ENCAD®

T-200™

SERVICE MANUAL

ENCAD, Inc.
A Kodak Company

ENCAD®

CADJET® T-200

COLOR INKJET PRINTER/PLOTTER SERVICE MANUAL

Part Number 219863-00

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 **CADJET T-200** printer.

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 ***CADJET T-200*** 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

ENCAD QIS (Quality Imaging 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
(858) 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

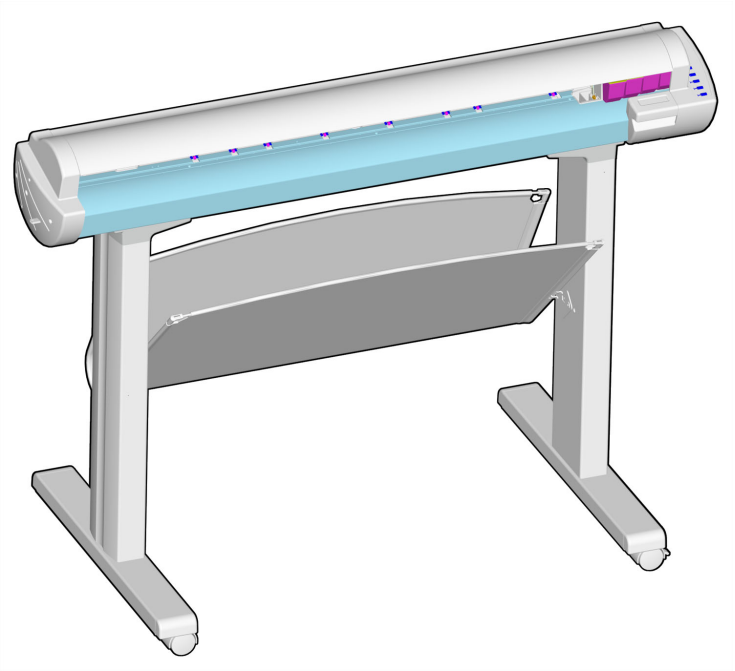

Figure 1-1. CadJet T-200 Inkjet Printer/Plotter.

Introduction

This manual provides service information for the ***ENCAD®, Inc.*** 36 inch **CadJet T-200** Color Inkjet Printer/Plotters.

It 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 both 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 in the User Guide for more details on the media size printable area.

A Centronics parallel connection is provided to interface with the host computer. Network connections are made possible through the optional SEH print server. Commands sent from the host computer can be in several forms including **HP-GL/2, HP-RTL** and **EN-RTL** formats.

Drivers are supplied to support Windows-based PC's (3.XX, 95/98, 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 printers to respond to and anticipate our customers' needs. Principal features are summarized below.

Locally or Remotely Configured via Host Computer
Take-Up Basket
PowerPC 33 MHz Microprocessor
8 User Configurable Settings
208 Jet Foam Filled Ink Cartridges
Ink Priming System
Snap On Ink Cartridge Caddies for longer print times between refilling
Smart Cartridges
Odometer Function
Electronic Jet Compensation
Fast CAD printing speeds

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.* CadJet T-200** Color Inkjet Printers:

- ***ENCAD*** Quick Start Guide for the **CadJet T-200**, P/N 217892-xx

- ***ENCAD* CadJet T-200** CD-ROM, P/N 217893-xx

Copies of these 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 PWAs (Printed Wiring Assemblies) associated with the 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 PWAs.

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 procedures 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.

CAUTIONS - 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.

NOTES - 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 **CadJet T-200** Color Inkjet Printers are as follows:

Max Printing Area:
- Norm 34.8" / 884 mm
- Extend 35.61" / 904 mm

Language Emulation:
- HP-RTL
- EN-RTL
- HP GL/2

Buffer:
- 32 MB installed
- upgradeable to 128 MB

Power Requirements:
- Input Voltage:
  - 90-246 VAC
  - 47-63 Hz
- Output Power:
  - 20 W idle
  - 50 W typical
  - 100 W maximum

Accuracy:
- Dot Placement: 0.0017
  - +/- 0.0008
- Cut sheet feed accuracy,
  - edge shift: +/- 0.065 inches as measured over 36 inches

Resolution:
- 600x600 dpi or
- 300x600 dpi

Interface:
- Centronics parallel
  - (IEEE 1284)
- Network: via 100 Base T
  - Print Server

Certifications:
- Safety
  - CSA, CSE/NRTL (equivalent to UL1950)
  - TUV GS
  - EN 50 082-1
  - EN 60 950
  - UL1950
  - NOM-019-SCFI-1993
  - IEC 950
  - AS/NZS 3260
- EMI
  - FCC Class B
  - CSA C108.8
  - EN 55 022 Class B
  - CISPR 22- Class B
  - AS/NZS 3548
  - GB9254-98

Environment:

Operating:

41° to 85° F
(5° to 30° C)
20% to 80% RH
non-condensing

Storage:

-5° to 140° F
(-21° to 60° C)
5% to 80% RH
non-condensing

Weight:

70 lbs (31 kg)

Dimensions:

Height 48" (1210 mm)

Width 54" (1370 mm)

Depth 30" (710 mm)

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 chapters so that each chapter can "stand alone". This allows information to be located without having to refer back and forth between chapters.

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*** **CadJet T-200** 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 color inkjet printers. Illustrated parts breakdown drawings are included to help clarify and identify parts for ordering. Special kits and adjustment jigs may also 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*** Knowledge Base located on ***ENCAD's*** website support:

***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: (858) 452-4350 or
(877) ENCAD-TS (362-2387)
Help Desk FAX: (858) 558-4672

International users contact your local ***ENCAD*** service provider. See details on your ***ENCAD*** registration card.

Theory of Operation 2

Introduction

This chapter explains the mechanical and electrical theory of operation of the ***ENCAD* CadJet T-200** color inkjet printers.

The **CadJet T-200** is a PowerPC 33MHz microprocessor-based digital printer that receives plotting instructions from a host computer through the Centronics parallel interface. This interface is either connected directly to a computer or through a network print server.

CadJet T-200 Printers General Block Diagram

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

The **CadJet T-200** printers consist of two mechanical assemblies:

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

and four main electrical assemblies:

1. MPWA (Main Printed Wiring Assembly)
2. Carriage Assembly
3. Display Assembly
4. Power Supply

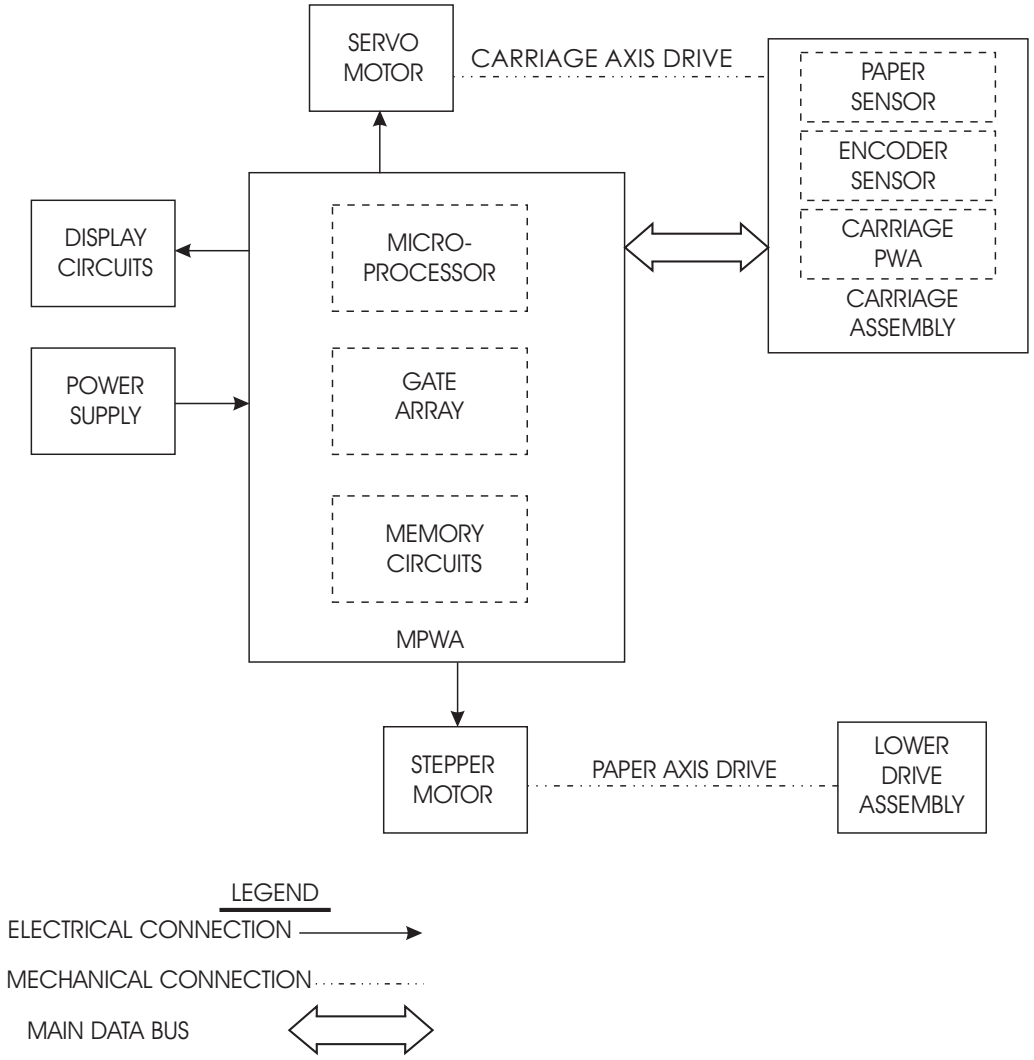

Figure 2-1. General Block Diagram.

Paper (Media) Axis Drive

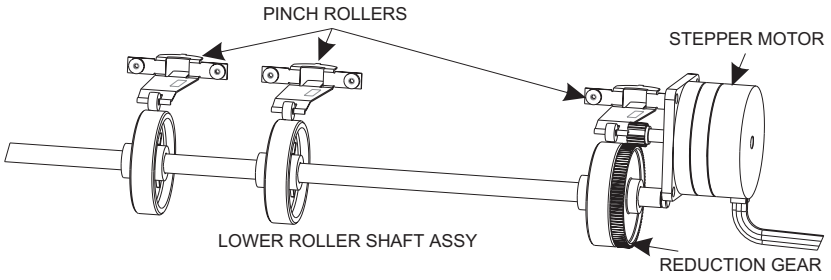

Figure 2-2. Paper (Media) Axis Drive.

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 rollers. This can be seen in Figure 2-2.

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 rollers is to apply pressure to the media onto the drive shaft assembly to reduce the chance of slipping.

Misaligned pinch wheels is a main cause of skewing the media. When skewing occurs, pinch roller alignment may be required.

The Carriage Axis Drive

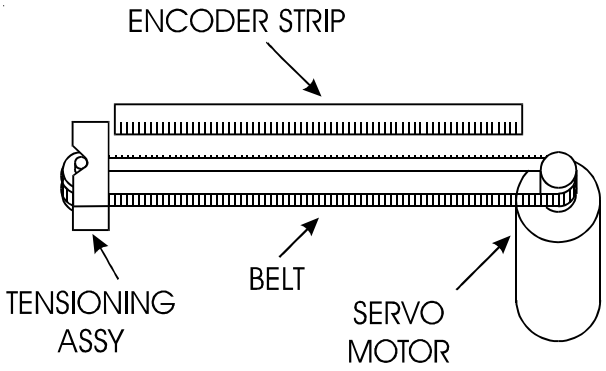

Figure 2-3. Carriage Axis Drive.

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

The servo motor, drive belt, and tensioning assembly are the components that actually drive the carriage assembly. The servo motor drives the belt back and forth allowing the attached carriage assembly to be repositioned as required. The tensioning 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 wiring assembly by the microprocessor.

