ENCAD®

CROMA24™

COLOR PRINTER SERVICE MANUAL

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ENCAD®

Croma24™ COLOR INKJET PRINTER SERVICE MANUAL

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Printing history

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FCC Statement (U.S.A.)

The United States Federal Communications Commision has specified that the following notice be brought to the attention of the users of the **Croma24** printers.

FEDERAL COMMUNICATIONS COMMISION RADIO AND TELEVISION INTERFERENCE FOR CLASS B DEVICE

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

User Instructions:

If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by **ENCAD, Inc.** could void the user's authority to operate the equipment.

VDE Statement

Hiermit wird bescheinigt, daß der ***CROMA24*** in Übereinstimmung mit den Bestimmungen der BMPT-AmstbIVfg 234/1991 funkentstört ist. Der vorschriftsmäßige Betrieb mancher Geräte (z.B. Meßsender) kann allerdings gewissen Einschränkungen unterliegen. Beachten Sie deshalb die Hinweise in der Bedienungsanleitung.

Dem Zentralamt für Zulassungen im Fernmeldewesen würde dan Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf die Einhaltung der Bestimmungen eingeräumt.

ENCAD, Inc. U.S.A

Material Safety Data Sheet

CROMA24 QIS (Quality Image Supplies) ink is nonhazardous, requiring no special disposal handling. It can be harmful if swallowed and should be kept away from children.

To obtain a Material Safety Data Sheet, contact ***ENCAD, Inc.*** at:

6059 Cornerstone Court West
San Diego, CA 92121-3734
(619) 452-4350

International users should contact their local dealer or distributor.

WARRANTY OR DAMAGE CLAIMS

United States

ENCAD®, Inc., warrants its printers ("PRODUCT") to be free from defects in workmanship and materials for a period of one year from the date of purchase. In order to submit a Warranty claim, please contact the ENCAD Help Desk at (619) 452-4350.

ENCAD reserves the right to make changes or improvements to Products, without incurring any obligation to similarly alter Products previously purchased.

Buyer's sole and exclusive rights pursuant to this Warranty shall be for the repair or replacement of defective Product. ENCAD specifically disclaims any and all other warranties, expressed or implied, including but not limited to, implied warranties of merchantability and fitness for a particular purpose. In no event shall ENCAD be liable for any loss of profit or other commercial damages, special, incidental or consequential damages, or any other damages or claims, whatsoever.

This Warranty gives Buyer specific legal rights, and Buyer may also have other rights that vary from state to state.

This Warranty applies only to printers purchased from ENCAD, or authorized ENCAD distributors or dealers. The intent of this Warranty is to repair or replace defective Products subjected to normal wear and tear, when operated according to ENCAD instructions.

This Warranty does not cover damage to the Product resulting from the following:

- **Accident or negligence.**
- **Unauthorized modification of the Product.**
- **Adverse environmental conditions.**
- **Service of the Product by other than an ENCAD authorized service provider.**
- **Unauthorized or improper use, including but not limited to:**
  - **Use in applications for which the Product was not designed.**
  - **Using cartridges or ink other than those supplied by ENCAD or authorized ENCAD resellers.**
  - **Using media other than that supplied by ENCAD or authorized ENCAD resellers.**
  - **Lubricating any part of the printer.**

Internationally: Contact your dealer or distributor for warranty information.

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General Description 1

Introduction

This manual provides service information for the ***ENCAD, Inc.*** **Croma24** Color Inkjet Printer.

There are three versions to the **Croma24** Color Inkjet Printer family:

	CAD version	GA & CAD version	GA version
for:	CAD market	GA & CAD	GA
I/O:	parallel	serial & parallel	serial & parallel
includes:			ENCAD software RIP

All versions will have an ADI Windows driver and print utility.

This manual is written for service personnel who possess analog and digital circuitry experience. Chapter 2, Theory of Operation, should be read and thoroughly understood before troubleshooting/ calibrating the printers.

The printers support pre-cut and roll media. Media size is automatically determined and hardclip limits are set accordingly. Pre-cut media uses different maximum plotting areas than roll media. See the Printer Specifications for more details.

Both RS-422 serial and Centronics parallel connections are provided to interface with the host computer on the GA (Graphic Arts) compatable versions. Only the Centronics parallel connection exists on the CAD only version. Commands sent from the host computer are in **Encad RTL** format.

Drivers are supplied to support Windows-based PC's (3.XX, 95, and NT) as well as Macintosh and Power PC computers.

These printers expand upon ***ENCAD's*** tradition of delivering fast, high-quality color or monochrome graphics for a variety of applications. ***ENCAD*** has made significant advances in designing these

plotters to respond to and anticipate our customers' needs. Principal features are summarized below.

Three Versions: CAD, GA (Graphic Arts), GA & CAD
ENCAD's software RIP supplied with the GA (Graphic Arts) version
Remotely Configured via Host Computer
25" (63.6 cm) Maximum Media Width
600 x 600 dpi (mono) addressable
300 x 300 dpi (color)

Overview

Printers draw according to instructions issued from a "host" computer. Every printer is engineered to understand a specific set of instructions and to execute each instruction in a precise manner. In addition, most printers are designed to execute predetermined characters automatically without a specific line-by-line instruction from the program. These characters are part of the printer's permanent memory.

Related Publications

The following publication contains additional information which may be useful in servicing the ***ENCAD, Inc.*** **Croma24** Color Inkjet Printers:

- ***ENCAD, Inc.*** **Croma24** User Guide, P/N 207103

Copies of this and other ***ENCAD, Inc.*** publications may be obtained by contacting your nearest authorized ***ENCAD, Inc.*** dealer or by contacting ***ENCAD's*** Technical Support and Service Department.

Electrostatic Discharge (ESD) Sensitivity

All PCBs (Printed Circuit Boards) associated with the **Croma24** printers have components sensitive to ESD (electrostatic discharge). Care must be taken to avoid damage to any of the components by following current ESD handling procedures and practices.

Always use an approved ESD grounding strap when handling or working with PCBs.

Warnings, Cautions, and Notes

Warnings, cautions, and notes are used when additional information, instructions, or care should be observed. In this manual, warnings cautions, and notes precede the text to which each applies. The definition of each is provided below.

WARNINGS - Warnings are used to stress that the following steps or procedure has the potential to cause serious harm or death to service personnel. Extreme care should be observed when following the procedures and to exercise standard safety procedures. They are indicated by:

Followed by a paragraph describing the concern.

CAUTION - Cautions depict that the following steps or procedures can cause damage to the equipment if not properly followed. Extreme care should be observed when following the procedures and to exercise standard safety procedures. They are indicated by:

Followed by a paragraph describing the concern.

NOTE - Notes are placed before a procedure to inform the service personnel of specific details to improve quality, to give reminders of interrelated parts, and to provide other helpful information. They are indicated by:

NOTE

Followed by a paragraph describing the concern.

Printer Specifications

The specifications and performance characteristics of the **Croma24** Color Inkjet Printers are as follows:

Max Printing Area:
Norm 23.8" 60.9cm
Extend 24.6" 62.9cm

Language Emulation:
ENCAD RTL

Buffer:
2 MB permanently installed
(not upgradable)

Power Requirements:
Input Voltage:
90 - 246 VAC
47 - 63 Hz

Output Power:
24 W typical
63 W maximum

Baud Rates:
38400
1MByte High Speed Serial (MAC only)

Resolution:
Mono 600x600 dpi addressable
Color 300x300 dpi

Accuracy:
0.2% line length (with ROLL mode off)

Interface:
Centronics parallel
RS-422 serial
(GA and GA/CAD versions only)

Environment:
Operating:
41° to 104° F
(5° to 40° C)
10% to 70% RH
non-condensing

Storage:
-40° to 140° F
(-40° to 60° C)
5% to 80% RH
non-condensing

Dimensions:
Height 12" (305mm)
Width 43.5"(1105mm)
Depth 14" (356mm)

Contents of this Service Manual

Figures are used in this manual to clarify procedures. They are for illustrative purposes only and may not necessarily be drawn to scale.

Material in this manual may be repeated in various sections so that each section can “stand alone”. This allows information to be located without having to refer back and forth between sections.

Figures and tables are easily located and cross-referenced, and are listed in the front of the manual under List of Illustrations and List of Tables.

This manual is divided into six chapters as:

Chapter 1 GENERAL DESCRIPTION - Contains a general description of the ***ENCAD*** **Croma24** printer. This includes printer specifications, and related materials. Also included is a description of the use of Warnings, Cautions and Notes as used in this manual and chapter contents.

Chapter 2 THEORY OF OPERATION - Functional descriptions of the overall printer and major assemblies are contained in this chapter.

Chapter 3 MAINTENANCE - This chapter covers the scheduled maintenance, cleaning procedures and alignment/adjustments recommended to perform on the printers. Diagnostics and a signal flow diagram are also listed.

Chapter 4 TROUBLESHOOTING - A table containing problems that could occur and possible causes and repairs is found in this chapter. This table is not intended to be a complete listing of troubleshooting procedures. It will isolate the problem down to the lowest replacable assembly. If the problem happens to be the wiring between assemblies, standard troubleshooting techniques will have to be implemented to correct the problem.

Chapter 5 ASSEMBLY/DISASSEMBLY - Contains detailed procedures to remove and replace printer parts and assemblies.

Chapter 6 PARTS LIST - Contains a complete listing of all field replacable parts and assemblies for the **Croma24** Color Inkjet Printer. Illustrated parts breakdown drawings are included to help clarify and identify parts for ordering. Special kits and adjustment jigs may be required.

ORIENTATION - Instructions in this manual are based on the assumption that the service person is facing the front of the printer. References to top view, back view, and so forth are consistent with this engineering standard. References to the X Axis and Y Axis (Paper Axis and Carrier Axis, respectively) follow the standard of **AutoCAD™** absolute coordinates: up and down for X, left to right for Y.

Technical Support

ENCAD offers full technical support and service for its various products. If you are unable to find the answer to your question in either the User's Guide, Service Manual, or other related publications, check out ***ENCAD's*** Technical Bulletins located on ***ENCAD's*** bulletin board or the Internet:

***ENCAD* BBS:**	(619) 452-2653 or (619) 452-3768
***ENCAD* Website:**	http://www.encad.com

Additional information is available though our Technical Support and Service Department's Help Desk.

ENCAD, Inc.
Technical Support & Service Dept.
6059 Cornerstone Court West
San Diego, CA 92121

Help Desk Telephone:	(619) 452-4350
Help Desk FAX:	(619) 546-0659

International Users contact your local ***ENCAD*** service provider. see details on your ***ENCAD*** registration card.

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Theory of Operation 2

Introduction

This chapter explains the mechanical and electrical theory of operation of the ***ENCAD* Croma24** D-Size Color Inkjet printer.

The **Croma24** is a MC68322 microprocessor-based digital printer that receives plotting instructions from a host computer through either the RS-422 serial interface or the Centronics parallel interface.

Croma24 Printer General Block Diagram

Figure 2-1 illustrates the major functional areas of the printer.

The Croma24 printer consists of two mechanical drives:

1. Paper (Media) Axis Drive
2. Carrier Axis Drive

and three main electrical assemblies:

1. MPCB (Main Printed Circuit Board)
2. Carrier Assembly
3. Power Supply

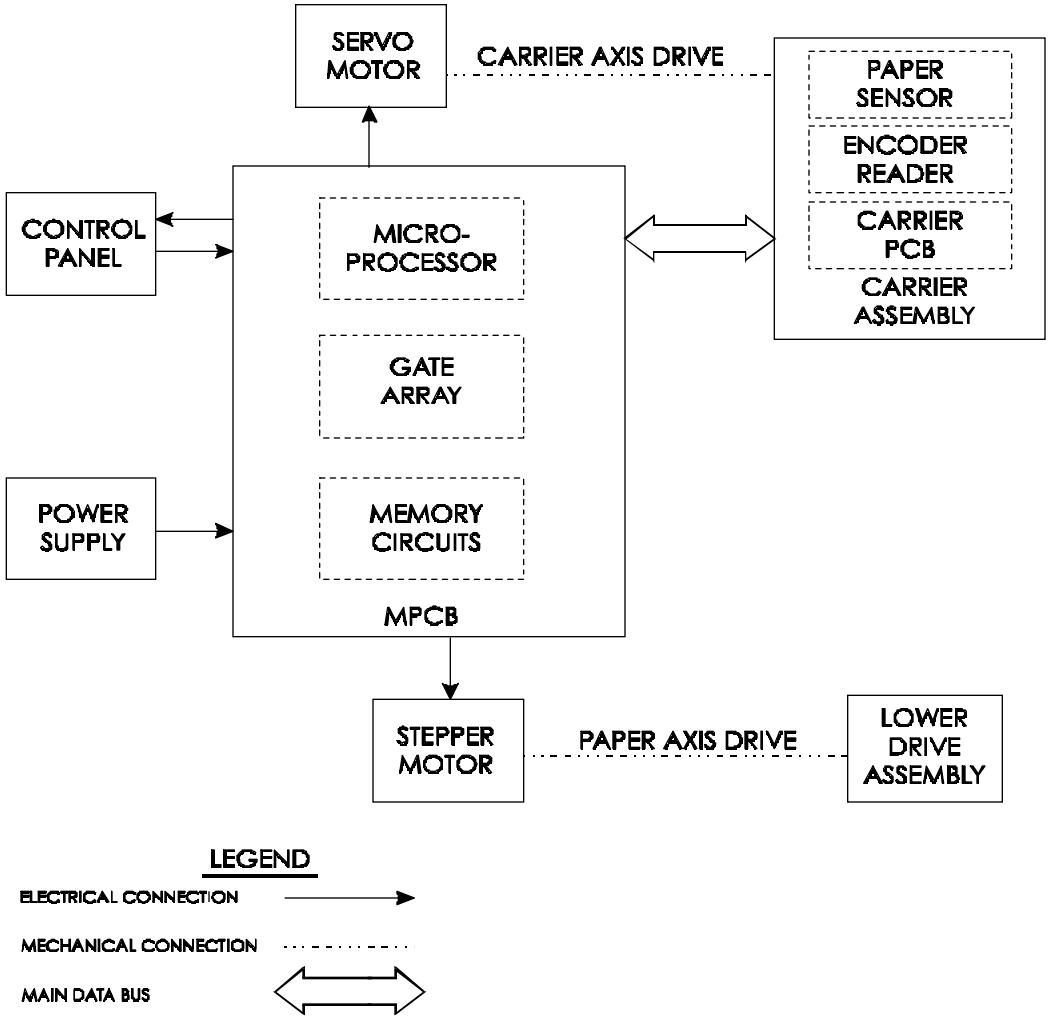

Figure 2-1. General Block Diagram.

Paper (Media) Axis Drive

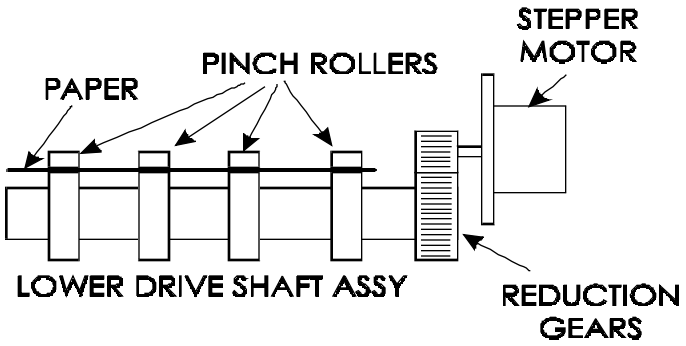

Figure 2-2. Paper (Media) Axis Drive.

The Paper (Media) Axis Drive moves the plotting media in a direction perpendicular to the length of the printer. This friction drive utilizes a micro-step drive technology and consists of a stepper motor, reduction gears, lower drive shaft assembly, and pinch wheels. This can be seen in Figure 2-2.

The micro-step technology associated with the stepper motor gives the capability of a resolution up to 600 dpi.

The reduction gear meshes the stepper motor to the lower drive shaft assembly which allows the media to advance or retract.

The purpose of the pinch wheels is to apply pressure to the media onto the drive shaft assembly to reduce the chance of slipping.

Misaligned pinch wheels is the main cause of skewing of the media.

The Carrier Axis Drive

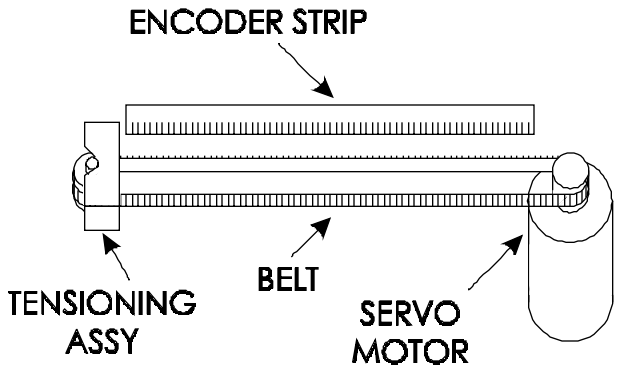

Figure 2-3. Carrier Axis Drive.

The Carrier Axis Drive moves the printer's carrier assembly along the length of the printer. The drive consists of a servo motor, linear encoder strip, drive belt, and tension assembly. These items are illustrated in Figure 2-3.

The servo motor, drive belt, and tension assembly are the components that actually drive the carrier assembly. The servo motor drives the belt back and forth allowing the attached carrier assembly to be repositioned as required. The tension assembly is spring controlled and allows the proper amount of tension on the belt.

The linear optical encoder strip is used to obtain the printers accuracy along the axis of the printer. It is made with 150 parallel lines per inch etched into it. By utilizing two optical encoder sensors that are slightly off set from each other, and reading the leading and trailing edges of the lines, a resolution of 600 dpi can be obtained.

The stepper and servo motors are controlled from the main printed circuit assembly by the microprocessor.

Main Printed Circuit Board (MPCB)

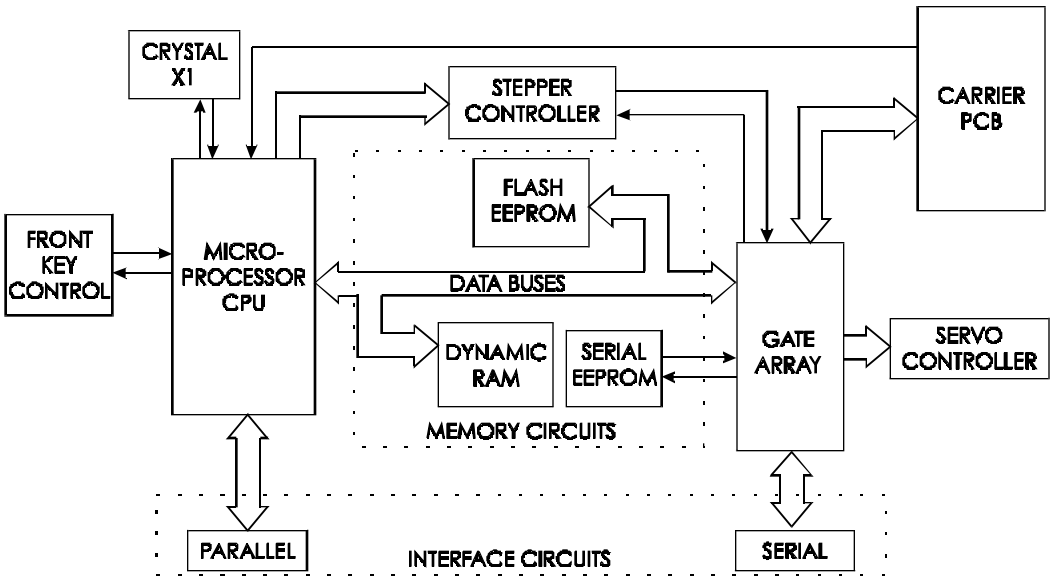

Figure 2-4. Main Printed Circuit Board.

The Main Printed Circuit Board (MPCB) consists of six functional areas:

1. Microprocessor (CPU)
2. Gate Array
3. Memory Circuits
4. Stepper Motor Controller
5. Servo Motor Controller
6. Interface Circuits: Serial & Parallel

Microprocessor

The microprocessor (a Motorola MC68322) is the central processor unit which supervises system functions, executes the printer firmware, manipulates data, and controls input/output data busses. It has a built-in parallel port, a two channel DMA (Direct Memory Access) controller, timer module, clock generator, and an on-board chip select generator. One DMA channel supplies data to the gate array for jet firing; the other DMA channel is used to receive data through the serial port via the gate array, or the serial port when using a high speed serial mode. One timer generates a servo interrupt every millisecond.

The microprocessor halves the 40MHz crystal reference (X1) signal to create the 20MHz system clock that is used for timing of all internal circuitry.

The chip select generator is programmed to generate chip selects at the appropriate addresses, with the appropriate data size (byte, word) and with the appropriate number of wait states.

Gate Array

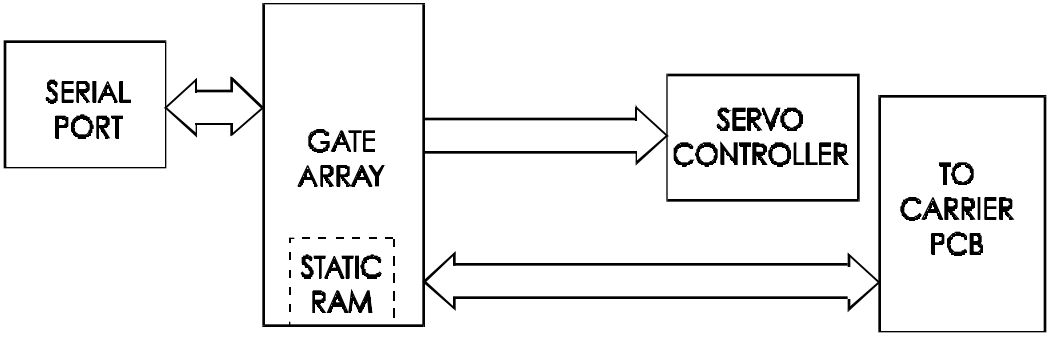

Figure 2-5. Gate Array.

