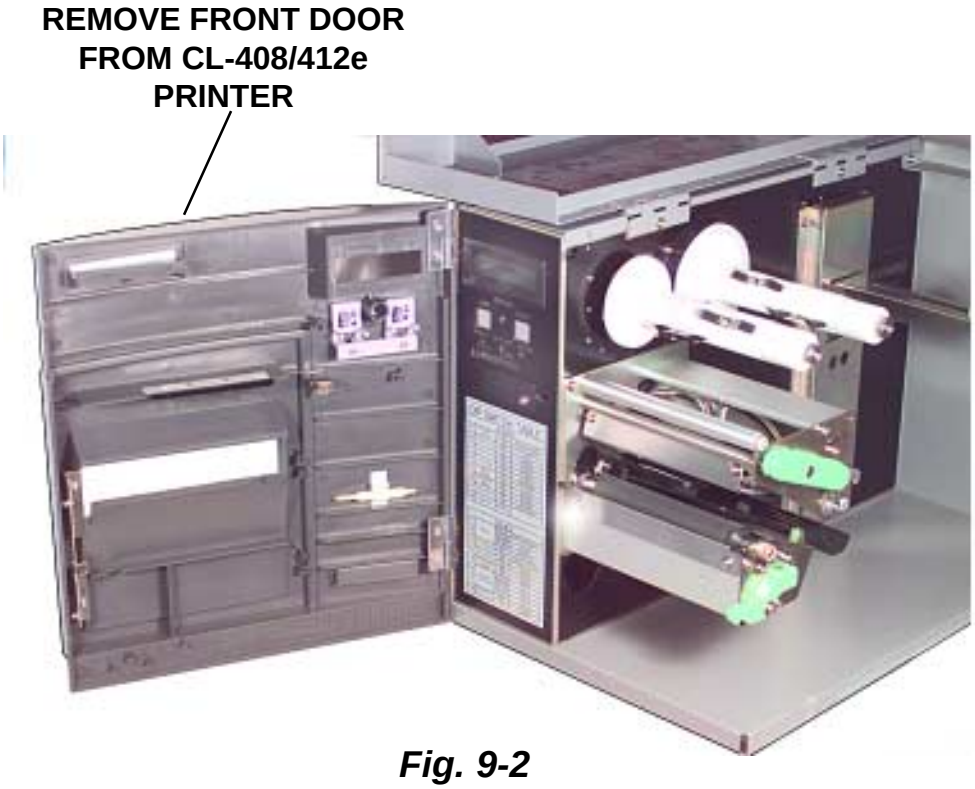


Fig. 9-2

Label Cutter Kit Installation - Guillotine Type

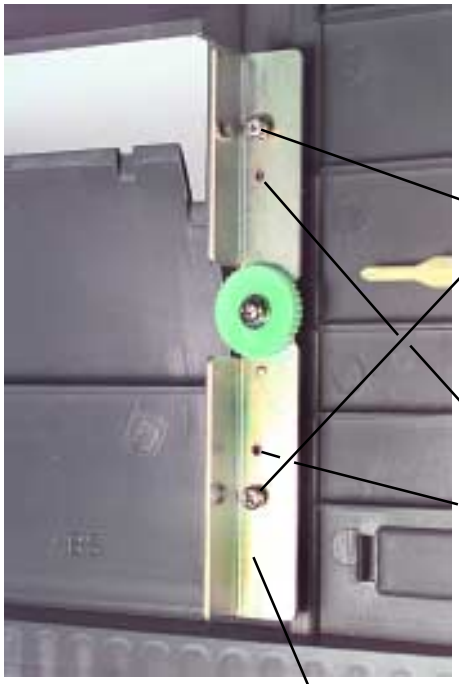


Fig. 9-3

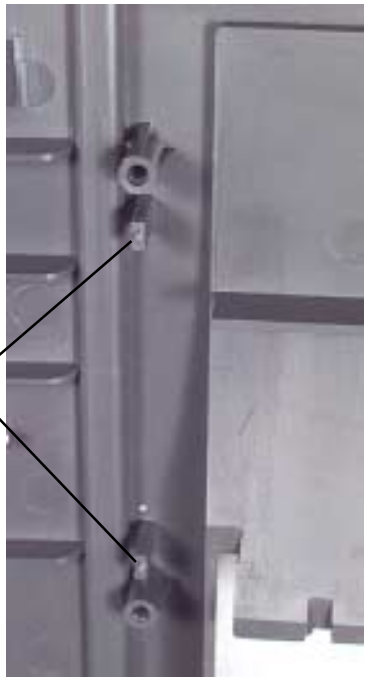


Fig. 9-4

Fig. 9-5

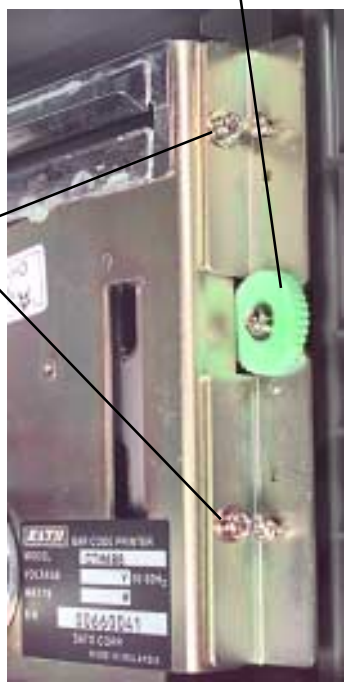
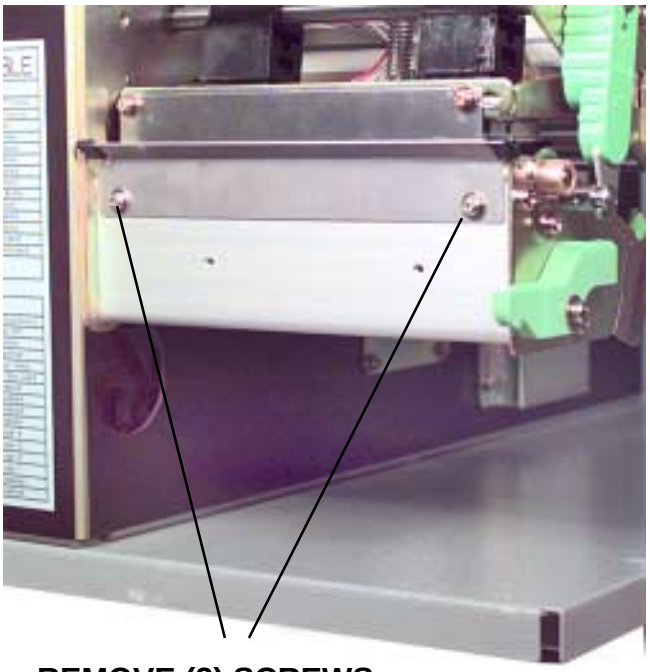


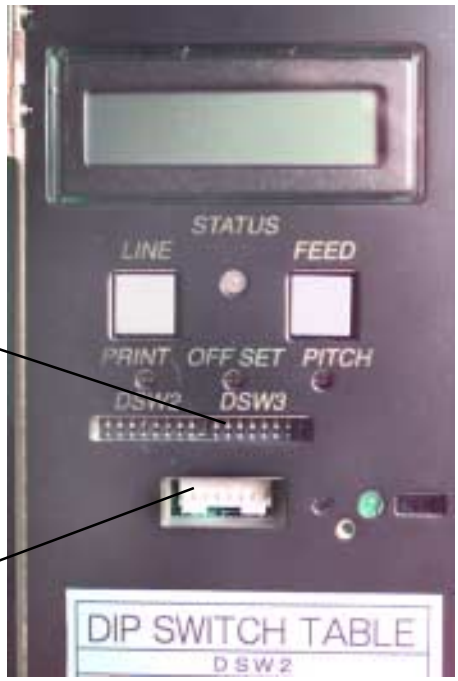
Fig. 9-6

Label Cutter Kit Installation - Guillotine Type



REMOVE (2) SCREWS AND DETACH LABEL TEAR OFF PLATE

Fig. 9-7



SET DSW3-2 TO THE ON POSITION

REMOVE CONNECTOR COVER AND INSTALL INTERFACE CABLE TO THE CONNECTOR

Fig. 9-8

9.3 Label Dispenser Installation

Installation of the optional Label dispenser into the printer adds the convenience of automatic label dispensing. Each label is printed, then peeled from the backing paper and presented at the front of the printer for removal by the operator. A photo electric sensor detects the presence of a completed label and signals the printer to await removal. Once the completed label is removed, this sensor signals the printer to automatically backfeed the label stock for correct alignment of the printing on the next label.

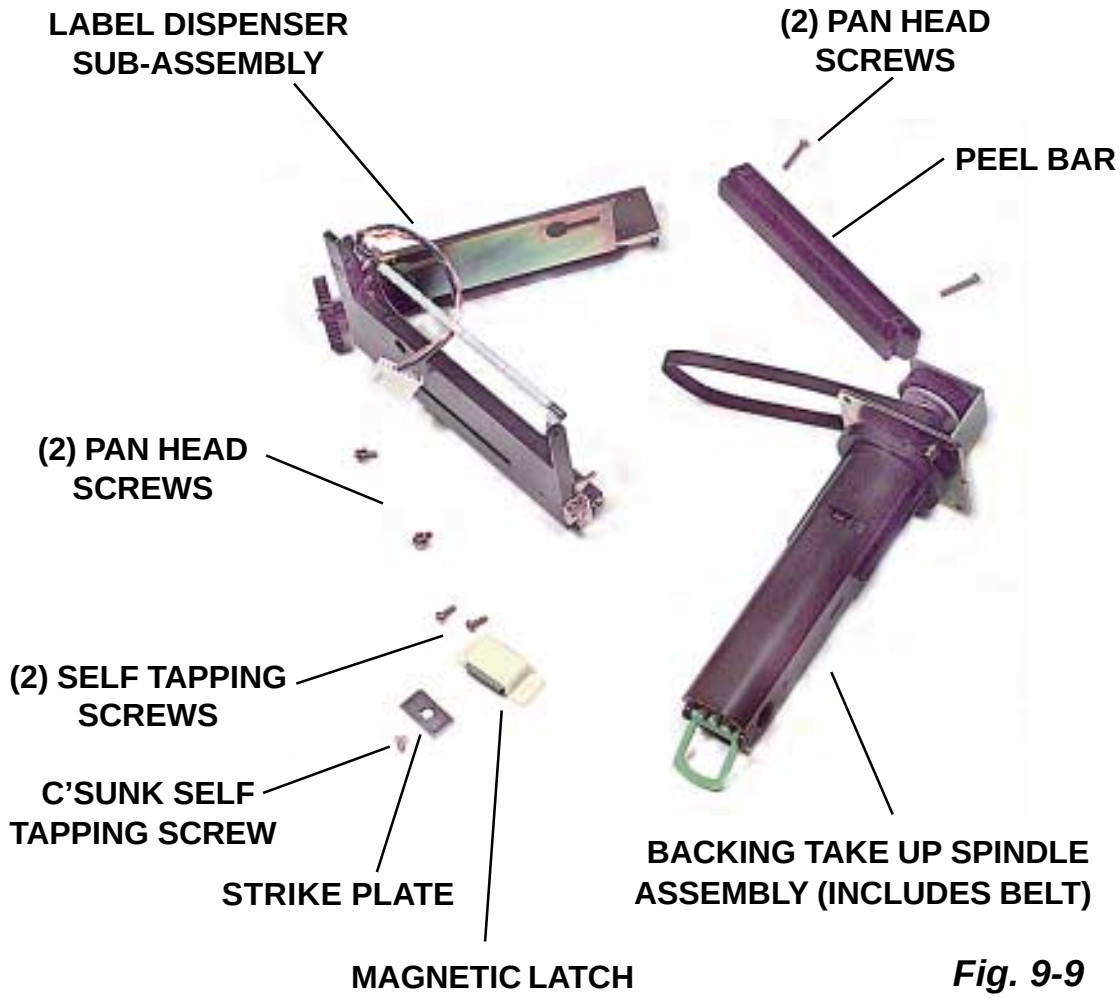


Fig. 9-9

LABEL DISPENSER KIT

Label Dispenser Installation

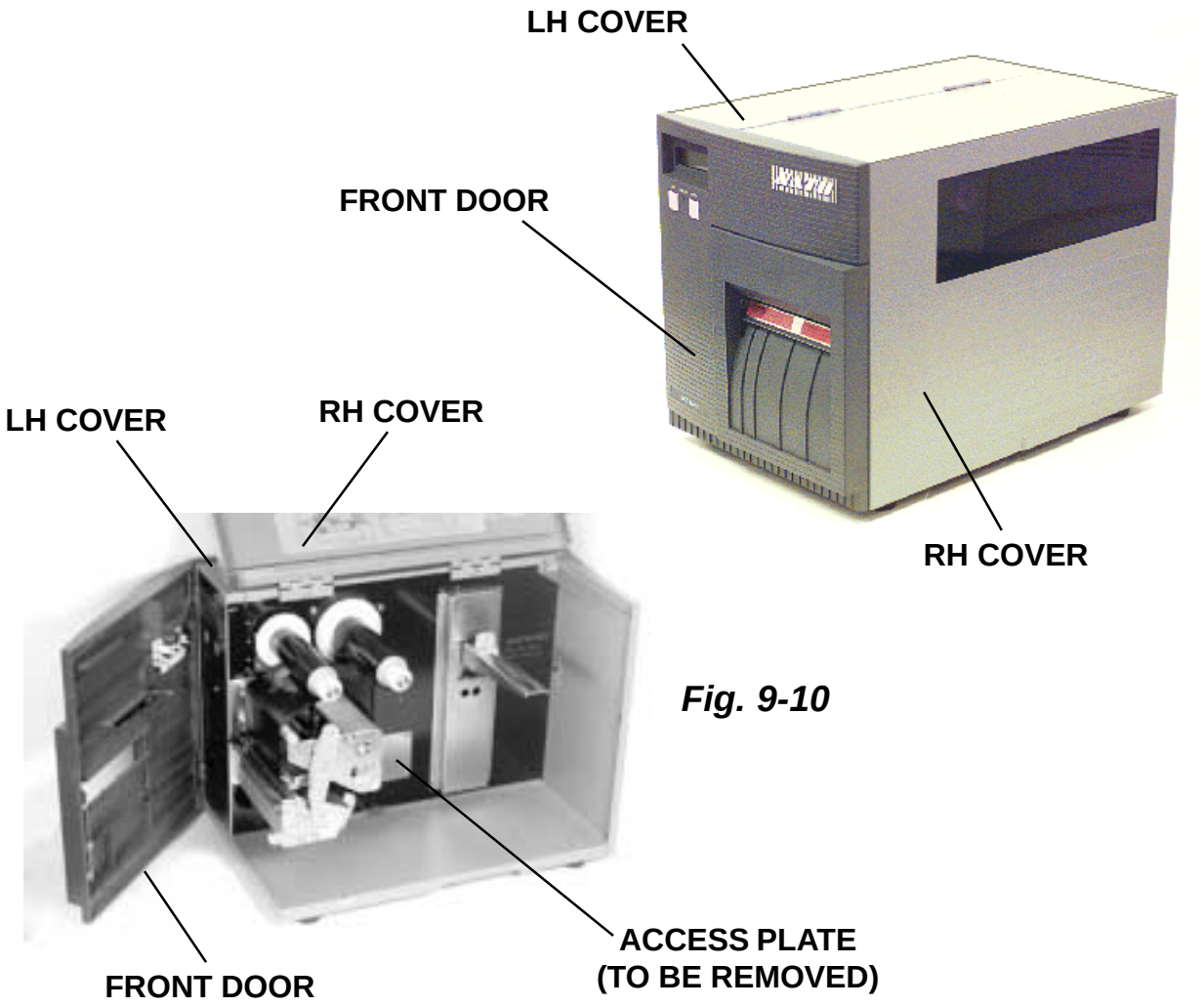


Fig. 9-10

STEP	PROCEDURE
1.	Switch the printer OFF but keep the power cable plugged in to discharge any possible static charges.
2.	Raise the RH cover uncovering the mechanical section. Loosen (2) inside screws holding the LH cover to the frame. Remove (2) outside screws holding the LH cover to the base and remove the cover. Swing the front door open. ***Figs. 9-10 & 9-11***

Label Dispenser Installation

Figs. 9-11

STEP	PROCEDURE
3.	Remove (4) screws holding the Backing Take Up Spindle Assembly Access Plate (inside mechanical section). Retain the screws from the Access Plate for installing the Backing Take Up Spindle Assembly. ***Fig. 9-12***
4.	Install the Backing Take Up Spindle Assembly by guiding the drive belt through the open access cavity and then gently sliding the drive gear portion through the access opening. Orient the unit so that the bracket legs, which attach to the plate, are to the top and to the right. The belt will exit from the bracket on the left side. Secure the Backing Take Up Spindle Assembly with the (4) screws that were removed in STEP 3. ***Fig. 9-13***
5.	Check the tension of the timing drive belt before loosening the motor. The timing belt must be restored to it's original tension after the Spindle Assembly is installed.
6.	Loosen the four screws that hold the stepper motor in place and slide the motor up in the motor mounting bracket. Remove the main timing belt from the motor drive shaft and then install the Backing Take Up Spindle Assembly timing drive belt on the inside track of the motor shaft. Reinstall the motor for optimum tension on both belts. Tighten the four screws that hold the motor in place. ***Figs. 9-14 & 9-15***

Label Dispenser Installation

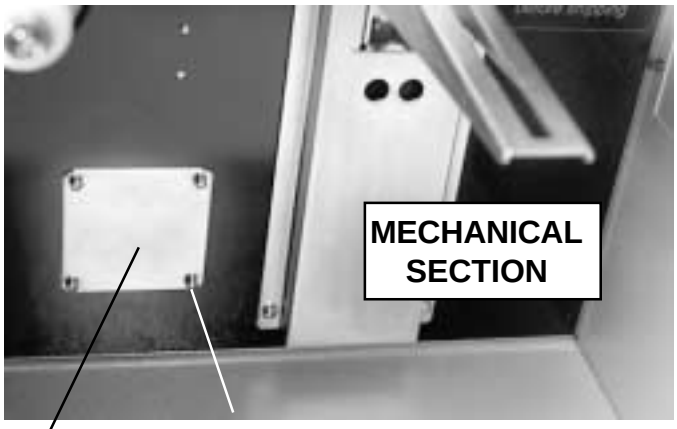


Fig. 9-12

THE BRACKET LEGS, WHICH ATTACH TO THE PLATE ARE ORIENTED ON TOP AND TO THE RIGHT

PLATE

GENTLY GUIDE THE SPINDLE ASSEMBLY THROUGH THE ACCESS OPENING, ORIENTING THE UNIT SO THAT THE BRACKET LEGS WHICH ATTACH TO THE PLATE ARE TO THE TOP AND TO THE RIGHT. THE BELT WILL EXIT FROM THE BRACKET ON THE LEFT SIDE