Main Printed Wiring Assembly (MPWA)

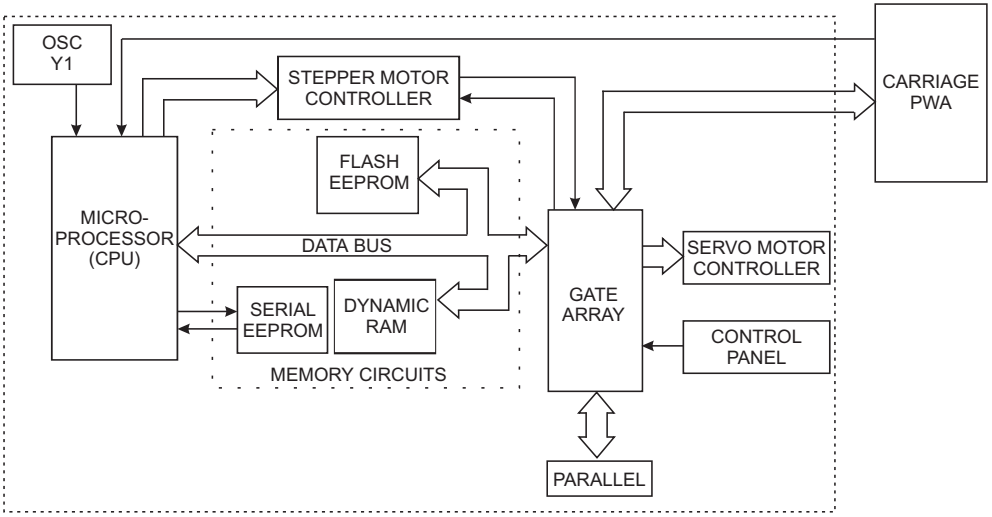

Figure 2-4. Main Printed Wiring Assembly.

The Main Printed Wiring Assembly (MPWA) consists of seven functional areas:

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

Microprocessor

The microprocessor (an IBM PowerPC) is the central processor unit which supervises system functions, executes the printer firmware, manipulates data, and controls input/output data busses. It has two built-in serial ports, a two channel DMA (Direct Memory Access) controller, a timer module, clock generator, and an on-board chip select generator. One serial port connects to the Mini-DIN connector which can be used to communicate with the host computer; the other serial port interfaces to the Control Panel. One DMA channel supplies data to the gate array for jet firing; the other DMA channel is used to receive data through the parallel 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 other is used for timing the Stepper Motor.

The system is timed by a 33MHz system clock from an oscillator (Y1).

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

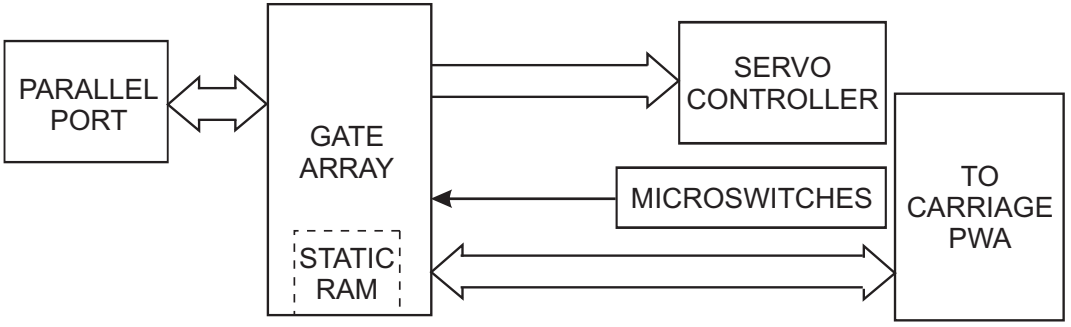

Figure 2-5. Gate Array.

The gate array contains the hardware logic for dot firing, monitoring changes in the Carriage Assembly position, controlling DMA through the parallel port, receiving commands from the microswitches 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, DRAM, and EEPROM.

Maximum installable memory is as follows:

DRAM = 32 MB

Flash = 1 MB

Serial EEPROM = 1KB

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, with no loss of information when power is off.

The system firmware is stored in Flash EEPROM. The Flash EEPROM allows the firmware to be upgraded by downloading the files containing the new firmware. It can be erased and reprogrammed more than 10,000 times. 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.

The normal method of downloading new firmware is to send the unit the files containing the code using either the GO.EXE utility or printing the file to the unit. This requires using an appropriate host utility and can be done through the serial port (for Macintosh users) or the parallel port (for PC users). See Firmware Downloading in Chapter 3 for the procedures.

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. That's why the printer control program is also copied from the Flash EEPROM to RAM, where it can be executed faster.

The printer also has one 168-pin 64-bit DIMM socket for a DRAM memory module. The printer is supplied with a 32 Megabyte DIMM installed on the MPWA. The following DIMM sizes are supported: 32MB, 64MB and 128MB.

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.

An 8K bit serial nonvolatile EEPROM stores calibration and configuration information. It retains data while the unit is off.

Stepper Motor Controller

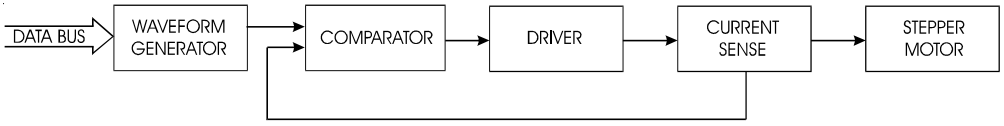

Figure 2-6. Stepper Motor Controller.

The media is driven by a Stepper Motor, which drives the media in a direction perpendicular to the width 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 waveform generator receives digital data from the CPU and generates a sine wave output. This signal is fed into a comparator circuit that is measuring the current through the winding of the stepper motor. If the current is too low, a pulse of 24V 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 functions (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 10V.

2. Motor current sense

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

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 used to drive the current level to the desired value.

Servo Motor Controller

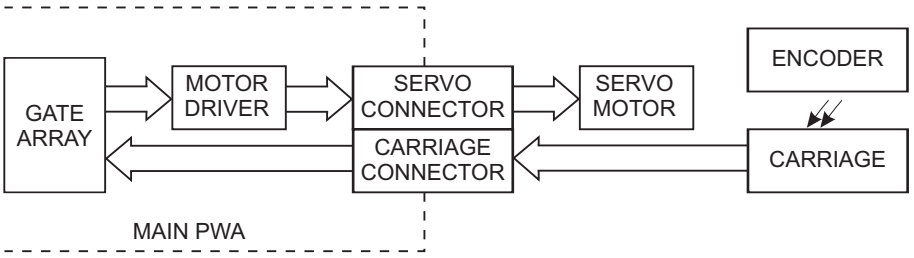

Figure 2-7. Servo Motor Controller.

The Carriage Assembly is driven by the Servo Motor. The speed of the Carriage Assembly is controlled by varying the duty cycle of the signal applied to the controller. The microprocessor checks the position of the Carriage Assembly approximately 1,000 times per second (during the servo interrupt). It then updates the PWM (pulse width modulator) register in the gate array which sets the duty cycle to make adjustments to the Carriage Assembly speed. A linear optical encoder is used to monitor the Carriage 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. For 300 dpi resolution, one of the detectors is not used.

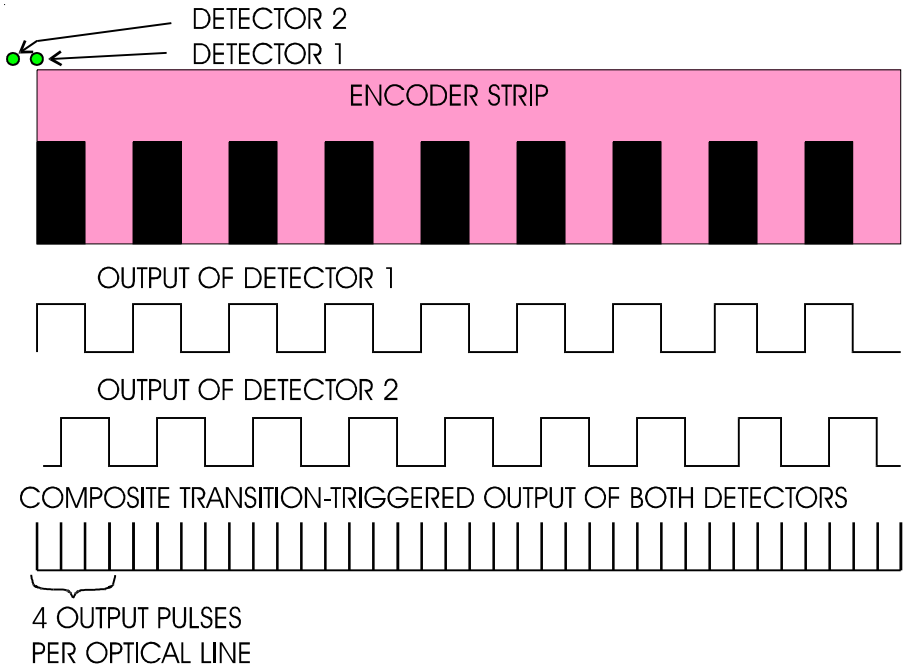

Figure 2-8. Quadrature Signal Generation.

The direction that the Carriage 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 Carriage Assembly moves left and decrements as the Carriage Assembly moves right. The hardware counter is only eight bits wide, so it cannot store a value large enough to represent an absolute Carriage 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.

Control Panel

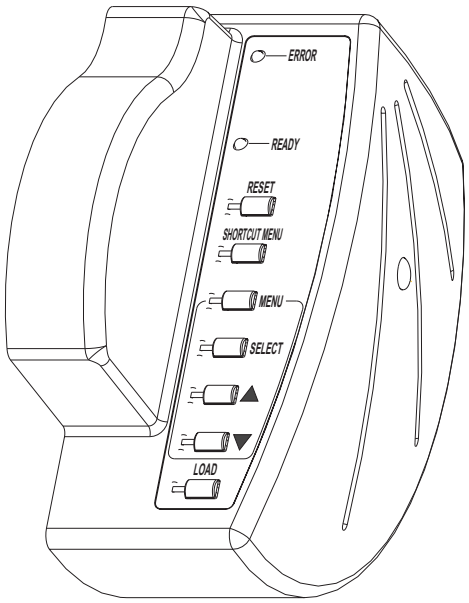

Figure 2-9. Control Panel.

The Control Panel is located on the right side of the printer and contains two indictors

ERROR
READY

and seven buttons

RESET	resets all conditions to factory select settings
SHORTCUT MENU	allows immediate access to common functions: cut, prime, feed media, access cartridge, pause and clean
MENU	begins the main menu routine

SELECT	when depressed, accepts the slection shown on the display
UP ARROW	cycles through the available options
DOWN ARROW	cycles through the available options
LOAD	loads the media

Interface Circuits: Parallel

Figure 2-10. Interface Circuits.

Data from the host computer is received through the Centronics parallel port. The gate array provides the control signals for DMA transfers from the parallel port to DRAM.

The parallel port is the connection for sending print jobs to the printer. This port can be connected to a wide variety of computers running various operating systems. It is also used to connect the printer to a network print server device such as the SEH Print Server that comes as an option with the printer.

Carriage Assembly Circuits

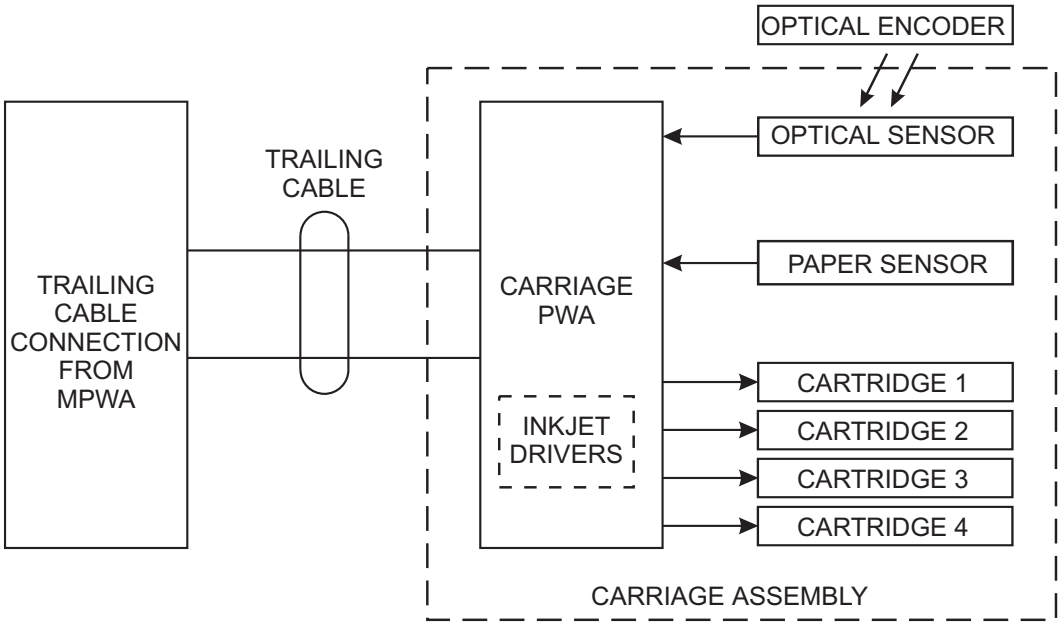

Figure 2-11. Carriage Assembly Circuits.