The gate array contains the hardware logic for dot firing, monitoring changes in the Carrier Assembly position, controlling DMA for the serial port, and generating the PWM (Pulse Width Modulation) waveforms for the servo controller.

The gate array is a Xilinx device. It is a static RAM-based field programmable gate array. This means that the logic that it implements is determined by configuration information in internal RAM storage. Each time power is turned on, this information must be downloaded from the system ROM. This type of gate array allows for the flexibility of upgrading the logic by simply downloading the new system software.

Memory Circuits

Memory is used to retain large amounts of information. This information is stored in the device memory in the form of binary bits.

Printer memory consists of Flash EEPROM, DRAM, and EEPROM.

Maximum installable memory is as follows:

DRAM = 2 MB

Flash EEPROM = 1 MB

Serial EEPROM = 1 KB

Flash EEPROM

Flash EEPROM is Electrically Erasable, Programmable, Read Only Memory used to store instructions and data constants which the microprocessor can access and interpret. This set of instructions and data constants is called the “firmware” of the plotter.

The term “Flash” means that bytes cannot be individually erased. A block or the whole device is erased at the same time and the block or whole device is then reprogrammed. It can be erased and reprogrammed more than 10,000 times.

The system firmware is stored in Flash EEPROM and can be upgraded by opening the Control Panel located on the host computer. Once the Control Panel has been executed, it first starts an initialization and status communication sequence with the printer. The Control Panel requires ink levels and deadband information to load correctly. At the same time, it checks the version of firmware that is loaded on the printer.

The flash EEPROM is a volitile memory in that it will lose updated information after a loss of power and revert back to the firmware that was initially installed at the factory. If the Control Panel contains a newer version of the firmware than the printer is currently loaded with, it automatically updates the firmware at the startup of the Control Panel.

DRAM

DRAM is Dynamic Random Access Memory which provides temporary storage of the microprocessor calculation and input/output data. It is also a faster type of memory then the Flash EEPROM. Thats why the printer control program is also copied from the Flash EEPROM to RAM, where it can be executed faster.

The printer is supplied with 2 Megabytes of DRAM permanently installed on the Main PC Board. Memory expansion is not available for this printer. Since it only supports EN-RTL language, additional memory is not required or beneficial.

Serial EEPROM

Serial EEPROM is an Electrically Erasable, Programmable, Read Only Memory which provides storage for calibration constants and user configuration data entered from the host computer.

A 1K bit serial nonvolatile EEPROM stores calibration and configuration information. It retains data while the unit is off.

Stepper Motor Controller

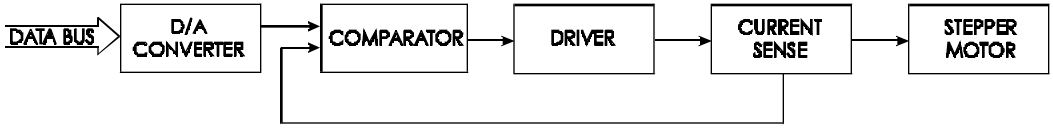

Figure 2-6. Stepper Motor Controller.

The media is driven by a Stepper Motor, which drives the media in a direction perpendicular to the length of the printer. The media in the printer can advance forward and backward, depending upon the commands which the Stepper Motor receives from the microprocessor.

The Stepper Motor Controller contains two identical circuits, one for each winding of the stepper motor. The circuit is a combination of two simpler types of circuits and can be thought of as a variation of either one.

A digital-to-analog (D/A) converter receives digital data from the CPU and generates a sine wave output. This signal is fed into a comparator circuit that measures the current through the winding of the stepper motor. If the current is too low, a pulse of 24 V is generated. When the current goes above the output of the waveform generator, the pulse turns off. Every time the output of the waveform generator is changed by the microprocessor, the motor moves 1 “micro-step”.

Each circuit contains four main blocks (see Figure 2-6):

1. Reference waveform generator

   The microprocessor uses a D/A (digital to analog) converter to set the desired level for the current in the stepper motor winding. The output of the D/A converter varies in time to create a reference waveform. This reference waveform is centered around 10 V.

2. Motor current sense

   The voltage across a series current sense resistor is measured and level shifted so that it is centered around 5 V.

3. Comparator

   This portion divides the output of the reference waveform generator by two and compares it to the output of the motor current sensor. Logic inside the gate array generates the control signals for the power driver that applies voltage across the motor winding in order to make the actual current match the reference waveform.

4. Power driver

   An H-bridge allows the supply voltage to be applied across the winding in either polarity to drive the current to the desired value.

Servo Motor Controller

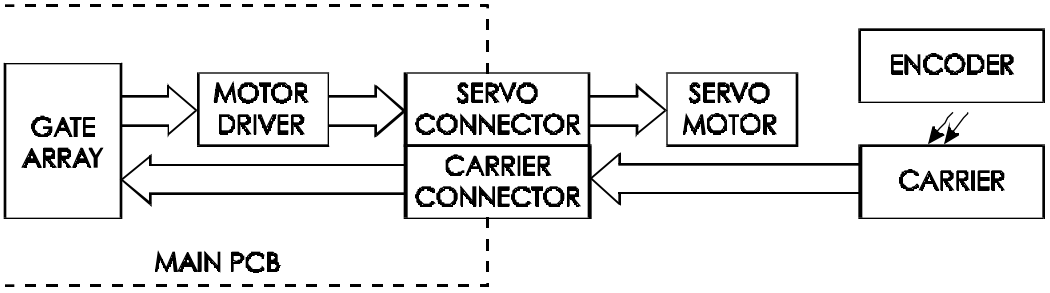

Figure 2-7. Servo Motor Controller.

The Carrier Assembly is driven by the Servo Motor. The speed of the Carrier Assembly is controlled by varying the duty cycle of the power applied to the controller. The microprocessor checks the position of the Carrier Assembly approximately 1,000 times per second (during the servo interrupt). It then updates the PWM (pulse width modula-

tor) register in the gate array which sets the duty cycle to make adjustments to the Carrier Assembly speed. A linear optical encoder is used to monitor the Carrier Assembly position.

The optical encoder strip runs the length of the Stabilizer Bracket and contains 150 lines and spaces per inch. Thus there are 300 edges per inch. The detector circuit actually consists of two optical edge detectors. They are separated from each other by one half the width of one of the optical lines on the encoder strip. This allows 4 evenly spaced pulses to be developed for each line on the encoder strip. This is known as quadrature signals. It gives an effective resolution of 600 lines per inch. See Figure 2-8 for a graphical representation of quadrature signals.

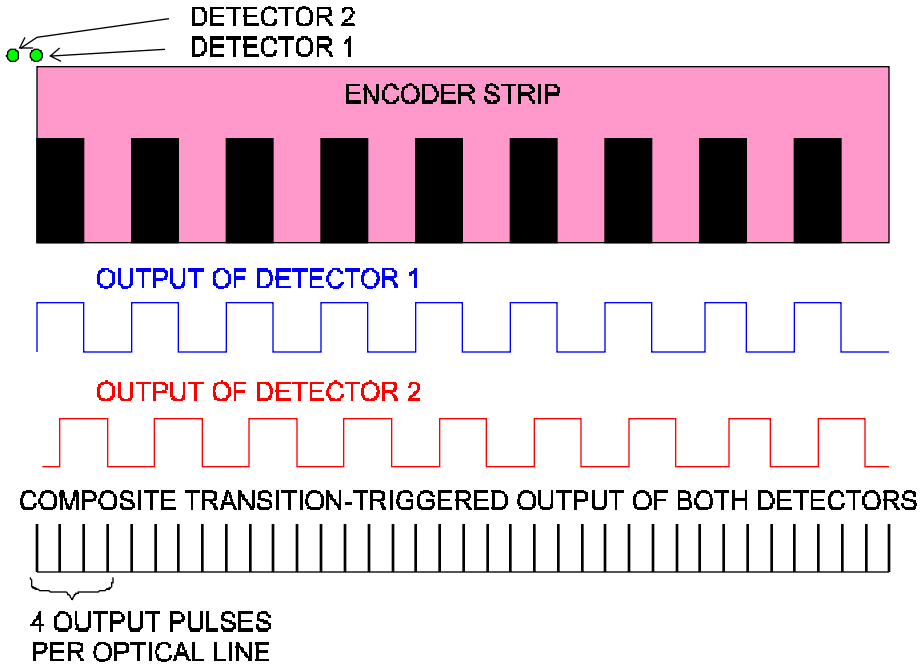

Figure 2-8. Quadrature Signal Generation.

The direction that the Carrier Assembly is moving is known based upon the state of one detector's output and the direction of the transition of the other detector's output.

A hardware counter in the gate array increments as the Carrier Assembly moves left and decrements as the Carrier Assembly moves right. The hardware counter is only eight bits wide, so it cannot store a value large enough to represent an absolute Carrier Assembly position. Instead, it is read during the servo interrupt and its value compared with that from the previous interrupt. This difference is used to update the absolute position value in the software.

Interface Circuits: Serial & Parallel

Figure 2-9. Interface Circuits.

Data from the host computer is received either through the Centronics parallel port or the serial port (on the GA/CAD or GA versions only). The gate array provides the control signals for DMA transfers from the serial port to DRAM.

The serial port is designed primarily to interface to a Macintosh printer port. It has an eight pin Mini-DIN connector. The data (TXD, RXD) signals meet RS-422 electrical specifications, and the control signal (DTRCLK) meets the RS-423 electrical specifications. The control signal can be configured as a 1 MHz clock for high speed serial communications with a Macintosh.

The serial port is compatible with RS-422 devices when an appropriate adapter cable is used. This cable is available from ***ENCAD***.

Carrier Assembly Circuits

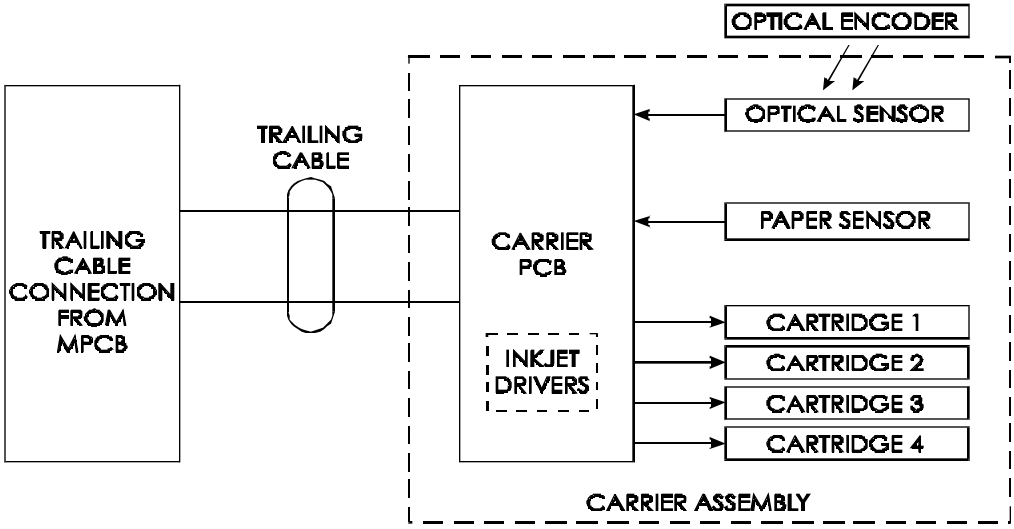

Figure 2-10. Carrier Assembly Circuits.

The Carrier Assembly contains:

1) Carrier PCB
2) Optical Sensors
3) Paper Sensor
4) Inkjet Cartridges

The Carrier PCB contains the logic and drive circuitry for the firing of the inkjet cartridges. It also establishes an interface path for the optical sensor and paper sensor to communicate with the MPCB.

The optical sensors receive their inputs from the optical encoder strip and sends this data to the MPCB. The MPCB uses this information to determine the horizontal position of the carrier assembly so that accurate printing can be established.

The paper sensor circuitry senses for the presence of loaded media. It does this automatically during the start-up and load sequences. It

also constantly monitors the media during printing to determine if the media has run out.

If no paper is sensed, the paper sensor sends this information to the MPCB, which immediately begins an 'out of paper' subroutine. This subroutine starts the LEDS on the printer to blink (green blinks slow while yellow blinks faster.) It also informs the host computer of the situation and stops the printer from printing until more media is loaded.

The sensor also checks for the size of the media loaded so it can determine the proper printing parameters.

Power Supply

An internal UL recognized switching power module supplies power for the **Croma24** printer. It provides a constant 5 VDC and 24 VDC output from input voltage in the range of 90-264 VAC. The 24 V supply is used for: the stepper controller (which advances the paper); the servo controller (which moves the Carrier); and power to fire the inkjets. The 5V supplies power to the logic circuits.

The power supply is fused using a 2 A 250 V fast blow type fuse.

The outputs share a common ground which is isolated from earth ground within the supply itself. Earth ground and DC ground are connected external to the power supply.

The power supply will shut down under overload/short circuit conditions on any output over the full range of input voltage. Overvoltage protection is 20%-30% above nominal for the 5 V and 24 V outputs.

System Grounding

Due to the amount of plastics used in the manufacturing of the printer, a system of grounding the metal assemblies to each other is required. If no common ground was in place, the potential of electric shock could exist due to static voltage buildup on the individual assemblies. The system grounding network ensures that all metallic assemblies have the same ground potential. Figures 2-11 and 2-12 show how the ground straps are implemented on the printers.

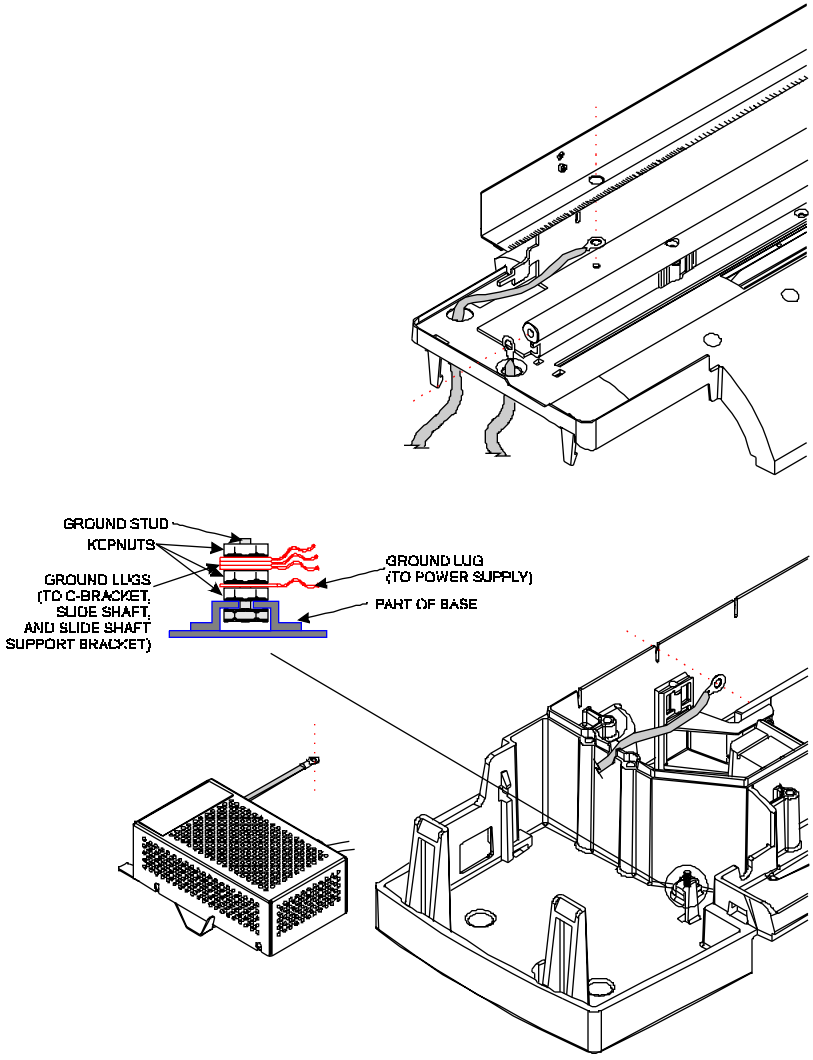

Figure 2-11. Croma24 System Ground Network (Left Side).

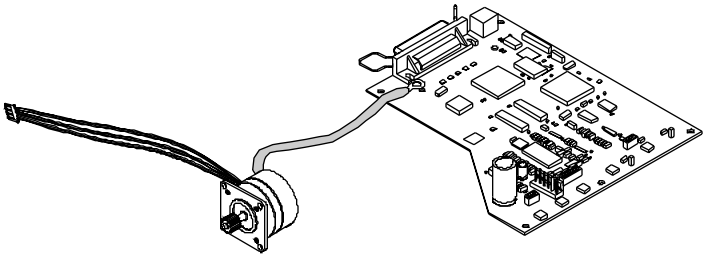

Figure 2-12. Croma24 System Ground Network (Right Side).

Front Key Controls

The Control Panel (see Figure 2-13) is located on the lower right side of the printer and consists of five controls and two LED indicators. The controls are (from left to right): Backward, Load, Forward, Cut, and Power. Table 2-1 lists all possible indications allowed using the LEDs and the conditions that generated that indication.

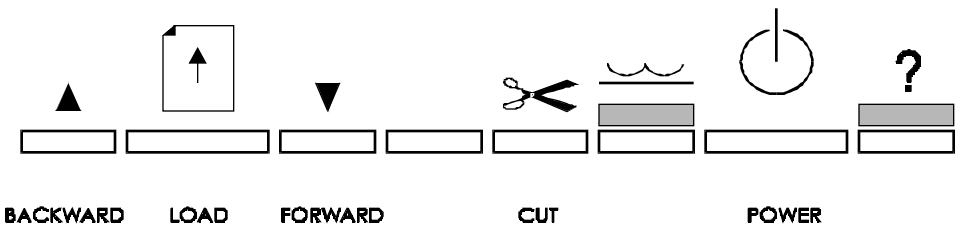

Figure 2-13. Front Key Controls.

Table 2-1. Front Key Control LED Codes.

GREEN LED 	AMBER LED 	DESCRIPTION
On	Off	Ready to print
Blinking fast	Off	Processing
Blinking slow	Blinking fast	Error (i.e. media out or ink empty) (follow computer prompts)
Blinking slow	Off	Error corrected
Blinking slow	On	Error (follow computer prompts)
Off	Off	Printer is in sleep mode (soft off)

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Maintenance 3

Introduction

This chapter contains general maintenance and cleaning instructions for the **Croma24** printer.

Scheduled Maintenance

Scheduled maintenance consists of a list of checks that are planned to be performed on a regular basis or when conditions warrant it.

Scheduled maintenance can be thought of as preventive maintenance since its purpose is to prolong the life of the printer. It is not intended to repair or isolate an existing problem, though it can sometimes be helpful in detecting a condition due to a weakened component that has not yet completely failed.

Below is a list of scheduled maintenance checks and their periodicity.

Clean external areas:	weekly, or as required
Clean slide shaft:	monthly
Clean service station:	biweekly
Clean encoder strip:	monthly
Clean cartridge dimples:	if prime fails
Clean flex cable contacts:	if prime fails, or cartridge is replaced
Clean and inspect motor gears:	annually
Clean and inspect MPCB:	annually
Clean and inspect carrier assembly:	annually
Reseat connectors on MPCB:	annually
Reseat connectors on carrier board:	annually
Replace carrier bushings:	biannually

Cleaning Procedures

Always turn the printer OFF, remove the power cord and the interface cable before cleaning the printer. An electrical shock hazard may be present if these procedures are not followed.

External Cleaning

Do not use abrasive cleansers of any sort on the surfaces of the printer. Damage to the surface may result.

The exterior surfaces of the printer may be cleaned with a soft cloth which has been dampened. For more persistent stains, a small amount of liquid detergent may be used. Cleaning intervals are determined by the environment in which the printer is used.

Slide Shaft Cleaning

Use only isopropyl alcohol on the slide shaft of the printer. Damage to the stainless steel slide shaft may result if cleaned with water and not completely dried off.

Printer problems can be caused by an accumulation of dirt or other contamination on the slide shaft. This contamination may lead to drag on the carrier. Extreme drag results in a “carrier axis failure” fault and will stop the carrier motion. These problems may be eliminated by maintaining and cleaning the slide shaft at intervals determined by the environmental conditions. **Do not use any lubrication.**

To clean the slide shaft:

1. Remove the power cord.
2. Raise the middle cover.
3. Moisten a clean cloth or paper wipe with isopropyl alcohol.
4. Wipe the length of the slide shaft with the moistened cloth or wipe.
5. Manually move the carrier assembly from side to side.
6. Wipe the shaft again to remove any deposits left from the carrier.
7. Lower the cover and reconnect the power cord, perform the PRIME plot. Be sure that the carrier moves freely over the slide shaft.

Service Station Cleaning

Ink and dust may build up on the service station, resulting in contamination which may smear the prints. The service station is cleaned as follows:

1. Disconnect the power cord and interface cable.
2. Raise the middle cover.
3. Carefully move the carrier toward the center of the printer.

4. Using a cotton swab dampened with distilled water, wipe the seals and the rubber wiper in the service station until no more ink residue or dust can be removed.