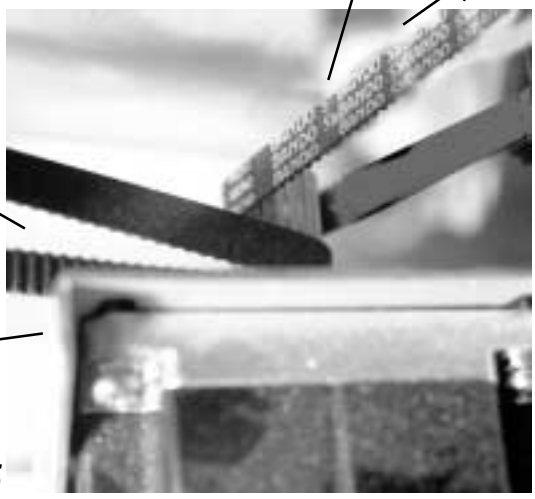
Fig. 9-13

LOOSEN (4) SCREWS HOLDING STEPPER MOTOR

Fig. 9-14

BELT TO FRONT PLATEN

INSTALL BELT FROM SPINDLE ASSEMBLY



STEPPER MOTOR

Fig. 9-15

Label Dispenser Installation

STEP	PROCEDURE
7.	Install the magnetic catch for the front cover on the base of the mainframe of the printer using the (2) self tapping screws. Attach the strike plate to the front cover using the countersunk self tapping screw. ***Figs. 9-16 & 9-17***
8.	Loosely attach (2) Pan Head Screws to the label drive assembly. Attach the Label Dispenser Sub Assembly to the front of the label drive by sliding the slotted openings of the Label Dispenser over the screws. Tighten the screws. Verify that the drive gear is properly meshed. ***Figs. 9-17 & 9-18*** ***NOTE:*** *Make sure that the Dispenser, when closed, does not contact the Label Tear Off Plate. If it does, loosen the two screws on the Tear Off Plate and move it upward. The Tear Off Plate must remain horizontal.*
9.	Remove the Connector Cover (if installed) from connector slot underneath the DSW2 and DSW3 switch access opening. Install the interface cable in the slot. The connector is keyed and should easily slide onto the pins. If the connector does not slide on easily, verify you are installing the cable correctly and that there are no bent pins on the connectors. ***Fig. 9-19***

Fig. 9-16

INSTALL STRIKE PLATE w/ COUNTERSUNK SELF TAPPING SCREW

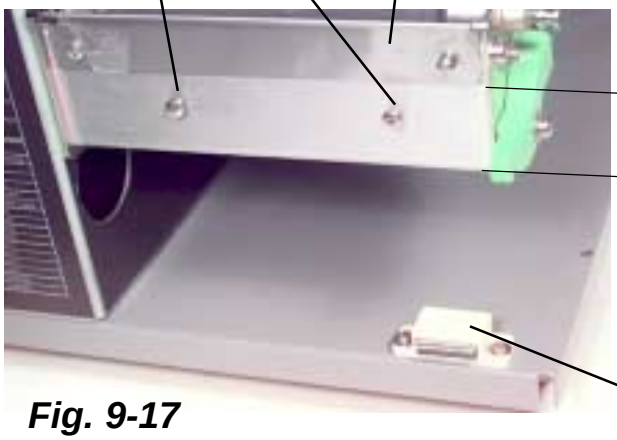
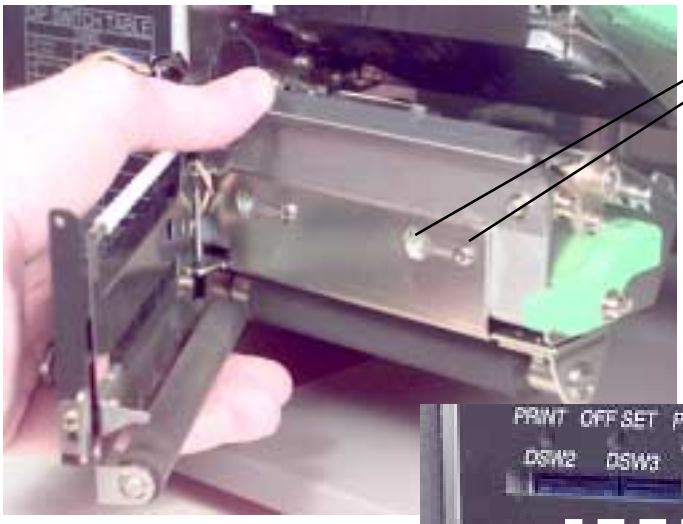


Fig. 9-17

Label Dispenser Installation



ATTACH BY SLIDING THE SLOTTED OPENINGS OVER THE PAN HEAD SCREWS

Fig. 9-18

REMOVE THE CONNECTOR COVER (IF INSTALLED)

INSTALL CABLE IN SLOT (CONNECTOR IS KEYED)

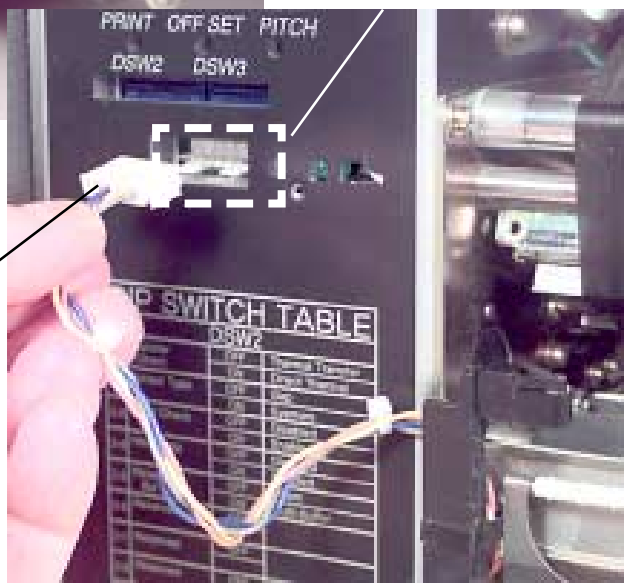
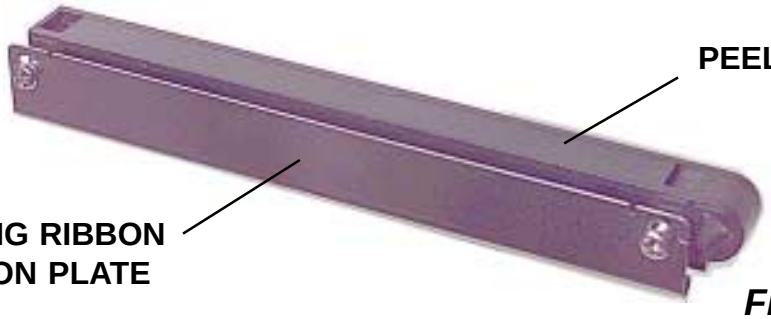


Fig. 9-19

Installing the Peel Bar will allow different types of material to dispense properly.



PEEL BAR

EXISTING RIBBON TENSION PLATE

Fig. 9-20

Label Dispenser Installation

STEP	PROCEDURE
10.	Detach the existing Tension Plate by removing (2) screws. Discard the screws. ***Fig. 9-21***
11.	Position the Tension Plate over the Peel Bar as shown in ***Fig. 9-20 & 9-22.***
12.	Attach these parts to the print head bracket using the supplied long screws in the position previously occupied by the Tension Plate. ***Fig. 9-23 & 9-24***
13.	Install the ribbon and adjust the Tension Plate by inserting a flat blade screw driver in the right side adjusting slot. Move Tension Plate up or down to eliminate wrinkles in ribbon.

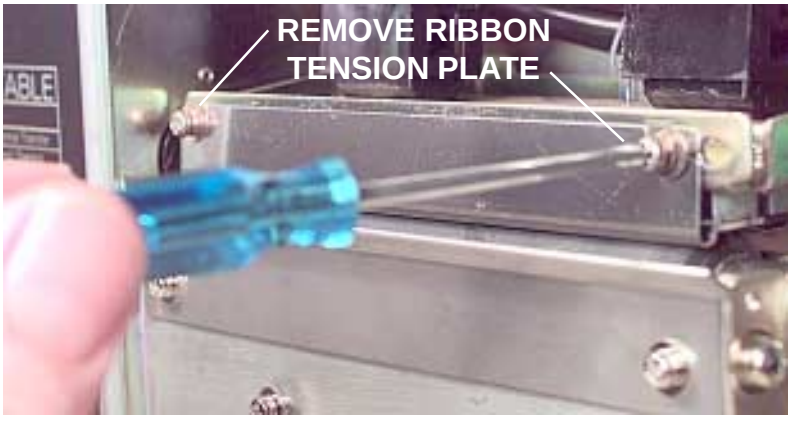


Fig. 9-21

Fig. 9-22

Label Dispenser Installation

Fig. 9-23

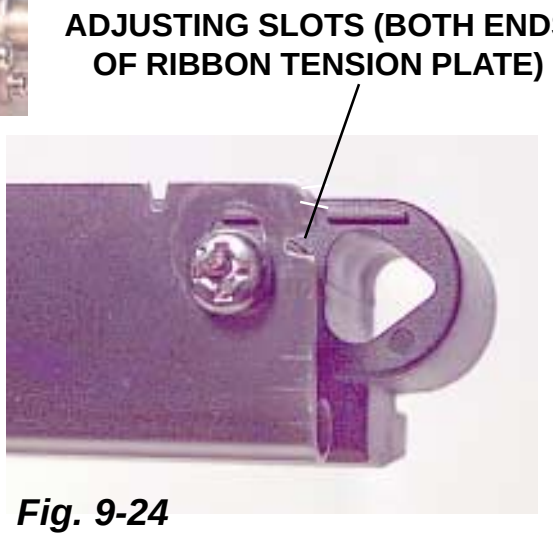


Fig. 9-24

STEP	PROCEDURE
14.	Load the labels and route the label backing down the front of the print mechanism and around the Backing Drive Roller. Verify that label backing material feeds through the dispenser assembly and onto the Backing Take Up Spindle Assembly. Secure the label stock to the take up spindle by inserting the label end between the core and label retainers. ***Figs. 9-25 & 9-26***
15.	Manually turn the Backing Take Up Spindle counter clockwise to take up all the slack in the backing. Swing the Label Dispenser front mechanism into position until the latch engages. Take care that the cable is properly routed to avoid crimping or damage. ***Figs. 9-25, 9-27 & 9-28***

Label Dispenser Installation

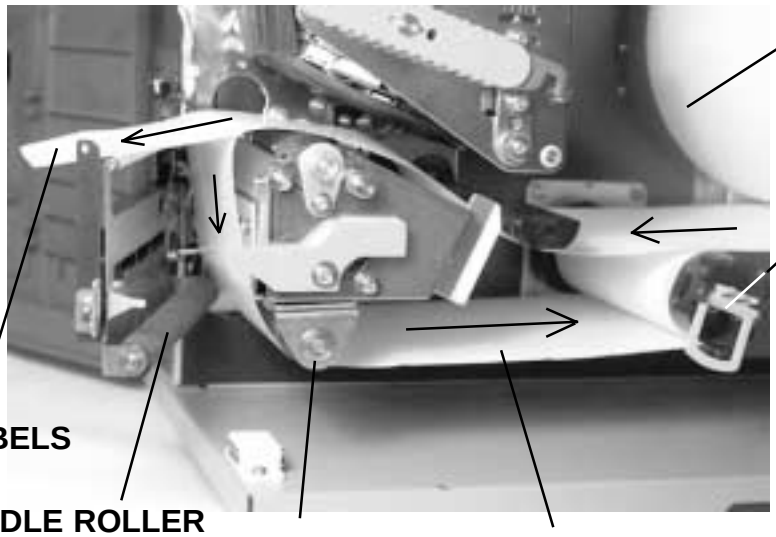


Fig. 9-25

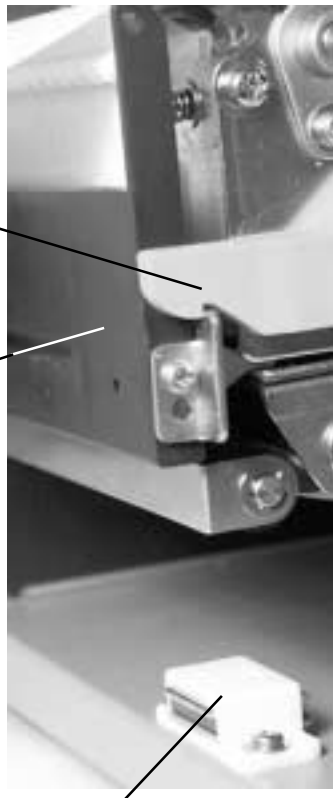
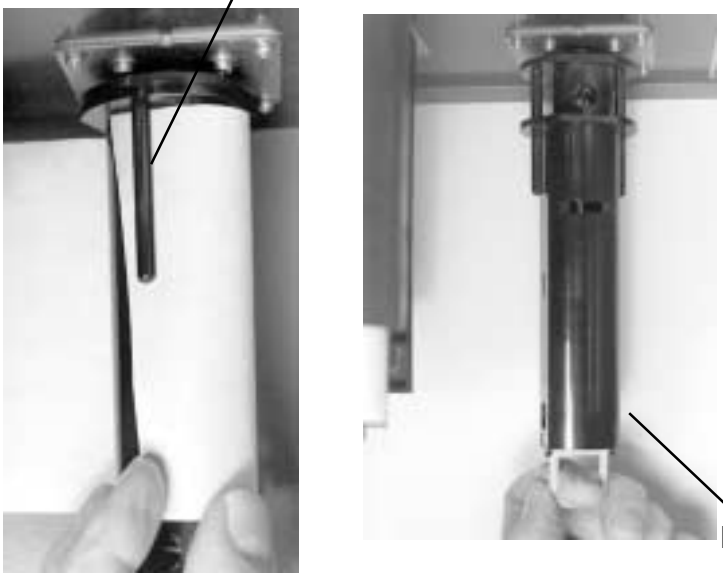


Fig. 9-27



Figs. 9-26

Label Dispenser Installation

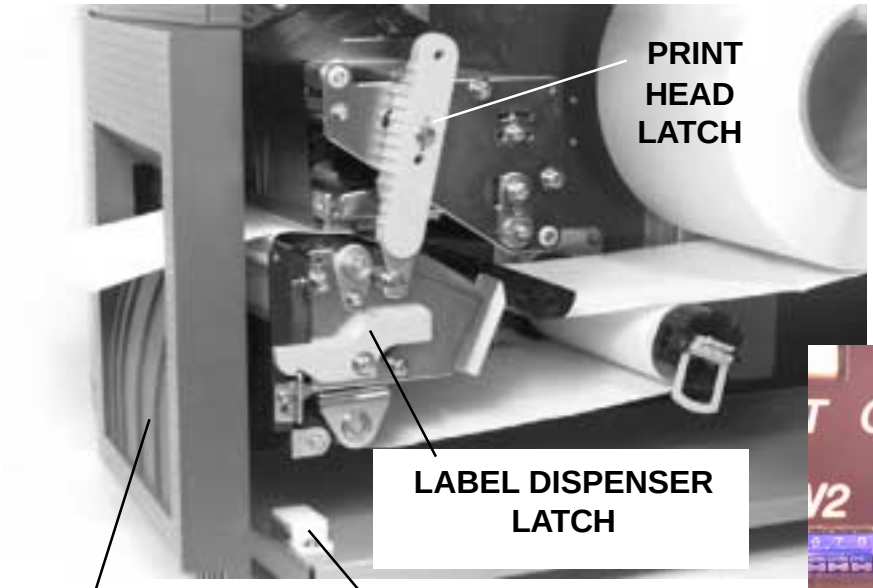


Fig. 9-28

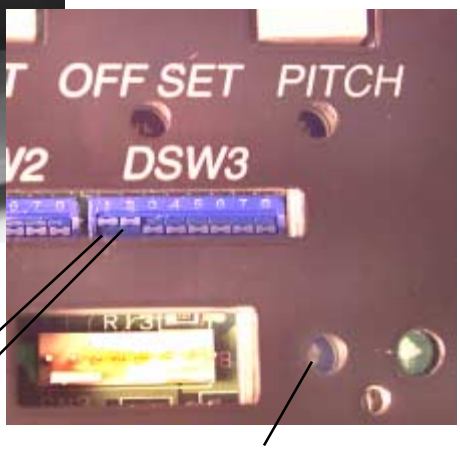


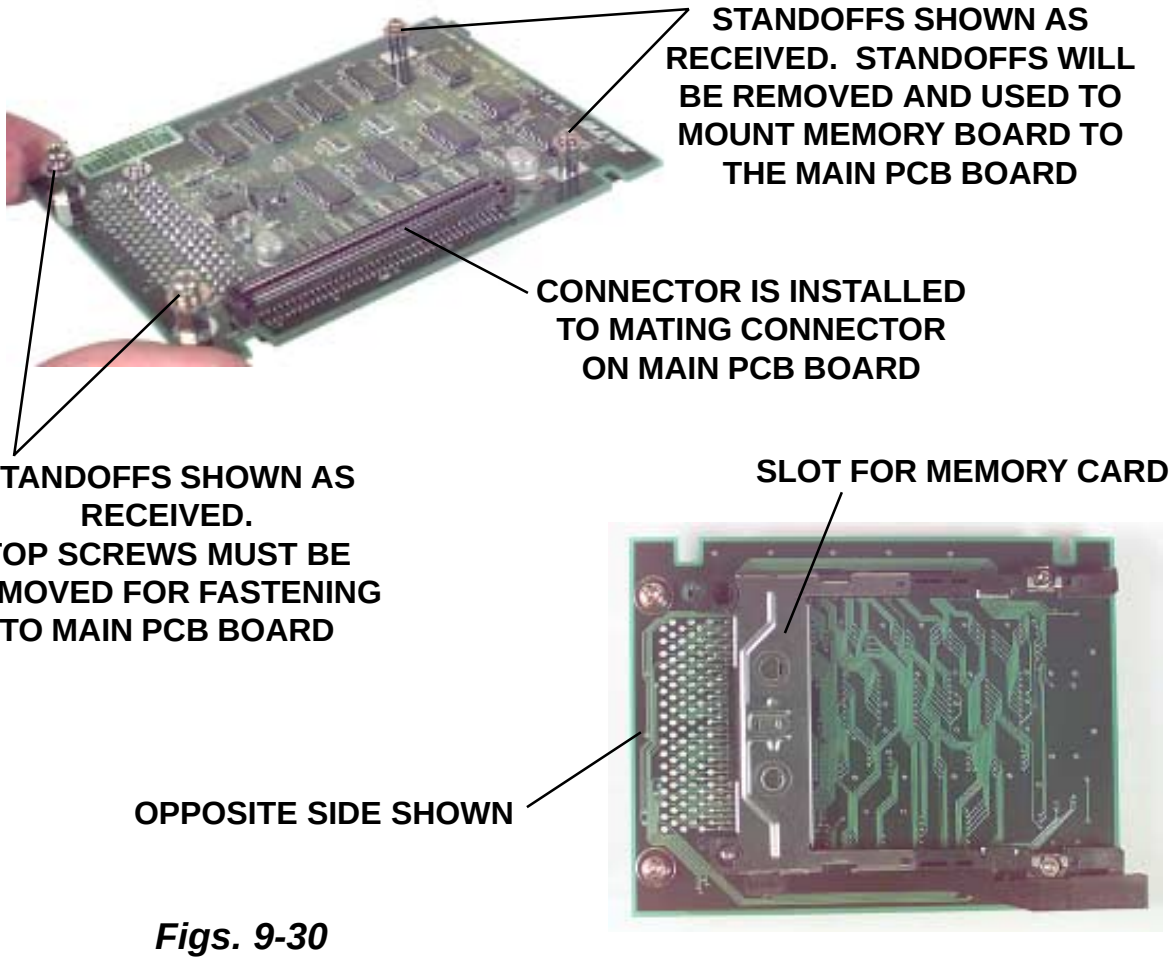
Fig. 9-29

STEP	PROCEDURE
16.	To activate the Dispenser Senser, DSW3 pin 1 & 2 must be in the ***upward*** position. ***Fig. 9-29*** See chart on front panel of printer.
17.	Close the Print Head, reinstall the LH Cover, close the RH Cover and the Front Door. ***Figs. 9-10, 9-11, & 9-28***
18.	Power up the printer and verify that all gears, belts, and drive assemblies are functional. If necessary, adjust the sensitivity level of the Label Taken Sensor and the position of the dispensing plate.
19.	Adjustment of the Label Taken Sensor level is made by turning the potentiometer located next to the connector slot until the green LED illuminates with no blockage to the sensor. The green LED should not be lit when the Label material is blocking it. For complete adjustment procedures refer to D-6 in the Operators Manual. ***Fig. 9-29***
20.	Run several labels and adjust the pitch offset so that the label material backfeeds correctly. Return the printer to service.