The Carriage Assembly contains:

1) Carriage PWA
2) Optical Sensors
3) Paper Sensor
4) Inkjet Cartridges

The Carriage PWA 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 MPWA.

The optical sensors receive their inputs from the optical encoder strip and sends this data to the MPWA. The MPWA uses this information to determine the horizontal position of the carriage 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 MPWA, which immediately begins an 'out of paper' subroutine. This subroutine 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.

Display Assembly

The Display Assembly is located on the right side portion of the platen and displays information and menu options available for selection.

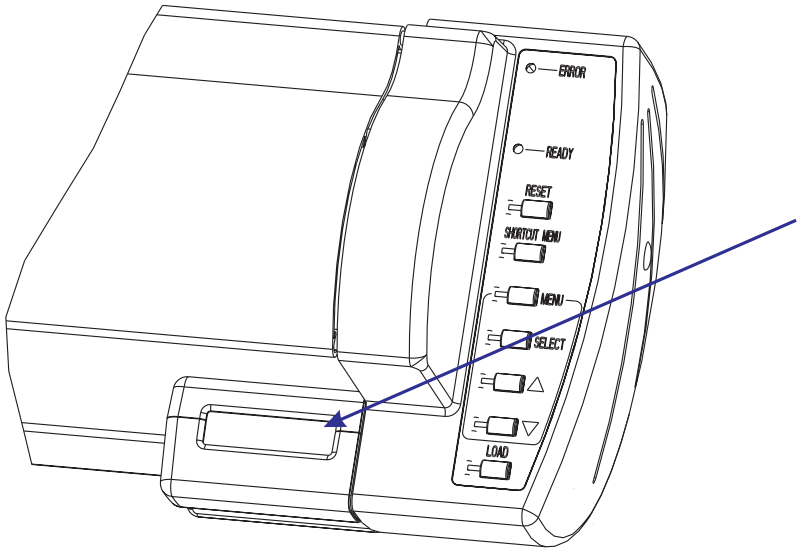

Figure 2-12. Display Assembly.

Power Supply

An internal UL recognized switching power module supplies power for the printers. It provides a constant 24VDC output from input voltage in the 90-132 VAC and 180-246 VAC ranges. A power switch turns the power on and off. The 24VDC is applied to the MPWA where it is further regulated and separated into 24VDC, 13VDC, and 5VDC. The 24V supply is used for: the stepper controller (which advances the paper); the servo controller (which moves the Carriage); and power to fire the inkjets. The 5V supply powers the logic circuits.

The power supply is fused using a 6.3A 250V fast blow type fuse.

The outputs share a common ground which is isolated from earth ground with in the supply itself. Earth ground and DC ground are connected external of 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 24V output.

Fan Operation

A fan is located inside the platen with its fan vent seen from under the platen on the right side of the printer. This fan provides suction on the platen bed and holds the paper (media) flat during the printing process. It also serves to cool the power supply since the power supply is located inside the platen.

Maintenance 3

Introduction

This chapter contains general maintenance and cleaning instructions for the **CadJet T-200** 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 recommended periodicity.

Clean external areas:	semiannually, or as required
Clean slide shaft:	weekly
Clean service station:	daily
Clean encoder strip:	weekly
Clean cartridge dimples:	weekly, of if prime fails
Clean flex cable contacts:	weekly, or if prime fails, or cartridge is replaced
Clean and inspect motor gears:	bimonthly
Clean and inspect MPWA:	annually
Clean and inspect carriage assembly:	annually
Reseat connectors on MPWA:	annually
Reseat connectors on carriage board:	annually
Replace carriage bushings:	semiannually
Replace service station wipers	every 150 plot hours

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 carriage. Extreme drag results in a "carriage axis failure" fault and will stop the carriage 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. Turn the printer OFF. Disconnect the power cord and interface cable.
2. Raise the printer lid.
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 carriage assembly from side to side.
6. Wipe the shaft again to remove any deposits left from the carriage.
7. Close the cover and reconnect the power cord and interface cable, turn the printer ON and perform the PRIME procedure. Be sure that the carriage moves freely on 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. Turn the printer OFF. Disconnect the power cord and interface cable.
2. Raise the printer lid.
3. Carefully move the carriage 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 lid and reconnect the power cord and interface cable.

7. If the service station is filling with ink or very dirty it can be removed for cleaning. To remove, pull the tab on the right side of the service station and lift out. Replacement of the pads in the service station are recommended at this time. Wash, dry thoroughly and replace by placing the left side in first then pushing down on the right side until the tab locks it in place.

Linear Encoder Strip Cleaning

Clean the linear encoder strip weekly 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.

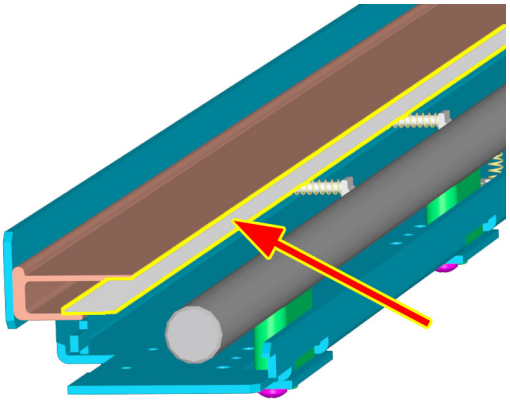

Figure 3-1. Encoder Strip Cleaning.

Cartridge Dimples Cleaning

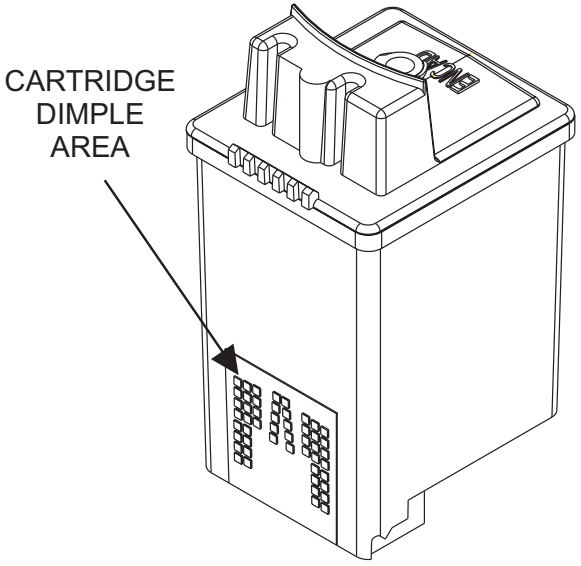

Figure 3-2. Cartridge Dimple Region.

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.

Be sure to clean the yellow cartridge because it is not readily apparent that it is dirty. The yellow ink is hard to see and could be overlooked.

Flex Cable Contact Cleaning

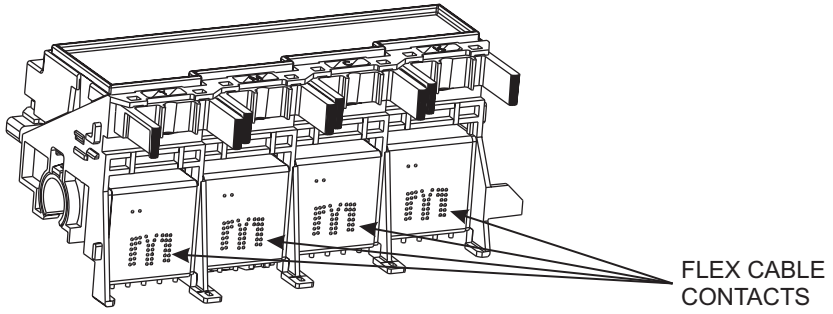

Figure 3-3. Flex Cable Contacts.

Cleaning the flex cable contact area is very important due to the ease of which this area can become dirty. The flex for the yellow cartridge is deceiving because it is not readily apparent that it is 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 up, it could cause wide banding in the print. 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 isopropyl alcohol can be used to remove any ink that may have accumulated on the gears.

Clean and Inspect MPWA

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

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

Inspect the MPWA 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 MPWA.

Clean and Inspect Carriage Assembly

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

Clean the carriage 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 carriage assembly for any damage to the boards, connections, or any of the components on the assembly.

Reseat Connectors on MPWA and Carriage 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.

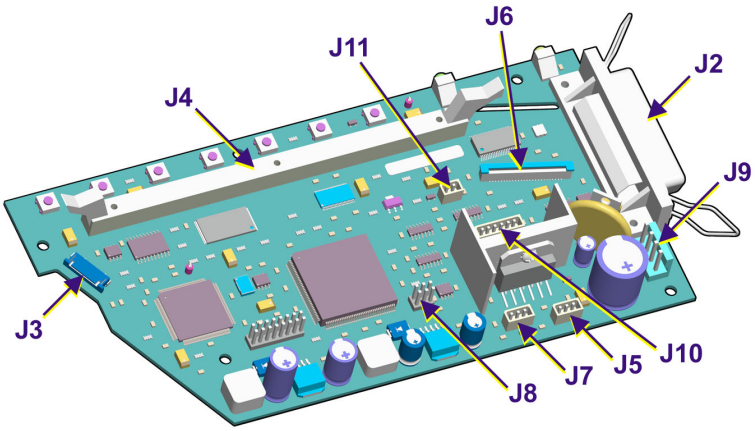

Figure 3-4. Main PWA Connection Locations.

Table 3-1. Main PWA Connections.

J1	not used	J7	Servo Motor
J2	Parallel Port	J8	not used
J3	Display Circuits	J9	Power Supply
J4	DIMM socket	J10	Stepper Motor
J5	Vacuum/Cooling Fan	J11	not used
J6	Trailing Cable		

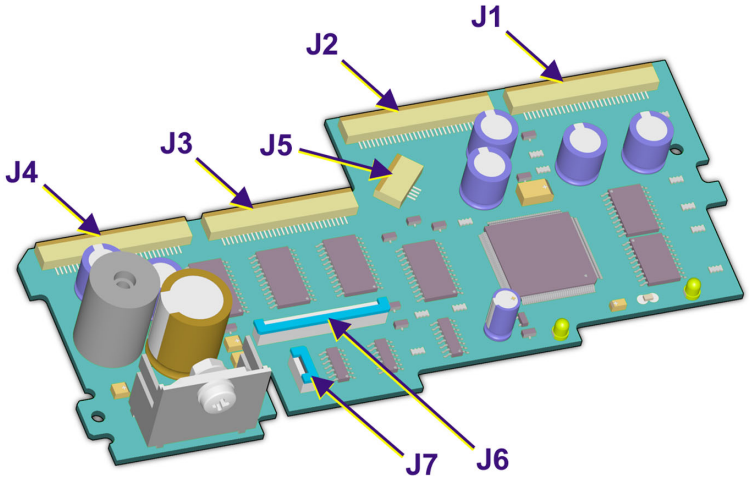

Figure 3-5. Carriage PWA Connection Locations.

Table 3-2. Carriage PWA Connections.

J1	Yellow Drivers	J5	Encoder Sensor
J2	Magenta Drivers	J6	Trailing Cable
J3	Cyan Drivers	J7	Paper Sensor
J4	Black Drivers		

Figures 3-4 & 3-5 and Tables 3-1 & 3-2 show the locations of all the connectors on the MPWA and carriage 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.

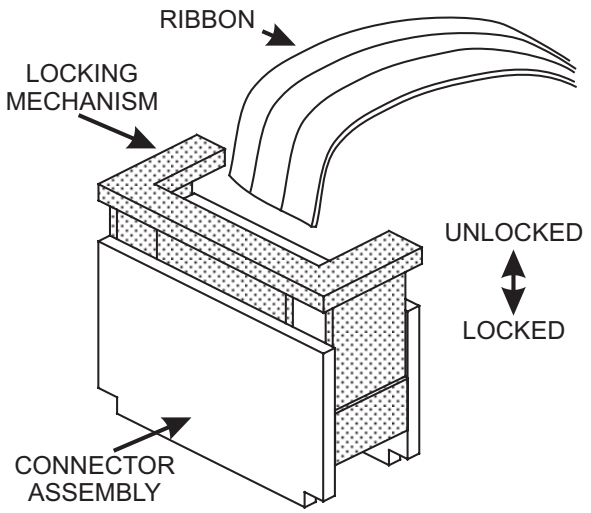

Figure 3-6. Ribbon Connector Locking Mechanism.

Replace Carriage Bushings

The carriage bushings are rated for approximately 1500 hours of operational usage. Many factors including, but not limited to, hours/day used, cleanliness of the slide shaft and general ambient environment make it impossible to calculate the average time that the carriage bushings to last.