5. With a dry swab, wipe all moisture from the seals and wipers.

6. Close the cover and reconnect the power cord and interface cable.

Linear Encoder Strip Cleaning

Clean the linear encoder strip monthly, or as necessary, to remove any buildup of debris. Distilled water or isopropyl alcohol may be used. You may notice that it tends to fog the encoder strip; however, no detrimental effect has been observed in the field.

To clean the Encoder Strip:

1. Disconnect the power cord and interface cable.

2. Slightly dampen a cotton swab with distilled water or isopropyl alcohol and wipe along the length of the encoder strip on both sides.

3. Reconnect the power cord and interface cable.

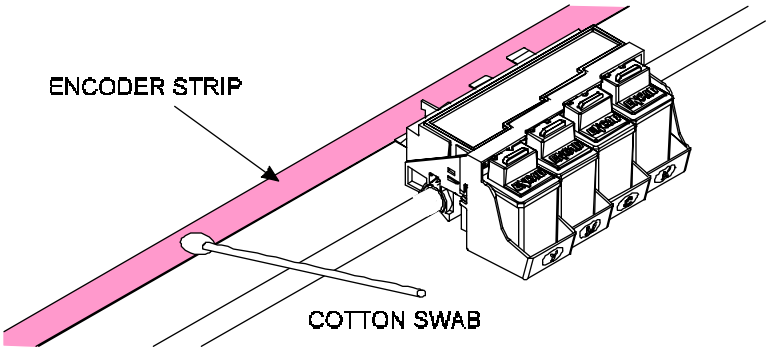

Figure 3-1. Encoder Strip Cleaning.

Cartridge Dimple Cleaning

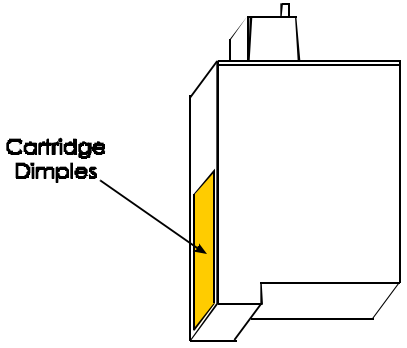

Figure 3-2. Cartridge Dimple Region.

The cartridge dimple area can easily be contaminated by oils and dirt on fingers and hands or ink spilled onto them. This causes the cartridges to not receive some of the electrical signals for a proper firing of the jets. This can be seen as a misfiring of the cartridge.

NOTE

Care should be used when handling the cartridges. Avoid touching the cartridges on the dimple area or on the inkjet holes on the bottom. The oils and dirt on fingers and hands can contaminate the area and result in misfiring of the inkjets.

Clean the cartridge dimple area by gently dabbing the area with a lint free cloth or cotton swab saturated with isopropyl alcohol.

Flex Cable Contact Cleaning

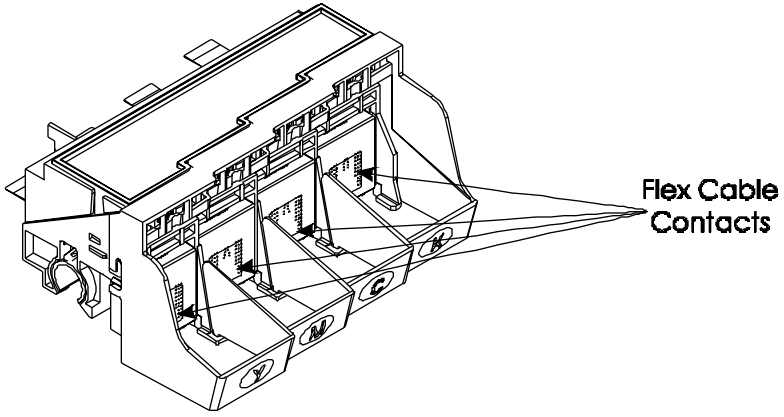

Figure 3-3. Flex Cable Contacts.

Cleaning the flex cable contact area is very important due to the ease of which this area can become dirty. This also causes the cartridges to not receive all of the electrical signals for a proper firing of the jets. This can be seen as a misfiring of the cartridge.

NOTE

Care should be used when handling the flex cable contact area. Avoid touching the contact area because the oils on your skin can contaminate the area and result in misfiring of the inkjets.

Clean the flex cable contacts by gently dabbing the area with a cotton swab soaked with isopropyl alcohol.

Clean and Inspect Stepper Motor Gears

The stepper motor gears can become dirty and after time if not cleaned, could cause wide banding in the print or paper skewing. This will reduce the quality of the intended output. Clean the motor

gears with a stiff brush to knock off any debris. A cotton swab soaked with isopropyl alcohol can be used to remove any ink that may have accumulated on the gears.

Clean and Inspect MPCB

Foreign material on the MPCB could short out electrical signals being developed on the MPCB and cause erroneous prints or even damage to the MPCB. All electrical circuits should be free of foreign material, especially those with conductive properties.

Clean the MPCB by blowing the objects away or gently brush them aside with a soft brush if required.

Inspect the MPCB for any damage to the board, connections, or any of the components on the board. Replace board if inspection reveals any damage or flaws that could effect the function of the MPCB.

Clean and Inspect Carrier Assembly

Foreign material on the carrier assembly could short out signals being developed on the carrier assembly and cause erroneous prints or even damage to the carrier assembly. A very common problem is where ink has been spilled onto the carrier assembly. All electrical circuits should be free of foreign material, especially those with conductive properties.

Clean the carrier assembly by blowing the objects away or gently brush them aside with a soft brush if required. Be careful not to let anything to fall into the printer as you clean or it could cause a new problem later.

Inspect the carrier assembly for any damage to the boards, connections, or any of the components on the assembly.

Reseat Connectors on MPCB and Carrier Board

CAUTION

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

CAUTION

Ribbon connectors can be easily damaged if incorrectly handled. Observe extreme caution when handling the ribbon connectors to avoid damage.

Many problems can be corrected simply by removing and reseating connections found in circuit assemblies. This process helps to clean the contacts and can dissipate any static electrical charges that might have developed.

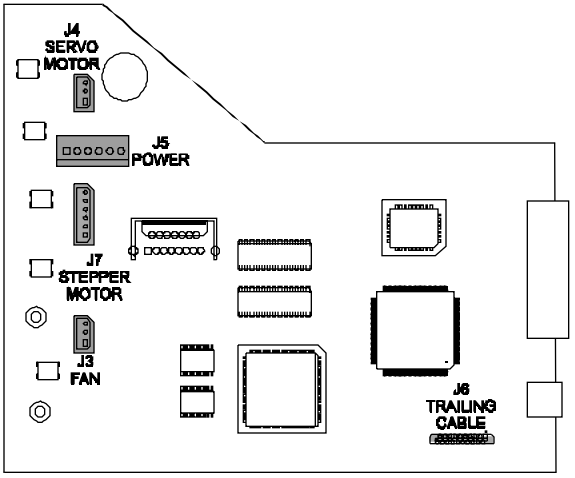

Figure 3-4. MPCB Connection Locations.

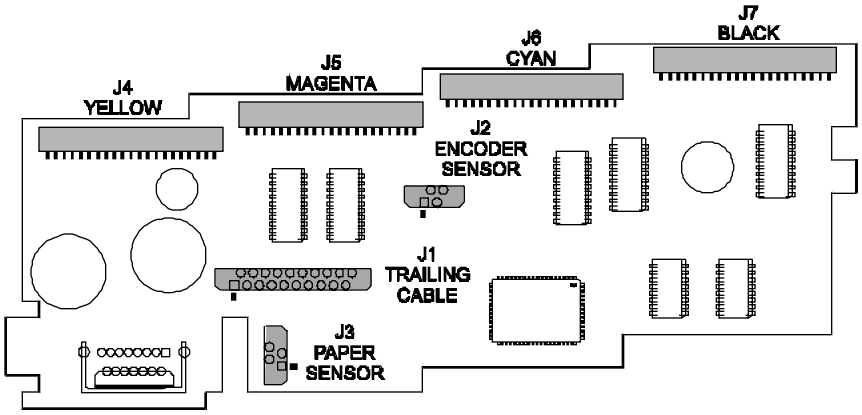

Figure 3-5. Carrier PCB Connection Locations.

Figures 3-4 and 3-5 shows the locations of all the connectors on the MPCB and carrier board respectively. To remove the ribbon cables from their connectors, lift the connector's ribbon locking mechanism as shown in Figure 3-6. To reattach, depress the locking mechanism back into the locking position after inserting the ribbon cable end.

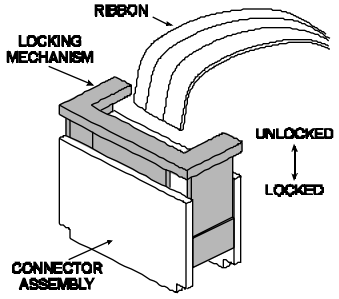

Figure 3-6. Ribbon Connector Locking Mechanism.

Replace Carrier Bushings

The carrier bushings are rated for approximately 1500 hours of operational usage. Given an average of about 3 hours a day of printing for 104 weeks, results in 1560 hours. Therefore, it is safe to approximate 1500 hours into 2 years of continuous service.

If not replaced, the wear on the bushings can result in erratic carrier motion and/or carrier axis failures. It can even cause cartridge headheight to become uneven.

To replace the carrier bushings, follow the Replacing the Carrier Bushing procedures in Chapter 5.

Servo Motor Winding Resistance Check

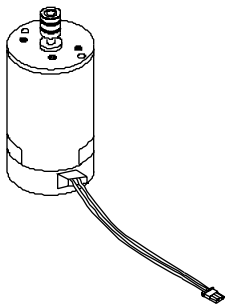

Figure 3-7. Servo Motor.

1. Disconnect the servo motor connection from the MPCB.

2. Using a standard ohmmeter or multimeter, connect the meter leads to the two wires going to the motor.

3. While manually rotating the servo motor, monitor the readings on the meter. The acceptable range is 10-20 ohms. Typically, the reading is 12-16 ohms.

5. If the measurement is found to be unsatisfactory, replace the servo motor.

Stepper Motor Winding Resistance Check

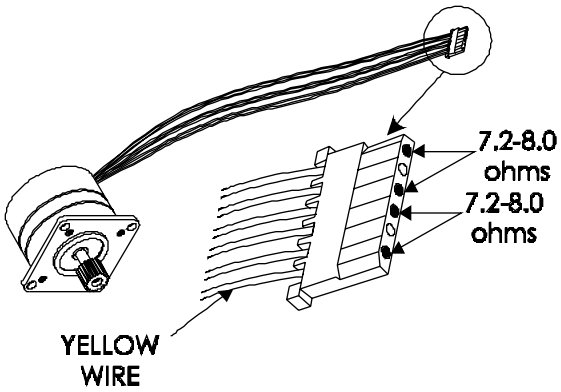

Figure 3-8. Stepper Motor.

1. Disconnect the stepper motor connection from the MPCB.
2. Using a standard ohmmeter or multimeter, measure between pins 1 (yellow wire) and 3.
3. The reading should indicate 7.2 - 8.0 ohms.
4. Continue by measuring between pins 4 and 6.
5. Reading should also indicate 7.2 - 8.0 ohms.
6. If either measurement is out of tolerance, replace the stepper motor.

Banding: Hardware vs Software

The technician must be able to identify whether the banding that is being observed is related to either a hardware or a software problem. The two examples in Figure 3-9 represent classic types of hardware and software banding errors.

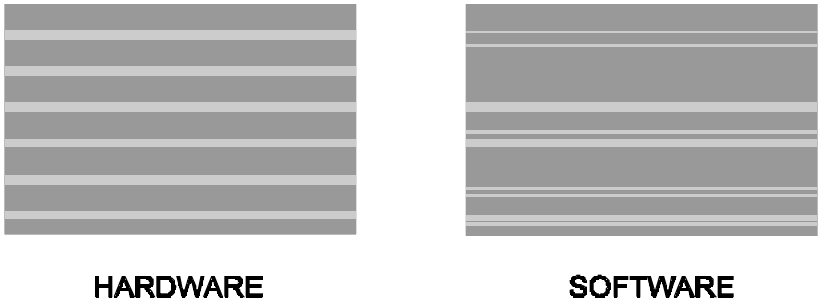

Figure 3-9. Examples of Banding.

Hardware banding is usually characterized by consistent banding strips as shown. It signifies a slippage in the media's normal movement that is possibly due to the stepper motor, lower drive shaft assembly, or the rollguides on the back of the printer. All these possible faulty areas deal with a rotational movement that, if faulty, will generate a consistent banding pattern. The MPCB and Carrier PCB can also cause this type of error to incur.

Software banding is characterized by inconsistent banding lines. These banding lines are generated by the software when incorrectly interpreting the paper advancing/ink firing sequence of the expected print file. Because it is not directly tied to a mechanical movement, the bands become inconsistent in both frequency and duration. The possible causes are the printer driver, the original software package, or the RIP, if used. To eliminate the chance that it is the printer driver:

1) Remove any RIP or network systems and connect the printer directly to the computer.

2) Print a test file approved by ***ENCAD*** that uses only the printer driver software and the ***ENCAD*** printer.

If the test file prints correctly, the problem lies in either the software package that generated the print or the RIP, if used.

Alignments/Adjustments

The ***ENCAD* Croma24** printers are designed with a minimum of maintenance requirements in mind. Most of the adjustments are controlled and performed via software/firmware interaction that require you to run a subroutine and enter values on the computer. Programmed calibrations include: color calibration, deadband alignment, and X-axis calibration. The mechanical adjustment requirements include the pinch roller adjustments and the encoder strip height adjustments. No electrical alignments are required.

Color Calibration

This procedure describes how to check that the cartridges are properly aligned for color plotting & should be followed each time the ink cartridges are installed. Figure 3-10 is a representation of how a color calibration looks when printed.

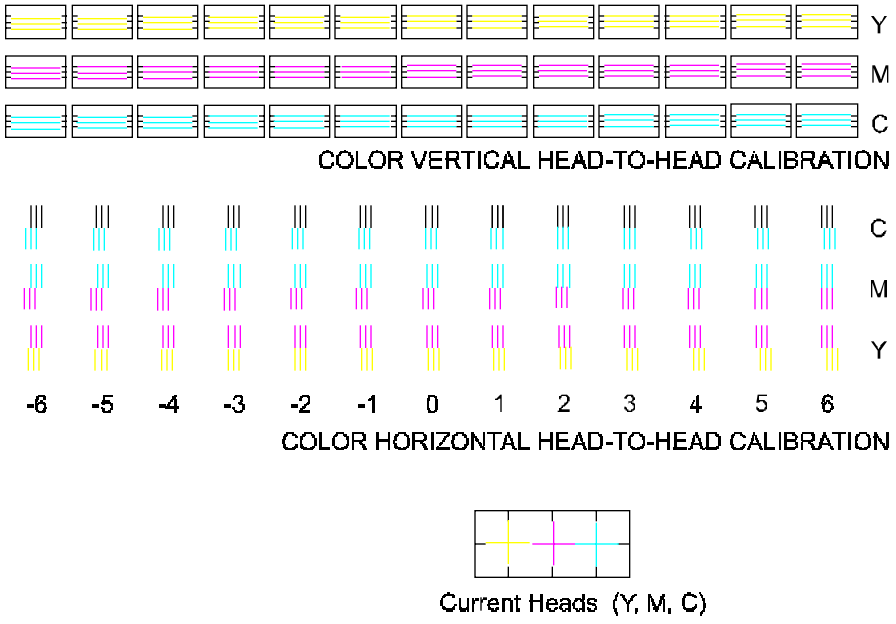

Figure 3-10. Color Calibration.

The “Current Heads (Y, M, C)” view represents the alignment of the heads as they are currently entered. This is just an overview of all heads and how they are aligned. Do not attempt to align the heads using this view.

The “Color Horizontal Head-to-Head Calibration” checks the alignment of the nozzles horizontally and allows corrections when required. Just enter the value below the set of lines that are correctly aligned. Be careful that you are aligning the correct color by observing the C (cyan), M (magenta), and Y (yellow) on the right side of the plot.

The “Color Vertical Head-to-Head Calibration” checks the alignment of the nozzles vertically and allows corrections when required. Just enter the value below the set of lines that are correctly aligned. Be careful that you are aligning the correct color by observing the C (cyan), M (magenta), and Y (yellow) on the right side of the plot.

Deadband Alignment

Deadband calibration compensates for minute differences created when bidirectional printing is used. Unidirectional printing is not affected by deadband. There are four types of deadband tests: slow deadband, fast deadband, fast deadband; vertical lines (all), and fast deadband; vertical lines (one).

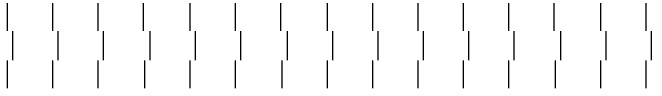

Figure 3-11. Deadband Slow/Fast.

Figure 3-11 shows what the display will look like when printing either the fast or slow test if it is out of alignment. A correctly aligned printer will appear as if there is only a series of vertical lines printed. No difference between the three segments of lines would be apparent.

The SLOW DEADBAND calibration is a precision test that checks the firing time of the jets as related to the forward and reverse direction.

X-Axis Calibration

The X-axis calibration procedure ensures that the processing that drives the stepper motor is correct to minimize line length accuracy errors.

Pinch Roller Adjustment Procedure

The purpose of the Paper Skew Adjustment is to make certain that the Pinch Roller in the Upper Roller Support stays centered on its shaft and/or has a gap when the Lower Roller is rotated forward for approximately two full revolutions. In other words, the Pinch Roller should not drift rapidly to the left or to the right when the Lower Roller is rotated forward for two full revolutions. (Slow drifting is acceptable.)

Use the torque screwdriver with the P0 bit to adjust the Pinch Roller mounting screws. The maximum torque requirement is 1 in-lbs ± 0.5.

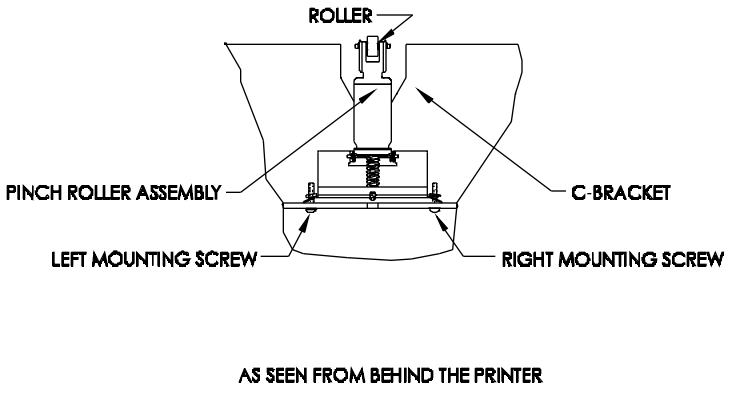

Figure 3-12. Upper Roller Support Description.

1. Figure 3-12 shows the Upper Roller Support and the mounting screws. Stand behind the printer in order to adjust the mounting screws on the Upper Roller Supports.

2. Become familiar with the actions and results shown in Table 3-1. Note that these actions are performed from behind the printer.

Table 3-1. Pinch Roller Adjustments.

ACTION	RESULT
1. Turn mounting screw counterclockwise (ccw).	1. Screw is loosened.
2. Turn mounting screw clockwise (cw).	2. Screw is tightened.
3. Loosen left mounting screw (turn ccw).	3. Roller moves to the right.
4. Tighten left monting screw (turn cw).	4. Roller moves to the left.
5. Loosen right mounting screw (turn ccw).	5. Roller moves to the left.
6. Tighten right mounting screw (cw).	6. Roller moves to the right.
7. Not maintaining downward pressure (towards the floor) on the head of each mounting screw at the same time as you loosen or tighten the screw.	7. The upper roller support will not be perfectly level and will not perform its function properly. Each mounting screw must be completely at the bottom edge of its hole in the back of the C-bracket as you loosen or tighten the screw. See Figure 3-13.

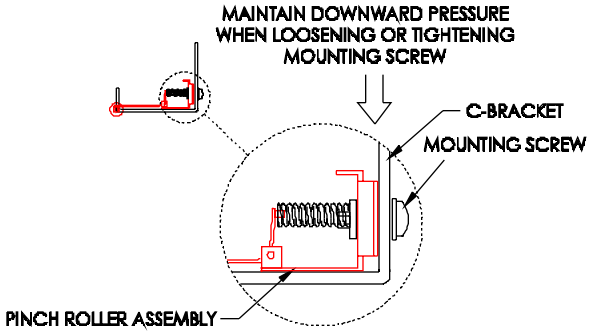

Figure 3-13. Upper Roller Mounting.

3. If you loosen one of the mounting screws and the roller moves in one direction, and you need to move the roller in the opposite direction, tighten the screw that was loosened to its maximum torque (1 in.-Lbs. ± 0.5) BEFORE loosening the other screw to move the roller in the opposite direction. NEVER LOOSEN OR TIGHTEN BOTH MOUNTING SCREWS AT THE SAME TIME ON THE SAME UPPER ROLLER SUPPORT.

4. Following all of the above information precisely will ensure that the Upper Roller Support springs are deflected and the lower tail of the springs will always be pressed against the C-bracket's vertical wall (without a gap) as shown in Figure 3-13.

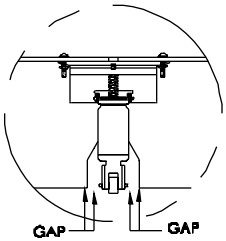

Figure 3-14. Gap of Pinch Roller.