9.4 PCMCIA Memory Expansion Installation

The Memory PCB Board provides the interface board for (1) PCMCIA memory card slot.

Applicable Specifications	PCMCIA Version 2.1 (JEIDA Version 4.1)
Size	Up to 4MB SRAM Up to 16MB Flash
Connector Pins	68
Battery	Approximately two years (manufacturer dependent)
Write Protect	Yes
Low Battery Detect	Yes



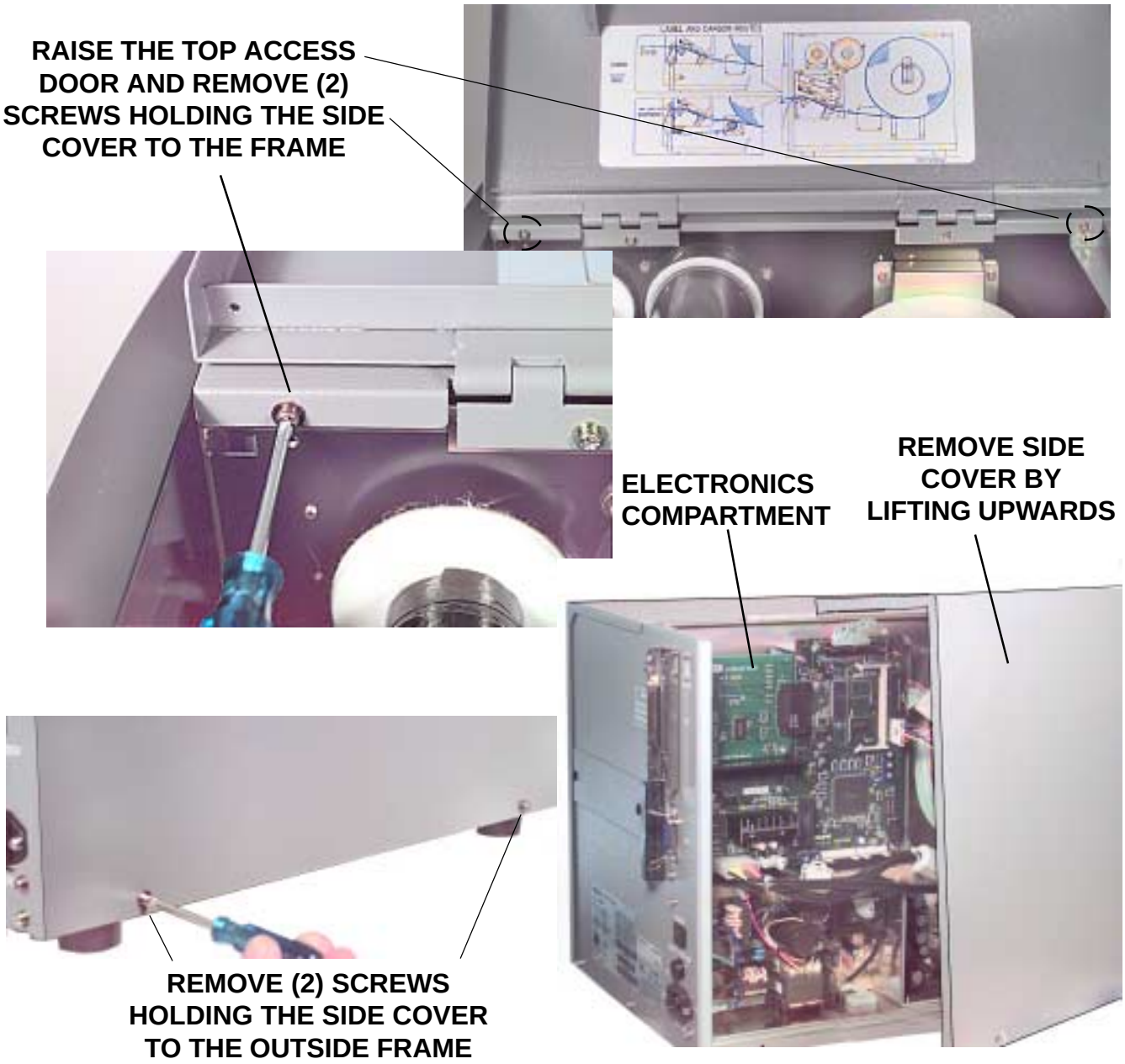
Figs. 9-30

MEMORY PCB BOARD

PCMCIA Memory Expansion Installation

Removing the Main PCB Board

STEP	PROCEDURE
1.	Turn the printer OFF and disconnect the AC power cord.
2.	Raise the access door and remove (2) screws holding the electronics side cover to the inside frame. ***Figs. 9-31***
3.	Remove (2) screws holding the electronics side cover to the outside frame. Remove the cover by lifting upwards to expose the main PCB.



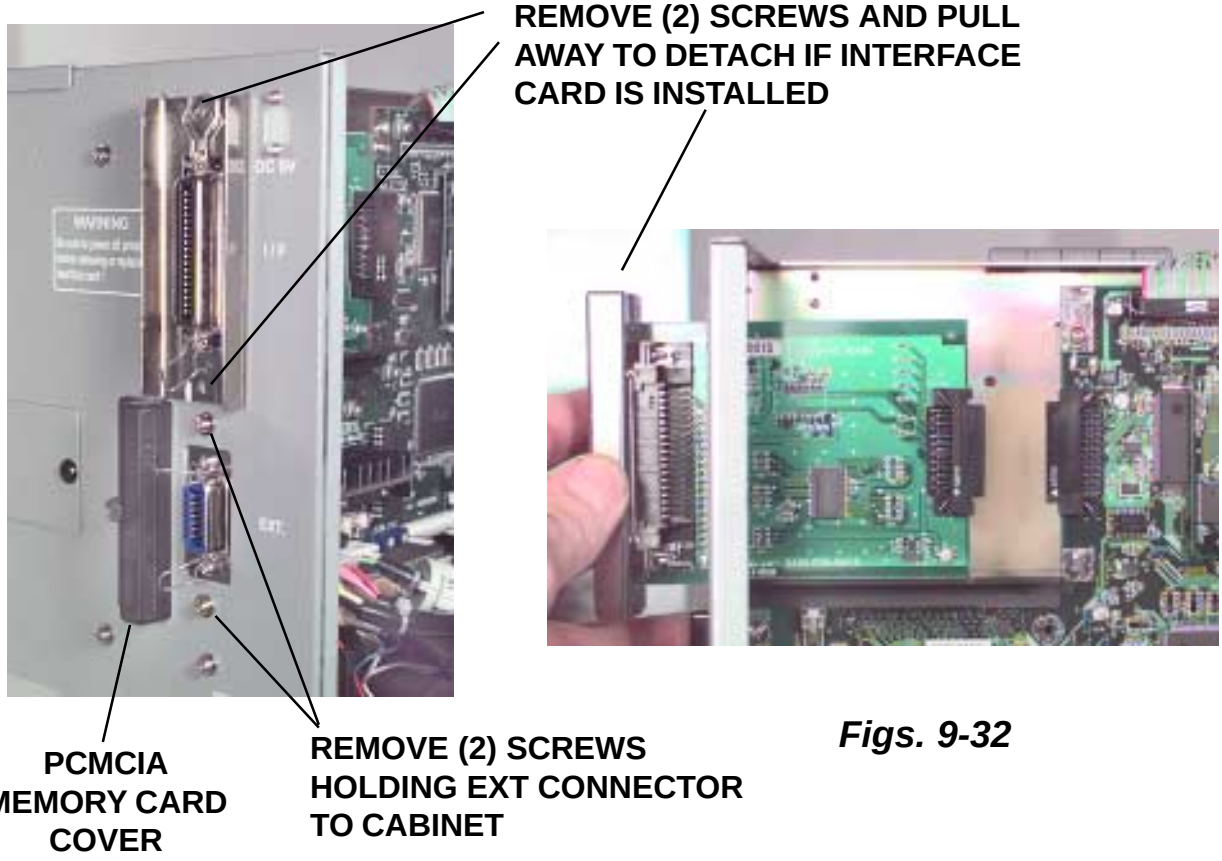
Figs. 9-31

PCMCIA Memory Expansion Installation

Removing the Main PCB Board

NOTE: Many of the components on this board are susceptible to damage by static electricity. To avoid damage from static electricity, do not unpack new circuit boards from anti-static bags until instructed to do so and use a wrist grounding strap.

STEP	PROCEDURE
4.	If an interface card is installed remove (2) screws holding the card to the rear cover and pull away to detach the card from the PCB Board. ***Figs. 9-32***
5.	Remove (2) screws holding EXT Connector to cabinet. ***Figs. 9-32***
6.	Note cable connection locations, then disconnect all cables from the PCB Board. ***Fig. 9-33***
7.	Remove (3) screws holding the PCB Board to the frame. ***Fig. 9-34***
	Remove the board from the printer and set aside for installing the Memory PCB Board. Continue on Page 9-20.



Figs. 9-32

PCMCIA Memory Expansion Installation

Removing the Main PCB Board

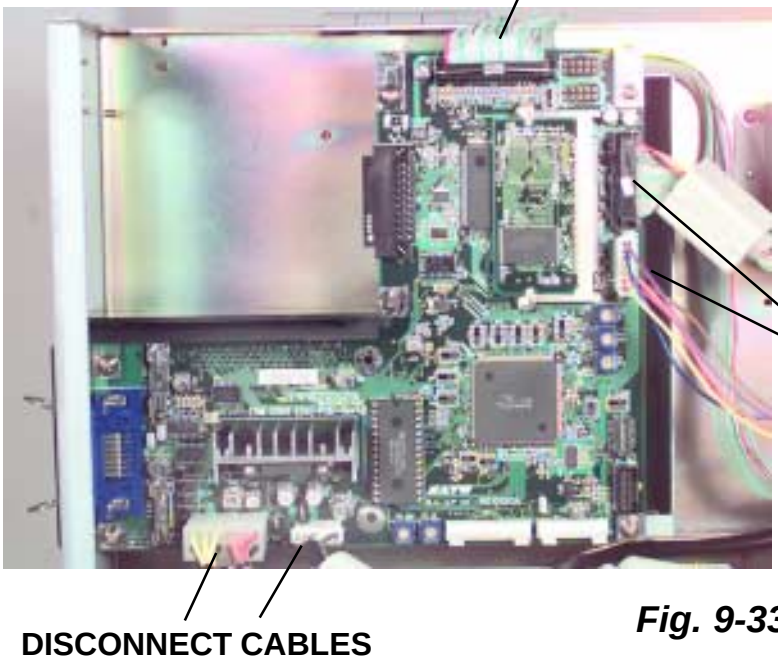


Fig. 9-33

Fig. 9-34

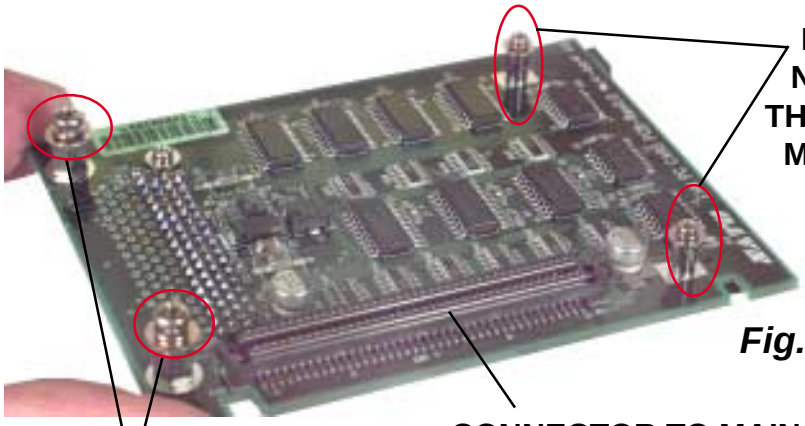
PCMCIA Memory Expansion Installation

NOTE: Many of the components on this board are susceptible to damage by static electricity. To avoid damage from static electricity, do not unpack new circuit boards from anti-static bags until instructed to do so and use a wrist grounding strap.

*** Continue here after you have removed the Main PCB Board from your printer.**

STEP	PROCEDURE
1.	Remove (2) screws, nuts and standoffs from the Memory PCB Board for mounting to the Main PCB Board. ***Fig. 9-35***
2.	Remove (2) screws and washers as shown in ***Fig. 9-35*** for installing to the Main PCB Board. Do not remove standoffs themselves.
3.	Refer to ***Fig. 9-36*** for installation location on Main PCB Board. Insert the (2) screws through the Main PCB Board and into the standoffs as shown in ***Fig. 9-37***
4.	Place the Memory PCB Board down over the Main PCB Board so the the connectors mate and the standoffs are aligned with the mounting holes through the standoffs. ***Fig. 9-37***
5.	Secure one end of the Memory PCB Board with (2) screws previously removed and the opposite end from the underside of the Main PCB Board with (2) ea. screws and washers previously removed. ***Fig. 9-37***
6.	Reinstall the completed Main PCB assembly to the printer reversing the Steps prior to the Memory Board installation.
7.	Complete the Factory Reset Procedure.

PCMCIA Memory Expansion Installation

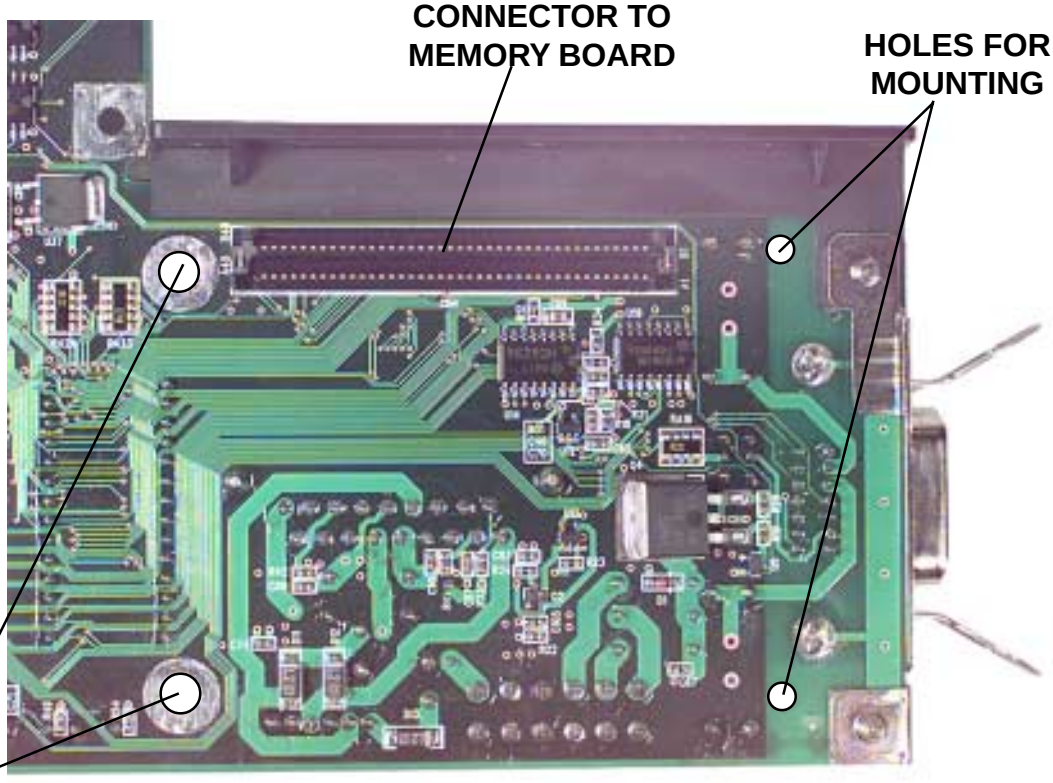


REMOVE (2) SCREWS, NUTS AND STANDOFFS. THIS HARDWARE WILL BE MOUNTED ON THE MAIN PCB BOARD (STEP 1)

Fig. 9-35

CONNECTOR TO MAIN PCB BOARD

REMOVE (2) SCREWS AND WASHERS FROM THIS END OF STANDOFFS (STEP 2)