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

To replace the carriage bushings, follow the procedures for Carriage Bushing Replacement found in Chapter 5.

Servo Motor Winding Resistance Check

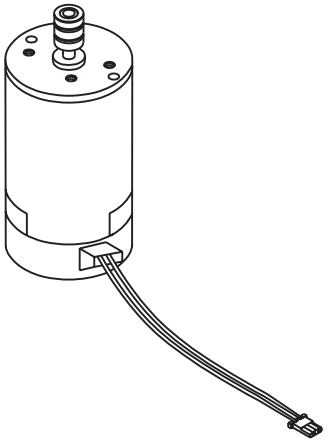

Figure 3-7. Servo Motor.

1. Disconnect the servo motor connection from J7 on the MPWA.

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 4-10 ohms. Typically, the reading is 5-8 ohms.

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

Stepper Motor Winding Resistance Check

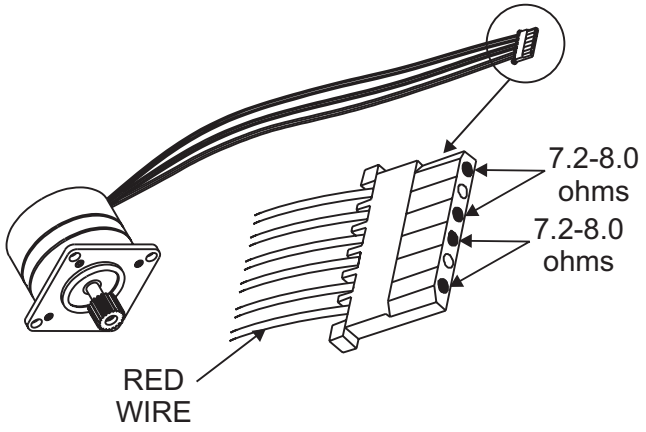

Figure 3-8. Stepper Motor.

1. Disconnect the stepper motor connection from J10 on the MPWA.
2. Using a standard ohmmeter or multimeter, measure between pins 1 (red 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.

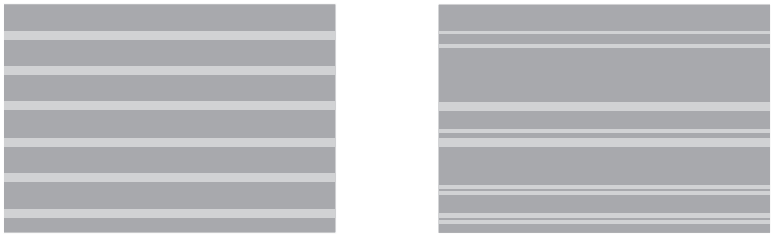

Figure 3-9. Examples of Banding.

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, pinch rollers, 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 MPWA and Carriage PWA 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 the application incorrectly interprets the media 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 one is 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.

A simple test to determine if the banding is caused by the computer/RIP/application or the printer is to rotate the image 90 degrees and see if the banding rotates or remains in the same orientation as the previous print. If the banding does not rotate, then look for causes in the printer. If the banding does rotate with the image, then look for causes in the computer/RIP or application.

Common Banding Causes

1. The RIP (Raster Image Processor) and print cycles. We recommend printing to a file first and then queuing the file to the printer to avoid the RIP and print cycle delays that can cause banding while printing.

2. Uneven inkjet kogation (partial clogging or orifice restriction) on the inkjet cartridge head nozzles. Run the 100% color test and re-prime or replace the cartridge if necessary.

3. Lower quality print modes normally cause slight banding, to reduce this banding, switch to 4-pass printing mode.

4. Air bubbles in the ink delivery system (if installed). This indicates a loss of negative pressure within the ink cartridge or ink delivery system, check all quick release fittings and connections for possible leaks and ensure that the cartridge is primed properly.

5. Improper priming. The lower secondary chamber within the cartridge may de-prime and then temporarily recover after entering the service station causing a momentary color drop out in the print if the cartridge is improperly primed.

6. Wiping during a print can sometimes cause a band of lighter density color in the image. Auto wipe may need to be temporarily turned off to prevent banding.

7. Operator intervention. If someone lifts up the media on the take-up side of the printer while it is printing, it can cause momentary banding in the print. Lifting up the media while printing changes the inkjet head-to-media distance and will effect the printed dot size and placement of the ink droplets.

8. Cartridge failures can cause banding — electrical cartridge failures and partial clogging of the inkjets can produce banding. With Inkjet Detection and Compensation technology, electrical cartridge failures and clogging can be corrected for up to 20 failures per cartridge with minimal degradation of the output.

9. Media width variations causing the media to drag on the media guides can cause banding. Check the edges of the media for evidence of media drag and edge anomalies.

10. Lower quality dithering. Select the highest quality dithering pattern in the printer driver. i.e. stochastic dithering.

11. Deadband and cartridge calibrations. If the deadband calibration is off, or the cartridge calibration is off, it can effect banding. Also, if one color seems to be causing the banding — shifting the color calibration of that color +/-1 unit may help.

12. Inkjet sputter. If the cartridge heater is set too high, inkjet sputter may occur causing intermittent white spots throughout the print.

13. Improper grounding or earthing. An improper A/C outlet power ground may cause banding due to excessive noise on the line between the neutral and ground. Ensure the outlet has a clean zero ground potential with minimal noise between the neutral and ground.

14. Static electricity. Using certain types of media (i.e. polyester-based media), static electricity buildup within the media roll may effect the un-roll resistance and cause momentary banding to occur. However this has not been tested.

15. Data corruption may also effect banding. If you are using a parallel cable that is too long or improperly shielded, the data being sent to the printer may get corrupted and cause artifacts in the print.

16. Overlapping images of different types on the same print may create color bands between the images at the overlaps (i.e. RGB images with CMYK images).

Alignments/Adjustments

The ***ENCAD*** **CadJet T-200** printer is designed with a minimum of maintenance requirements in mind. Calibrations include: paper axis calibration, deadband alignment, and color calibration. The mechanical adjustment requirements include the slide shaft profile, cartridge head height and paper skew adjustments. They do not require any electrical alignments.

Slide Shaft Profile Adjustment

The **CadJet T-200** printer Slide Shaft height is factory set and is firmly mounted on the outer sides and only has adjustments in the middle portion of the shaft, to remove any bowing of the shaft's profile. The following procedure is to ensure that the Slide Shaft is relatively perpendicular to the surface of the Platen and to remove any bowing that may be present in the shaft's profile.

The Slide Shaft is set to 1.418" (36cm) from the top of the Slide Shaft to the Platen surface for these printers. The normal operating range for the height of the Slide Shaft is between 1.390" (35.3cm) to 1.440" (36.6cm).

You will need the following:

- Height Gauge Kit Assembly
- 1/4" open and box end wrench (.110" thick)

Height Gauge (Alignment) Kit Contents are:

Dial Gauge Micrometer
Modified Novajet Cartridge for newer products
Modified Novajet 4/Pro/Pro 50 Cartridge - Not Used
Platen/Carriage Shaft Mounting Block
Calibration Jo Block (1.434") - Not used
Plastic Gauge Card (0.011") - Not used

There are two basic measurements that are to be made using this kit (ensure power is off prior to performing these procedures):

1. Slide Shaft Profile Adjustment
2. Carriage (Cartridge) Head Height Setting

1. Connect the dial gauge micrometer to the Shaft mounting block as shown in Figure 3-10.

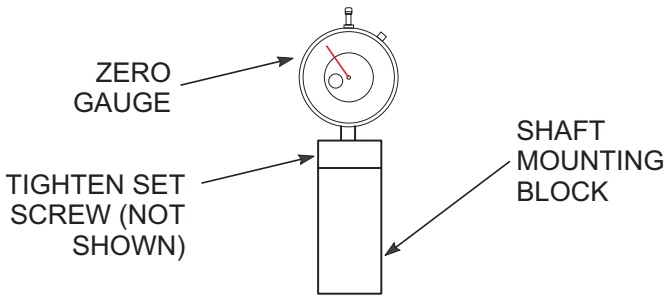

Figure 3-10. Dial Gauge Micrometer Assembly.

2. Place gauge against left side of shaft assembly allowing micrometer tip to rest directly on top of shaft. See Figure 3-11. **Zero the gauge** (this is to become the reference point).

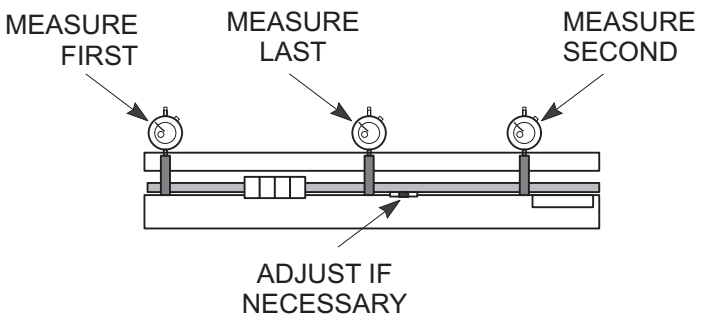

Figure 3-11. Measurement Positions for Slide Shaft.

3. Measure the right side (next to media alignment mark.) and note the difference. Divide this amount by two.

4. Measure just off the center of the slide shaft and adjust the center turnbuckle with an open ended wrench if required, for the average value (the value found in step 3.) See Figure 3-12.

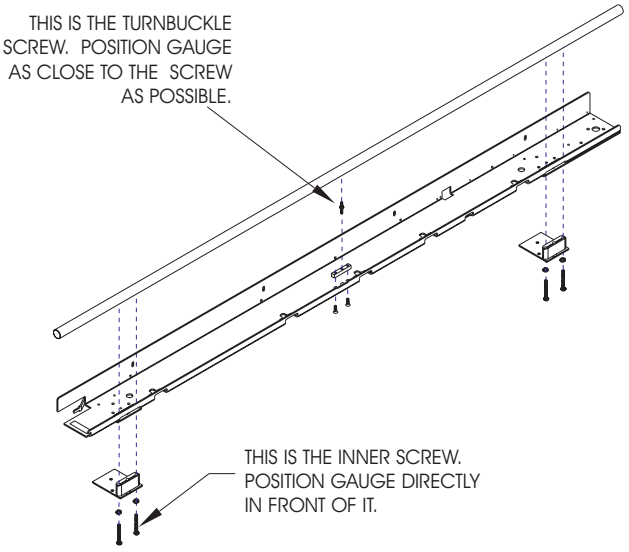

Figure 3-12. Slide Shaft Profile Adjustment.

For example: If the Left = 0, Right = +0.004", then the center should be adjusted to + 0.002". This will ensure a smooth plane of travel for the carriage assembly. There are no adjustments on either end of the shaft in all models.

Head Height Alignment Procedure

Perform this procedure only when the encoder strip stabilizer has been removed from the Y-Arm or whenever the alignment is in question.

The head height alignment procedure is to ensure that the correct amount of distance exists between the cartridge jet plate and the Platen. See Figure 3-13.

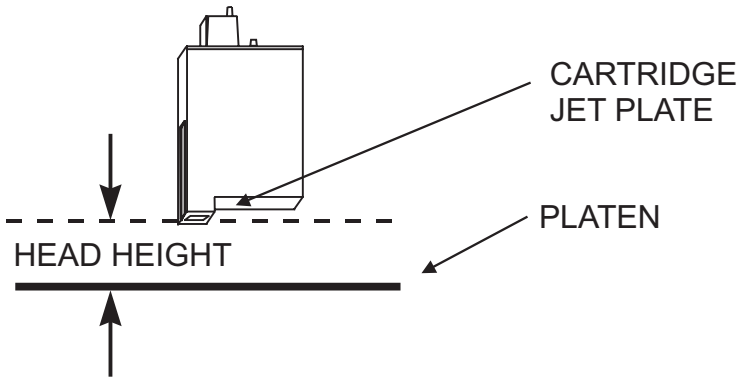

Figure 3-13. Carriage Head Height Tolerance.

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 3-14.

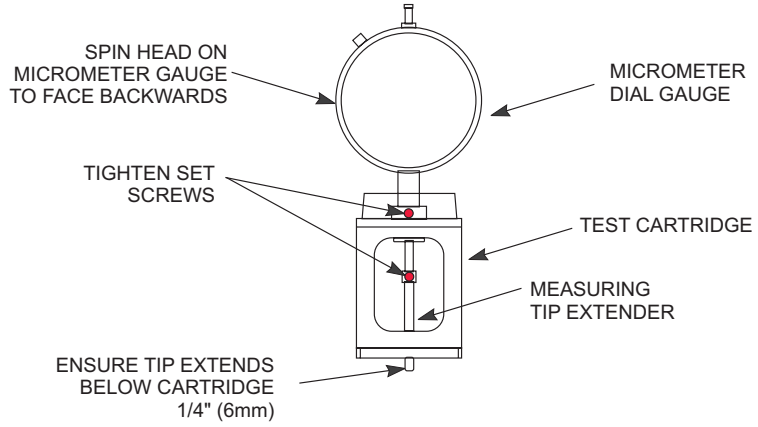

Figure 3-14. Setting Up Tools from Height Gauge Kit.