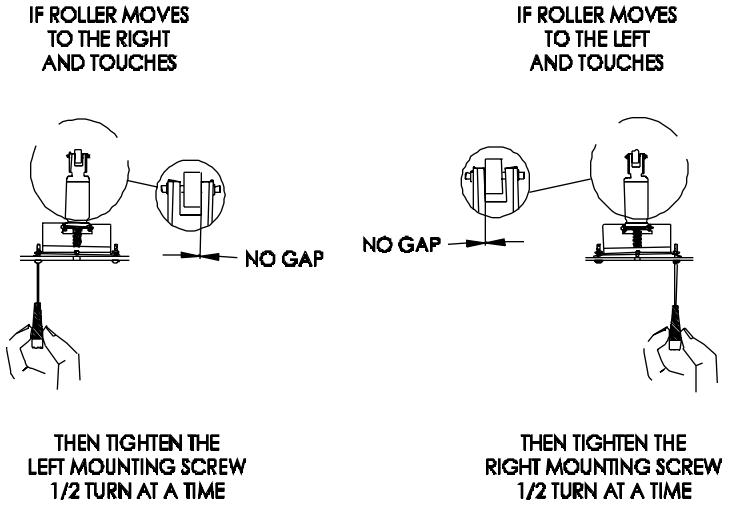

Figure 3-15. Upper Roller Adjustment.

Figure 3-15 shows how the motion (rapid drifting to the right or to the left) of the roller determines which mounting screw should be tightened in order to eliminate the motion of the roller so that the roller stays in the center of the shaft and/or there is a gap when the Lower Roller is rotated forward.

Head Height Alignment Procedure

Perform this procedure only when the encoder strip stabilizer has been removed from the C-Bracket or whenever the alignment is in question. The head height alignment procedure is to ensure that a 0.065” +/- 0.003” difference exists between the cartridge jet plate and the Platen. See Figure 3-16.

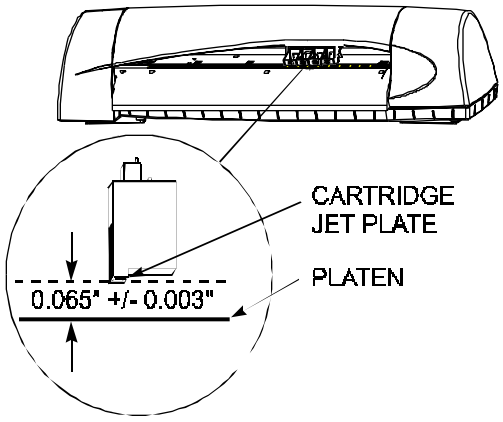

Figure 3-16. Carrier Head Height Tolerance.

1. Remove the lid and the right cover of the printer. See Chapter 5 for procedures.

2. Obtain the 3 tools (Micrometer Dial Gauge, Test Cartridge, and Measuring Tip Extender) from the Height Gauge Kit. Assemble the tools as shown in Figure 3-17.

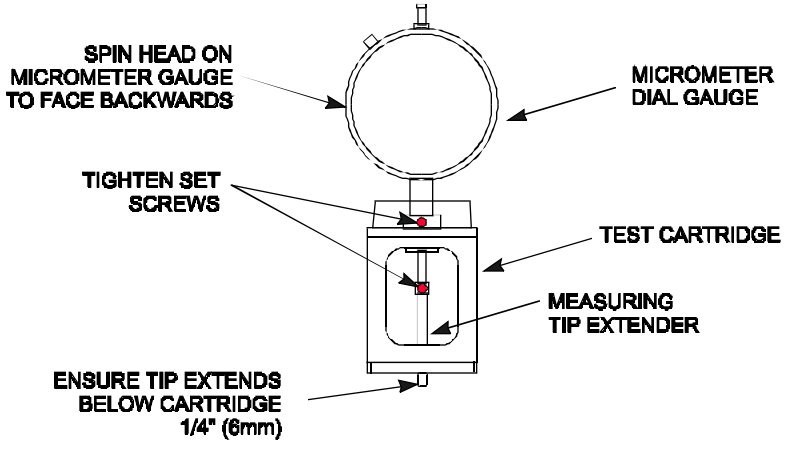

Figure 3-17. Setting Up Tools from Height Gauge Kit.

3. Place the test cartridge upright on a flat surface and 'zero' the gauge by loosening the knob near the top and turning the dial until the needle is at the '0' position on the dial. Tighten the knob. See Figure 3-18.

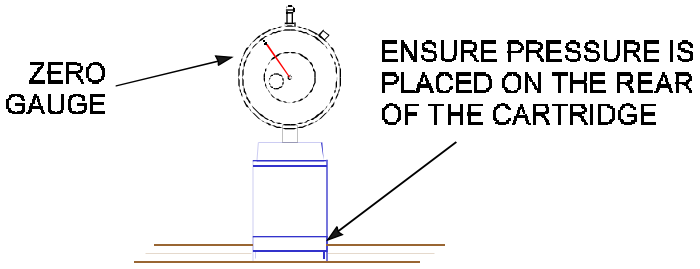

Figure 3-18. Zeroing the Micrometer Gauge.

4. Remove the Cyan ink cartridge. Snap the test cartridge with the micrometer gauge into the position vacated by the Cyan ink cartridge. See Figure 3-19. Ensure that the micrometer can be read from the BACK of the printer.

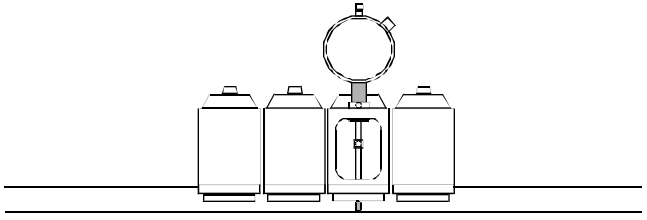

Figure 3-19. Test Cartridge Installed.

5. Remove the trailing cable assembly.

6. Loosen the three screws located on the back of the C-bracket that secures the stabilizer to the C-bracket.

CAUTION

Damage may occur to the micrometer gauge if the Carrier is moved without lifting up on the measuring tip. This action could also take the micrometer out of alignment and foul the results of the alignment.

7. While lifting up the measuring tip of the micrometer, slide the Carrier to the center of the stabilizer as shown in Figure 3-20. Position it as close to the screw as possible and drop the measuring tip onto the platen. Do this a couple of times to ensure an accurate reading.

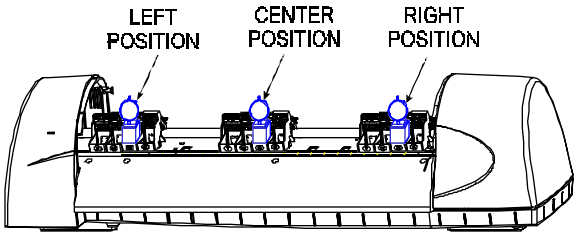

Figure 3-20. Carrier Positions for Head Height Adjustment.

8. Move the left and right ends of the stabilizer bracket until a reading of 0.075 +/- 0.003” is observed. Read only the RED numbers on the micrometer gauge. The measurement of 0.075 +/-0.003” is used because the test cartridge being used does not have a print head attached. A 0.010” difference had to be added to compensate for the lack of a print head.

9. Tighten the screw on the center of the stabilizer.

10. While lifting up the measuring tip of the micrometer, slide the Carrier to the left of the stabilizer as shown in Figure 3-20. Position it as close to the screw as possible and drop the measuring tip onto the platen. Do this a couple of times to ensure an accurate reading.

11. Move the left end of the stabilizer bracket until a reading of 0.075” +/- 0.003” is observed. Read only the RED numbers on the micrometer gauge.

12. Tighten the screw on the left end of the stabilizer.

13. While lifting up the measuring tip of the micrometer, slide the Carrier to the right of the stabilizer as shown in Figure 3-20. Position it as close to the screw as possible and drop the measuring tip onto the platen. Do this a couple of times to ensure an accurate reading.

14. Move the right end of the stabilizer bracket until a reading of 0.075” +/- 0.003” is observed. Read only the RED numbers on the micrometer gauge.

15. Tighten the screw on the right end of the stabilizer.

16. Repeat these steps as many times as necessary to ensure an accurate alignment.

Croma24 Control Panel

During the installation procedures for the ***Croma24*** , a software Control Panel for this printer is installed onto the computer. This control panel provides a means to monitor and adjust certain variables utilized by the printer. These variables include:

ink levels in the cartridges
color calibration adjustments

Other items that can be accomplished at the control panel are:

media movement (forward/backward)
media standard selections
cutting the media
priming the cartridges
access cartridge (moves the Carrier to the middle of the Platen for changing cartridges, etc.)

The printer control panel also has a hidden maintenance menu that has been developed with subroutines to aide the technician in troubleshooting and to assure the quality of the printed output products.

All menus depicted in this section have been derived from the Windows95™ Control Panel version. Other versions of the Control Panel may look slightly different but have the same functionality.

The maintenance subroutines are hidden and should be performed by competent technicians only. To make the Maintenance Menu appear:

1. Open (or execute) the Croma24's Control Panel program.
2. At the "About Croma24" menu, simultaneously type 'S' while holding down the 'Alt' key.

This brings up the Maintenance Menu as seen in Figure 3-21.

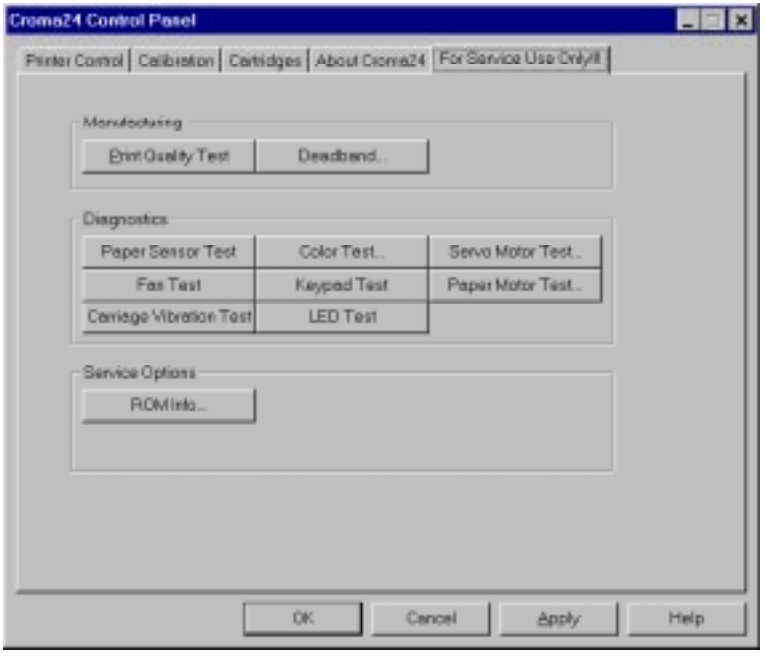

Figure 3-21. Maintenance Menu.

Figure 3-21 shows that the Maintenance Menu for the ***Croma24*** is divided into 3 submenus:

Manufacturing
Diagnostics
Service Options

Manufacturing Menu

Figure 3-22. Manufacturing Menu.

The Manufacturing Submenu (Figure 3-22) consists of two procedures:

Print Quality Test
Deadband

The procedures are primarily used in the manufacturing process and is adjusted correctly before it leaves the plant. They are also available to the field technician in case such adjustments are required to be performed again.

Print Quality Test

The Print Quality Test prints an imbedded 24" RTL graphic that allows the technician to get a general idea how well the printer is operating. The graphic depicts a series of triangles of different colors. This test is primarily used to identify if banding is present.

Deadband

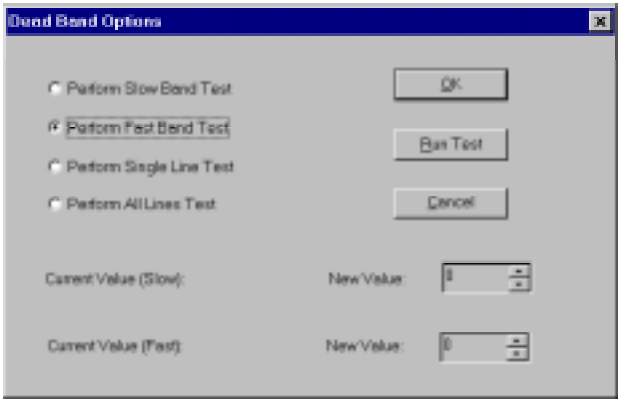

Figure 3-23. Deadband Options Menu.

The Deadband calibration (Figure 3-23) consists of four tests:

Slow Deadband Test
Fast Deadband Test
Single Line Test
All Line Test

Figure 3-24. Deadband Slow/Fast Display.

Figure 3-24 shows what the display will look like when printing either the fast or slow test if it is out of alignment. A correctly aligned printer will appear as if there is only a series of vertical lines printed. No differences will be apparent between the segments in each set of lines .

The SLOW DEADBAND calibration is a precision test that checks the firing time of the jets as related to the forward and reverse direction.

Allowable values for the Slow Deadband is -1, 0 and 1, and from 0 to 164 in increments of one for the Fast Deadband.

The Single Line Test and All Line Test are variations of the Slow and Fast Tests except they print longer lines so that long time integration of the deadband calibration can be observed. The Single Line Test prints only one line at a time while the All Line Test prints all lines at the same time.

Diagnostics Menu

Figure 3-25. Diagnostics Menu.

The Diagnostics Menu as seen in Figure 3-25 consists of eight tests:

Paper Sensor Test
Fan Test
Carrier Vibration Test
Color Test
Keypad Test
LED Test
Servo Motor Test
Paper Motor Test

Paper Sensor Test

The Paper Sensor Test checks the operation of the optical paper sensor. Once activated, a pop-up dialog box (Figure 3-26) appears that displays the widthof the media loaded in inches, centimeters, and millimeters.

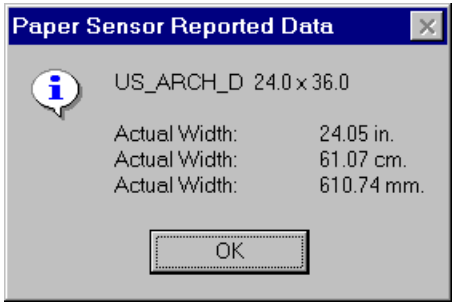

Figure 3-26. Paper Sensor Reported Data Dialog Box.

Fan Test

Figure 3-27. Fan Test Menu Panels.

The Fan Test toggles the fan on and off each time the control button is activated.

Carriage Vibration Test

The Carriage Vibration Test prints 5 sets of 3 parallel lines to test the vibration characteristics of the carrier assembly.

Color Test

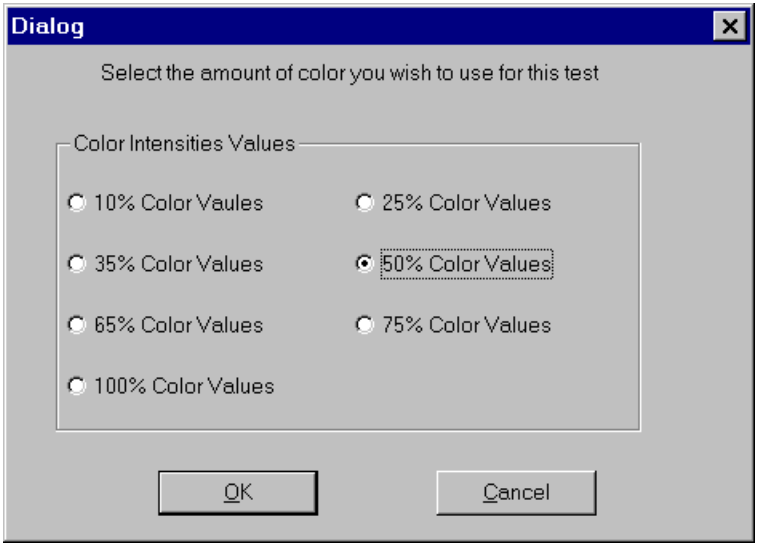

Figure 3-28. Color Test.

The Color Test prints a 1 inch swath of each color (total of 4) to test for banding. The test is selectable in the amount of ink that is printed to 10%, 25%, 35%, 50%, 65%, 75%, or 100%.

Keypad Test

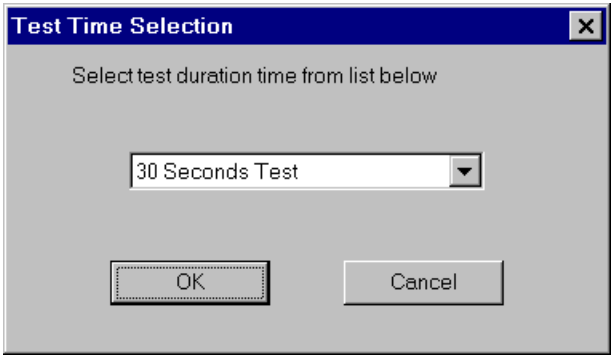

Figure 3-29. Keypad Test.

The Keypad Test checks the keypads on the MPCB. The keypads are the microswitches that are activated whenever one of the tabs on the actuator is depressed.

Each time a switch is activated and hold for a few seconds, a LED (or both LEDs) becomes illuminated. The indications to be observed is listed in Table 3-2.

Table 3-2. Keypad Test Indications.

SWITCH	GREEN LED	AMBER LED
Backward	Off	On
Load Media	On	On
Forward	On	Off
Cut	Off	On
Power	On	Off

The test is selectable in duration. The available time selections are: 5, 10, 20, 30, 40, 50, 60, 90, 120, 180, 240, or 300 seconds, 10 or 30 minutes, or 1 hour.

LED Test

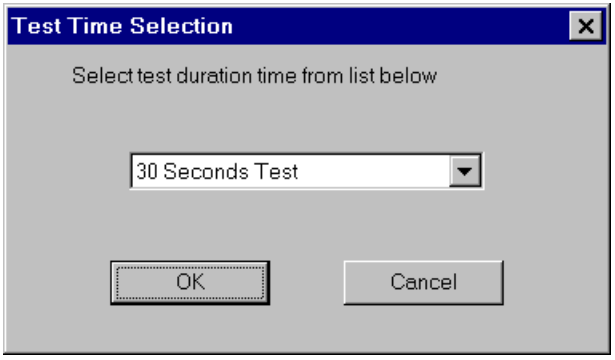

Figure 3-30. LED Test.

The LED Test lights both LEDs on the printer. The test is selectable in duration. The available time selections are: 5, 10, 20, 30, 40, 50, 60, 90, 120, 180, 240, or 300 seconds, 10 or 30 minutes, or 1 hour.

Servo Motor Test

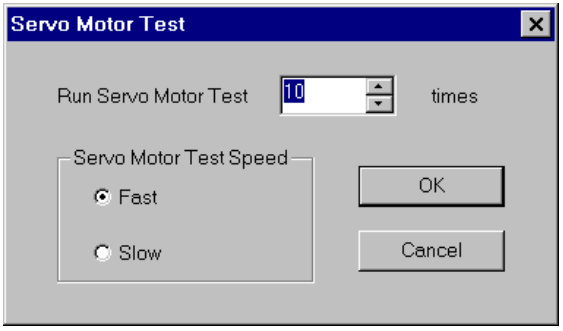

Figure 3-31. Servo Motor Test.

The Servo Motor Test tests the servo motor by moving the carrier back and forth across the slide shaft. Speed is selectable to either slow or fast. The number of cycles the carrier does is selectable between 0 and 10,000 cycles.

Paper Motor Test

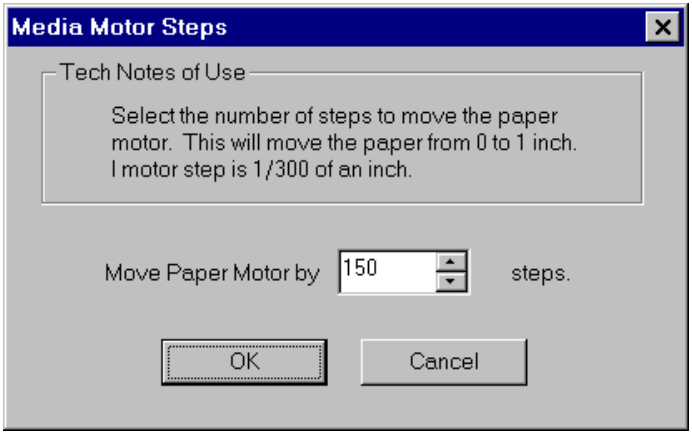

Figure 3-32. Paper Motor Test.

The Paper Motor Test tests the stepper (media) motor by moving the paper forward by a selected number of steps. The number of steps is selectable between 0 and 300 steps. At 0 steps, the media will not advance at all.

Service Menu

Figure 3-33. Service Menu.

The Service Menu consists of ROM Information.

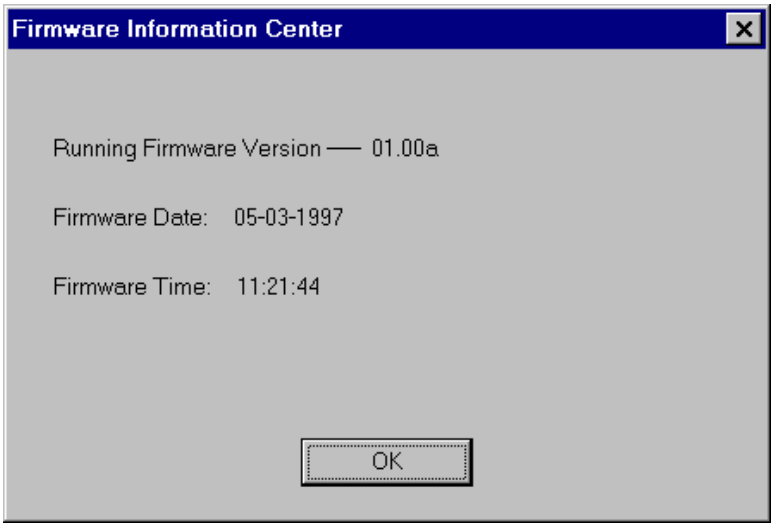

Figure 3-34. ROM Info.