CONNECTOR TO MEMORY BOARD

HOLES FOR MOUNTING

HOLES FOR MOUNTING

Fig. 9-36

MAIN PCB BOARD SHOWING WHERE THE MEMORY BOARD WILL BE INSTALLED

PCMCIA Memory Expansion Installation

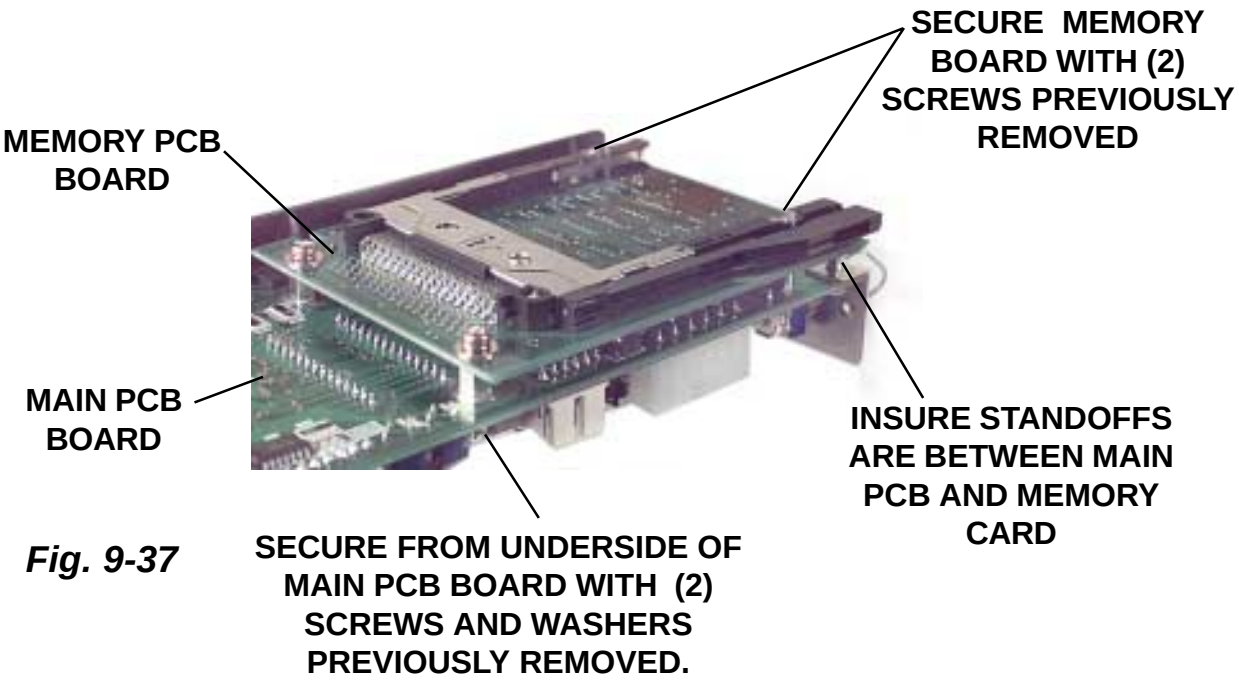
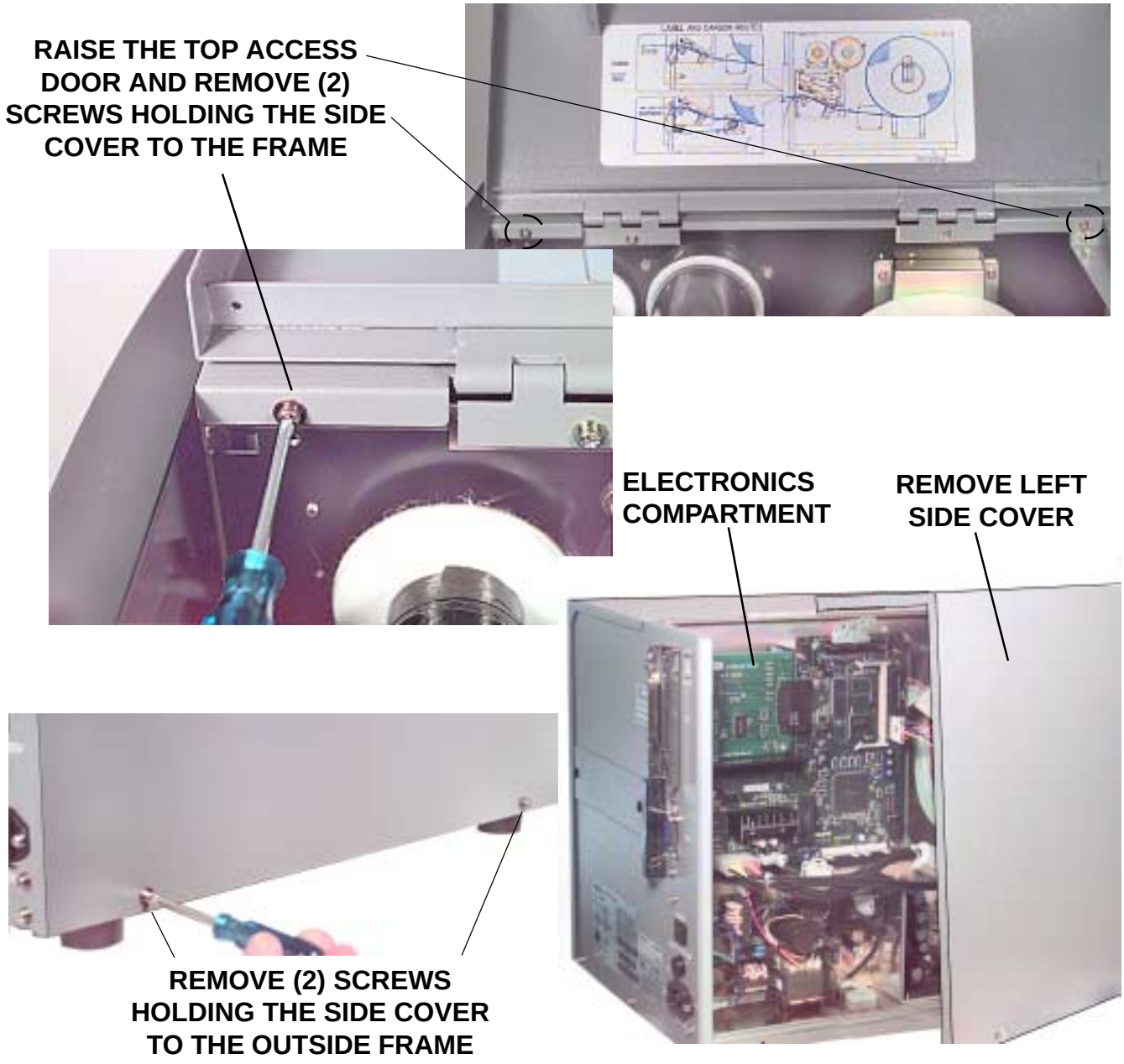


Fig. 9-37

9.5 Flash Memory Expansion Installation

STEP	PROCEDURE
1.	Turn the printer OFF and disconnect the AC power cord.
2.	Raise the access door and remove (2) screws holding the left side cover to the inside frame. ***Figs. 9-38***
3.	Remove (2) screws holding the left side cover to the outside frame. Remove the cover to expose the main PCB.

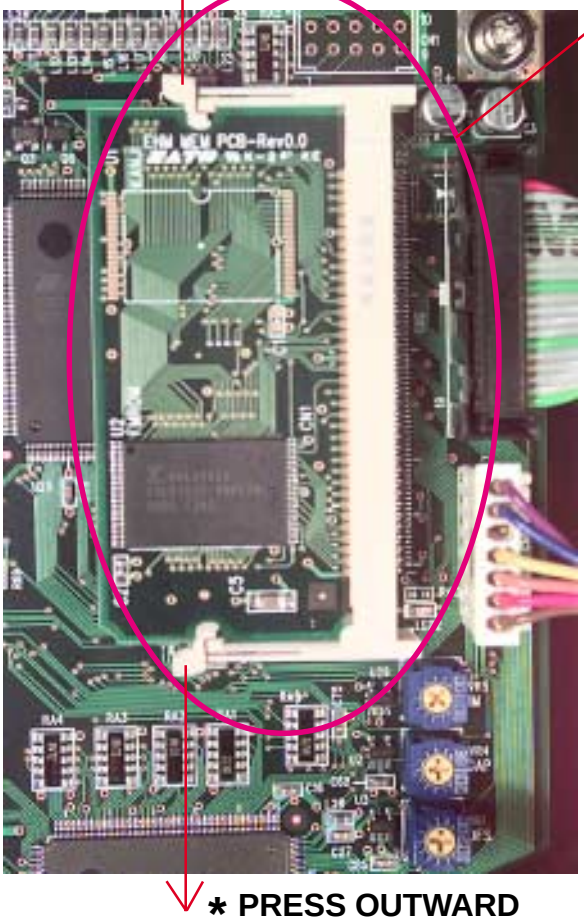


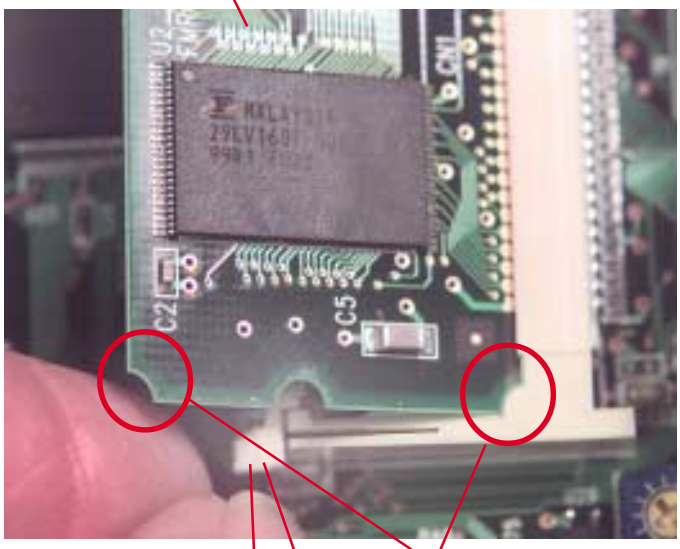
Figs. 9-38

Flash Memory Expansion Installation

NOTE: Many of the components on this board are susceptible to damage by static electricity. To avoid damage, do not unpack new circuit boards from anti-static bags until instructed to do so and use a wrist grounding strap.

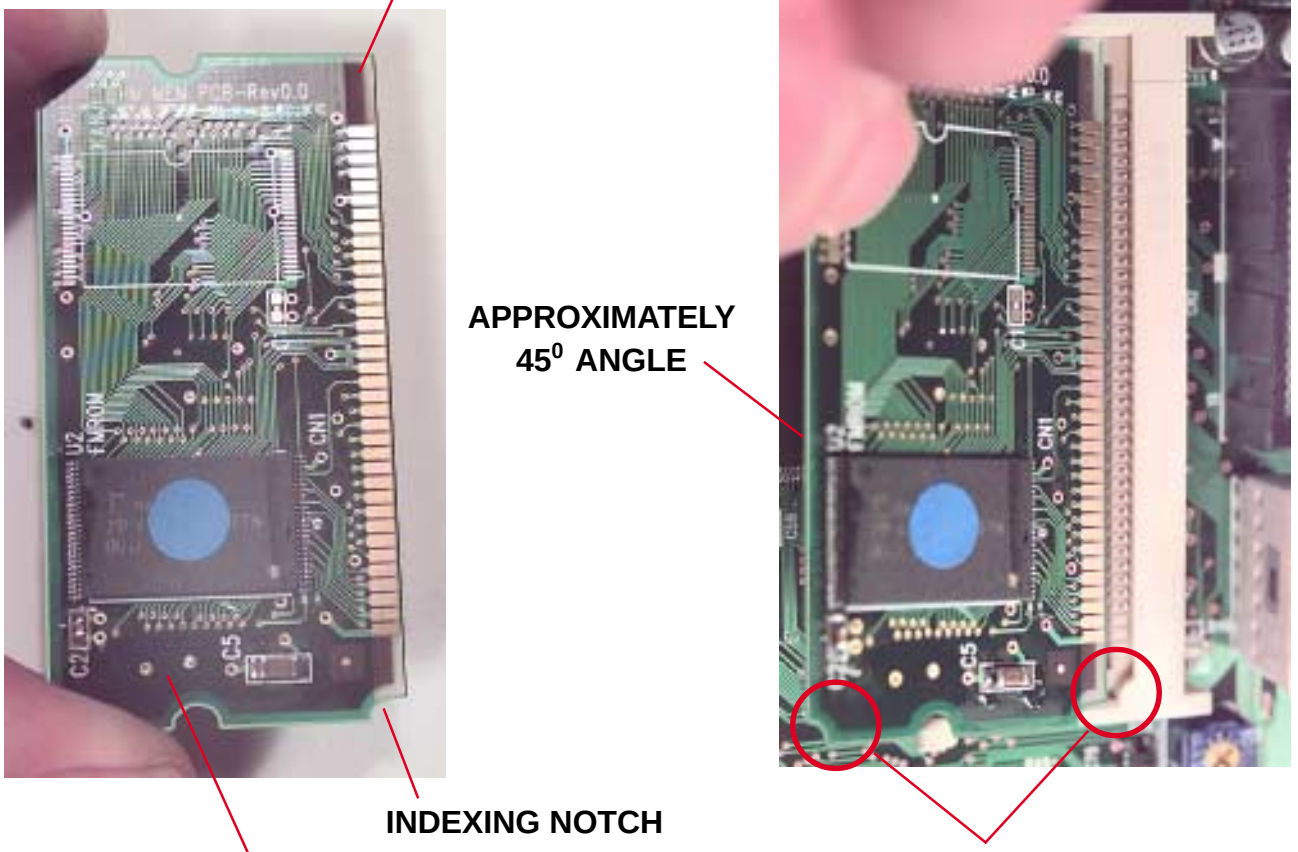
STEP	PROCEDURE
4.	Carefully press outward on the tabs on both ends of the Main PCB Board Memory Frame to release the Standard Memory PCB. The Standard Memory PCB should lift by itself when released. Remove the Memory PCB from the frame. Note the indexing notches. ***Figs. 9-39***
5.	Remove the Flash Memory Module from the anti-static bag handling the module by the edges. Note the indexing notches. Insert the module into the Main PCB Memory Frame at approximately 45^0 away from the Main PCB Board. Gently push down to snap into position. ***Figs. 9-40***
6.	Replace the cover reversing removal steps.
7.	Complete the Factory Reset Procedure.

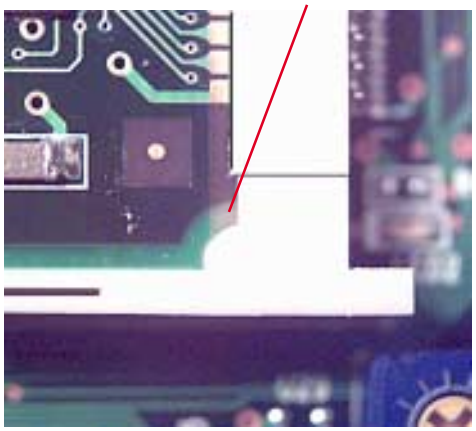




Figs. 9-39

Flash Memory Expansion Installation





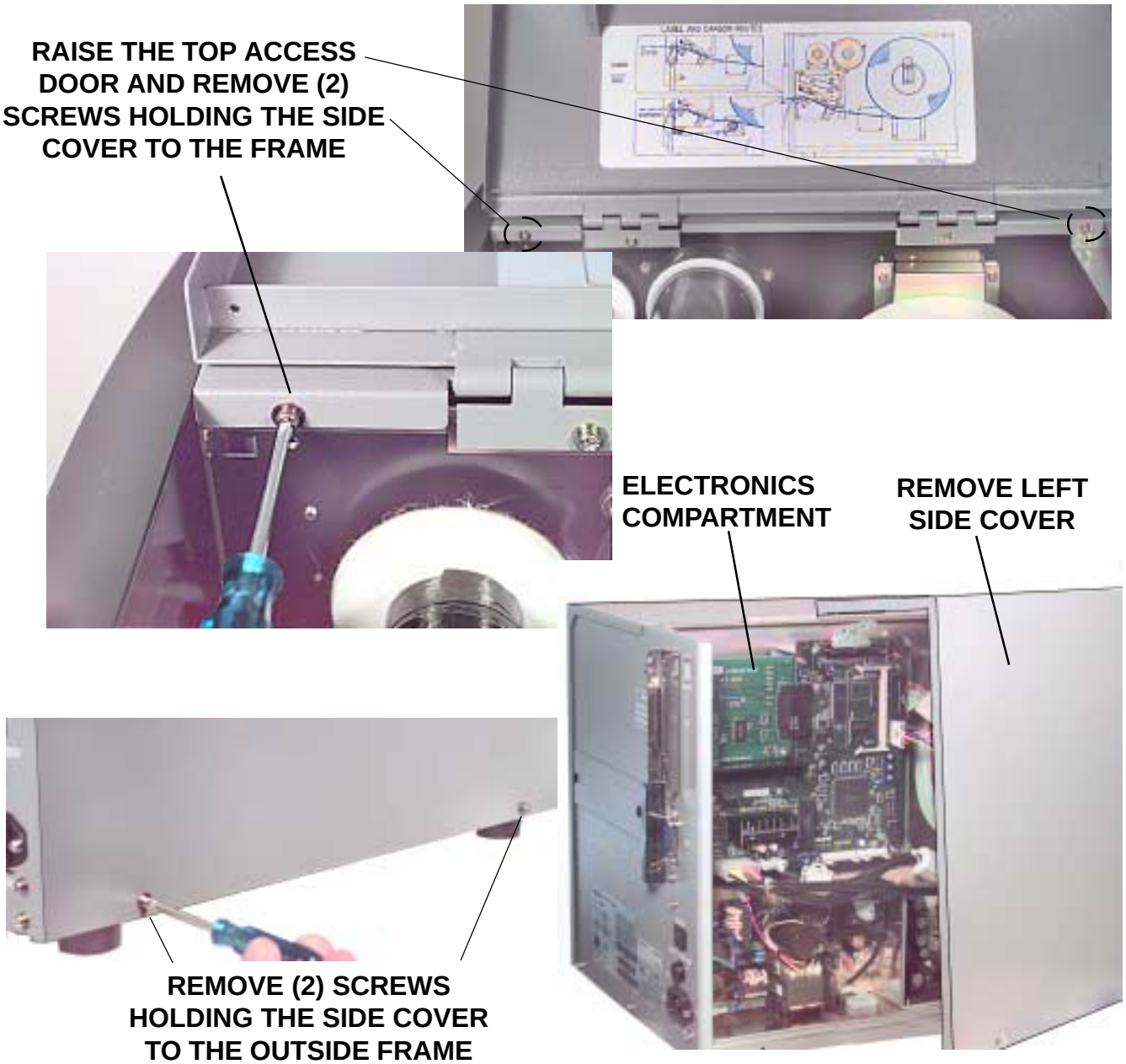
INSERT THE FLASH MEMORY MODULE INTO THE MAIN PCB MEMORY FRAME AT APPROXIMATELY 45⁰. NOTE THE INDEXING NOTCH ON THE MODULE. GENTLY PUSH DOWN TO SNAP INTO POSITION

Figs. 9-40

9.6 Real Time Clock Installation

The Real Time Clock Chip allows the date and time to be maintained in the local printer rather than using the system clock. It consists of a special clock chip that replaces the EEPROM chip on the main PCB.

STEP	PROCEDURE
1.	Turn the printer OFF and disconnect the AC power cord.
2.	Raise the access door and remove (2) screws holding the left side cover to the inside frame. ***Figs. 9-41***
3.	Remove (2) screws holding the left side cover to the outside frame. Remove the cover to expose the main PCB.