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 3-15.

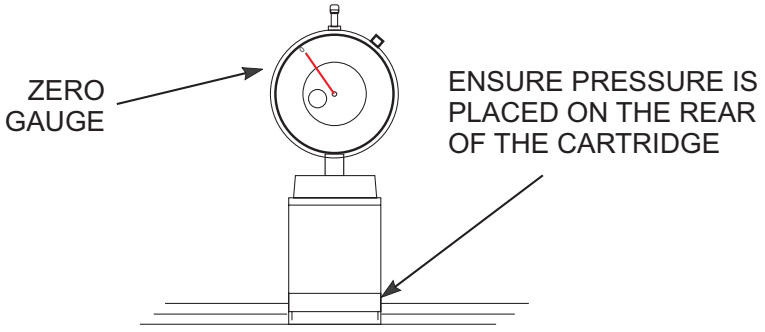

Figure 3-15. Zeroing the Micrometer Gauge.

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 3-16. Ensure that the micrometer can be read from the BACK of the printer.

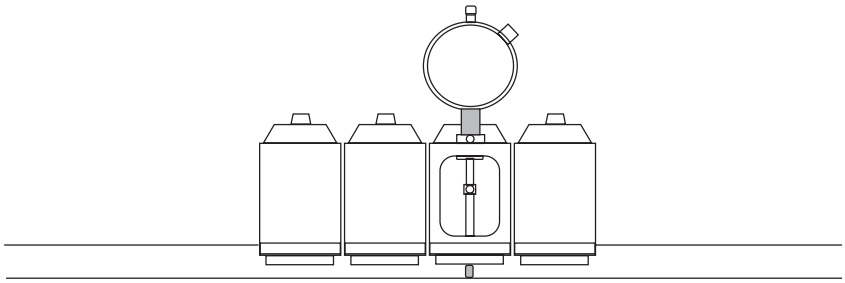

Figure 3-16. Test Cartridge Installed.

5. Slightly loosen the screws located on the back of the Y-arm that secures the stabilizer to the Y-arm.

CAUTION

Damage may occur to the micrometer gauge if the Carriage 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.

6. While lifting up the measuring tip of the micrometer, slide the Carriage to the left side of the stabilizer. 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.

7. Move the left end of the stabilizer bracket until the reading below is observed. Read only the RED numbers on the micrometer gauge.

   For these printers adjust for a reading of 67 +/- 3. This equates to a head height of 0.075".

NOTE

The actual measurement is different than the true head height due to the fact that the test cartridge does not contain a jet plate assembly. A difference had to be calculated to compensate for the lack of a jet plate assembly on the test cartridge.

9. Tighten the screw on the left side of the stabilizer.

10. While lifting up the measuring tip of the micrometer, slide the Carriage to the right until the next stabilizer screw is lined up. 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 correct reading is observed. Read only the RED numbers on the micrometer gauge.

12. Tighten the screw on the stabilizer that is next to the Carriage.

13. Continue performing steps 10 through 12 until all four of the stabilizer screws have been adjusted.

14. Reposition the Carriage to all of the adjustment positions and verify that the measurements are correct.

15. Perform steps 6 through 14 as many times as necessary to correctly accomplish this adjustment.

16. Install the ink delivery system support bracket following the procedures located in Chapter 5.

Paper Skew Adjustment

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.

NOTE

Read and follow **ALL** of the information in the following pages before you begin the actual ajustments.

Paper Skew Adjustment Sequence

It is very important that the sequence for the adjustment given in this section be observed. Refer to Figure 3-17 for the numbering sequence of the Pinch Roller Supports.

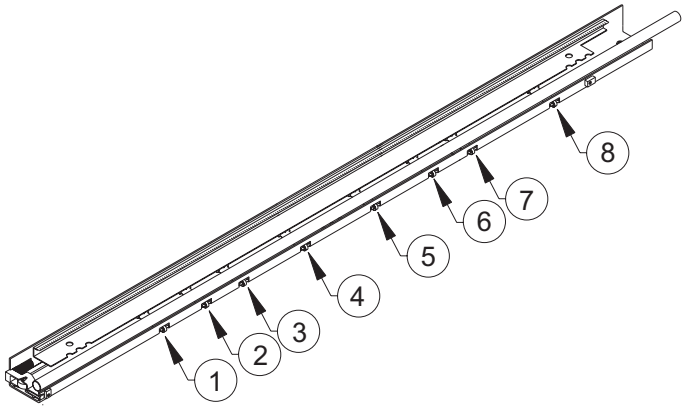

Figure 3-17. Pinch Roller Supports Numbering Sequence.

NOTE

The rollers should be adjusted **moving from the right side of the Platen to the left side of the Platen**.

1. Load a sheet of B-Size paper and adjust Rollers #8, #7, and #6, following the directions in the Adjustment of Pinch Roller Supports section.

2. Load a sheet of D-Size paper and adjust Rollers #5 and #4, following the directions in the Adjustment of Pinch Roller Supports section.

3. Load a sheet of E-Size paper and adjust Rollers #3, #2, and #1, following the directions in the Adjustment of Pinch Roller Supports section.

Mounting Screw Information

1. The torque requirements for the Pinch Roller Support mounting screws is 3 In.-Lbs. ± 0.5.

2. Turning the mounting screw clockwise will tighten the screw. Turning the mounting screw counterclockwise will loosen the screw.

3. Figure 3-18 shows the Pinch Roller, Pinch Roller Spacer and the mounting screws. You must stand behind the plotter in order to adjust the mounting screws on the Pinch Roller Supports.

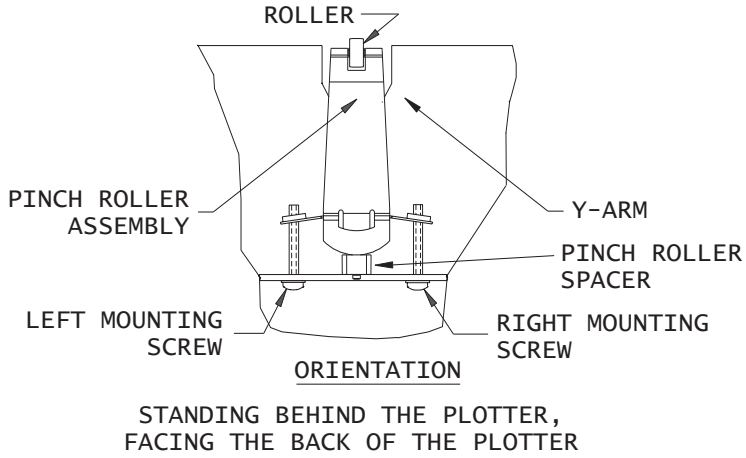

Figure 3-18. Pinch Roller Support and Mounting Screws.

4. If the mounting screw on the right side is loosened (turned counterclockwise), the roller will move to the left. If the mounting screw on the left side is loosened (turned counterclockwise), the roller will move to the right. **NEVER LOOSEN OR TIGHTEN BOTH MOUNTING SCREWS AT THE SAME TIME ON THE SAME UPPER ROLLER SUPPORT.**

5. If you have loosened one of the mounting screws and the roller has moved, and you need to move the roller in the opposite direction, you must tighten that mounting screw BEFORE loosening the other screw to move the roller in the opposite direction. When tightening the first screw, turn it clockwise with the torque screwdriver until the maximum torque is reached. Then loosen the other screw. **AGAIN, NEVER LOOSEN OR TIGHTEN BOTH MOUNTING SCREWS AT THE SAME TIME ON THE SAME UPPER ROLLER SUPPORT.**

6. It is **extremely important** that you maintain downward pressure (towards the floor) on the head of each screw at the same time as you tighten or loosen the screws. Each screw must be completely at the bottom edge of its hole in the back of the Y-Bracket. **If this is not done, the Upper Roller Support will not be perfectly level and will not perform its function properly.**

7. Following all of the information in this section precisely will ensure that the Pinch Roller Support springs are deflected and the lower tail of the springs will always be pressed against the Pinch Roller Spacer (without a gap) as shown in Figure 3-19.

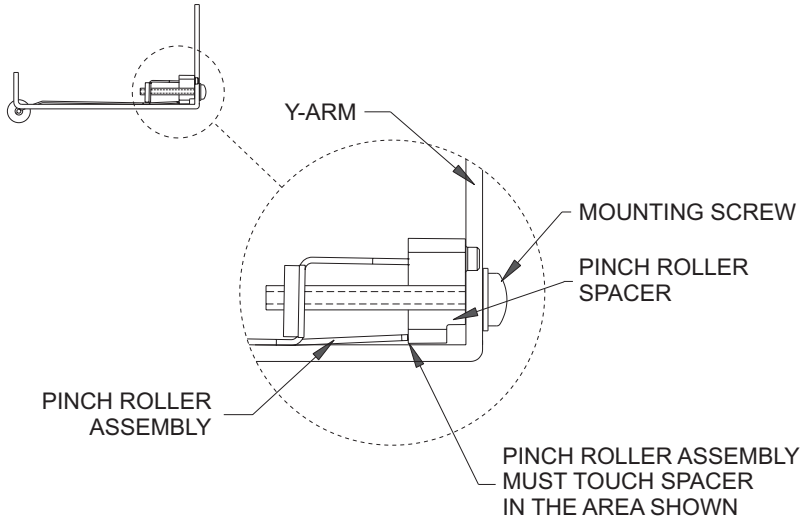

Figure 3-19. Correct Positioning of the Spring in the Pinch Roller Support.

Other Functional Requirements

The paper skew has a tendency to increase as the size of paper increases (B-Size through E-Size). When adjusting the skew, make sure that:

1. the skew for B-Size paper is as close to the low end of the range as possible; and

2. a minimum gap still remains between all Pinch Roller Supports and the Y-Arm. The test for acceptable gap is that a piece of bond paper can be inserted through the gap without interference; that is, the gap must be at least the thickness of a piece of bond paper. See Figure 3-20. Avoid adjusting the Pinch Roller Supports so that they touch the Y-Arm's cut outs.

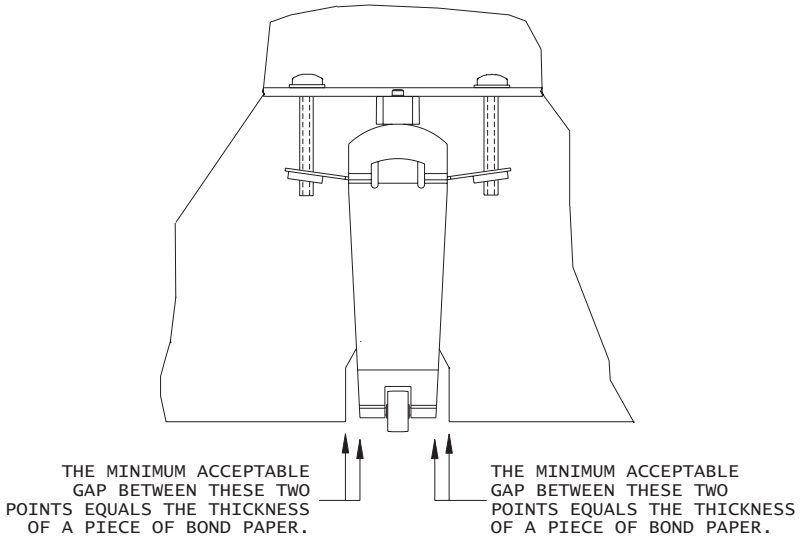

Figure 3-20. Test for Minimum Acceptable Gap.

Adjustment of Pinch Roller Supports

NOTE

Be sure to perform the adjustment according to the sequence given in Figure 3-17.

Visual Verification

Make sure that the roller is centered in the Y-Arm. The gap between the roller and the Y-Arm should be approximately equal on both sides of the roller. See Figure 3-21.