The ROM Info screen displays the current firmware version, and date and time of development. This information helps the technician by providing a means of identifying the firmware loaded on the printer.

Additional information can be obtained by revealing the Service Special Information Menu as shown in Figure 3-35. To display the Service Special Information Menu, at the Maintenance Menu, simultaneously type 'S' while holding down the 'Alt' key and then type in "bali."

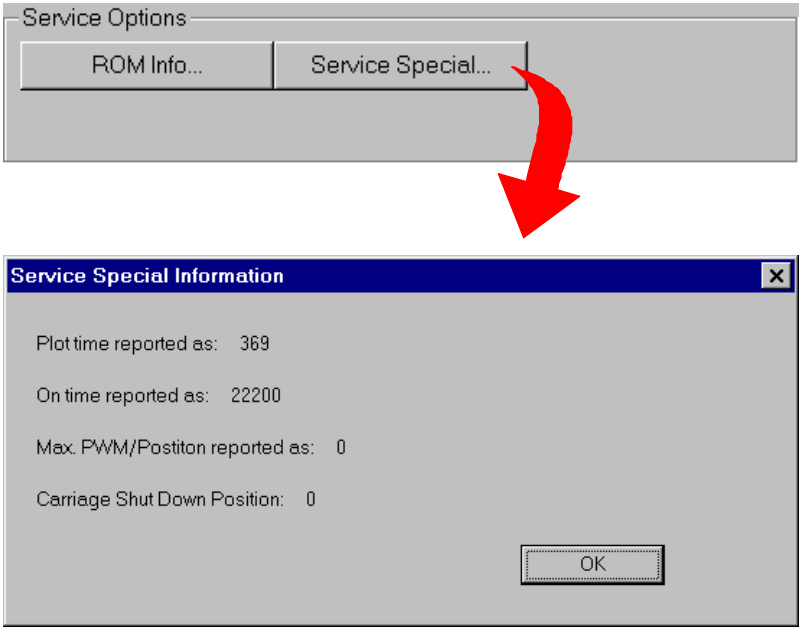

Figure 3-35. Service Special Information.

The Service Special Information Menu displays information about the printers plot and ON time (in seconds) as well as the Maximum PWM/Position and Carriage Shut Down Position.

Built In Test (BIT)

The Croma24 printer has a built in test mode which is used as an additional tool for the technician in troubleshooting. The BIT mode is a way of checking the performance of the printer while removing any interferance or conditions that may be caused by the computer or network. It is considered as a stand-alone test.

To perform the BIT test, a loopback cable is required and needs to be installed into the I/O ports before powering up the printer. If the printer is a GA or GA & CAD version, insert both the parallel and serial ends of the loopback cable before powering up.

To enter the BIT mode, apply power to the printer while simultaneously depressing the 'soft on' button. Continue to hold onto the 'soft on' button until the carrier assembly has traveled halfway across the length of the platen. Release the 'soft on' button.

The printer will go through its normal start-up routine. Once the start-up routine is completed, it will perform and print out a series of tests. First thing it will do is prime the cartridges.

The prime is followed by a serial port test (GA or GA & CAD versions). The loopback cable is required to pass this test.

Then it will print a fast deadband display and a color calibration display.

It will then test the parallel port test. The loopback cable is required to pass this test.

After completing the parallel port test, the BIT test begins again with a prime. It will continue to perform the BIT test until the BIT mode is exited. To exit the BIT mode, turn the printer off and on again in the normal power-up mode.

The deadband and color calibration displays are for visual inspection of the condition of the printer only, no adjustments can be performed while in the BIT mode.

Firmware/Software Upgrades

The Croma24 Control Panel, Printer Driver, and embedded firmware are all upgraded onto the computer at the same time by installing the latest Croma24 software bundle. The latest version can be found on ENCAD's bbs or website, the phone numbers are located in Chapter One.

The installation procedure will upgrade the Control Panel and the Printer Driver simultaneously. Verify that the upgrade was successful by checking in the "about" panel in both the Control Panel and the Driver for version specs.

The latest firmware version was included and installed onto the computer during the installation process. To upgrade the firmware on the printer, open the Control Panel with the printer online. During the initial start up of the Control Panel, it communicates with the printer's firmware. The Control Panel is collecting information stored on the printer such as current ink levels and the firmware version. If the Control Panel finds an older version of firmware, it automatically installs the latest version that is stored on the computer.

This communication between the Control Panel and the printer happens every time that the Control panel is opened.

NOTE

The printer's firmware will revert back to version 1 (the original version) if power is removed from the printer for any reason.

To assure that the latest version is loaded onto the printer, it is a good practice to run a "Prime" every morning that the printer is to be used. This forces the user to open the Control Panel, which verifies that the latest version of firmware is loaded.

It also helps the cartridges to purge any possible obtructions within the jets before clogging begins by firing all the jets for a period of time.

Internal Cabling and Signal Flow Diagram

Figure 3-36 is a schematic of the major components and the cabling associated between them. The diagram depicts component boards or assemblies, jack connections, cables, and signal flow. It is to be used by the technician as an additional aid in troubleshooting and improve understanding of the printer theory of operation.

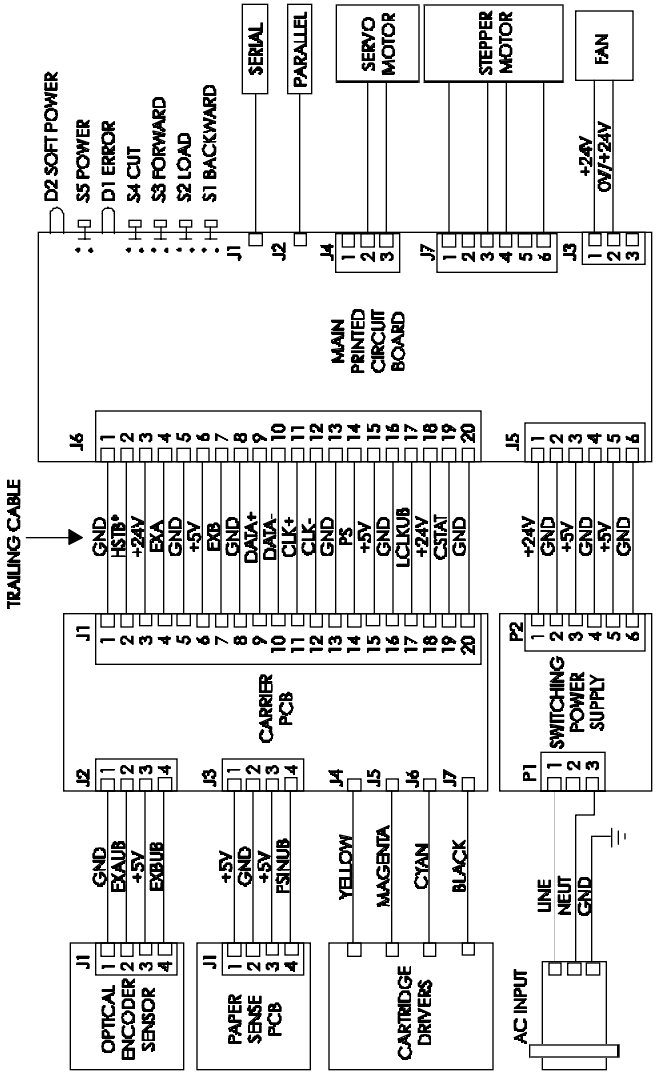

Figure 3-36. Signal Wiring Diagram.

Troubleshooting 4

Introduction

Chapter 4, Troubleshooting consists of a table that is intended to aide the technician in troubleshooting the **Croma24** printer. This table addresses symptoms with their possible causes and solutions.

Basic troubleshooting skills will be required to perform the symptom identification, troubleshooting, fault isolation, and repair of the printer when using this table.

Ensure that all applicable software diagnostic tests have been properly executed, all visual indications (including LED status) have been observed, and all applicable pushbuttons have been depressed to obtain a complete list of symptoms to be applied to the table below.

Use the table in conjunction with Chapter 3, Maintenance, whenever the table prompts you for additional information. This information may be in the form of an illustration, additional data, or a procedure that needs to be performed.

Table 4-1. Troubleshooting Table.

Symptoms	Possible cause	Solution
No Power	• faulty power cord	replace power cord
	• AC input not present at power supply	replace AC entry module

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
No Power (cont)	• all DC output voltages not present (see Figure 3-18 for voltages)	1) check fuse on power supply 2) replace power supply
	• all DC voltages present at MPCB	replace MPCB
Media Does Not Move		
	• perform Stepper Motor Winding Resistance check	replace stepper motor
	• rough motion while spinning stepper motor	bad bearings - replace stepper motor
	• pinch rollers not adjusted correctly	adjust pinch rollers
	• paper sensor not responding	replace paper sensor
	• media control switches on printer are operating correctly	Croma24 Control Panel corrupted - reinstall Control Panel
	• bad MPCB	replace MPCB

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Carrier Axis Failure		
	• dirty (or lubricated) slide shaft	perform Slide Shaft Cleaning procedure
	• perform Servo Motor Winding Resistance check	replace servo motor
	• check servo motor for smooth movement	bad bearings - replace servo motor
	• obstruction in path of carrier (may or may not be visible)	remove obstruction
	• dirty encoder strip	perform Encoder Strip Cleaning procedure
	• damaged encoder strip	replace encoder strip
	• bad encoder sensor	replace encoder sensor
	• worn carrier bushings	replace carrier bushings
	• loose trailing cable connections	reseat trailing cable connections at the MPCB and the carrier assembly

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Carrier Axis Failure (cont)	• cutter assembly malfunction	replace cutter assembly
	• damaged carrier drive belt system	1) check idler/ tension assembly 2) check carrier belt
Does Not Print		
	• bad connection between computer and printer	reseat cable connections on computer and printer
	• firmware is corrupted	refresh EEPROM firmware with new download
	• bad MPCB	replace MPCB
Ink Cartridge Misfiring		
	• cartridge low on ink	refill or replace cartridge
	• flex contacts dirty or damaged	1) perform Flex Cable Contact Cleaning procedures 2) replace carrier assembly

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Ink Cartridge Misfiring (cont)	• cartridge dimple area dirty or damaged	1) perform Cartridge Dimple Cleaning procedure 2) replace cartridge
	• cartridge not seated correctly	reseat cartridge
	• bad cartridge	replace cartridge
	• service station dirty or not properly sealing cartridge jet area	1) perform Service Station Cleaning procedures 2) replace seal on service station
	• bad carrier assembly	replace carrier assembly
	• bad MPCB	replace MPCB
Paper Skewing	• pinch rollers not aligned correctly	perform Pinch Roller Adjustment Procedure
	• stepper motor gearing dirty or damaged	perform Clean and Inspect Stepper Motor Gears procedure

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Printer Output is Banding		
	• if banding is consistent	1) inspect and/or replace stepper motor (perform Stepper Motor Winding Resistance Check) 2) inspect and/or replace stepper motor gears and/or lower roller assembly 3) replace MPCB
	• check amount of ink in cartridges	replace or refill cartridges
	• cartridges need to be primed	perform Prime
	• color calibration required	perform Color Calibration
	• X-axis calibration required	perform X-axis Calibration
	• cartridge dimple area dirty or damaged	1) perform Cartridge Dimple Cleaning procedure 2) replace cartridge

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
	• flex cable contacts dirty or damaged	1) perform Flex Cable Contact Cleaning 2) replace carrier assembly
	• carrier belt is loose, too tight, worn, or damaged	reinstall, check tension assembly, and/or replace belt
	• carrier bushings worn or damaged	replace bushings
Fan Does Not Power Up		
	• MPCB has 24 VDC at J3 pins 1-2	1) reseat connection at MPCB to fan 2) replace fan
	• power not being applied to fan	replace MPCB

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Assembly\Disassembly 5

Introduction

Chapter 5 contains the procedures for removal and replacement of the *C*roma*24* printer assemblies and mechanisms. Illustrations are provided for clarity. Steps for each replaceable part may depend on parts already removed in previous disassembly directions. It is recommended that you read through each procedure before beginning the removal and replacement of any assemblies or mechanisms.

The following is a list of tools which are recommended to disassemble and reassemble the printer:

- #1 Phillips Torque Screwdriver
- #2 Phillips Torque Screwdriver
- #1 Slotted Torque Screwdriver
- #2 Slotted Torque Screwdriver
- #1 Phillips Screwdriver
- #2 Phillips Screwdriver
- #1 Slotted Screwdriver
- #2 Slotted Screwdriver
- Torque Screwdriver, Allen Hex Driver (4mm)
- Torque Screwdriver, Socket Head (4mm)
- Wire Cutters
- Needle Nose Pliers
- X-ACTO Knife
- ESD Wrist Strap

The following materials are also required:

- Isopropyl Alcohol
- Cotton Swabs
- Lint Free Cloth or Tissue
- Double Sided Tape (1/16” thick, 3/4” wide)
- Loctite Blackmax, P/N 200172

A Hardware Kit is available for the printers. See Chapter 6 of this manual for the part number.

Always turn the printer OFF, remove the power cord and the interface cable before beginning any disasembly procedures. An electrical shock hazard may be present if these precautions are not followed.

Remove the Left, Middle (Lid), and Right Covers

Removing the Left Cover allows immediate access to the left side of the Platen for removal of the Carrier Assembly, Carrier Drive Belt, Tension Assembly, and the Cutter Activator.

Removing the Right Cover provides immediate access to the Main Printed Circuit Board (MPCB), Control Panel, Servo Motor, and the MPCB connections (to the Stepper and Servo Motors, Fan, Trailing Cable, and Power Supply.)

The Middle Cover (Lid) needs to be removed before any of the other covers can be removed. It also gives access to the Carrier Assembly and the Service Station when in the open position.

1. Remove Cover Retaining Clips (2) from the Middle (Lid) Cover. Insert a Needle Nose Pliers into the square openings near the back of the Lid and remove the Retaining Clip.

2. Put the Middle Cover (Lid) in the open position by lifting the front of the Middle Cover to the full upward position.

3. Remove the Middle Cover by pushing the Middle Cover backwards to disengage it from the Left Cover pin. Push back on the right side to disengage it from the Right Cover pin.

4. Remove the Right Cover by using a flat head screwdriver to unhook the locking clasps located in Figure 5-1. All clasps can be accessed from under the Base. Carefully lift off the Cover.

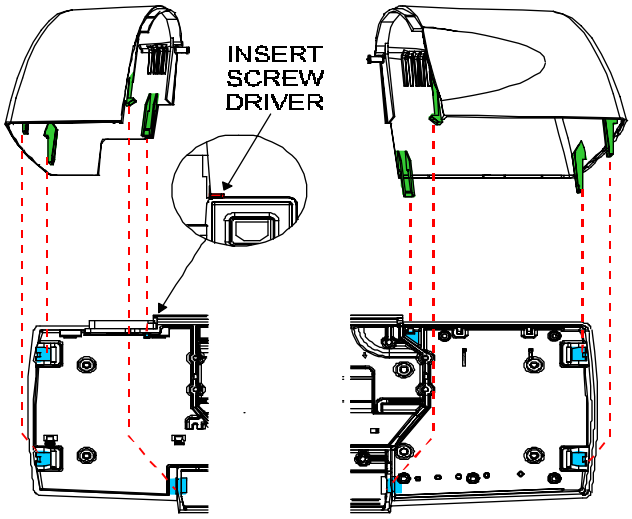

Figure 5-1. Cover Removal/Installation.

5. Remove the Left Cover by using a flat head screwdriver to unhook the locking clasps located in Figure 5-1. All clasps but one can be accessed from under the Base. The clasp located near the AC input plug can be reached with a #1 flathead screwdriver inserted into the slot between the Base and the Cover above and to the left of the AC plug on the back of the printer. See insert on Figure 5-1. Carefully lift off the Cover.

Install the Left, Middle, and Right Covers

1. Align the locking mechanisms on the Left Cover with the holes in the Base. Carefully push the Cover down onto the Base until it locks into place.

2. Align the locking mechanisms on the Right Cover with the holes in the Base. Carefully push the Cover down onto the Base until it locks into place.

3. Reinsert the Middle Cover by pressing it back onto the left and right pins. Lower the Middle Cover into the ready position.

4. Reinstall the Cover Retaining Clips (2) into the square openings in the Lid.

Remove the MPCB (Main Printed Circuit Board) and Actuator Assembly

CAUTION

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Perform steps 1 through 4 of the Left, Middle, and Right Cover Removal procedures to remove the Middle and Right covers.
2. Remove the three screws and washers securing the Actuator Assy and the MPCB.
3. Lift out the Actuator Assy.
4. Put on an ESD wrist strap.
5. Disconnect the Trailing Cable connector at the J6 location. Use the thumb and forefinger to pull up on the connector lock and remove the trailing cable from the connector.
6. Disconnect the Fan connector (red and black wires) at the J3 location. Grasp the Fan connector with the thumb and forefinger and pull straight out.
7. Disconnect the Stepper Motor connector at the J7 location. Grasp the Stepper Motor connector with the thumb and forefinger and pull straight out.
8. Disconnect the Power Supply connector at the J5 location. Grasp the Power Supply connector with the thumb and forefinger and pull straight out.
9. Disconnect the Servo Motor connector (red and blue wires) at the J4 location. Grasp the Servo Motor connector with the thumb and forefinger and pull straight out.
10. Remove the grounding strap for the Stepper Motor.

11. Using care, remove the MPCB by bringing it out the front of the printer.

CAUTION

Failure to use an approved anti-static bag for storage or shipment may cause damage to the MPCB and affect the Warranty.

12. Place the MPCB in an ESD bag (anti-static bag) in preparation for shipment to ***ENCAD*** for replacement or repair, or if it is to be stored at your facility for repair.

Install the MPCB and Actuator Assembly

CAUTION

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Put on an ESD wrist strap.
2. Remove the MPCB from the ESD bag.
3. Insert the MPCB through the area in the front of the printer. Align the MPCB so that the serial and parallel connections protrude out of the back of the printer and that the screw holes are aligned to the holes on the Base of the printer.
4. Using a #2 Phillips Torque Screwdriver, fasten the Actuator Assy to the MPCB and the Base with 15 in-lb of torque.
5. Attach the grounding strap for the Stepper Motor.

6. Connect the Servo Motor connector to J4 on the MPCB.
7. Connect the Power Supply connector to J5 on the MPCB.
8. Connect the Stepper Motor connector to J7 on the MPCB.
9. Connect the Fan connector to J3 on the MPCB.
10. Connect and lock the Trailing Cable connector to J6 on the MPCB.
11. Reinstall the Middle and Right Covers by performing steps 2 through 4 of the Reinstall the Left, Middle, and Right Covers procedure.

Remove Servo Motor

1. Perform the Left, Middle, and Right Cover Removal procedures to remove the Left, Middle and Right Covers.
2. Disconnect the Servo Motor connector (red and blue wires) at the J4 location on the MPCB.

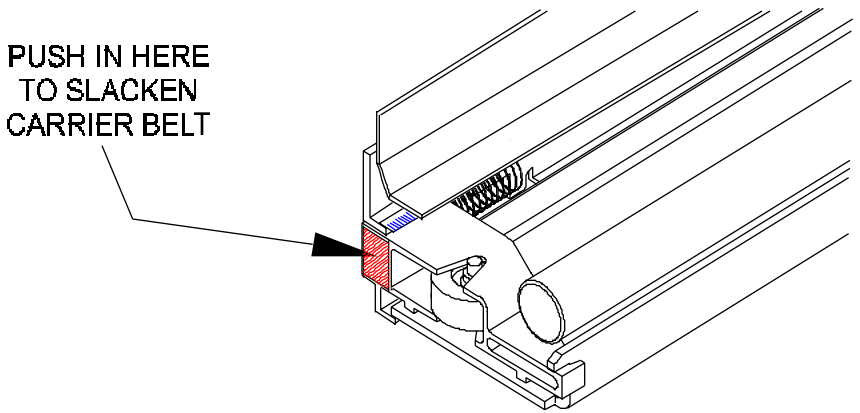

Figure 5-2. Frame Tensioner.

3. Depress the back of the Frame Tensioner (see Figure 5-2) to create slack in the Carrier Belt and slip it off of the Servo Motor pulley.

4. Move the Carrier Belt to the left so it is out of the way of the Servo Motor pulley.

5. Move the Carrier Assembly to the left end of the Slide Shaft.

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

6. Put on an ESD wrist strap.

7. In order to have access to the back screw on the Servo Motor, it is necessary to disconnect the Trailing Cable from the MPCB and lift up the right end of the Trailing Cable. Disconnect the Trailing Cable connector at the J6 location on the MPCB.

8. Lift up gently and hold the right end of the Trailing Cable.

9. Using a #2 Phillips screwdriver, remove the back screw on the Servo Motor. The screwdriver will be at a slight angle. Be careful not to strip the head of the screw or to cause damage to the Encoder Strip.

10. Lower the Trailing Cable back into place.

11. While holding the Servo Motor, remove the front screw on the Servo Motor.

12. Tilt the bottom of the Servo Motor towards the back of the Platen and carefully lower the motor through the opening and out of the back of the printer.

Install Servo Motor

CAUTION

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Put on an ESD wrist strap.
2. Reinsert the Servo Motor under the Platen with the connector facing the FRONT side of the Platen. Guide the pulley up through the opening in the Platen.
3. Once the Servo Motor pulley is through the Platen, push up on the Servo Motor and align the screw holes with the screw hole openings.
4. Insert the front screw into the Servo Motor and tighten it almost all the way.
5. Lift up gently and hold the right end of the Trailing Cable.
6. Insert the back screw into the Servo Motor and tighten it. Make sure the screw does not go into the motor at an angle, and be careful not to strip the head of the screw or to cause damage to the Encoder Strip.
7. Tighten both screws on the Servo Motor to 15 in-lb of torque.
8. Push the right end of the Trailing Cable back down into the hole on the Platen and reconnect the end to J6 on the MPCB.
9. Depress the back of the Frame Tensioner and wrap the Carrier Belt over the Servo Motor pulley. Make sure that the guides on the inside of the belt are inserted in the pulley grooves and that the belt is not twisted.
10. Move the Carrier Assembly back and forth to check the Carrier Belt tension.