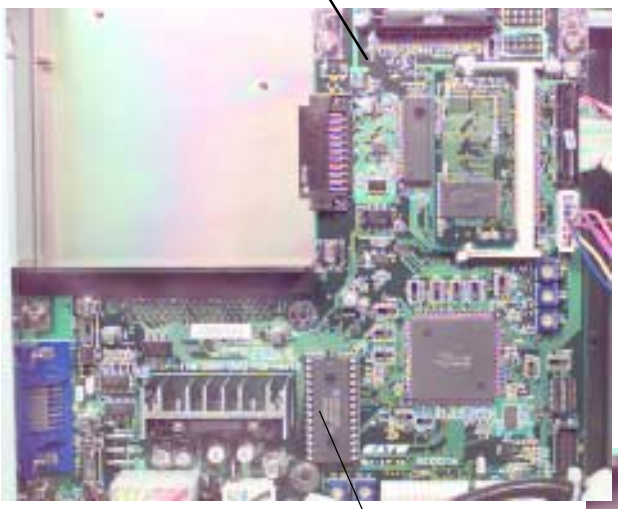


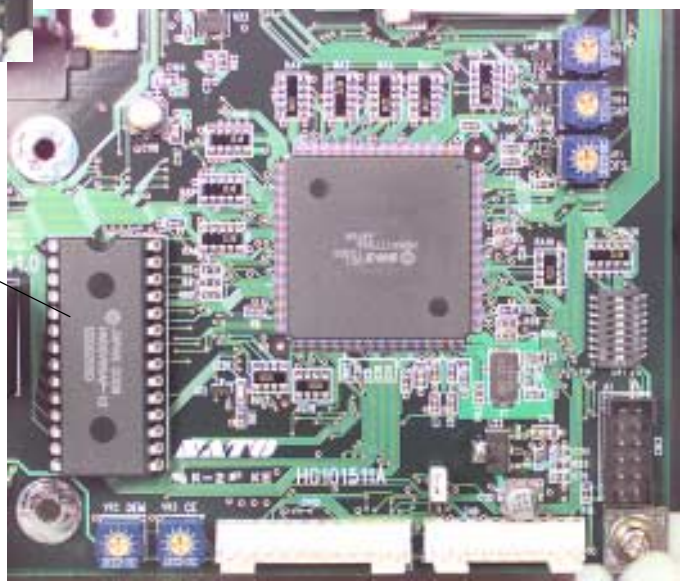
Figs. 9-41

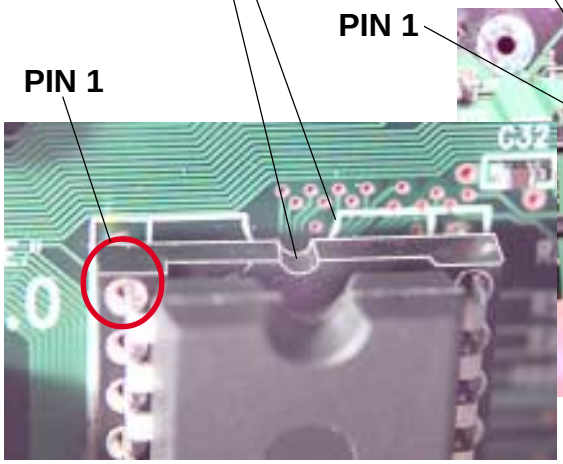
Real Time Clock Installation

STEP	PROCEDURE
1.	Refer to ***Figs. 9-42*** Remove the EEPROM chip. **CAUTION: Using a screwdriver to remove EEPROM may cause damage to the PCB. Be sure to have Prom remover under EEPROM and not under the socket itself.**
2.	Install the Real Time Clock Chip in location vacated by the EEPROM chip. Carefully align and insert the chip with the mark spot on the chip (identifying pin1) securely into the chip block socket using the “U” shaped notch as reference. Be very careful not to bend any chip legs.
3.	Replace the cover reversing the removal steps.
4.	Reattach and plug in the power cord. Perform the factory reset procedure to complete the installation of firmware and Real Time Clock Chip.

Real Time Clock Installation





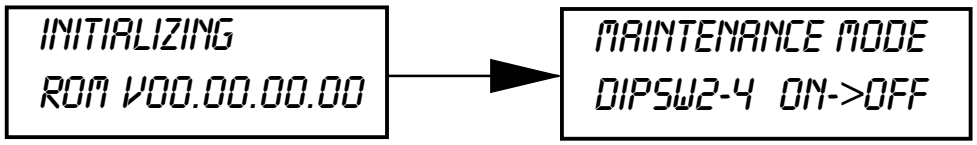


Figs. 9-42

Factory Reset Procedure

To reset the printer to the factory settings, perform the following steps.
Caution: Resetting the printer will clear all registers.

STEP	PROCEDURE
1.	Record all current dip switch positions, then place all switches in the **OFF** position.
2.	Place the **DSW2-4** in the **ON** or up postion.
3.	Press the **LINE and FEED** key while simultaneously turning **ON** the power switch. When the printer beeps, release the keys. The following screens will appear.



4.	Place the DSW-4 in the OFF postion and the following screen will appear.

5.	Press the **FEED** key to display the next screen.

6.	Press the **LINE** key once to change the message from **NONE** to **ALL**.

7.	Press the **FEED** key to clear the EEPROM. After a pause, the next screen will appear.

8.	Select the print label size by pressing the LINE key. The default is LARGE.
9.	Press the FEED key for a test print. Press the FEED key again to stop printing.

Warning: This test activates all the heating elements on the print head and therefore should be used for testing purposes only with full width labels to avoid damaging the print head.

10.	Verify that the counters on the test print have reset to 0.0 km.
11.	Power OFF the printer and confirm that all switches are in the OFF or down position.

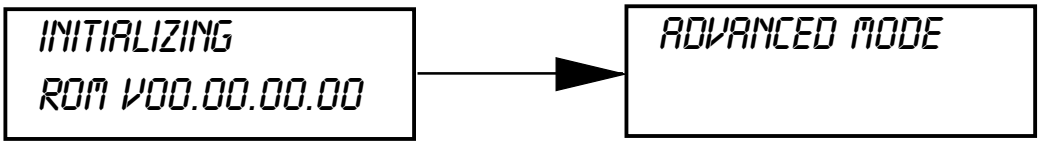
Set Calendar

After the Real Time Chip has been installed you must enter the Advance Mode to set the Calendar. Several steps are necessary in the Advanced Mode to get to the Calendar screen. For a full description of the steps in the Advanced mode leading to the Calendar screen refer to the Section 2 in the Service Manual.

The following steps will take you to the Calendar screen where you can input the settings:

***To Enter Advanced Mode*:**

STEP	PROCEDURE
	Press the LINE key while simultaneously turning the power on. When the printer emits one long beep, release the LINE key to display the first screen.



Press the FEED key 11 times to display the “Set Calendar” display.

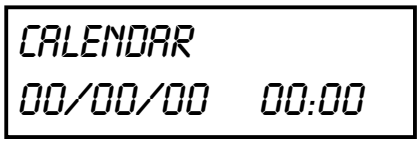
Set Calendar

This message will only be displayed if the Calendar Option is installed in the printer.

The Calendar is an optional feature in CL408e/CL412e and CL608e/CL612e printers allowing the date and time to be set manually using the LCD Display or via the <ESC>WT Calendar Set command (SATO Programming Language). The last setting, set either manually via software command, received by the printer will be the value used. The format of the display is YY/MM/DD hh:mm (Year/Month/Day/hours:minutes). The date format is fixed and cannot be changed.

To enable the Calendar feature (if installed), press the LINE key until the underline cursor is beneath the YES. If the Calendar feature is to be disabled, press the LINE key until the cursor is underneath the NO. When the desired setting is selected, Press the FEED key.

Calendar
00/00/00 00:00



Set Calendar (Cont)

STEP	PROCEDURE
1.	Year - The first display shown will have the two digit year selection underlined. You can scroll through the dates by pressing the LINE key. The year number will increase by one each time the LINE key is pressed until it reaches its maximum leagal value (i.e., "99" for the year digits) at which point it will wrap around to the "00" setting.
2.	Month - After you have set the correct year, pressing the FEED key will advance the underline cursor to the two digit Month position. You can scroll through the numbers corresponding to the month by pressing the LINE key. The month number will increase by one each time the LINE key is pressed until it reaches a value of "12" at which point it will wrap around to the "01" setting.
3.	Day - After you have set the correct month, pressing the FEED key will advance the underline cursor to the two digit Day position. You can scroll through the numbers corresponding to the month date by pressing the LINE dey. The date number will increase by one each time the LINE key is pressed until it reaches a value of "31" at which point it will wrap around to the "01" setting.
4.	Hour - After you have set the correct date, pressing the FEED key will advance the underline cursor to the two digit Hour position. You can scroll through the numbers corresponding to the hour (using a 24 hour clock) by pressing the LINE key. The hour number will increase by one each time the LINE key is pressed until it reaches a value of "24" at which point it will wrap around to the "01" setting.
5.	Minute - After you have set the correct hour, pressing the FEED key will advance the underline cursor to the two digit Minute position. You can scroll through the numbers corresponding to the hour by pressing the LINE key. The minute number will increase by one each time the line key is pressed until it reaches a value of "60" at which point it will wrap around to the "01" setting.
6.	After you have set the minutes, pressing the FEED key will accept the setting. Power Off the printer to exit.

Section

10

Spare Parts List

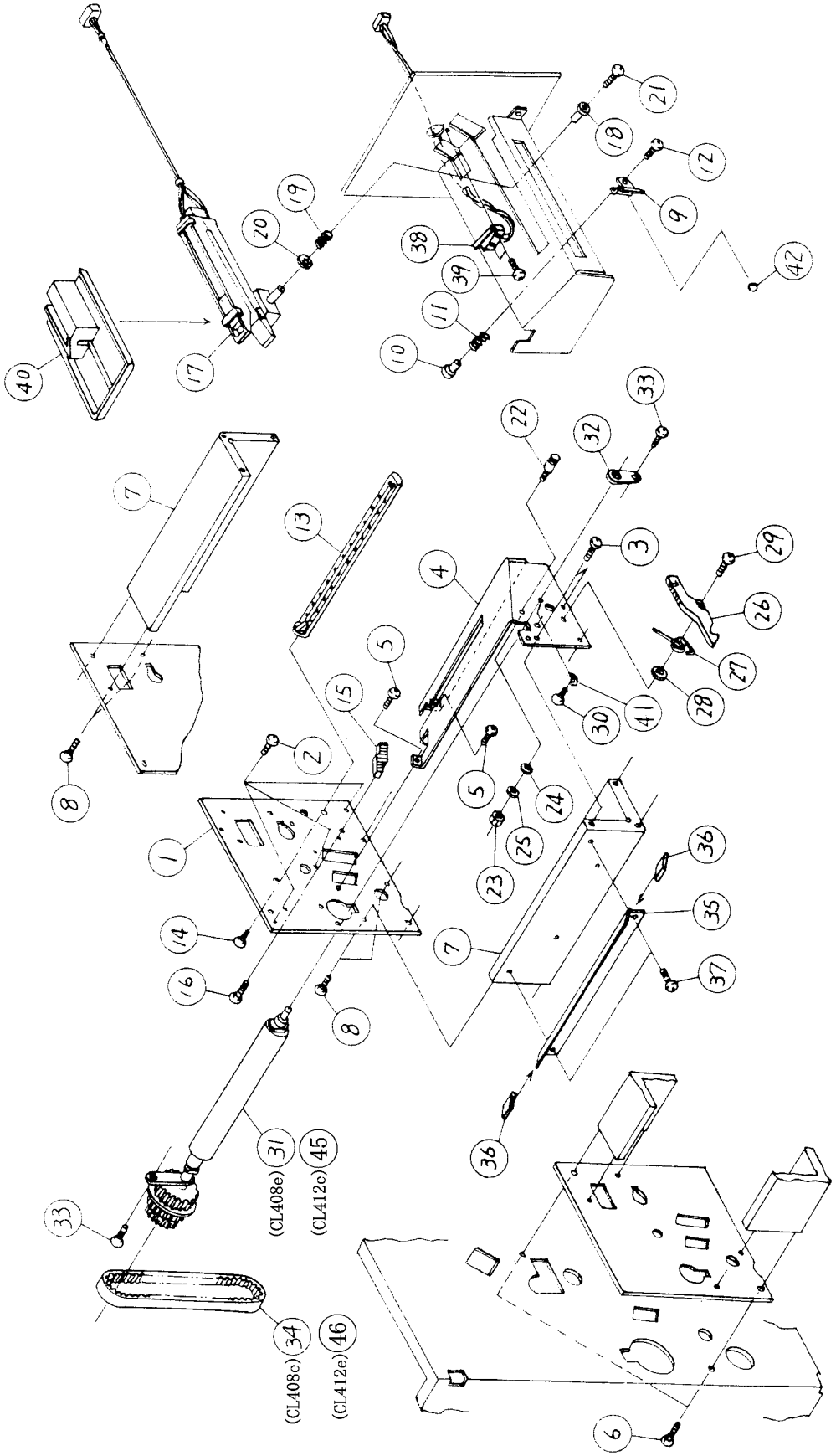
10.1 Overview

The following parts lists are included for the CL408e/CL412e Printers:

- *Frame Assembly*
- *Print Head Assembly*
- *Ribbon Assembly*
- *Base Cover Assembly*
- *Main PCB Assembly*
- *Interface Options*
- *PCMCIA Memory Option*
- *Cutter Assembly Option*
- *Dispenser Assembly Option*

Note:
The spare parts information in this manual is accurate at the time of publication of this service manual and is subject to change without notice.

10.2 Frame Assembly



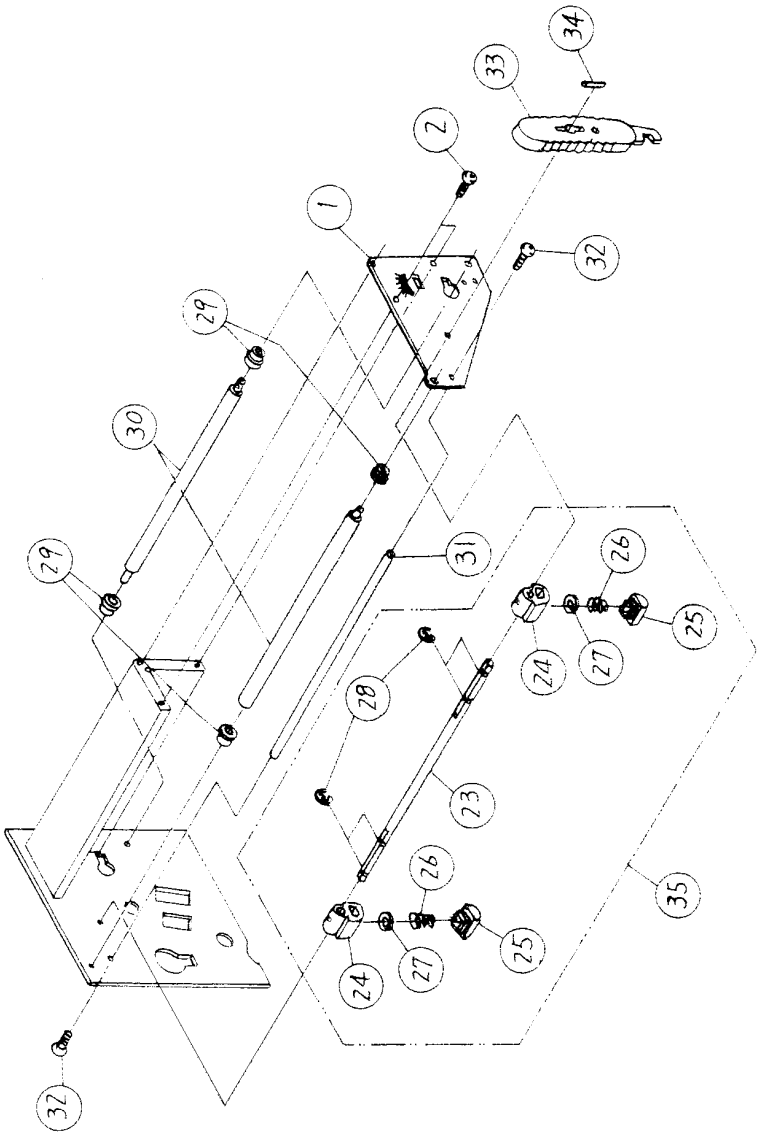
Frame Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
1	PA1772700	ENGINE FRAME	1
2	MD4300621	PAN HEAD SCREW	3
3	MD3401021	PAN HEAD SCREW	2
4	PA1772800	SIDE FRAME	1
5	MD4300621	PAN HEAD SCREW	2
6	MD4401021	PAN HEAD SCREW	2
7	PD1770100	STAY	2
8	MD4401021	PAN HEAD SCREW	4
9	PA1773100	GUIDE PLATE	1
10	PB2770200	COLLAR	1
11	PC1770100	SPRING (GUIDE)	1
12	MD4301422	PAN HEAD SCREW	1
13	PE5680000	GUIDE SHAFT	1
14	MH0301221	P-TIGHT SCREW	1
15	PE1770300	GUIDE BLOCK	1
16	MH0300821	P-TIGHT SCREW	1
17	PR7770100	PITCH SENSOR SUB	1
18	PE2770500	COLLAR	1
19	PC1770100	SPRING (GUIDE)	1
20	PE2770400	COLLAR	1
21	MH0300821	P-TIGHT SCREW	1
22	PB0770500	POST	1
23	MT1400722	HEX NUT	1

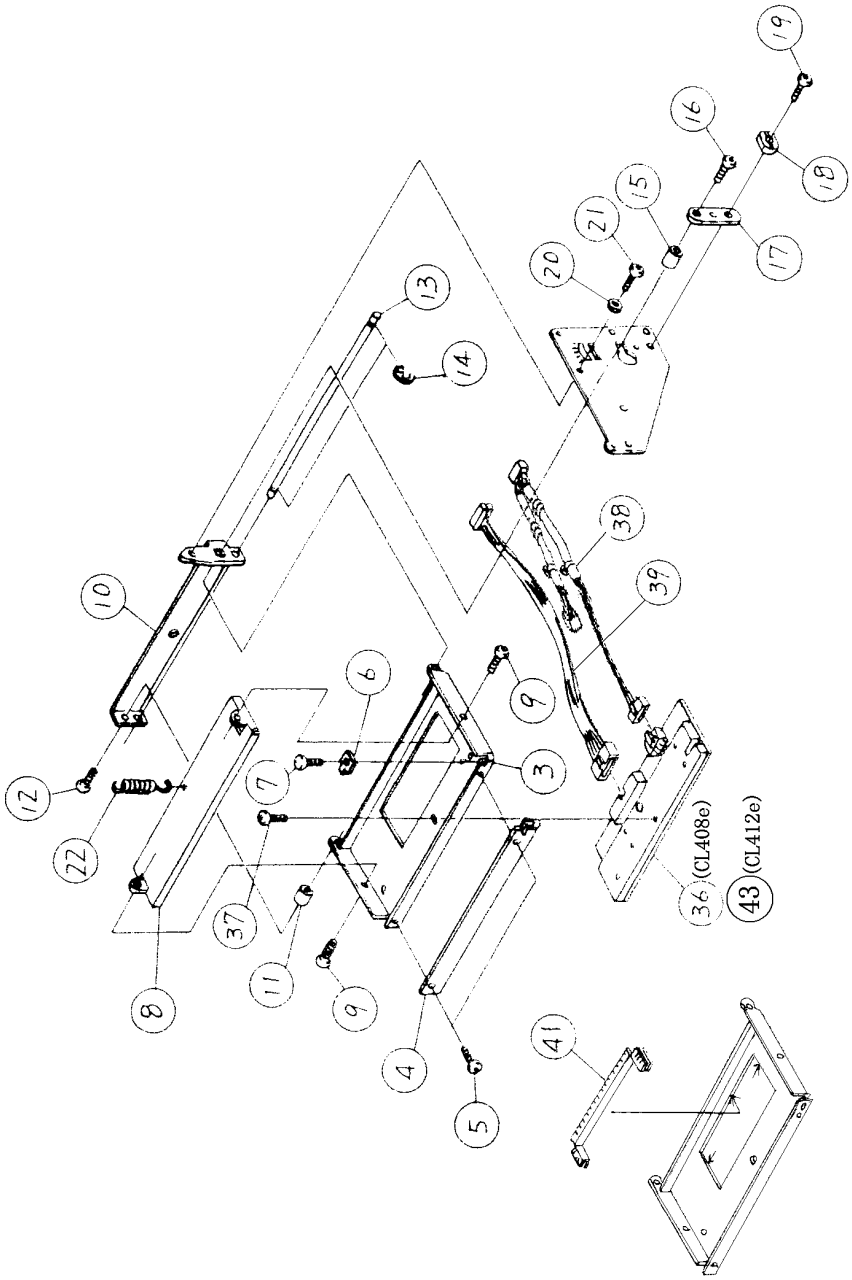
Frame Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
24	NA1040022	PLAIN WASHER	1
25	NB0040022	SPRING WASHER	1
26	PE1770400	LATCH HANDLE	1
27	PC2770100	SPRING (LATCH HANDLE)	1
28	PB2770100	COLLAR	1
29	MD4401421	PAN HEAD SCREW	1
30	MD4300821	PAN HEAD SCREW	1
31	PR7770200	PLATEN (CL408E)	1
32	PA1770800	CLAMP (B)	1
33	MD4300621	PAN HEAD SCREW	2
34	PT8127064	TIMING BELT (CL408E)	1
35	PA1773200	TEAR-OFF CUTTER	1
36	PE1770800	CUTTER PROTECTOR	2
37	MD4300821	PAN HEAD SCREW	2
38	RH1770800	HEAD OPEN SW	1
39	MD3201221	PAN HEAD SCREW	2
40	PE6770900	PAPER GUIDE	1
41	NA1030022	PLAIN WASHER	1
45	PR7771000	PLATEN ROLLER SUB (CL412e)	1
46	PT8130064	TIMING BELT (CL412e)	1