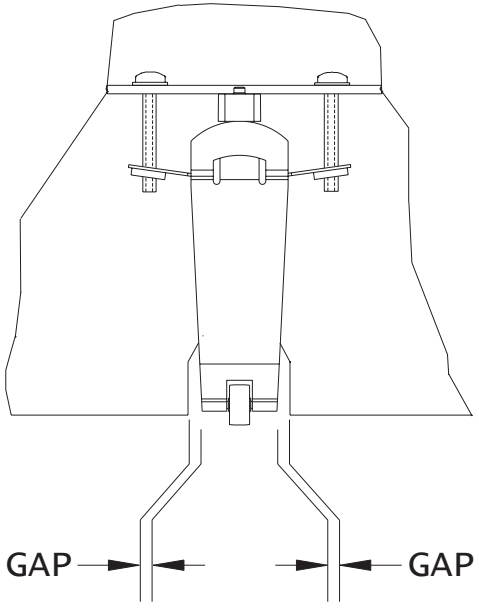

Figure 3-21. Visual Verification of Gap between Roller and Y-Arm.

Observation of Paper Skew at Rear Media Alignment Mark

1. Position a sheet of the appropriate size paper for loading. The cut corner should be the top right corner of the paper as you load it. Make sure the correct side is up against the rollers, and the right-hand side is aligned with the Front Media Alignment Mark on the front of the Platen.

NOTE

Make sure that there is no gap between the right edge of the paper and the left edge of the Front Media Alignment Mark on the Platen.

2. Hold the media and press LOAD. The paper will be pulled in past the Platen's groove. The paper will roll forward (out) and stop.

3. Check to make sure that the gap between the right edge of the paper and the left edge of the Rear Media Alignment Mark (on back of the Platen) is within 2 line widths (0.12"). See Figure 3-22.

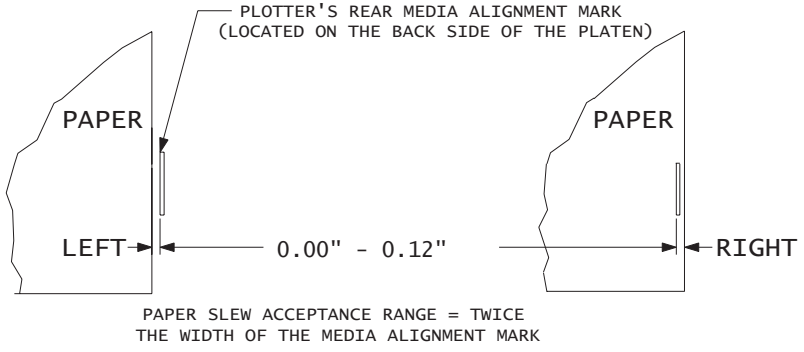

Figure 3-22. Paper Skew Acceptance Range for Rear Media Alignment Mark.

Observation of Paper Skew at Front Media Alignment Mark

1. Press FEED MEDIA and then the UP ARROW to move the media forward while you observe the paper skew at the Front Media Alignment Mark.

2. The paper should be returning to its preloading location, preferably without any skew (gap). Engineering specification requires the skew to be within 0.00" 0.06" (approximately one width of Platen's line). See Figure 3-23.

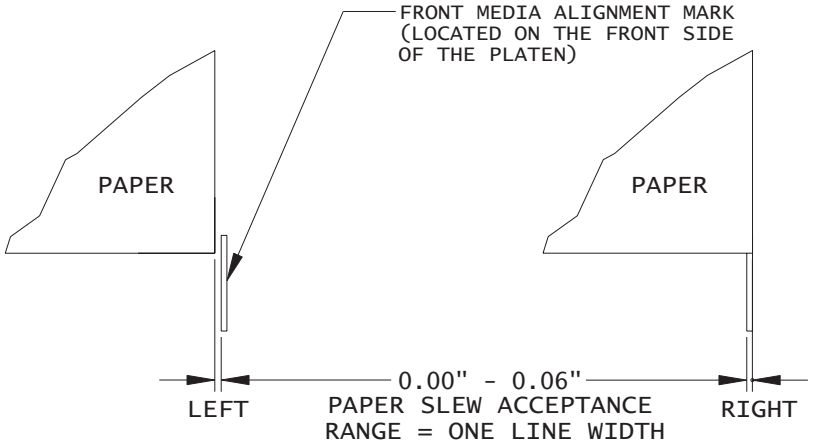

Figure 3-23. Paper Skew Acceptance Range for Front Media Alignment Mark.

Adjustment of the Mounting Screws

Figure 3-24 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.

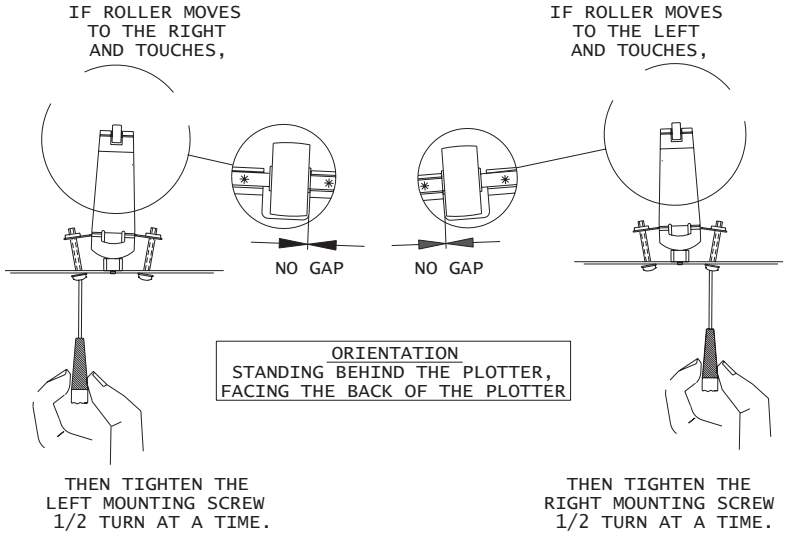

Figure 3-24. Motion of Rollers and Adjustment of Mounting Screws.

Once you have completed the adjustment of Rollers #8, #7, and #6, adjust Rollers #5 and #4, following the same procedures. After Rollers #5 and #4 are adjusted, adjust Rollers #3, #2, and #1, following the same procedures.

Paper Axis Calibration

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

To perform the paper axis procedure:

Depress the “Menu” key on the control panel to begin the main menu subroutine.

Using the “Up Arrow”, Down Arrow” and “Select” keys on the control panel select:

Utility Menu
Paper Calib
Calib XY=(“On” or “Off”)

Ensure that Calib XY is set to ON and press “Select.” This allows the printer to store the data that is entered in the following steps.

Then select:

Paper Axis Test

This runs the paper axis test which prints out two “T” figures that are mirrored from each other and about 33” apart. See Figure 3-27.

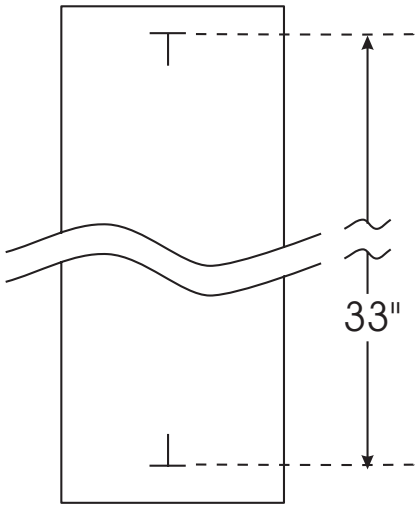

Figure 3-25. Paper Axis Test.

With a precision drafters measuring stick, measure the exact distance from each of the "T" intersections.

Select Paper Axis=*XX*. The XX will read "33.00" if the plotter is set in English units or "83.82" if in metric units.

Using either "Up Arrow" or "Down Arrow", rotate through the selections until the exact value of the measurement found is selected. Press "Select" to accept the selection.

Deadband Alignments

Deadband calibration compensates for minute differences created when bidirectional printing is used. Unidirectional printing is not affected by deadband. There are two types of deadband tests:

Fast Deadband
Slow Deadband

Figure 3-26. Slow Deadband.

Figure 3-26 shows what the display will look like when printing the slow deadband 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 top and bottom set of lines to the center set 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.

Allowable values for the Slow Deadband calibration is -2, -1, 0, 1 and 2.

The Fast Deadband test will print a display similiar to Figure 3-26 but will print the pattern for each of the four colors. This is a visual check of the color deadband alignment only. No adjustments can be made for this test. To make adjustments see the Color Deadband Alignment section.

Allowable values for the Color Deadband alignments are from 1 to 12.

To perform the Slow Deadband Alignment

Depress the “Menu” key on the control panel to begin the main menu subroutine.

Using the “Up Arrow”, Down Arrow” and “Select” keys on the control panel select:

Utility Menu
Db Calib
Slow Db Test

Selecting “Slow Db Test” will run the slow deadband test. This will print the color calibration plot as shown in Figure 3-26.

When the plot is complete, observe the plot and determine if an adjustment is required.

If an adjustment is required, select “slow Db=*XX*” and using either “Up Arrow” or “Down Arrow”, choose a value that is either one less or one greater then the current value. Press “Select” to accept the selection and rerun the Slow Db Test.

Continue performing these steps until the slow deadband adjustment is correct.

Color Deadband Alignment

The color deadband alignments are necessary to ensure that the output images are being produced with the highest quality standards available while using the ***ENCAD*** printer in a bidirectional mode.

These adjustments help to compensate for any deviations that may have become apparent due to the carriage speed and/or the type of media loaded. Precise calculations are being performed to time the release of the ink drop so that they land on the media at the correct location. Differences in media thickness make the distance that the ink has to fall vary and this variable needs to be compensated for in the calculations.

To perform the Color Deadband Alignments

Depress the “Menu” key on the control panel to begin the main menu subroutine.

Using the “Up Arrow”, Down Arrow” and “Select” keys on the control panel select:

Utility Menu
Db Calib
Color Db Test

Select “Color Db Test” to run the color deadband test.

The test consists of 12 default calibration settings. When the test is run it will print out a pattern of 5 calibration lines for each of the 12 settings. It will print this pattern in black first, followed by cyan, magenta and then yellow. Also printed will be the current settings for each of the four colors as well as the slow deadband setting.

When the plot is complete, select “K Fast DB=*XX*”.

Observe the plot and using either “Up Arrow” or “Down Arrow”, rotate through the selections until one that seems closest to the correct value is selected. Press “Select” to accept the selection.

Continue performing these steps until the all color deadband adjustments are correct.

Color Calibration

This procedure describes how to check that the cartridges are properly aligned for color plotting and should be followed each time the ink cartridges are installed. Figure 3-25 is a representation of how a color calibration looks when printed.

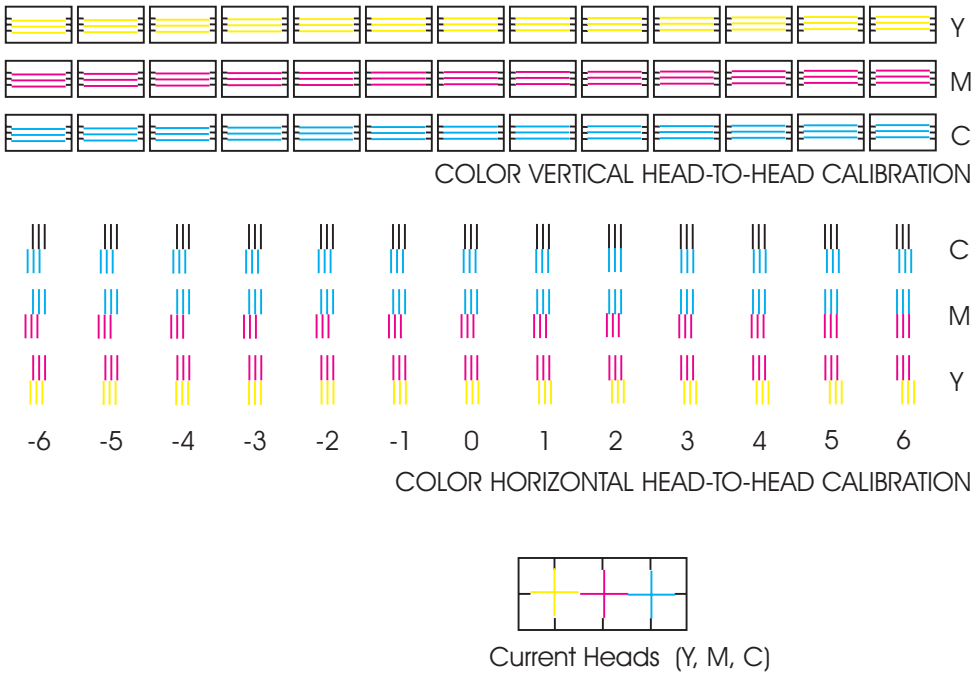

Figure 3-27. Color Calibration.

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.

To perform the Color Calibration:

Depress the “Menu” key on the control panel to begin the main menu subroutine.