11. Perform the Reinstall the Left, Middle, and Right Covers procedures to reinstall the Left, Middle and Right Covers.

Remove the Carrier Assembly, Carrier Belt, and the Frame Tensioner

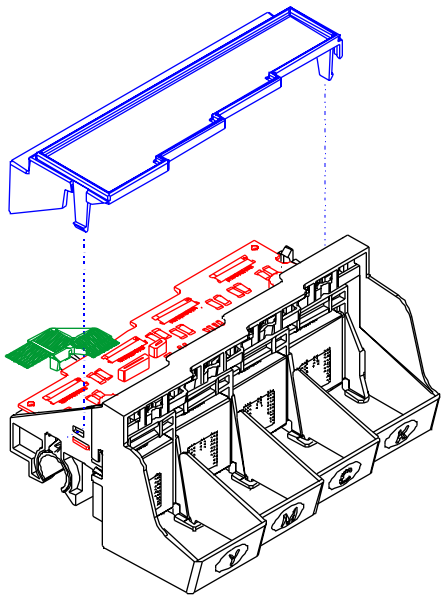

Figure 5-3. Electronics Cover Removal.

1. Perform the Left, Middle, and Right Cover Removal procedures to remove the Left, Middle and Right Covers.
2. Remove the Cutter Actuator by reaching under the Platen and releasing the actuator support tabs.
3. Move the Carrier Assembly to the far left side of the Slide Shaft.

4. Lift up on the front left side of the Electronics Cover until it comes part way off of the Carrier Assembly. Then lift up on the front right side of the Electronics Cover and move the Electronics Cover slightly to the left so that the back of it clears the Trailing Cable Support Assembly. See Figure 5-3.

5. Lift up on the connector lock to unlock the Trailing Cable connector (J1) on the Carrier PCB and remove the end of the Trailing Cable.

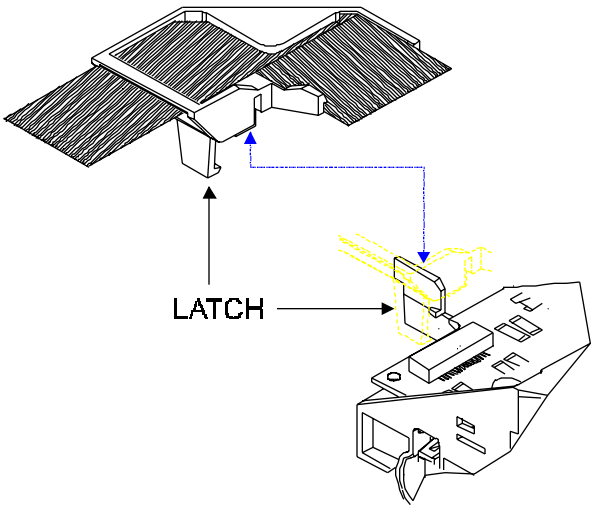

Figure 5-4. Strain Relief Removal/Installation from Carrier.

6. Remove the Trailing Cable and Strain Relief from the Carrier Assembly by releasing the latch on the left lower side of the Strain Relief and lifting it off of the Carrier Assembly. See Figure 5-4.

7. Move the Carrier Assembly away from the left end of the Slide Shaft. Compress the back of the Frame Tensioner and use the end of a screwdriver to remove the Carrier Belt from the Servo Motor pulley. See Figure 5-2.

8. Remove the Compression Spring from the Frame Tensioner and set it aside.

9. Push the Carrier Belt through the Frame Tensioner enough to remove the Idler Pulley Assembly from the Frame Tensioner, and then set aside the Idler Pulley Assembly and the Frame Tensioner. (See Figure 5-6 for part identification, if necessary.)

10. Slide the Carrier Assembly and Drive Belt off the left side of the Slide Shaft.

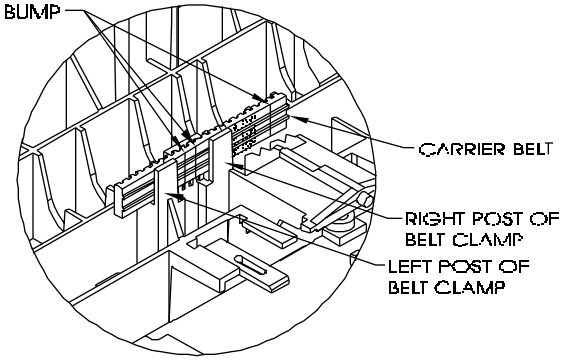

Figure 5-5. Carrier Belt Clamp.

11. Once the Carrier Assembly is removed from the Slide Shaft, turn it over so that you can see the Belt Clamp. See Figure 5-5.

12. To disengage the Carrier Belt from the Belt Clamp, push the Carrier Belt away from the left post of the Belt Clamp and gently lift up until the bottom edge of the Carrier Belt clears the top of the left post.

13. Push the Carrier Belt away from the right post of the Belt Clamp and gently lift up to finish removing the Carrier Belt from the Belt Clamp.

CAUTION

Failure to use an approved anti-static bag for storage or shipment may cause damage to the MPCB and affect the Warranty.

14. Place the Carrier Assembly in an ESD (anti-static) bag in preparation for shipment to ***ENCAD*** for replacement or repair, or if it is to be stored for repair at your facility.

Install the Carrier Assembly, Carrier Belt, and the Frame Tensioner

1. To install the Belt onto the Carrier Assembly, the “bumps” on the belt (where the ends of the belt are joined together to make the belt continuous) must be positioned between the left and right posts of the Belt Clamp. See Figure 5-5.
2. Slide the Carrier Belt between the right post and the middle post and guide it down into the Belt Clamp. Then slide the Carrier Belt between the left post and the middle post and finish placing the Carrier Belt into the Belt Clamp.
3. Check the position of the Carrier Belt to make sure it matches Figure 5-5.
4. Make sure the left end of the Trailing Cable extends out beyond the left end of the Trailing Cable Support Assembly.
5. Slide the Carrier Assembly onto the left end of the Slide Shaft, making sure that the Encoder Strip fits into the slot in the Slider and the Encoder on the Carrier PCB. Guide the belt while sliding the Carrier Assembly from left to right on the Slide Shaft.
6. Move the Carrier Assembly to the left end of the Slide Shaft and align the left bushing on the Carrier Assembly with the left end of the Slide Shaft.

7. Insert the Strain Relief (with Trailing Cable) onto the Carrier Assembly by sliding it onto the Strain Relief Support until it snaps firmly into place. See Figure 5-4.

8. Place the Trailing Cable into the J1 connector lock on the Carrier PCB. Make sure the silver fingers on the Trailing Cable are fully inserted into the lock and slide both sides of the connector lock shut at the same time.

9. Place the right side of the back of the Electronics Cover under the Trailing Cable Support Assembly and gently press down on the ends of the Electronics Cover until the latches snap into the Carrier Assembly.

10. Slide the Carrier Assembly to about the middle of the Slide Shaft and stretch out the Carrier Belt.

11. Insert the Carrier Belt into the Frame Tensioner so that the belt extends about an inch past the Frame Tensioner.

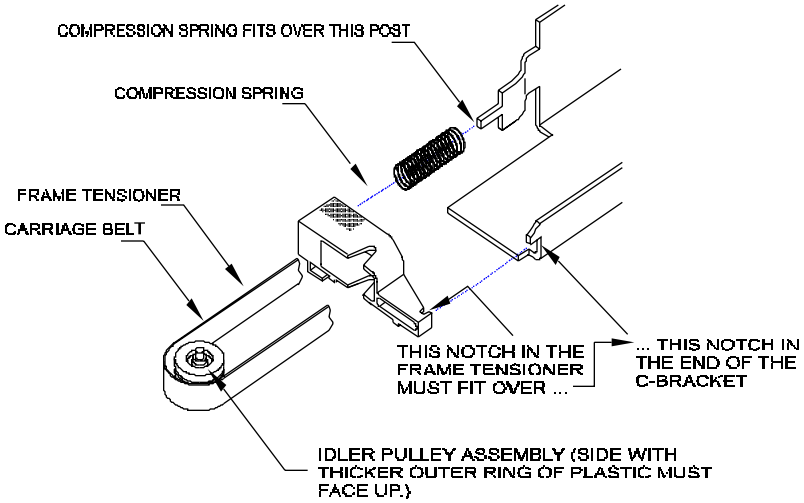

Figure 5-6. Installation of Frame Tensioner.

12. Holding the Carrier Belt and Frame Tensioner, insert the Idler Pulley Assembly into the loop of the belt. Make sure that the side of the Idler Pulley Assembly with the thicker outer ring of plastic is facing up. See Figure 5-6.

13. Once the Idler Pulley Assembly is in position, pinch the belt to hold the Idler Pulley Assembly in place and pull it into the Frame Tensioner so that the axle rests in the V-shaped groove in the Frame Tensioner.

14. Insert the Compression Spring into the opening in the back of the Frame Tensioner so that the end of the spring fits over the post inside the opening.

15. Fit the Compression Spring over the post at the back of the C-Bracket.

16. Fit the notch in the front end of the Frame Tensioner over the notch in the front of the C-Bracket.

17. Depress the back of the Frame Tensioner and slip the Carrier Belt over the Servo Motor pulley. Make sure that the guides in the Carrier Belt are properly fitted over the Servo Motor pulley.

18. Gently move the Carrier Assembly from end to end and make sure that the Carrier Belt is not rubbing against any other parts.

Remove the Carrier PCB

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Removal procedures to remove the Carrier Assembly from the Slide Shaft.

2. Put on an ESD wrist strap.

3. Unlock the connectors and remove all flex cables on the Carrier PCB. Ensure that the ferrite remains on the black cartridge flex cable.

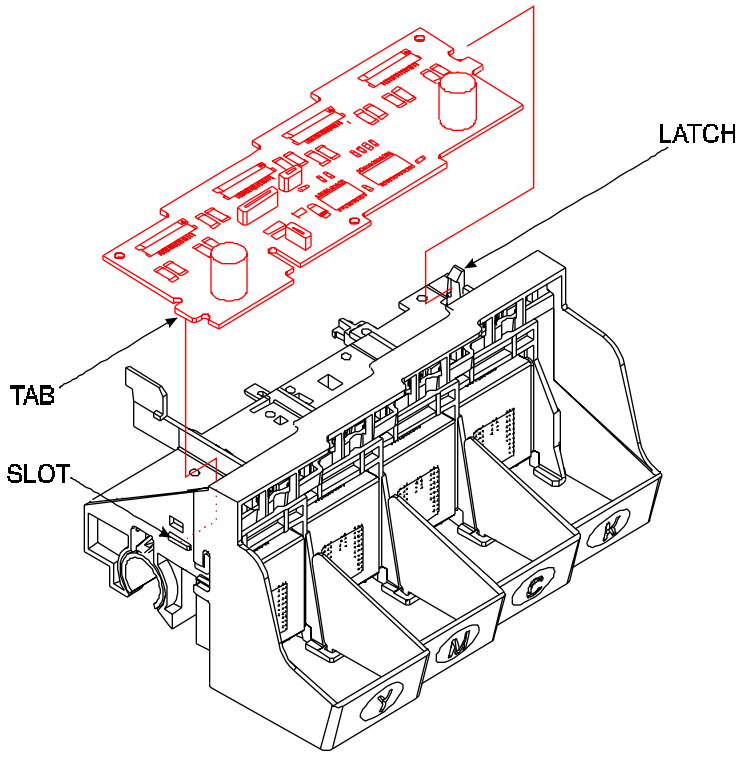

Figure 5-7. Carrier PCB Removal/Installation.

4. Unlock the latch on the right end of the Carrier Assembly and lift up the right end of the Carrier PCB. See Figure 5-7.

5. Slide the Carrier PCB to the right to remove the tab on the left end of the Carrier PCB from the slot in the Carrier Assembly.

CAUTION

Failure to use an approved anti-static bag for storage or shipment may cause damage to the Carrier PCB and affect the Warranty.

6. Place the Carrier PCB in an ESD bag (anti-static bag) in preparation for shipment to ***ENCAD*** for replacement or repair, or if it is to be stored at your facility for repair.

Install the Carrier PCB

1. Put the tab on the left end of the Carrier PCB into the slot in the left side of the Carrier Assembly. See Figure 5-7.
2. Ensure that no flex cables are underneath the Carrier PCB.
3. Push down the right end of the Carrier PCB until the latch snaps into place.
4. Reattach all flex cables on the Carrier PCB. Ensure that the ferrite remains on the black cartridge flex cable.
5. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Reinstallation procedures to reinstall the Carrier Assembly.

Remove the Paper Sensor or the Encoder Sensor

1. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Removal procedures to remove the Carrier Assembly from the Slide Shaft.

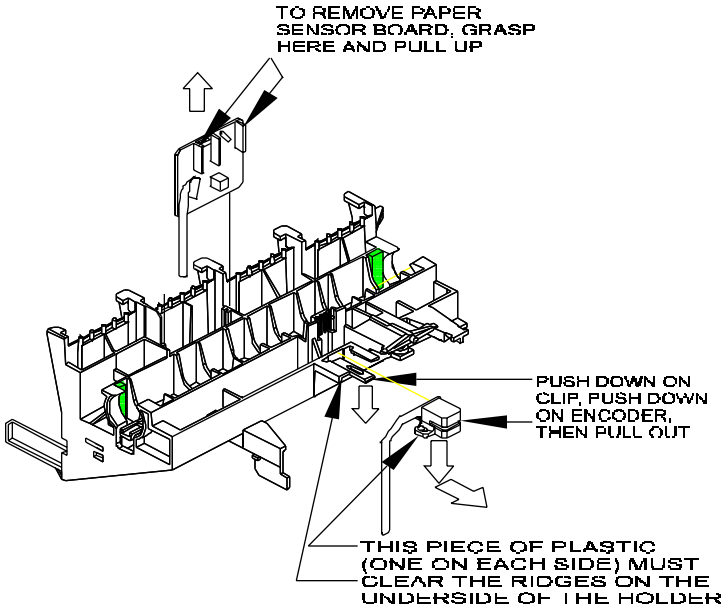

Figure 5-8. Paper and Encoder Sensor Removal.

2. To remove the Paper Sensor:

   a. Unlock the connector at J3 and remove the flex cable.

   b. Turn the Carrier Assembly over and hold it while firmly grasping the Paper Sensor between thumb and index finger. See Figure 5-8.

   c. Pull straight up on the Paper Sensor and remove it from the Carrier Assembly.

3. To remove the Encoder Sensor:

   a. Unlock the connector at J2 and remove the flex cable.

   b. Turn the Carrier Assembly over and lay it with the top side facing down.

   c. Push down on the plastic clip and at the same time push down on the Encoder until the plastic pieces on each side of

the Encoder clear the ridges which hold it in place. Then pull it straight out. See Figure 5-8.

Install the Paper Sensor or the Encoder Sensor

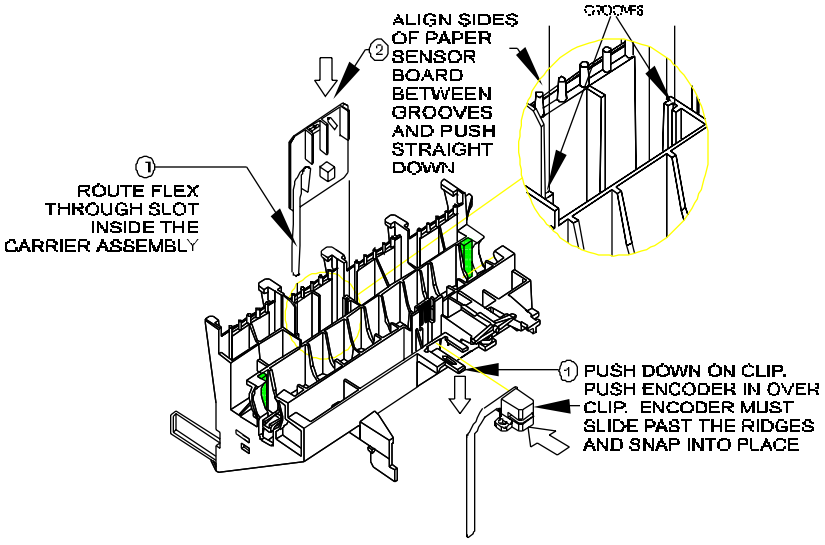

Figure 5-9. Paper and Encoder Sensor Installation.

1. To install the Paper Sensor:

   a. Turn the Carrier Assembly so that the bottom side of it is facing up.

   b. Route the flex on the Paper Sensor through the slot in the Carrier Assembly. Make sure the flex cable goes all the way through and does not curl under the Carrier PCB.

   c. Grasp the Paper Sensor between thumb and index finger and guide the sides of the board into the grooves on each side of the opening. See Figure 5-9.

   d. Push the Paper Sensor board down into the Carrier Assembly until it snaps firmly into place.

e. Turn the Carrier Assembly over and insert the Paper Sensor flex cable into the connector at J3.

f. Push both sides of the connector lock shut at the same time.

2. To install the Encoder Sensor:

a. Turn the Carrier Assembly so that the bottom side of it is facing up.

b. Push down on the plastic clip and slide the back of the Encoder Sensor over it.

c. Push the Encoder Sensor in past the ridges until the Encoder Sensor snaps into place.

d. Turn the Carrier Assembly over and insert the Encoder flex cable into the connector at J2.

e. Push both sides of the connector lock shut at the same time.

3. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Reinstallation procedures to reinstall the Carrier Assembly.

Remove the Trailing Cable Cover Assembly

1. Perform the Left, Middle, and Right Cover Removal procedures to remove the Left, Middle and Right Covers.

2. If you have not already removed the Carrier Assembly from the Slide Shaft, you will need to perform Steps 3 through 7 of the Removing the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures in order to remove the Electronics Cover and release the left end of the Trailing Cable from the Carrier PCB.

3. Disconnect the Ferrite and Ferrite Bracket from the Strain Relief by turning the Strain Relief over and pushing down on the Ferrite Bracket's catch until it can pass under the Strain Relief. Pull the Ferrite Bracket clear from the Strain Relief.

4. Remove the Trailing Cable from the triangular portion of the Strain Relief.

5. Lift up on the short end of the tape and unfold the bend in the Trailing Cable.

6. Remove the Strain Relief by pushing the Trailing Cable down through the opening in the Strain Relief.

7. Disconnect the Trailing Cable connector at the J6 location on the MPCB. Use the thumb and forefinger to pull forward on the connector lock and remove the Trailing Cable from the connector. See Figure 3-6 if necessary.

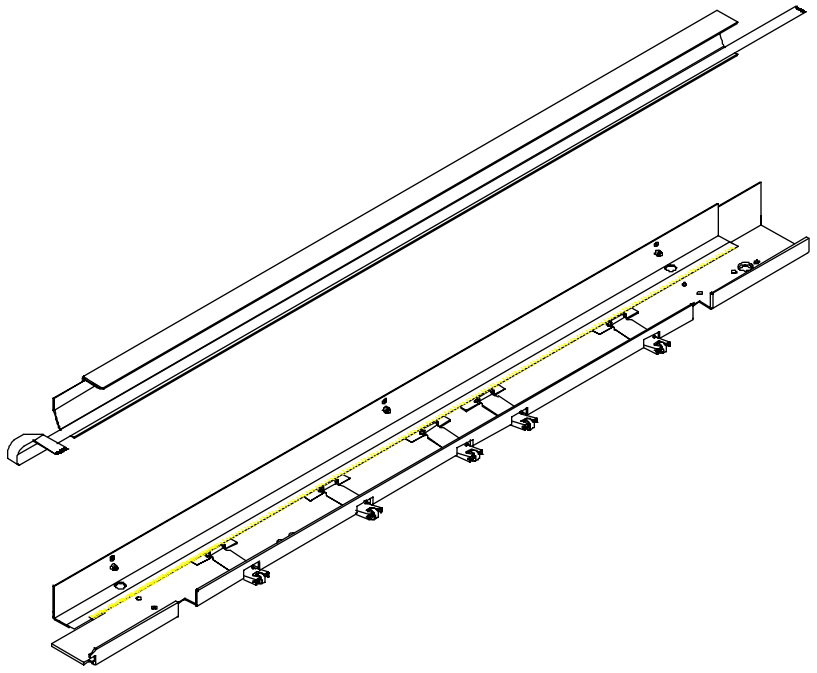

Figure 5-10. Trailing Cable Assembly Removal/Installation.

8. Using a #2 Phillips screwdriver, remove the three screws and washers securing the Trailing Cable Cover Assembly to the C-Bracket Assembly. See Figure 5-10.

9. With the Carrier Assembly in the far right position (if still installed), carefully slide the Trailing Cable Cover left until it clears the back of the Carrier Assembly. Then lift the Trailing Cable Assembly out of the printer.

Install the Trailing Cable Cover Assembly

1. Ensure that the Carrier Assembly (if installed) is at the far right side of the Slide Shaft, position the Trailing Cable Support Assembly in front of the C-Bracket and offset to the left enough to clear the Carrier Assembly.

2. Carefully slide the right side of the Trailing Cable Cover Assembly behind the Carrier Assembly until the screw holes on the Trailing Cable Cover Assembly lines up with the holes in the C-Bracket Assembly.