10.3 Print Head Assembly



Print Head Assembly



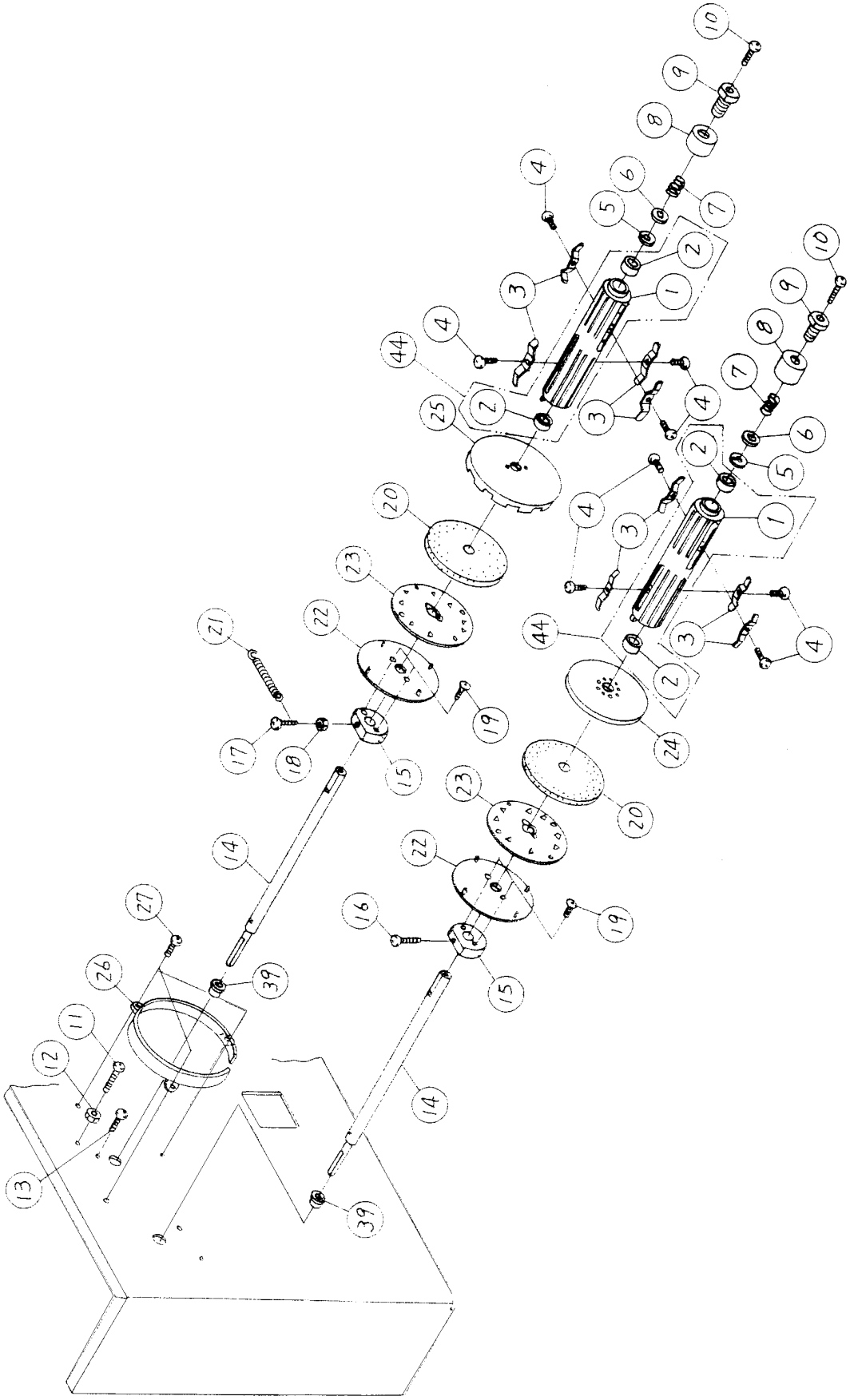
Print Head Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
1	PA1772000	HEAD FRAME	1
2	MD4401021	PAN HEAD SCREW	2
3	PA1772500	HEAD BRACKET	1
4	PA1771900	PLATE (RIBBON ADJUST)	1
5	MD4300621	PAN HEAD SCREW	2
6	PA1772300	ADJUST PLATE (A)	1
7	MD4300621	PAN HEAD SCREW	1
8	PA1771800	HEAD SUB BRACKET	1
9	MD4300621	PAN HEAD SCREW	2
10	PA1770600	ADJUST PLATE (B)	1
11	PB2770300	COLLAR	1
12	MA0401021	PAN HEAD SCREW	1
13	PB0770700	SHAFT (HEAD ADJUST)	1
14	ND0020030	E-SNAP RING	2
15	PB2770100	COLLAR	1
16	MD4401421	PAN HEAD SCREW	1
17	PA1771500	ADJUST PLATE	1
18	PL2720100	ADJUST COLLAR	1
19	MD4300821	PAN HEAD SCREW	1
20	NA1040022	PLAIN WASHER	1
21	MD4300821	PAN HEAD SCREW	1
22	PC0770100	SPRING	1
23	PB0770600	SHAFT (HEAD PRESSURE)	1

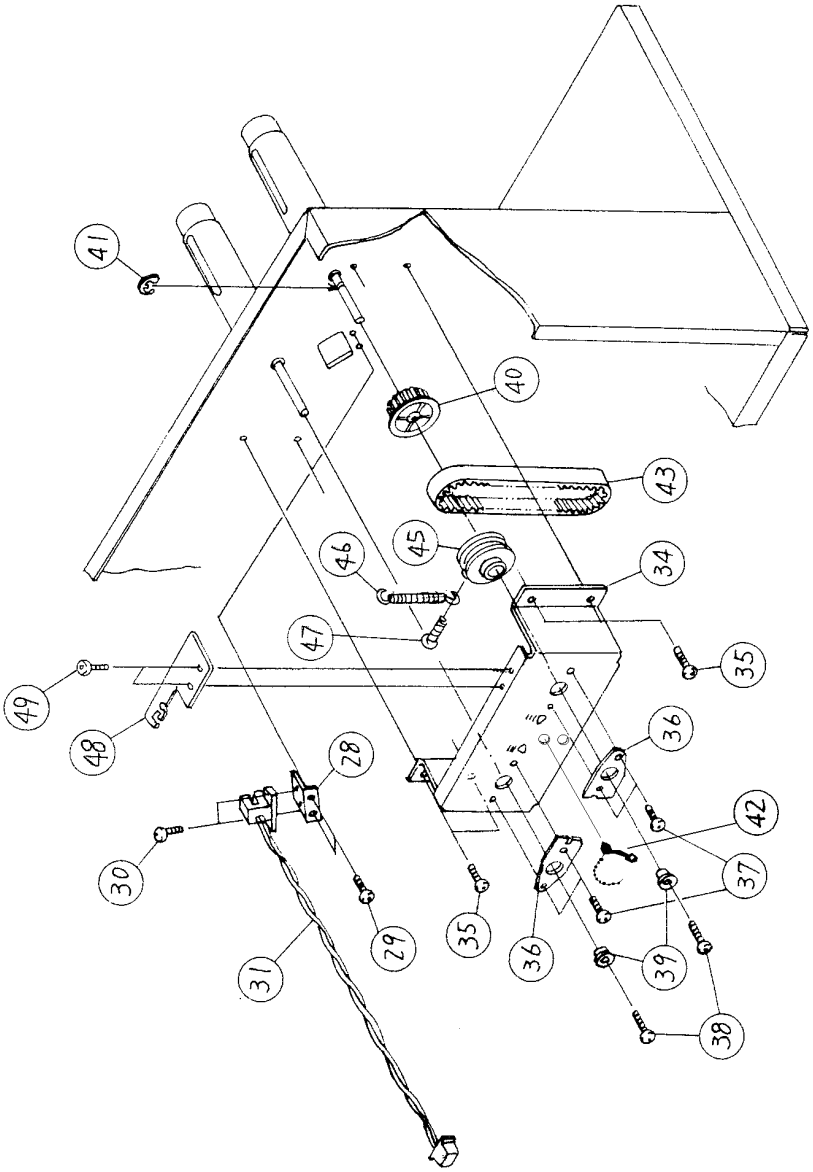
Print Head Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
24	PE1740100	HEAD PRESSURE BRACKET	2
25	PE1740200	HEAD TENSION PIN	2
26	PC1770200	SPRING (HEAD)	2
27	PA0740100	PRESSURE PLATE	2
28	ND0060030	E-SNAP RING	4
29	PE2770300	COLLAR	4
30	PB3770100	ROLLER	4
31	PB0770300	SHAFT (SUPPORT)	1
32	MD4300621	PAN HEAD SCREW	2
33	PR7770600	LATCH HANDLE	1
34	NG2201230	PIN	1
35	PR7770700	HEAD PRESSURE SET	1
36	GH000531A	PRINT HEAD (CL408e)	1
37	MD4300621	PAN HEAD SCREW	1
38	RH1775100	CABLE ASSY, PRINTHEAD	1
39	RH1775201	CABLE ASSY, PRINTHEAD	1
41	PV9740300	BUSHING	1
43	GH000771A	PRINT HEAD (CL412e)	1

10.4 Ribbon Assembly



Ribbon Assembly



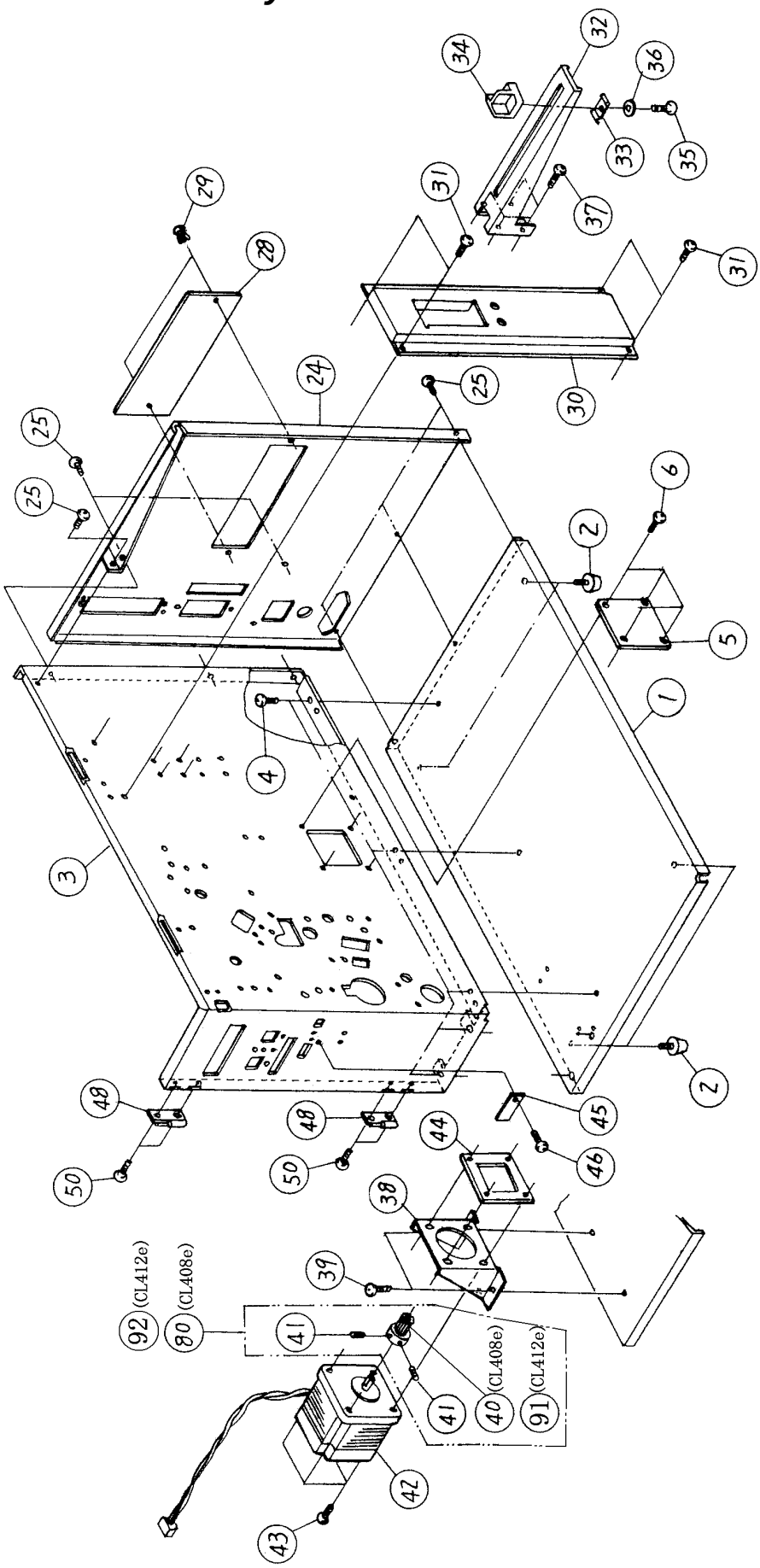
Ribbon Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
1	PE4730100	RIBBON BOSS	2
2	PE2720100	COLLAR	4
3	PA4690900	SPRING	8
4	MH0300521	P-TIGHT SCREW	8
5	PT2301020	OILLESS DRY METAL	2
6	PA0680400	DISC	2
7	PC1730100	SPRING	2
8	PE2730100	STOPPER COLLAR	2
9	PB5730100	ADJUST SCREW	2
10	MA0303022	PAN HEAD SCREW	5
11	MA1300822	FLAT HEAD SCREW	1
12	MT1300522	HEX NUT	1
13	MD4300621	PAN HEAD SCREW	1
14	PB0771101	RIBBON (SHAFT)	2
15	PE4720200	PLATE HOLDER BOSS	2
16	MA0301821	PAN HEAD SCREW	1
17	MA0302522	PAN HEAD SCREW	1
18	MT1300522	HEX NUT	1
19	MH1250621	P-TIGHT SCREW	4
20	PA0680300	LINING	2
21	PC0740200	SPRING	1
22	PA0730100	GUIDE PLATE	2
23	PA0730200	HOLD PLATE	2

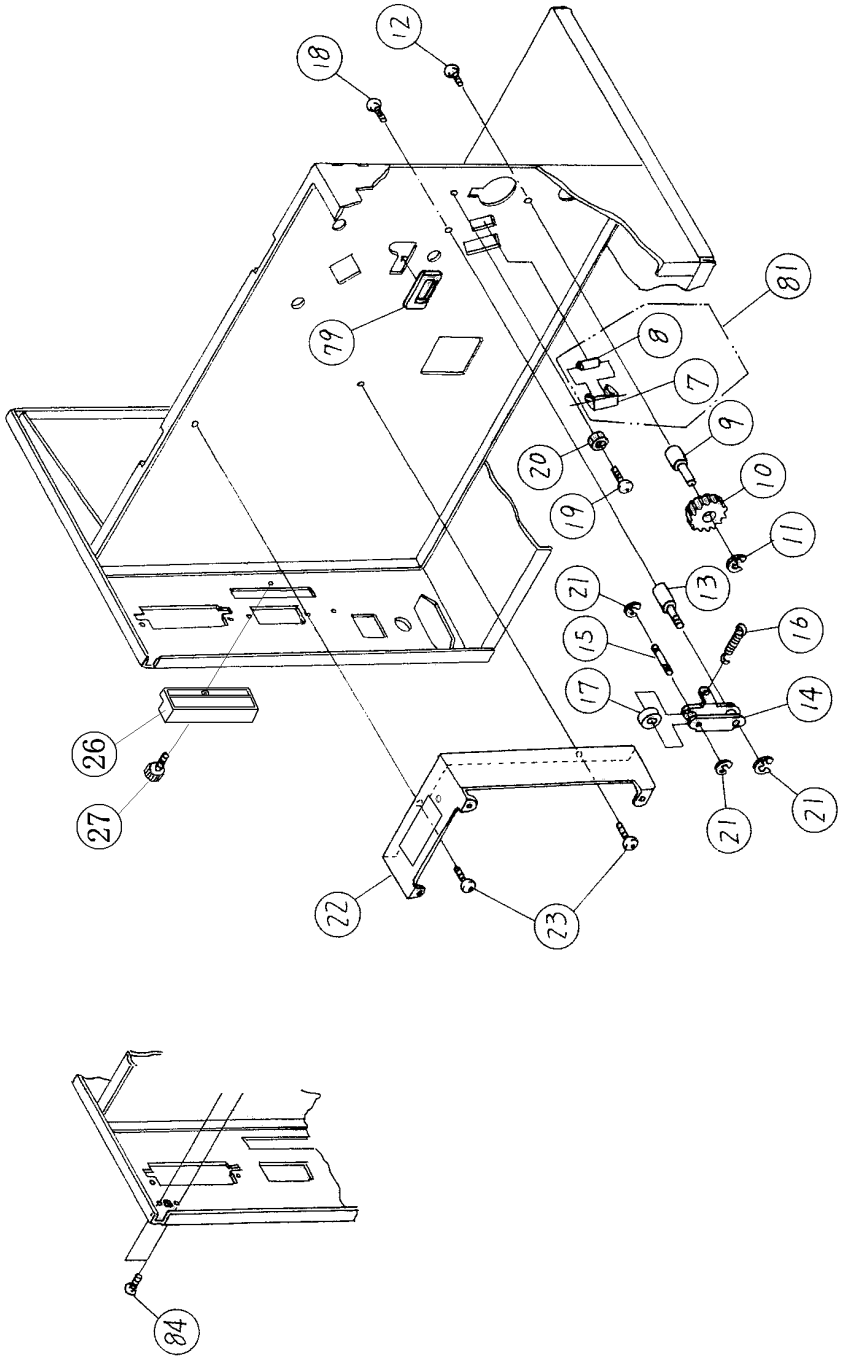
Ribbon Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
24	PE1681100	GUIDE PLATE (B)	1
25	PE7720100	DISC PLATE (A)	1
26	PE6720100	DISC PLATE COVER	1
27	MD4300621	PAN HEAD SCREW	3
28	PA1770500	SENSOR BRACKET	1
29	MD4300621	PAN HEAD SCREW	1
30	MA0300621	PAN HEAD SCREW	2
31	RH1740400	RIBBON SENSOR (SEN4)	1
34	PA1772600	RIBBON FRAME	1
35	MD4300621	PAN HEAD SCREW	4
36	PA1771700	ADJUST PLATE	2
37	MD4300621	PAN HEAD SCREW	4
38	MD4401021	PAN HEAD SCREW	2
39	PT1112080	BALL SUPPORTER	4
40	PR1720400	PULLEY (50)	1
41	ND0060030	E-SNAP RING	1
42	JG100501A	PUSH BUTTON WIRE TIE	1
43	PT8170064	TIMING BELT	1
44	PR1730900	RIBBON BOSS	2
45	PR1770100	PULLEY	1
46	PC0740200	SPRING (BACK)	1
47	MH0300821	P-TIGHT SCREW	1
48	PA2771300	SPRING BRACKET	1
49	MD4300621	PAN HEAD SCREW	2