Using the “Up Arrow”, Down Arrow” and “Select” keys on the control panel select:

Utility Menu
Color Calib
Print Test

This will print the color calibration plot as shown in Figure 3-25.

When the plot is complete, use the “Up Arrow”, Down Arrow” and “Select” keys on the control panel to select “C Vert=*XX*”.

Observe the plot and using either “Up Arrow” or “Down Arrow”, rotate through the selections until the one that best aligns the cyan color on the plot is selected. Press “Select” to accept the selection and return to the Color Calib Subroutine.

Continue until all six calibrations on the Color Calib Menu have been accomplished.

Diagnostics Menu

To get to the Diagnostics Menu:

Depress the “Menu” key on the control panel to begin the main menu subroutine.

Using the “Up Arrow”, Down Arrow” and “Select” keys on the control panel select:

Utility Menu
Service Menu
Diag. Menu

All tests under the Diagnostics Menu should be performed by competent technicians only. The types of tests that can be performed are: Servo PWM Test, Servo Cycle Test, Carriage Test, Color Test and Continuous Test.

Servo “PWM Test” - Monitors the PWM (pulse width modulation) signal applied to the servo motor from the driver on the MPWA to check the amount of force required to move the Carriage. The test performs three complete cycles of the carriage assembly and lists the average PWM, the maximum PWM, and the position of the carriage where the maximum PWM occured.

Servo “Cycle Test” - Tests the servo motor by moving the carriage back and forth across the slide shaft. The number of cycles is selectable and the available options are:

10
100
1,000
10,000
100,000
1,000,000.

Carriage Test - Prints 5 sets of 3 parallel lines to test the vibration characteristics of the carriage assembly.

Color Test - The Color Test prints a wide swath of each color (total of four) to test for banding. The test is selectable in the amount of ink that is to be printed. The available are: 10%, 25%, 35%, 50%, 65%, 75%, and 100%.

Continuous Test - The Continuous Test sends the printer into a test loop that will perform a series of tests continuously. Powering down and restarting the printer is the only way of exiting this test loop.

The Continuous Test will first prime the cartridges, followed by a serial port test, parallel port test, a fast deadband display and a color calibration display.

The deadband and color calibration displays are used only as a visual inspection of the operating condition of the printer. No adjustments can be performed while in the Continuous Test mode.

A loopback Test Cable is required to correctly accomplish the serial and parallel port tests. Install both ends of the Loopback Cable before running this test. The Loopback Test Cable is listed in Chapter 6.

After completing the deadband display, the test will begin again with the prime and continue until power is removed.

Clearing the NVRAM

NOTE

If you think that the printer is coming back to ENCAD for Failure Mode Analysis, do not clear the NVRAM as it will also clear out any additional information that FMA and Engineering may need to properly diagnose the cause of the failure.

Clearing the NVRAM is required anytime that a MPWA is to be permanently removed from a printer. The NVRAM is a section of nonvolatile memory that stores printer size information. The MPWA is the identical for both printers but it will have to learn which size printer it is installed in. Clearing the NVRAM allows the MPWA to relearn which size printer it is reinstalled into.

Clearing the NVRAM also resets **all** values to their default settings, including the clock. After clearing the NVRAM, all user settings and electrical calibrations will be lost and needs to be performed again.

To clear the NVRAM

Depress the "Menu" key on the control panel to begin the main menu subroutine.

Using the "Up Arrow", Down Arrow" and "Select" keys on the control panel select:

Utility Menu
Service Menu

Press either the "Up Arrow", Down Arrow" key until a blank is displayed on the bottom line, then press the "Select" key **twice**.

Using the “Up Arrow”, Down Arrow” and “Select” keys on the control panel select:

Code1 = 0
Code1 = 8
Code2 = 0
Code2 = 2
Code3 = 0
Code3 = 4
Code4 = 0
Code4 = 5
Hidden Menus
Clear NVRAM

After selecting “Clear NVRAM”, cycle the power on the printer.

Firmware Download/Upgrading

The normal method of downloading new firmware is to send the file as if it was a standard print job.

To perform the firmware download, follow the steps listed below:

1. Power OFF printer, wait 15 seconds.
2. Connect parallel printer cable between the printer and PC.
3. Turn the printer ON.
4. Obtain the latest firmware for your printer. Save both of the files to the same directory on the hard drive. Double click on XXXX.EXE file to inflate the compressed files. The file name might be different then listed above.
5. Go to a DOS environment and from within that same directory type: **`GO XXXX.ROM`** and press Enter. The firmware is sent to the printer as an ordinary print job.

NOTE

For NT3.5x or NT4.0 systems click on “Start” - “Programs”, “Command Prompt.” At the “dos” prompt go to the location of the .ROM (i.e.: if the .ROM file is on a floppy disk, type `A:` and press Enter.

Then type: **`PRINT /D:LPT1 A:\XXXX.ROM`** and press Enter.

6. Wait approximately 40 seconds.

7. Remove power from printer for 15-20 seconds. Apply power to the printer. The printer should initialize properly. Verify firmware revision by sequencing through **Utility Menu - Service Menu - About** menu. Verify firmware has been incorporated.

8. If the firmware download is **not** successful you may hear more than 1 beep or complete silence. Check parallel port connections and return to step 5.

Internal Cabling and Signal Flow Diagrams

Figures 3-28 and 3-29 are schematics of the major components and the cabling associated between them. The diagrams 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 printers theory of operation.

Figure 3-28 shows all cable connections to the MPWA and the power supply. Figure 3-29 shows all cable connections to the carriage PWA.

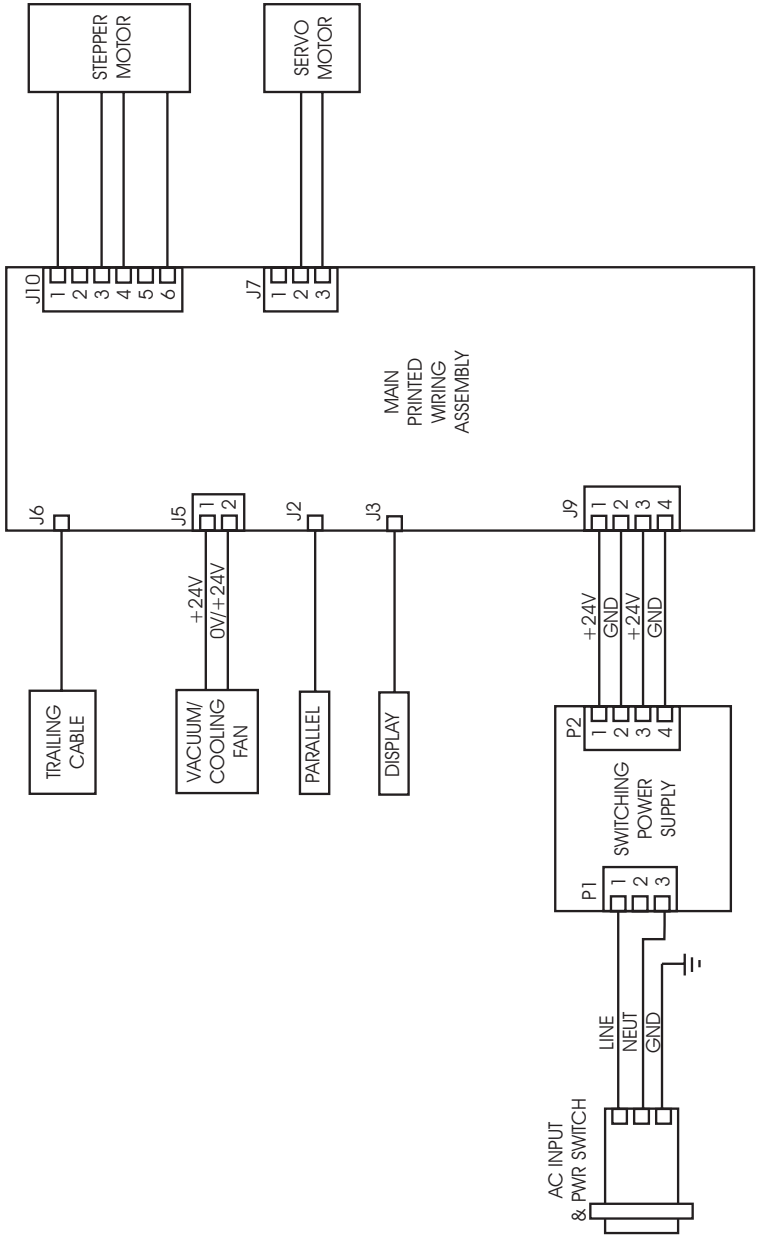

Figure 3-28. MPWA Connections Diagram.

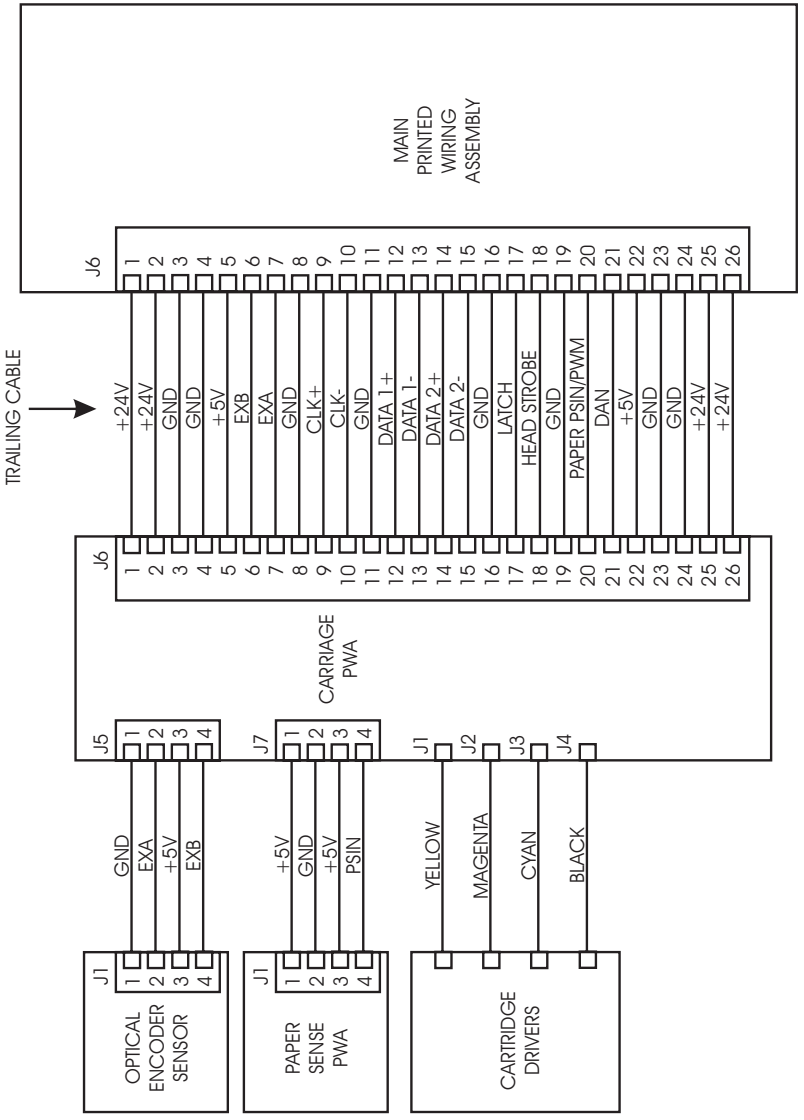

Figure 3-29. Carriage PWA Connections Diagram.