3. Fasten the Trailing Cable Cover Assembly onto the C-Bracket Assembly with 3 screws with 15 in-lb of torque.

4. Insert the right side of the Trailing Cable through the hole provided in the Platen and Secure to the J6 connector on the MPCB.

5. If the Carrier Assembly is not installed, perform steps 5 through 18 of the Reinstalling the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures.

6. Push the Trailing Cable up through the opening in the Strain Relief.

7. Fold the Trailing Cable and press it down onto the tape.

8. Slide the fold in the Trailing Cable under the triangular portion of the Strain Relief.

9. Slide the Ferrite Bracket onto the Strain Relief until the catch is securely in place on the Strain Relief.

7. Insert the Strain Relief (with Trailing Cable) onto the Carrier Assembly by sliding it onto the Strain Relief Support until it snaps firmly into place. See Figure 5-4.

Replacing the Carrier Bushings

1. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Removal procedures to remove the Carrier Assembly from the Slide Shaft.

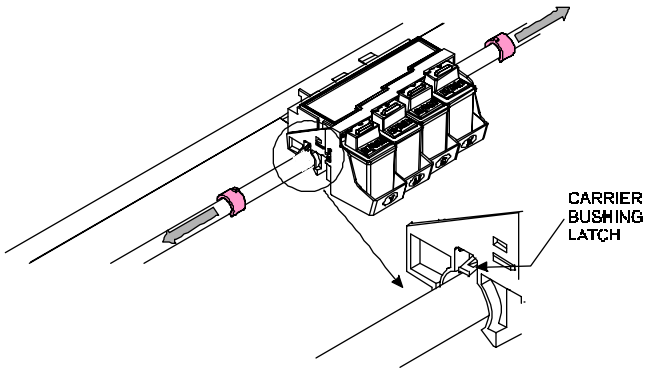

Figure 5-11. Carrier Bushing Removal.

2. Use a flat tip screwdriver to push up on the latch which holds the Carrier Bushing in place. See Figure 5-11.
3. Pull the Carrier Bushing out of the Carrier Assembly.
4. Repeat Steps 2 and 3 for the other Carrier Bushing.

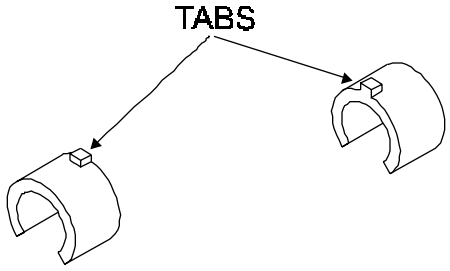

Figure 5-12. Carrier Bushing Installation.

5. Orient the new Bushing as shown in Figure 5-12 so that the metal tab on top of the Bushing goes into the Carrier Assembly first.

6. Push the Bushings in until they snap into place.

7. Perform the Reinstall the Carrier Assembly, Carrier Belt, and the Frame Tensioner procedures to reinstall the Carrier Assembly.

Remove the Service Station, Seals, and Wipers

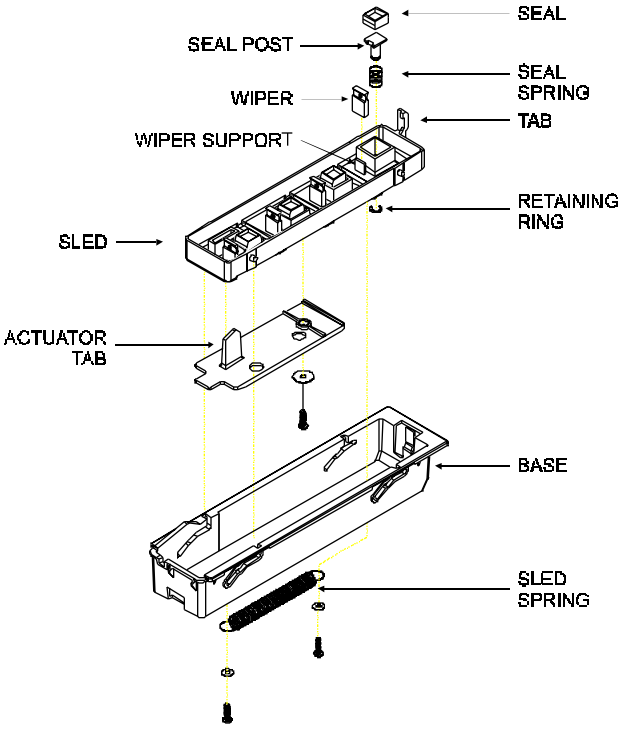

Figure 5-13. Service Station, Exploded View.

1. Place the Middle Cover in the open position.
2. Move the Carrier Assembly to the left side of the Slide Shaft.
3. Reach into the Right Cover and pull back on the Service Station release tab located on the far side of the Service Station. See Figure 5-13.
4. Raise the right side of the Service Station out of the Platen.
5. Lift out the left side of the Service Station from the Platen and remove the Service Station. Moving the Service Station

farther to the right might be required to release the left side of the Service Station.

6. To remove a Service Station Wiper, lift the Wiper up and off of the Wiper support.

7. To remove a Service Station Seal:

   a. Disconnect the Sled spring from the post on the bottom of the Service Station Sled. See Figure 5-13.

   b. Slide the Service Station Sled to the right and up until it is removed from the Service Station Base.

   c. While pushing the Service Station Seal in, remove the retaining ring from the other side. This releases the Seal Post (with the Seal attached) and the Seal spring.

   d. Remove the Seal from the Seal Post by sliding the rubber Seal until it is released.

Install the Service Station, Seals, and Wipers

1. To install a Service Station Seal:

   a. Slide the new Seal over the Seal Post.

   b. Insert the Seal Post through the Seal spring.

   c. Align the Seal Post and spring into the hole on the Service Station Sled, it is keyed to only go in one way.

   d. Press the Seal Post in to give enough clearance on the other side to attach the retaining ring.

   e. Insert the Service Station Sled into the Service Station Base by sliding the Service Station Sled down and to the left into the Base. To seat the Sled completely into the Base it will be necessary to press down on the tab on the Actuator.

   f. Reattach the spring onto the post on the bottom of the Service Station Sled.

2. To install a Service Station Wiper, press the new Wiper onto the wiper support.

3. Position the Service Station inside the Right Cover and place the left side of the Service Station into the Platen.

4. Push down on the right side of the Service Station until the Service Station snaps into place.

5. Slide the Carrier Assembly to the right and back into the home position.

6. Lower the Middle Cover.

Remove the Lower Roller Assembly and Stepper Motor

1. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Removal procedures to remove the Carrier Assembly from the Slide Shaft.

2. Perform the Trailing Cable Cover Assembly Removal procedures to remove the Trailing Cable Support Assembly.

3. Disconnect the Servo Motor connector (red and blue wires) at the J4 location on the MPCB.

4. Using a #2 Phillips screwdriver, remove the back screw on the Servo Motor. The screwdriver will be at a slight angle. Be careful not to strip the head of the screw or to cause damage to the Encoder Strip.

5. While holding the Servo Motor, remove the front screw on the Servo Motor.

6. Tilt the bottom of the Servo Motor towards the back of the Platen and carefully lower the motor through the opening and out of the back of the

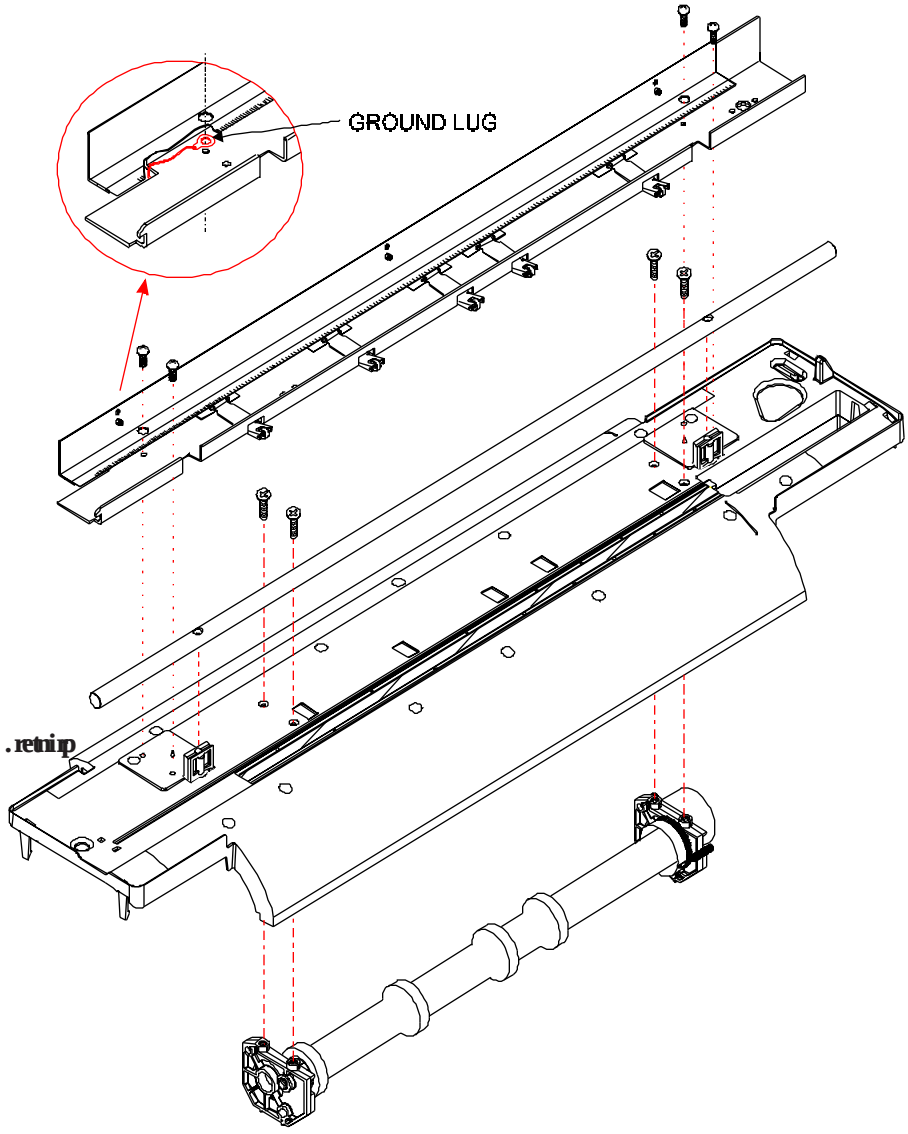

Figure 5-14. C-Bracket Assembly and Platen Removal.

7. Remove the C-Bracket Assembly by removing the four attaching screws. See Figure 5-14.

8. Using a #2 Phillips screwdriver, remove the grounding strap on the left side of the Slide Shaft.

9. Remove the Slide Shaft using a 3mm hex head driver.

10. Disconnect the Lower Drive Shaft Assembly from the Platen by removing the 4 attaching screws. See Figure 5-14.

11. Remove the Platen by releasing the 4 securing tabs (2 on each side) and six screws. Gently lift the Platen off of the Base.

12. Disconnect the Stepper Motor cable from J7 on the MPCB.

13. Disconnect the Stepper Motor ground strap from the MPCB.

14. Raise the Lower Drive Shaft Assembly out of the Base.

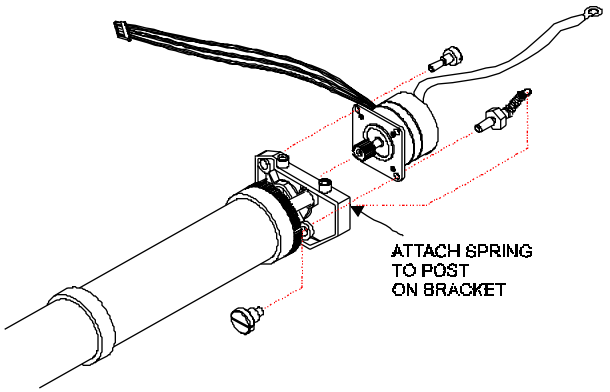

Figure 5-15. Stepper Motor Removal/Installation.

15. Remove the Stepper Motor Extension Spring from the Stepper Motor and the post on the Left Lower Drive Shaft Bracket. See Figure 5-15.

16. Remove the hardware securing the Stepper Motor to the Left Lower Drive Shaft Bracket and remove the Stepper Motor.

Install the Lower Roller Assembly and Stepper Motor

NOTE

Ensure that the stepper motor wires are exiting the motor casing in the “down” direction when completely installed. The wires should be opposite from the holes that secure the bracket to the platen.

1. Loosely attach the Stepper Motor to the Lower Roller bracket using Stepper Motor hardware as shown in Figure 5-15.
2. Attach the Stepper Motor tension spring to the Stepper Motor and the Lower Roller Bracket. Tighten the Stepper Motor hardware to 8 in-lb of torque.

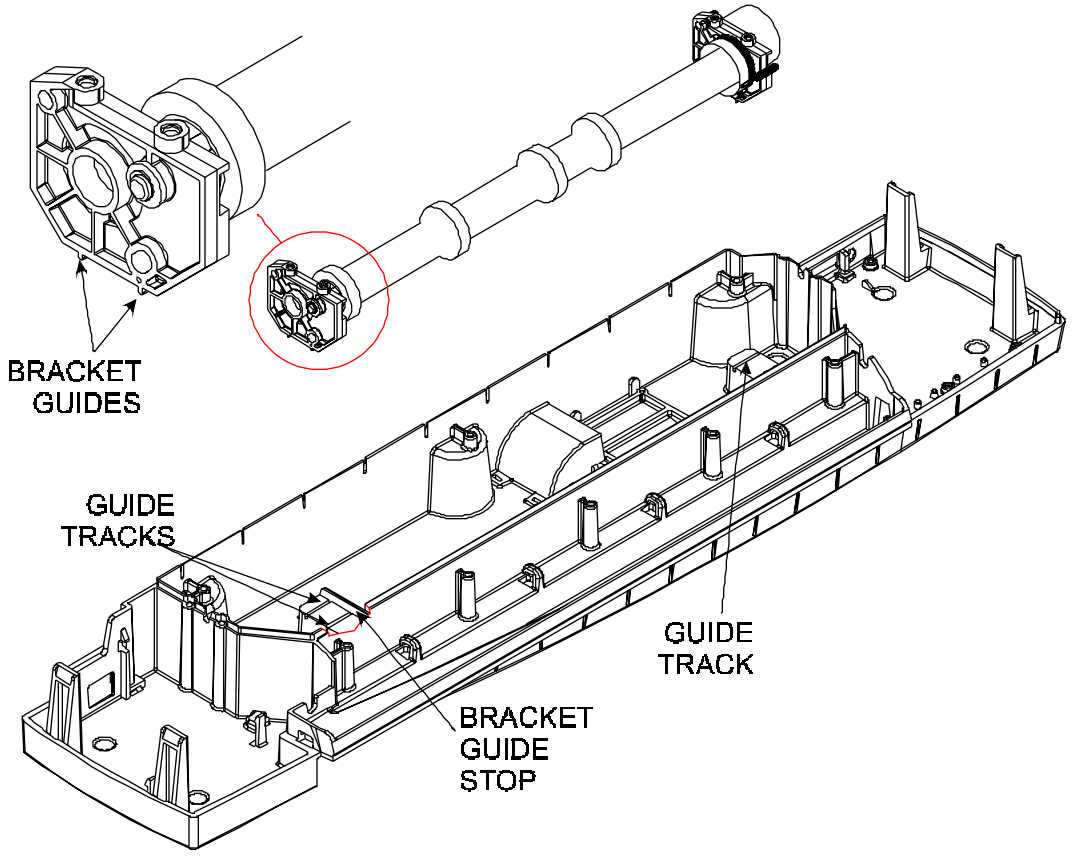

Figure 5-16. Installing Lower Roller Assembly.

3. Lower the Lower Roller Assembly into the Base of the printer by aligning the bracket guides with the base guide tracks. See Figure 5-16.

4. Slide the Lower Roller Assembly to the right until the left lower roller bracket is snug against the bracket stop guide.

5. Route the Stepper Motor wires through the wire access area and to the wire clamp. Attach the connector to J7 on the MPCB.

6. Route the Stepper Motor ground strap through the wire access area and to the wire clamp. Attach onto the back of the MPCB.

7. Carefully snap the Platen onto the printer Base. Ensure that the ground straps for the Slide Shaft and C-Bracket are coming through the holes in the Platen.

8. Secure the Lower Roller Assembly onto the Platen.

9. Attach the C-Bracket Assembly and ground strap to the Platen by aligning the bracket onto the bracket guide pins and securing with attaching hardware to 15 in-lb of torque. See insert of Figure 5-14 for connection of ground strap onto the C-Bracket. Ensure that the Pinch Rollers are centered on the lower rollers and that tension is being applied the the lower rollers.

10. Attach the Slide Shaft to the supports tightening to 15 in-lbs of torque using 3mm hex head torque screwdriver.

11. Attach the ground strap to the left side of the Slide Shaft.

12. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Reinstallation procedures to reinstall the Carrier Assembly.

Remove the Power Supply and AC Entry Module

1. Remove the Left, Middle, and Right covers by following the cover removal procedures.

2. Remove the Cutter Actuator by reaching under the Platen and releasing the actuator tabs.

3. Release the Carrier Belt from the servo Motor spindle by pressing the tension assembly inward to allow enough slack to lift off the belt from the servo motor.

4. Disengage the Trailing Cable from the Carrier Assembly by disconnecting the cable from J1 on the Carrier Board and pressing on the Trailing Cable Strain Relief latch (see Figure 5-4).

5. Slide the Carrier Assembly, Belt and Tension Assembly off the left side of the Slide Shaft.

6. Disconnect the Trailing Cable from J6 on the MPCB and remove the Trailing Cable Cover Assembly.

7. Disconnect the Servo Motor cable from J4 on the MPCB and remove the Servo Motor.

8. Remove the C-Bracket Assembly.

9. Using a #2 Phillips screwdriver, remove the grounding strap on the left side of the Slide Shaft.

10. Remove the Slide Shaft using a 3mm hex head driver.

11. Disconnect the Lower Drive Shaft Assembly from the Platen by removing the 4 attaching screws.

12. Remove the Platen by releasing the 4 securing tabs (2 on each side) and six screws. Gently lift the Platen off of the Base.

13. Disconnect the Power Supply cable from J5 on the MPCB. Remove the cable from the cable supports on the Base.

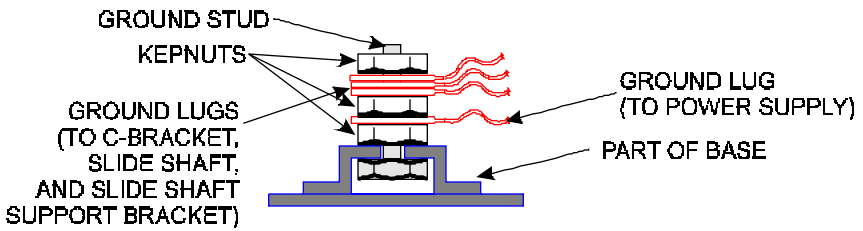

Figure 5-17. Ground Stud With Ground Lugs Attached.

13. Disconnect the ground lug from the ground stud. See Figure 5-17.

14. Remove the Power Supply Assembly by unhooking it from the two plastic hooks securing it to the Base and sliding it out.

15. Loosen the 4 screws and slip the Power Supply cover off of the Power Supply base. See Figure 5-18.

16. Disconnect the cable from TB2 on the Power Supply Board.

17. Disconnect the AC Entry Module from the Power Supply Board by disconnecting cable from TB1.

18. Remove 4 screws and washers securing power supply board and remove power supply board. Remove grounding wire to the AC Entry Module from the mounting screw on the power supply lower cover.

19. Remove AC Entry Module by unsnapping from the power supply base.

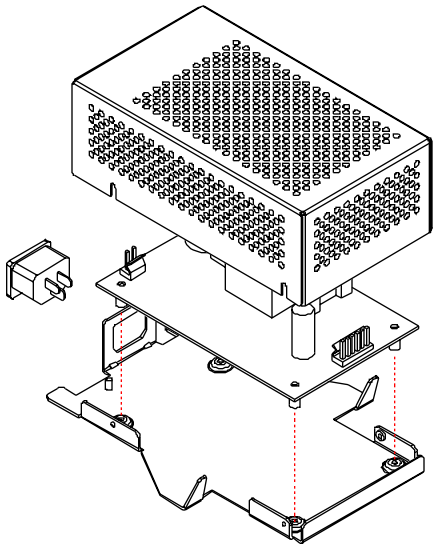

Figure 5-18. Power Supply Assembly.

Install the Power Supply and AC Entry Module

1. Insert the AC Entry Module by snapping it into the Power Supply base.
2. Install Power Supply board into the Power Supply base using four mounting screws and washers. Attach the ground wire from the AC Entry Module to the lower Power Supply cover mounting screw.
3. Connect the AC Entry Module plug into TB1 on the Power Supply board.
4. Attach the Power Supply cable to the TB2 connector on the Power Supply board.
5. Place the Power Supply cover over the assembly and slide into place over the loosened screws on the Power Supply base. Ensure that the grounding strap is still attached to the screw on the Power Supply base.
6. Insert the Power Supply Assembly into the printers Base. Orient the assembly so that the extensions on the back of the Power Supply base slip into the square holes in the Base of the printer and that the AC Entry Module extends through the back of the printer.
7. Apply pressure downward on the Power Supply Assembly until it snaps firmly into place.
8. Connect the ground lug to the grounding stud on the Base. See Figure 5-17.
9. Position the Power Supply cable into the cable supports inside the front part of the Base until it reaches the MPCB.
10. Connect the Power Supply cable to the J5 connector on the MPCB.
11. Carefully secure the Platen onto the printer Base. Ensure that the ground straps for the Slide Shaft and C-Bracket are coming through the holes in the Platen.