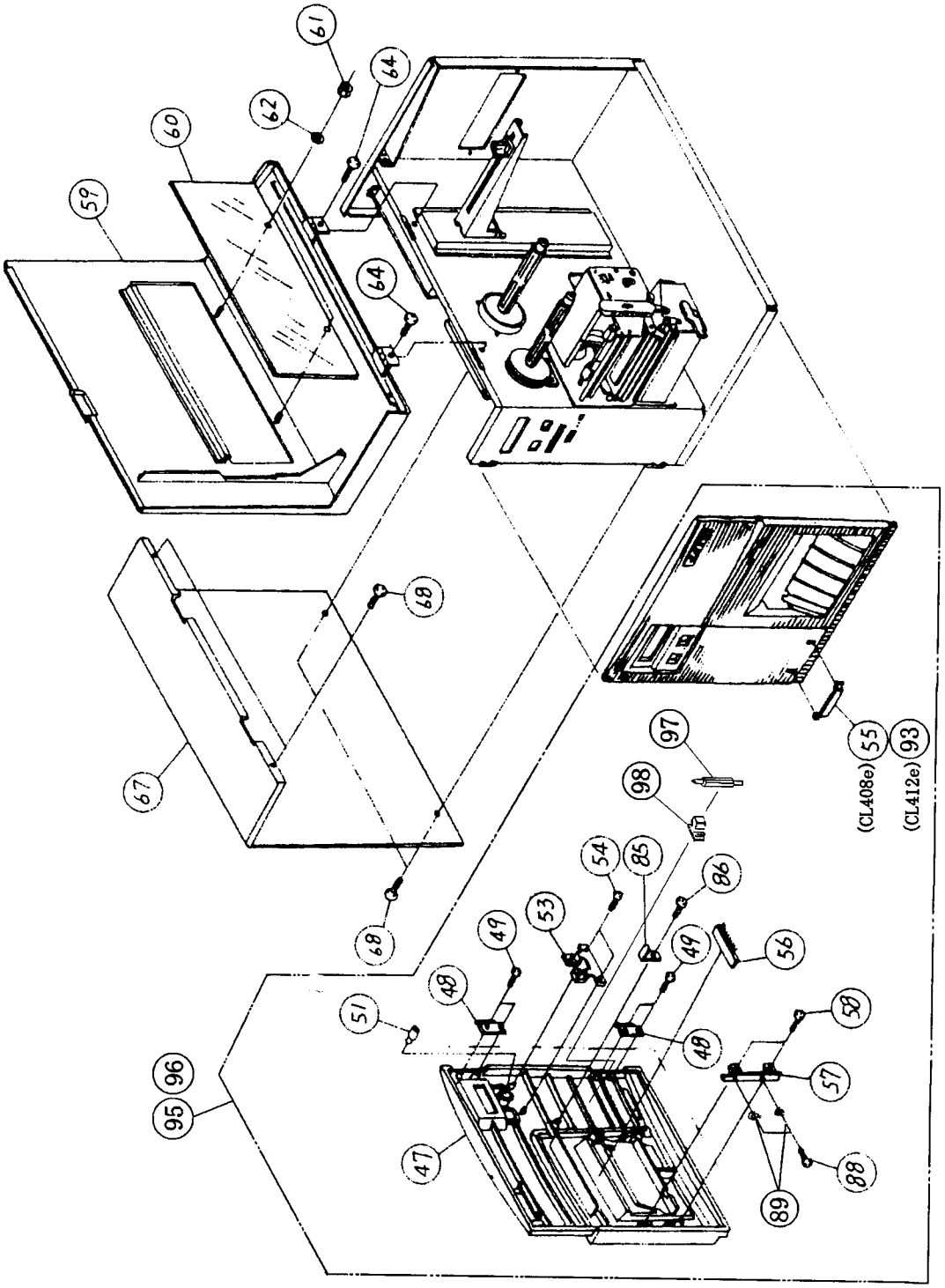
10.5 Base Cover Assembly



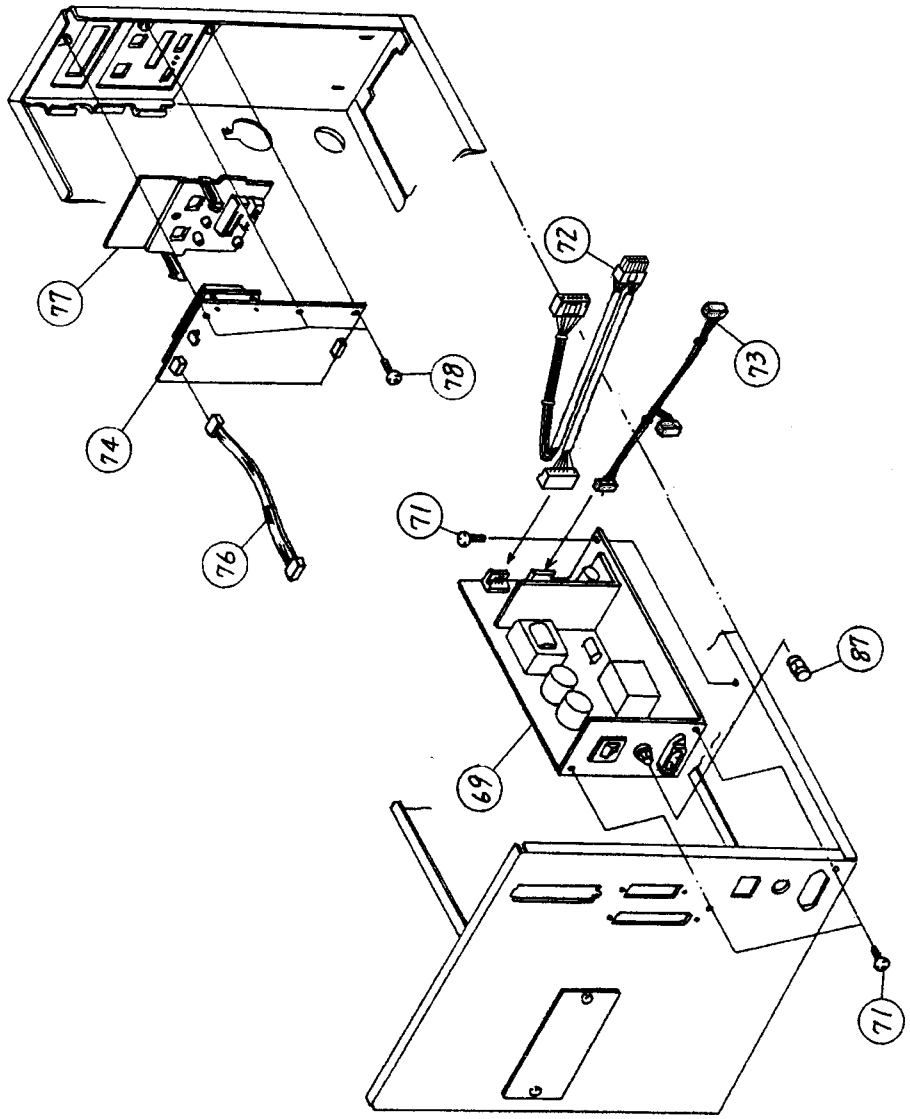
Base Cover Assembly



Base Cover Assembly



Base Cover Assembly



Base Cover Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
1	PR3770500	BASE FRAME	1
2	PT6680100	RUBBER FOOT	4
3	PZ0771500	CENTER FRAME	1
4	MD4401021	PAN HEAD SCREW	5
5	PA1771000	LID	1
6	MD4300621	PAN HEAD SCREW	4
7	PE1770200	ROLLER BRACKET	1
8	PE3770100	ROLLER	1
9	PB0770100	POST	1
10	PE8770100	GEAR	1
11	ND0040030	E-SNAP RING	1
12	MD4401021	PAN HEAD SCREW	1
13	PB0770400	POST	1
14	PA3741800	TENSION BRACKET	1
15	PB0740900	SHAFT (TENSION ROLLER)	1
16	PC0740100	SPRING (TENSION)	1
17	PE3720100	TENSION ROLLER	1
18	MD4300621	PAN HEAD SCREW	1
19	MD4301422	PAN HEAD SCREW	1
20	MT1300522	HEX NUT	1
21	ND0040030	E-SNAP RING	3
22	PA1775400	PCB BRACKET	1
23	MD4300621	PAN HEAD SCREW	2
24	PZ0771000	REAR COVER	1
25	MD4300621	PAN HEAD SCREW	6
26	PE6771001	MEMORY CARD COVER	1
27	PB5A20001	PAN HEAD SCREW	2
28	PH3683802	LID	1
29	PT9520100	NYLON RIVET	2
30	PA1772100	GUIDE PLATE	1
31	MD4300621	PAN HEAD SCREW	4
32	PA1773500	UNWIND BRACKET	1
33	PA4520300	STOPPER SPRING	1
34	PE1720300	LABEL STOPPER	1
35	MH0300821	P-TIGHT SCREW	1
36	NA1030022	PLAIN WASHER	1

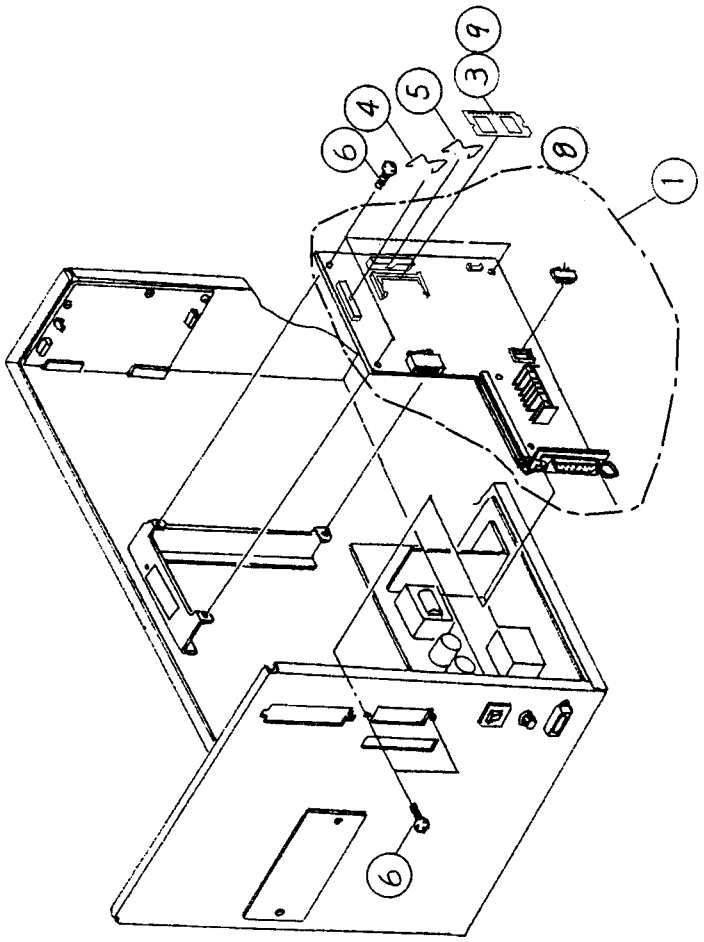
Base Cover Assembly

ITEM NO.	CODE	DESCRIPTION	QTY
37	MD4300621	PAN HEAD SCREW	4
38	PA2770200	MOTOR BRACKET	1
39	MD4401021	PAN HEAD SCREW	2
40	PL1770100	MOTOR PULLEY (CL408e)	1
41	MJ1400524	W-POINT SCREW	2
42	RH1770300	STEPPING MOTOR	1
43	MD3401221	PAN HEAD SCREW	4
44	PA1771400	PLATE NUT	1
45	PE6770200	CONNECTOR COVER	1
46	MD4300621	PAN HEAD SCREW	1
47	P20770400	FRONT COVER	1
48	PT3770100	HINGE	2
49	MH1300821	P-TIGHT SCREW	4
50	MA1300622	FLAT HEAD SCREW	4
51	PE6770400	LENS	1
53	PE6770300	SWITCH BUTTON	1
54	MH0300821	P-TIGHT SCREW	2
55	PZ0771300	LOGO PLATE (CL408e)	1
56	PR1340500	ANTI-STATIC BRUSH	1
57	PA1773000	LATCH BRACKET	1
58	MH0300821	P-TIGHT SCREW	2
59	PR3770100	COVER RH	1
60	PH2720100	WINDOW	1
61	MT1300522	HEX NUT	2
62	NA1030022	PLAIN WASHER	2
64	MD4300621	PAN HEAD SCREW	2
67	PH1770100	COVER LH	1
68	MD4300621	PAN HEAD SCREW	4
69	KA500631A	POWER SUPPLY UNIT (115V)	1
71	MD4300821	PAN HEAD SCREW	3
72	RH1771700	POW 1 CABLE	1
73	RH1770600	POW 2 CABLE	1
74	RJ1771501	DISPLAY PCB	1
76	RH1770500	KB CABLE SET	1
77	PE6770600	KB PROTECTOR	1

Base Cover Assembly

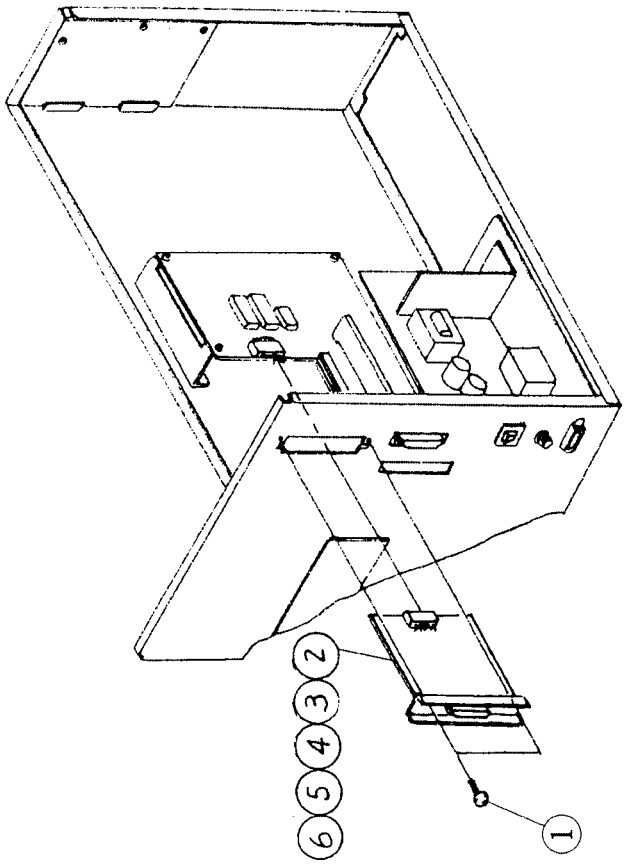
ITEM NO.	CODE	DESCRIPTION	QTY
78	MD4300621	PAN HEAD SCREW	3
79	PE6770700	CABLE PROTECTOR	1
80	PR7770300	MOTOR PULLEY SET (CL408e)	1
81	PR7770400	GUIDE ROLLER	1
84	MD3201221	PAN HEAD SCREW	2
85	PA1772900	SENSOR SLIT	1
86	MH0300821	P-TIGHT SCREW	1
87	HD100321A	FUSE (250V 3.15A)	1
88	MD4300621	PAN HEAD SCREW	2
89	NA1030022	PLAIN WASHER	2
91	PL1770200	MOTOR PULLEY (CL412e)	1
92	PR7771100	MOTOR PULLEY SET (CL412e)	1
93	PZ0771400	LOGO PLATE (CL412e)	1
95	PR7773500	COVER FRONT SUB (CL408e)	1
96	PR7773600	COVER FRONT SUB (CL412e)	1
97	PE6A21900	MICRO DRIVER	1
98	JG100551A	CK CLAMP	1

10.6 Main PCB Assembly



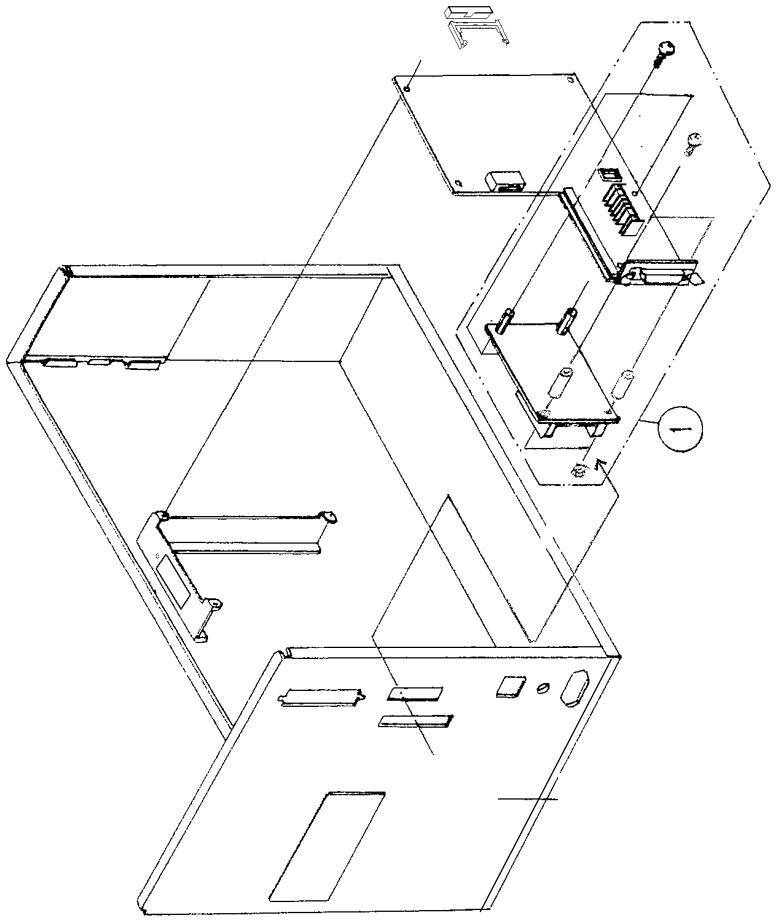
ITEM NO.	CODE	DESCRIPTION	QTY
1	RJ1771200	MAIN PCBA	1
3	RJ7770200	MEMORY PCB	1
4	PC9730100	SPRING	1
5	PC9680000	SPRING	1
6	MD4300621	PAN HEAD SCREW	5
9	RJ7770300	MEMORY PCB (4MB UPGRADE OPTION)	1

10.7 Interface Options



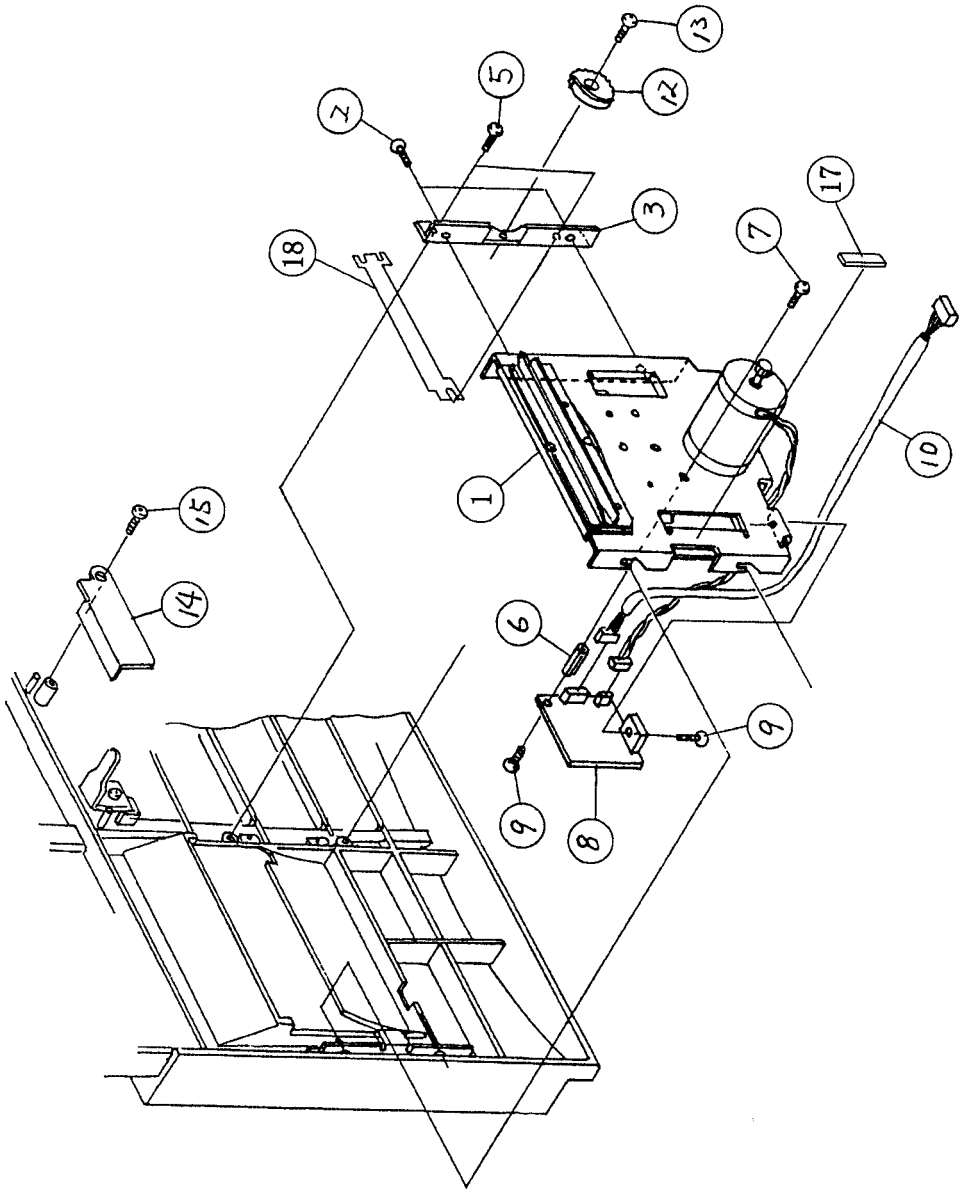
ITEM NO.	CODE	DESCRIPTION	QTY
1	MD3300622	SCREW	2
2	WCL404070	IEEE-1284 PARALLEL INTERFACE	1
3	WCL404051	SERIAL INTERFACE	1
4	WCL404060	USB INTERFACE	1
5	11S000158	ETHERNET INTERFACE	1
6	11S000136	CX/TX INTERFACE	1

10.8 PCMCIA Memory Option



ITEM NO.	CODE	DESCRIPTION	QTY
1	RJ4770100	PCMCIA 16 MB MEMORY OPTION KIT	1

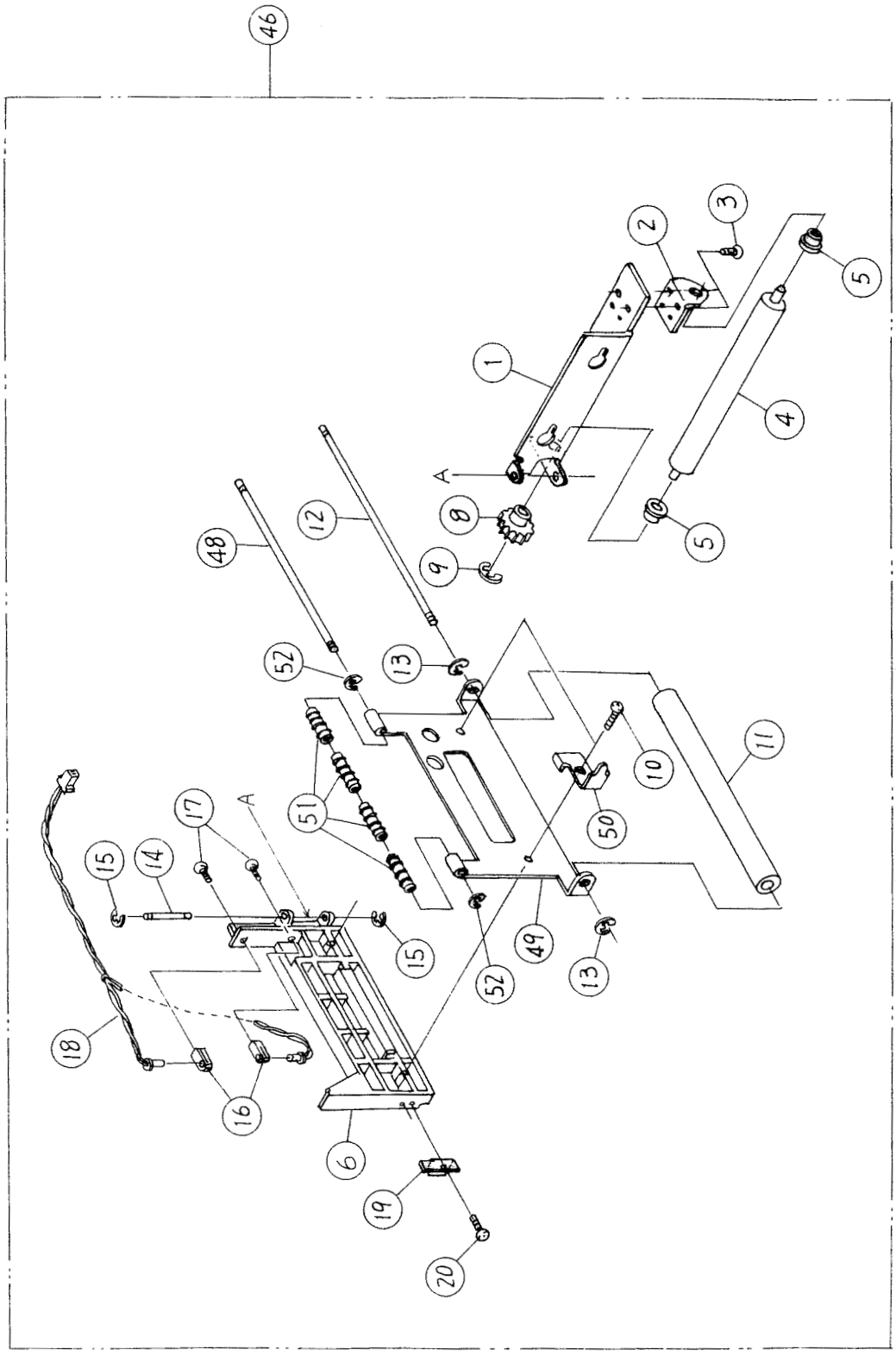
10.9 Cutter Assembly Option



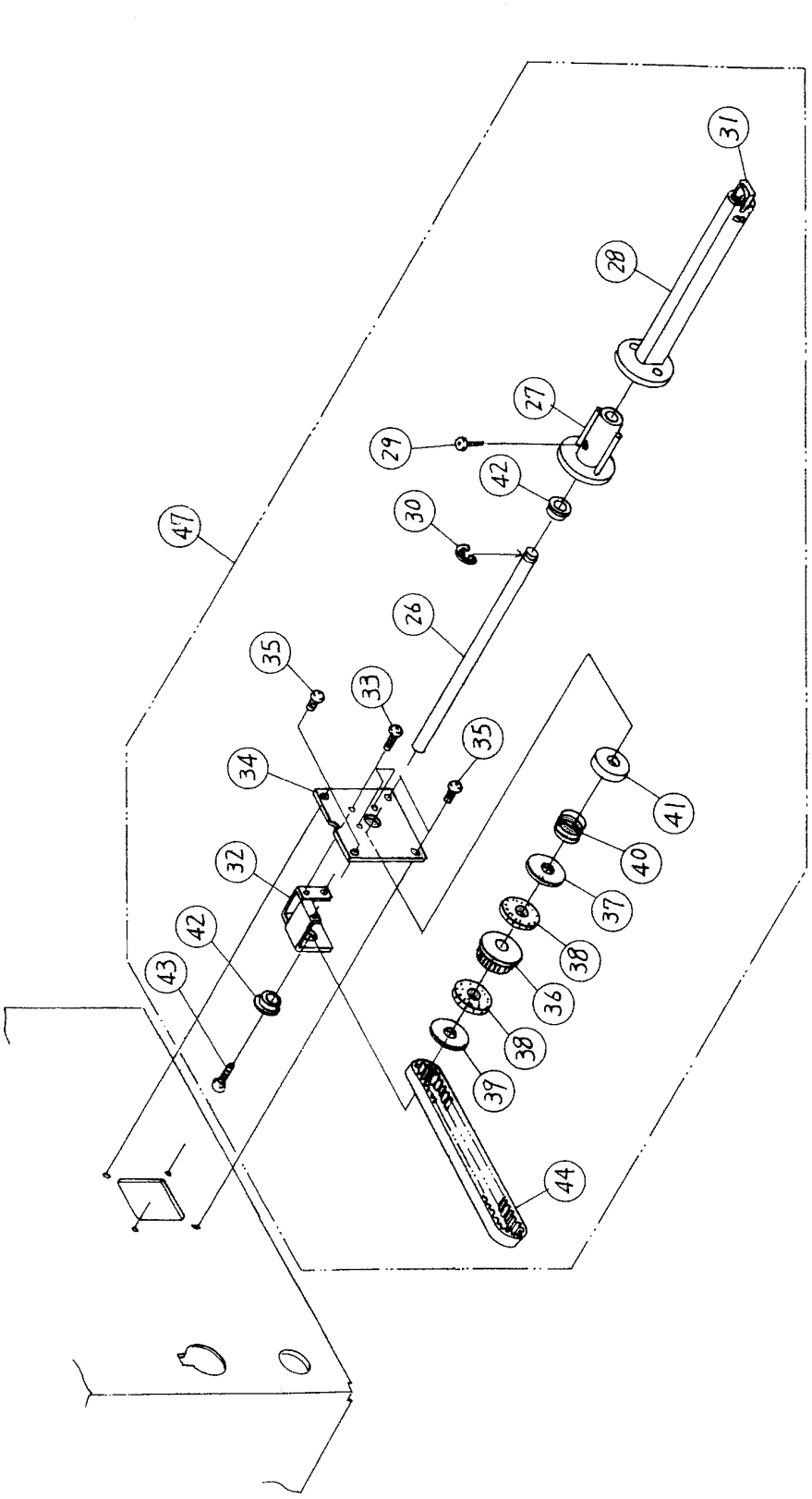
Cutter Assembly Option

ITEM NO.	CODE	DESCRIPTION	QTY
1	PR7772000	CUTTER SET	1
2	MD4300621	PAN HEAD SCREW	2
3	PA2770700	CUTTER BRACKET	1
5	MH0300821	P-TIGHT SCREW	2
6	PB0771000	POST	1
7	MD4300621	PAN HEAD SCREW	1
8	RJ1773600	CUTTER PCB SET	1
9	MD4300621	PAN HEAD SCREW	2
10	RH1772000	CUTTER CABLE	1
12	PE1771000	COLLAR	1
13	MD4300821	PAN HEAD SCREW	1
14	PA2770500	CABLE COVER	1
15	MH0300821	P-TIGHT SCREW	1
17	PV9770600	EMI GASKET	1
18	PG0770000	FG PLATE	1

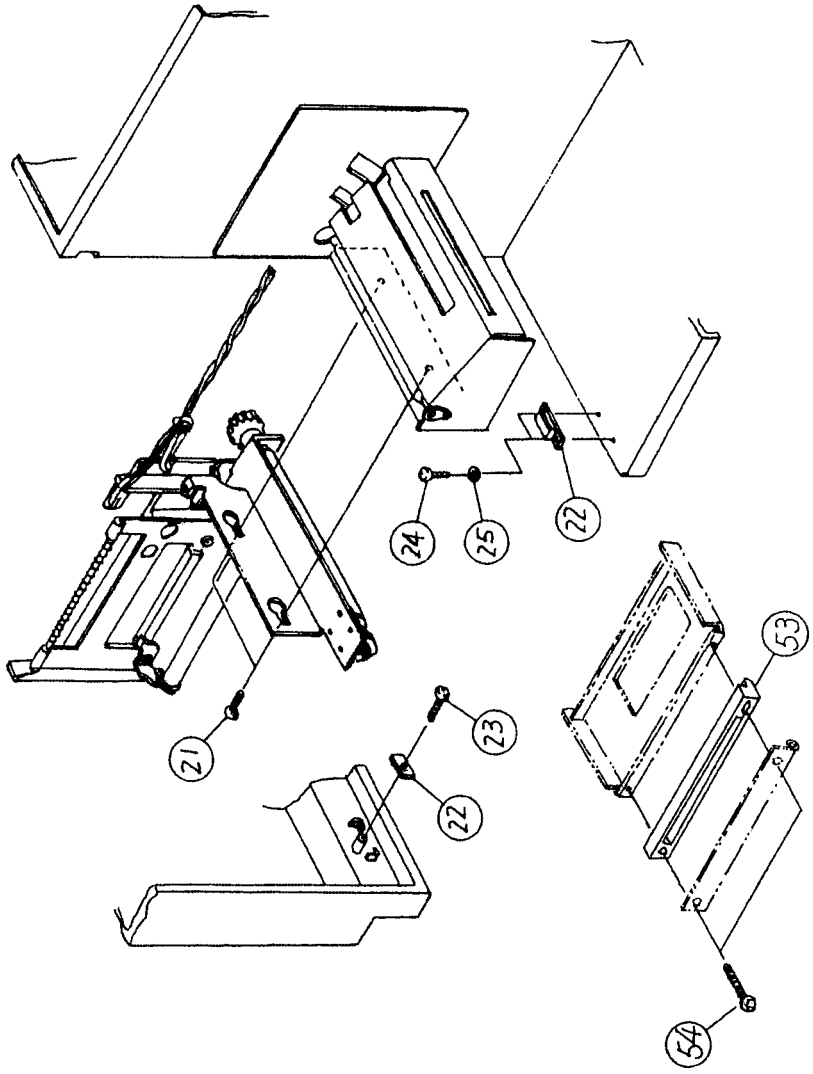
10.10 Dispenser Assembly Option



Dispenser Assembly Option



Dispenser Assembly Option



Dispenser Assembly Option

ITEM NO.	CODE	DESCRIPTION	QTY
1	PA1774100	DISPENSE FRAME	1
2	PA1770700	ROLLER BRACKET	1
3	MD4300621	PAN HEAD SCREW	2
4	PR0770100	DISPENSE ROLLER	1
5	PT1112060	BALL SUPPORTER	2
6	PE1770900	DISPENSE BRACKET	1
8	PR1770200	GEAR	1
9	ND0040030	E-SNAP RING	1
10	MH0300821	P-TIGHT SCREW	2
11	PR1520200	PRESSURE ROLLER	1
12	PB0770200	SHAFT (PRESSURE)	1
13	ND0040030	E-SNAP RING	2
14	PB0770900	SHAFT (DISPENSE)	1
15	ND0020030	E-SNAP RING	2
16	PE1570300	DISPENSE SENSOR BRACKET	2
17	MH0250821	P-TIGHT SCREW	2
18	RH1772100	DISPENSE CABLE	1
19	PA1774200	LATCH BRACKET	1
20	MH0300821	P-TIGHT SCREW	1
21	MD4300821	PAN HEAD SCREW	2
22	PT9689000	MAGNET	1
23	MH1300621	P-TIGHT SCREW	1
24	MH4300821	S-TIGHT SCREW	2
25	NA1003022	PLAIN WASHER	2
26	PB0770800	SHAFT (REWIND)	1
27	PE4770100	REWIND CORE	1
28	PE4770200	REWIND BOSS	1
29	MD4301221	PAN HEAD SCREW	1
30	ND0060030	E-SNAP RING	1
31	PE1520700	HANDLE	1
32	PA1774000	REWIND FRAME	1
33	MD4300621	PAN HEAD SCREW	3
34	PA1773900	REWIND PLATE	1
35	MD4300621	PAN HEAD SCREW	4
36	PE8770400	PULLEY	1

Dispenser Assembly Option

ITEM NO.	CODE	DESCRIPTION	QTY
37	PA0770100	FLANGE	1
38	PJ4770100	FACING	2
39	PE7770100	FLANGE	1
40	PC1770400	SPRING (REWIND)	1
41	PE2770800	COLLAR (SPRING)	1
42	PT1112080	BALL SUPPORTER	2
43	MD4401021	PAN HEAD SCREW	1
44	PT8155064	TIMING BELT	1
46	PR7773100	DISPENSE SUB UNIT	1
47	PR7773000	REWIND SUB UNIT	1
48	PB0771200	SHAFT (DISPENSER)	1
49	PA1774700	DISPENSE PLATE	1
50	PA2770100	STOPPER BRACKET	1
51	PE3520600	DISPENSE ROLLER	4
52	ND0020030	E-SNAP RING	2
53	PE1771100	SPACER (RIBBON ADJUST)	2
54	MA0301821	PAN HEAD SCREW	2

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