12. Secure the Lower Roller Assembly onto the Platen.

13. Attach the C-Bracket Assembly to the Platen by aligning the bracket onto the bracket guide pins and securing with attaching hardware. Ensure that the Pinch Rollers are centered on the lower rollers and that tension is being applied the the lower rollers.

14. Attach the Slide Shaft to the supports tightening to 15 in-lbs of torque using 3mm hex head torque screwdriver.

15. Attach the ground strap to the left side of the Slide Shaft.

16. Perform the Carrier Assembly, Carrier Belt, and the Frame Tensioner Reinstallation procedures to reinstall the Carrier Assembly.

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Parts List 6

This chapter lists the items and their associated numbers for the parts and assemblies of the **Croma24** printers that are field replaceable. The list is in order of part name as identified in the assembly/disassembly chapter.

This list is to be used in conjunction with the assembly/disassembly procedures to aquire the necessary parts and properly install them into the printer.

The parts and asssemblies may be ordered through your local authorized dealer or ***ENCAD, Inc.'s*** Technical Support and Service department.

Table 6-1. Parts List.

FIGURE	ITEM	PART NAME	PART #
6-1	1	COVER, LID	207027
6-1	2	COVER, LEFT	207028
6-1	3	COVER, RIGHT	207029
6-1	4	TRAILING CABLE COVER ASSY	208405
6-1	5	TRAILING CABLE ASSEMBLY	207068
6-1	6	BELT	203037
6-1	7	SPRING, COMPRESSION	203999
6-1	8	IDLER ASSY	207185
6-1	9	FRAME TENSIONER	207197
6-1	10	SLIDE SHAFT	206480
6-1	11	SERVICE STATION ASSEMBLY	204629
6-1	12	CUTTER ACTUATOR	206812
6-1	13	PLATEN	206546
6-2	1	SERVO MOTOR, METRIC	207034
6-2	2	LIGHT PIPE	207031

FIGURE	ITEM	PART NAME	PART #
6-2	3	ACTUATOR, MPCB	207030
6-2	4	MAIN PRINTED CIRCUIT BOARD	207047
6-2	5	LOWER DRIVE SHAFT ASSY	206479
6-2	6	FAN ASSEMBLY	203443
6-2	7	POWER SUPPLY ASSEMBLY	207042
6-2	8	ROLLGUIDE ASSY, RIGHT	204969-5
6-2	9	ROLLGUIDE ASSY, LEFT	206828-4
6-2	10	FEET	207041
6-2	11	BASE ASSEMBLY	207040
6-3	1	COVER, CARRIER	207038
6-3	2	CARRIER PCB	207088
6-3	3	ENCODER SENSOR W/FLEX	206823
6-3	4	PAPER SENSOR W/FLEX	207180
6-3	5	STRAIN RELIEF	204694
6-3	6	CARRIER BUSHING (SET OF 2)	207961
6-3	7	CARRIER FRAME ASSY	207077
6-4	1	ENCODER STRIP	206384
6-4	2	PINCH ROLLER ASSY	207071
6-5	1	STEPPER MOTOR W/GEAR	207173
6-5	2	BRACKET, STEPPER MOTOR, RIGHT	206854-1
6-5	3	BRACKET, STEPPER MOTOR, LEFT	206854-2
		HARDWARE KIT	208995

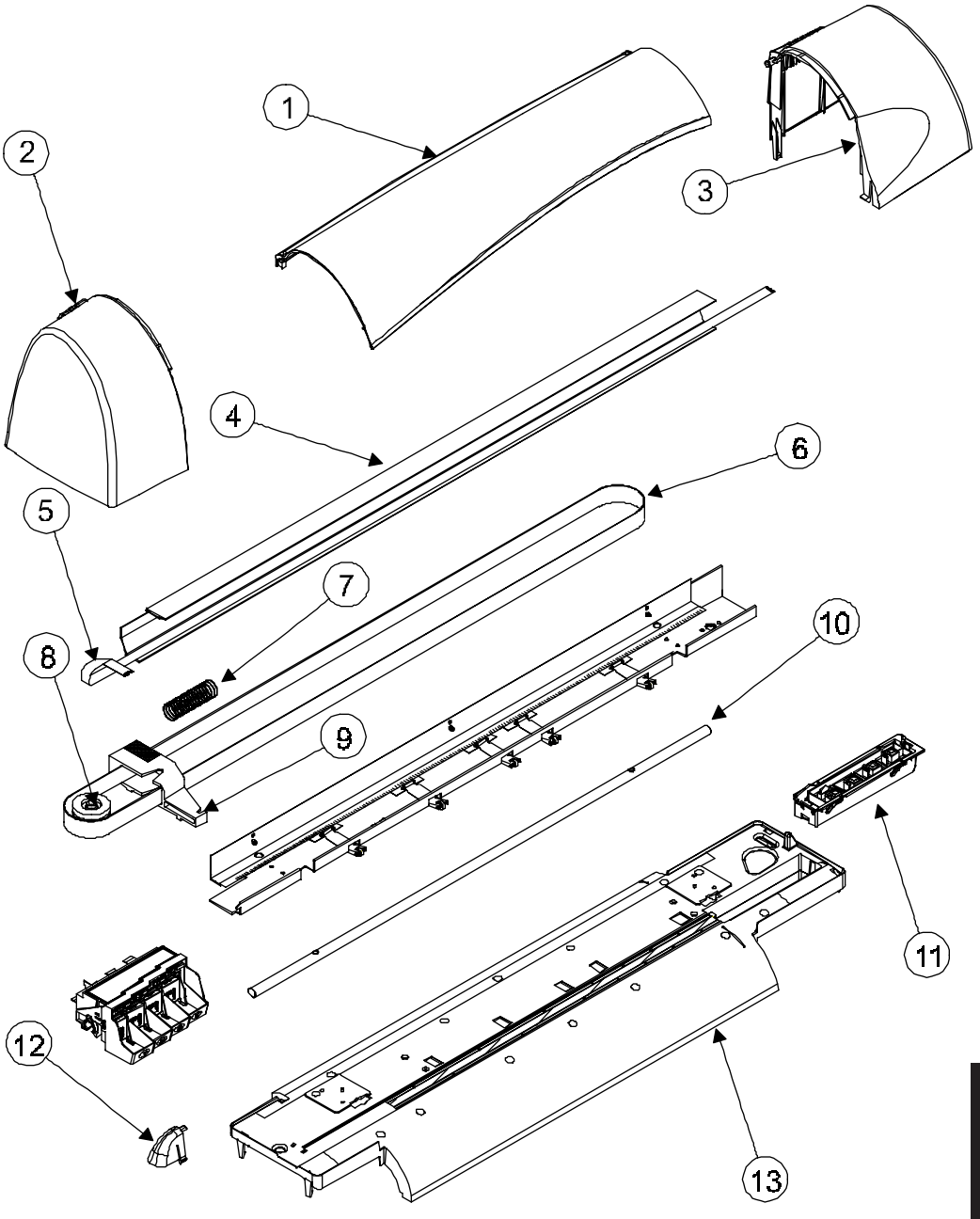

Figure 6-1. Croma24 Assembly Parts (Platen and Above).

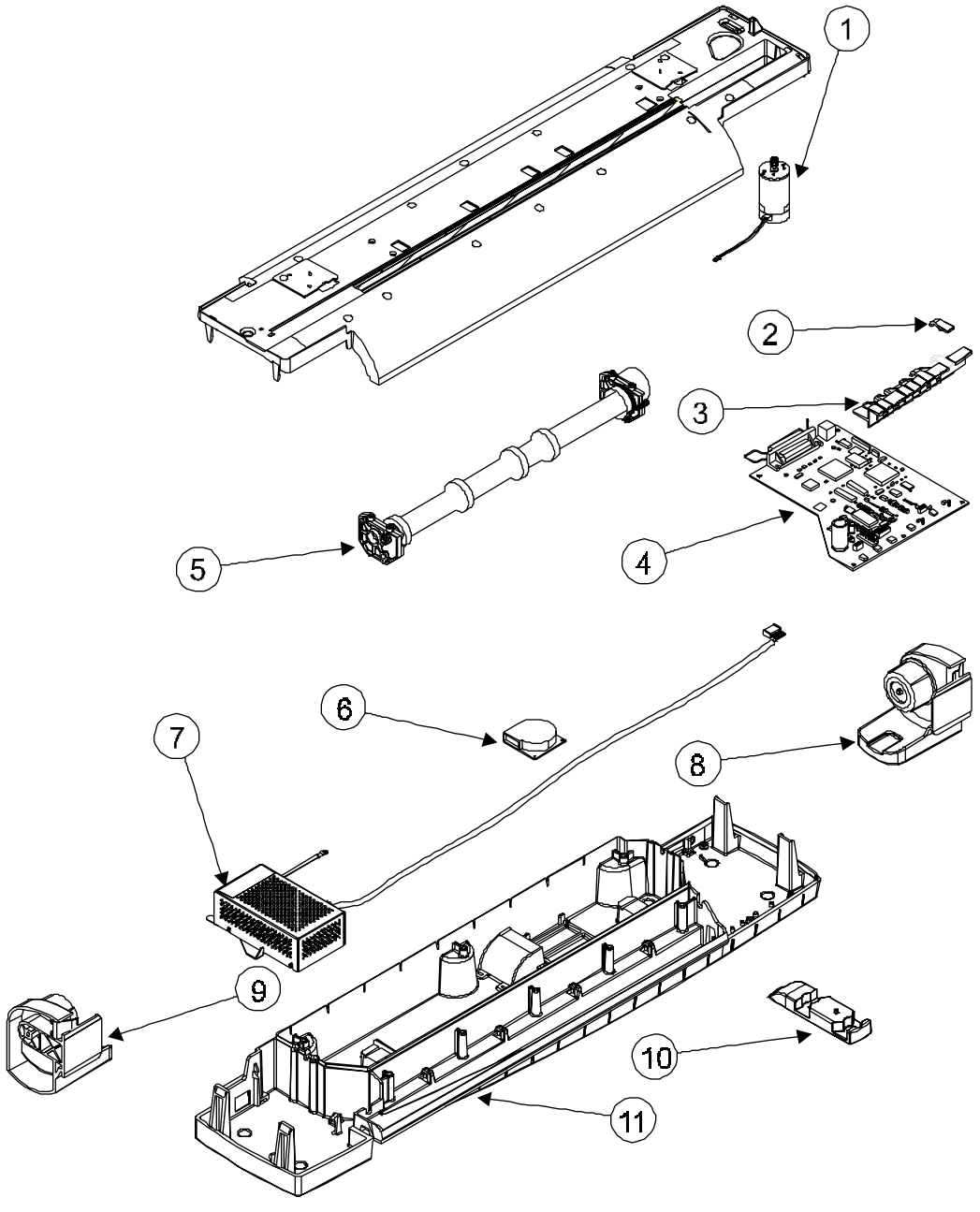

Figure 6-2. Croma24 Assembly Parts (Below Platen).

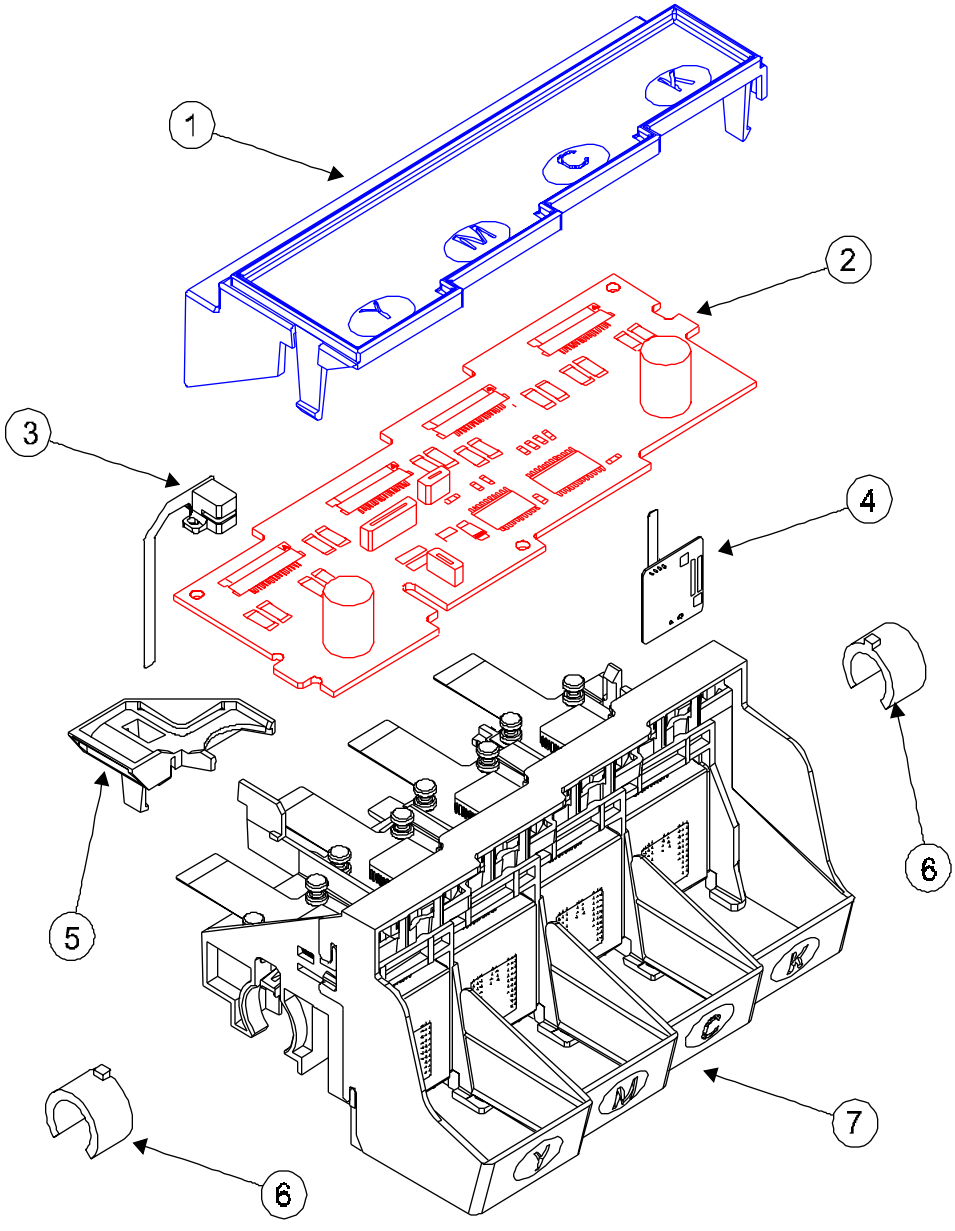

Figure 6-3. Carrier Assembly Breakdown.

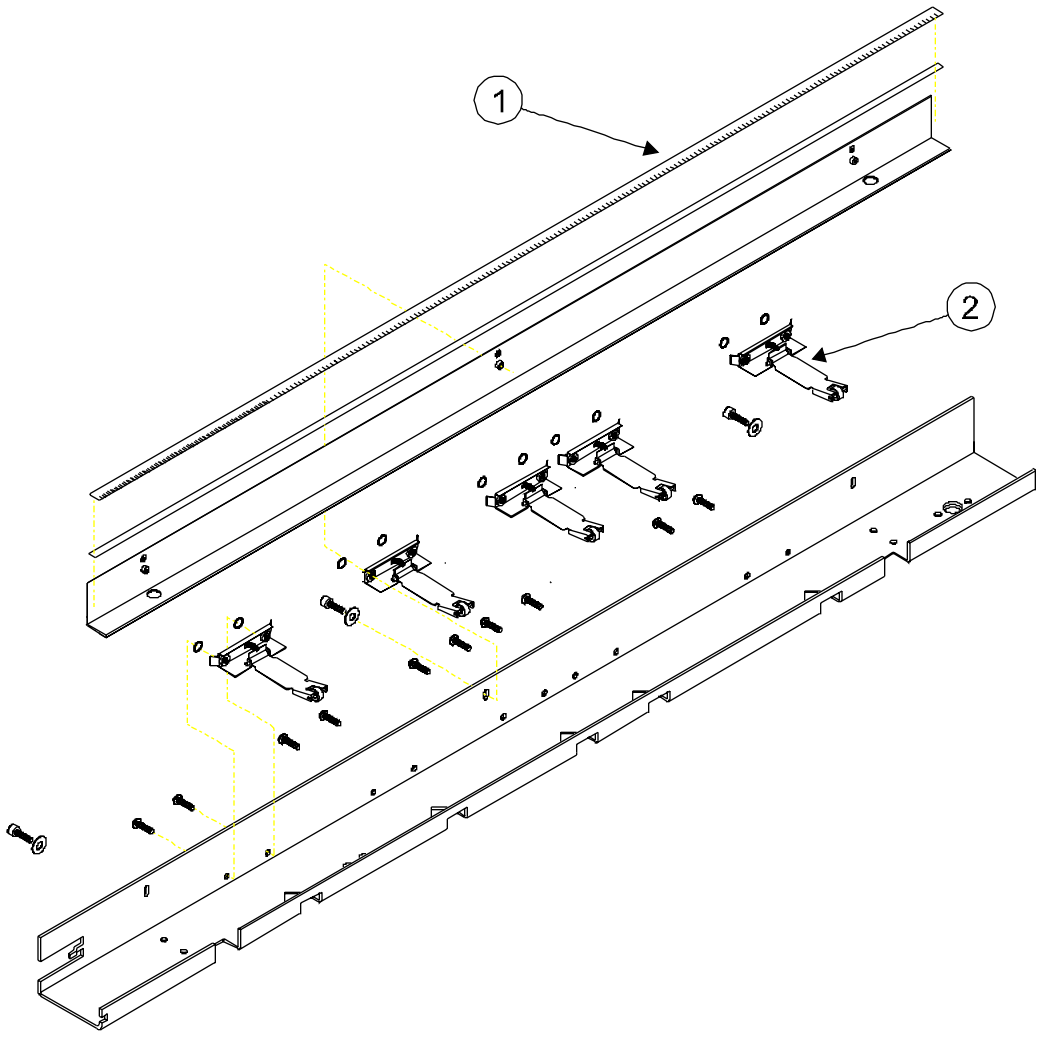

Figure 6-4. C-Bracket Assembly Breakdown.

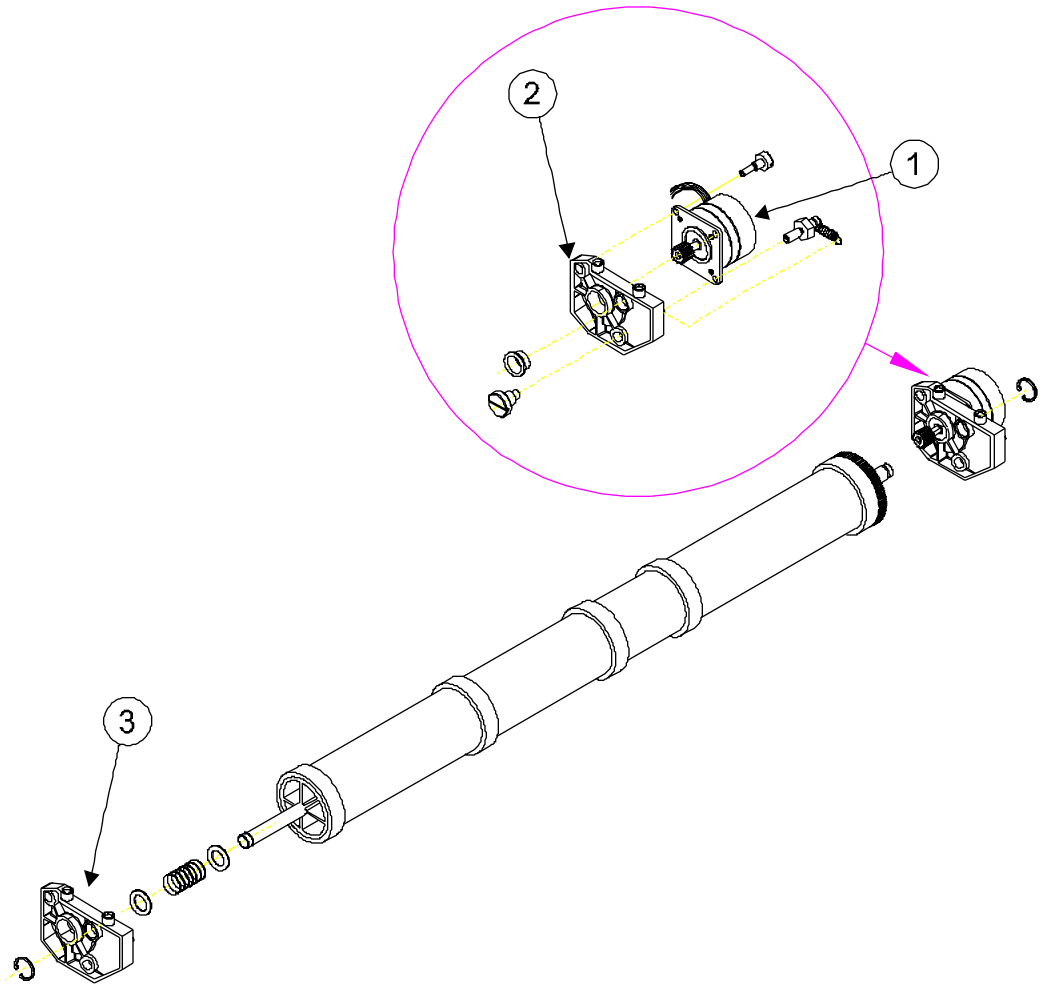

Figure 6-5. Lower Roller Assembly Breakdown.

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