Troubleshooting 4

Introduction

Chapter 4, Troubleshooting consists of a table that is intended to aide the technician in troubleshooting the **CadJet T-200** printers. 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		
	• printer not ON	depress power switch
	• 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)	• DC output voltage not present (see Figure 3-28 for pin-out)	replace power supply
	• DC voltage present at MPWA	replace MPWA
Initialization Failure		
	• DIMM unseated, defective or missing	reseat or replace DIMM
	• power supply defective	replace power supply
	• trailing cable defective	replace trailing cable
Media Does Not Move		
	• perform Stepper Motor Winding Resistance check	replace stepper motor if out of tolerance
	• rough motion while spinning stepper motor	bad bearings - replace stepper motor

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Media Does Not Move (cont)	• media control switches are operating correctly	driver corrupted - reload printer driver
	• firmware corrupted	reload firmware
	• bad MPWA	replace MPWA
	• ESD (electro-static discharge)	ensure that all ESD components are properly installed then replace MPWA
Internal ERROR "Carriage 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 carriage (may or may not be visible)	remove obstruction

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Internal ERROR "Carriage Axis Failure" (cont)	• dirty encoder strip	perform Encoder Strip Cleaning procedure
	• dirt under the carriage bushings	remove carriage bushings and clean
	• damaged encoder strip	replace encoder strip
	• bad encoder sensor	reseat or replace encoder sensor
	• worn carriage bushings	replace carriage bushings
	• loose trailing cable connections	remove power and reseat trailing cable connections at the MPWA and the carriage assembly
	• cutter assembly malfunction	replace cutter assembly
	• damaged carriage drive belt system	1) check idler/ tension assembly 2) check carriage belt
	• faulty trailing cable	replace trailing cable

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Internal ERROR "Encoder Sensor Failure"		
	• encoder sensor cable unseated	reseat encoder sensor cable
	• bad encoder sensor	replace encoder sensor
Internal ERROR "Paper Sensor Failure"		
	• servo motor and vacuum fan connections to MPWA are switched	reattach connections correctly (use Figure 3-4 for reference)
	• paper sensor cable unseated	reseat paper sensor cable
	• bad paper sensor	replace paper sensor
	• servo motor disconnected	check servo motor connections
	• trailing cable connection is faulty	reseat trailing cable
	• bad trailing cable	replace trailing cable

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Internal ERROR "MPCB Failure"	• bad MPWA	replace MPWA
Unrecognized Cartridges Error	• faulty connection of cartridge ID chip to flex cable	check cartridges
	• wrong cartridges installed	check cartridges
	• carriage flex cable disconnected	check flex driver cable connections
	• trailing cable connections	reseat trailing cable
	• faulty trailing cable	replace trailing cable
	• MB version incorrect	verify correct MB version (ie 18-27-0)
	• faulty carriage PWA	replace carriage PWA
Image Skews or Moves	• dirty encoder strip	clean encoder strip (top and bottom)
	• defective encoder strip	replace encoder strip

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Does Not Print		
	• no media loaded	verify media is measured properly
	• bad connection between computer and printer	reseat cable connections on computer and printer
	• firmware is corrupted	refresh EEPROM firmware with new download
	• faulty quad flex cable	replace quad flex cable or complete carriage assembly
	• bad MPWA	replace MPWA
Ink Cartridge Misfiring		
	• nozzles clogged	perform “clean”
	• cartridge low on ink	refill or replace cartridge
	• cartridge filter clogged	replace cartridge
	• ink drop out (ink starvation resembling intermittent banding)	replace ink caddy

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Ink Cartridge Misfiring (cont)	• flex contacts dirty or damaged	1) perform Flex Cable Contact Cleaning procedures 2) replace carriage assembly
	• 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 service station
	• bad carriage assembly	replace carriage assembly
	• bad MPWA	replace MPWA

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Paper Skewing		
	• stepper motor gearing dirty or damaged	clean assemblies and perform Inspect Stepper Motor Gears procedure
	• lower roller loose	torque screws down securing lower roller
Printer Output is Banding (Horizontal)		
	• low print pass mode	increase print pass mode
	• 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 MPWA
	• check amount of ink in cartridges	replace or refill cartridges
	• cartridges need to be primed	perform Prime, followed by Color Test to ensure nozzles are clear

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Printer Output is Banding (Horizontal) (cont)	• color calibration required	perform Color Calibration
	• paper axis calibration required	perform Paper Axis Test Calibration
	• carriage bushings worn or damaged	replace bushings
	• defective carriage bushings	replace bushings
	• faulty or corrupt firmware	reload firmware
	• cartridge dimple area dirty or damaged	1) perform Cartridge Dimple Cleaning procedure
		2) replace cartridge
	• flex cable contacts dirty or damaged	1) perform Flex Cable Contact Cleaning
		2) replace carriage assembly
	• carriage assembly obstructed	check carriage assembly for proper movement along Y-arm
	• carriage belt is loose, too tight, worn, or damaged	reinstall, check tension assembly, and/or replace belt

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Printer Output is Banding (Horizontal) (cont)	• corrupted NVRAM	clear NVRAM
	• carriage head height incorrect	check carriage head height and perform calibrations
	• incompatable or defective memory module	replace memory module
Printer Output is Banding (Vertical)		
	• dirty carriage bushings	clean bushings
	• defective carriage bushings	replace bushings
	• trailing cable connections	reseat trailing cable
	• faulty trailing cable	replace trailing cable
	• lower roller height incorrect	check lower roller
	• dirty encoder strip	clean encoder strip
	• defective encoder strip	replace encoder strip

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Printer Output is Banding (Horizontally and Vertically)		
	• dirty encoder strip	clean encoder strip
	• defective encoder strip	replace encoder strip
	• bad MPWA	replace MPWA
Keypad Locked-Up or Not Functioning Properly		
	• firmware problem	1) reset printer 2) refresh or upgrade firmware
	• keypad assembly damaged	replace keypad assembly
	• faulty connection between MPWA and keypad	reseat or replace connector
	• bad MPWA	replace MPWA

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Noisy Operation		
	• ink or paper debris in printer	clean printer
	• obstruction in path of carriage	remove obstruction/ clean printer
	• carriage bushings worn	replace carriage bushings
	• debris or obstruction in fan	clean fan assembly
	• drive belt slipping on idler	replace frame tensioner, spring, or idler
	• hardware or assemblies loose	tighten hardware or assemblies
	• carriage height too low	perform Carriage Head Height Adjustment
	• lower drive shaft gears are dirty or misaligned	clean and/or realign lower drive shaft gears
	• noisy servo motor	replace servo motor
	• noisy stepper motor	replace stepper motor

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Line Quality Degraded		
	• ink cartridges dirty or clogged	clean and prime ink cartridges
	• cartridge dimple region dirty or damaged	clean or replace cartridge
	• color calibration needed	perform Color Calibration
	• deadband calibration needed (in bidirectional printing mode)	perform Deadband Calibration
	• debris or lubrication on slide shaft	clean slide shaft
	• leaks or bubbles in ink delivery lines	1) reseal/prime ink delivery lines on both sides 2) replace ink delivery lines
	• dirty encoder strip	clean encoder strip
	• defective encoder strip	replace encoder strip
	• carriage bushings worn	replace carriage bushings

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Line Quality Degraded (cont)	• drive belt worn	replace drive belt
	• drive belt slipping on idler	replace frame tensioner, spring, or idler
	• vacuum fan not operating	replace fan assembly
Fan Does Not Power Up		
	• MPWA has 24 VDC at J3 pins 1-2	1) reseat connection at MPWA to fan
		2) replace fan
	• power not being applied to fan	1) reload firmware
		2) replace MPWA
Media is Not Measured Properly		
(normal carriage function is observed, but media reverses out the rear of printer or continually advances forward)	• dirty platen surface	clean platen surface
	• defective platen surface	recoat platen surface with applicable paint
	• dirty paper sensor	clean paper sensor
	• defective paper sensor	replace paper sensor

Initialization Troubleshooting

The sequence that the printer follows during initialization (power up) is as follows:

1. Power supply turns on - LED D2 on carriage turns on then D5 turns on.
2. Reads the Flash ROM information.
3. Performs memory test with installed SIMMs.
4. Writes the Flash ROM data into RAM for quicker execution of the code. Starts executing instructions from RAM.
5. Loads MPWA gate array with boot code data.
6. Checks for a valid ROM. If the ROM is not valid, waits for a ROM image to be downloaded.
7. Steps 2 - 4 performed again.
8. Loads MPWA gate array with ROM code data.
9. Loads gate array on the carriage board. LED D2 goes out as soon as the carriage board gate array is programmed.
10. Turns on power supply cooling fan.
11. Moves carriage.
12. Checks and measures media size if loaded.
13. Turn on display.

To troubleshoot using the D2 and D5 LEDs:

With the power off, move the carriage away from the service station and snap the carriage cover off just enough to view the LEDs located in Figure 4-1.

Turn on the unit. After a short delay, the LED D2 will light. This will be followed by D5 turning on (D5 will illuminate dimly).

After about 3-4 seconds LED D2 will extinguish. Ensure that the LED extinguishes after about 3-4 seconds. Approximately 4 seconds later LED D5 will illuminate brightly momentarily and then return to the dimly lit status.

The fan will turn on and the carriage assembly will begin to move.

Turn the unit off immediately after the LED D5 returns to the dimly lit status to ensure no damage occurs to the carriage or carriage cover due to the carriage movement as stated in step 11.

Snap the cover back onto the carriage.

LED D5 signifies that bias voltage is available on the carriage board.

If LED D2 does not go out, setup the printer and download new firmware as discussed in Chapter 3. Repeat these procedures. If LED D2 still does not go out, possible areas to suspect is the MPWA, carriage board, or the trailing cable.

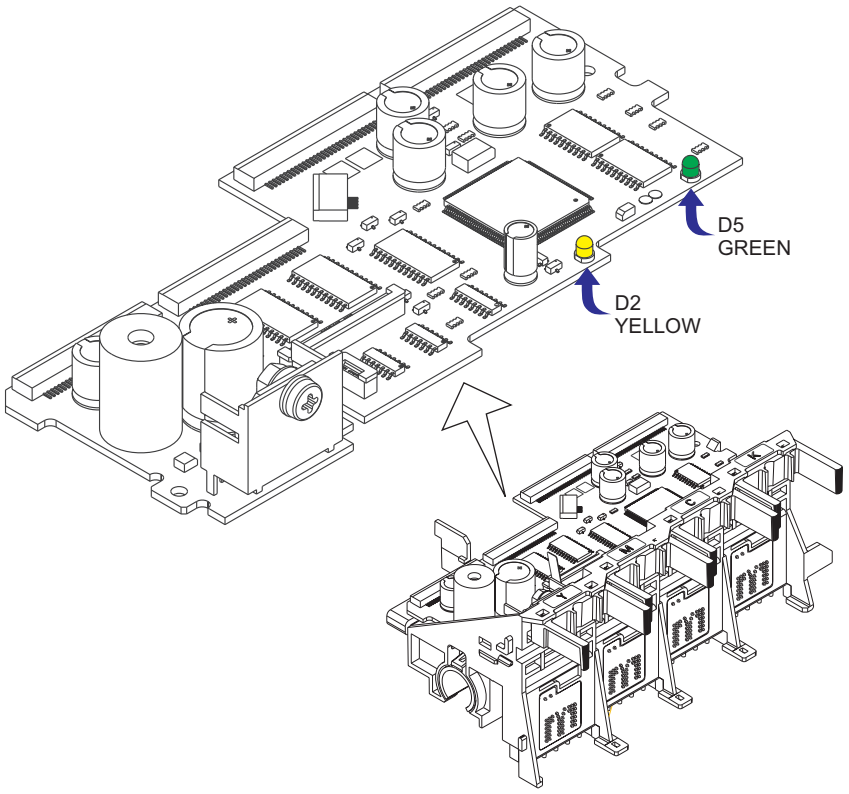

Figure 4-1. Carriage Board LED D2 and D5 Locations.

Assembly\Disassembly 5

Introduction

Chapter 5 contains the procedures for removal and replacement of the **CadJet T-200** printer assemblies and mechanisms. Illustrations are provided for clarity. Steps for each replacable part may depend on parts already removed in previous diassembly procedures. It is recommended that you read through each procedure before beginning the removal and replacement of any assemblies or mechenisms.

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
5/16 Hex Nut Driver
7/64 Hex Nut Driver
Wrench, 1/4"
Screwdriver, Socket Head, 1/4"
Wire Cutters
Needle Nose Pliers
X-ACTO Knife
ESD Wrist Strap
Fixture, Trailing Cable, Tape, Location, P/N 204142 (optional)

The following materials are also required:

Isopropyl Alcohol
Cotton Swabs
Lint Free Cloth or Tissue
Double Sided Tape (1/16' thick, 3/4" wide)
Loctate 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 disassembly procedures. An electrical shock hazard may be present if these precautions are not followed.

Removing the Right Cover Assembly

Removing the Right Cover Assembly provides access to the Memory Module, MPWA, and all MPWA connectors (Stepper Motor, Servo Motor, Fan, Display, Power Supply and Trailing Cable).

To remove the Right Cover Assembly:

1. Remove the Top Cover. Keep the right end of the Top Cover tilted up so that the Retracting Stop and Compression Spring don't fall out.
2. You may find it helpful to wrap a rubberband around the connector clips on the parallel port to hold them out of the way while the Right Cover Assembly is being removed.
3. Move the Carriage Assembly to the middle of the Platen.

4. Using a #2 Phillips screwdriver, loosen the top and front captive fastener screws and remove the bottom back screw on the inside of the Right Cover. The front captive fastener screw can be accessed by inserting the screwdriver into the groove on the Display Assembly as shown on the lower right side of Figure 5-1.

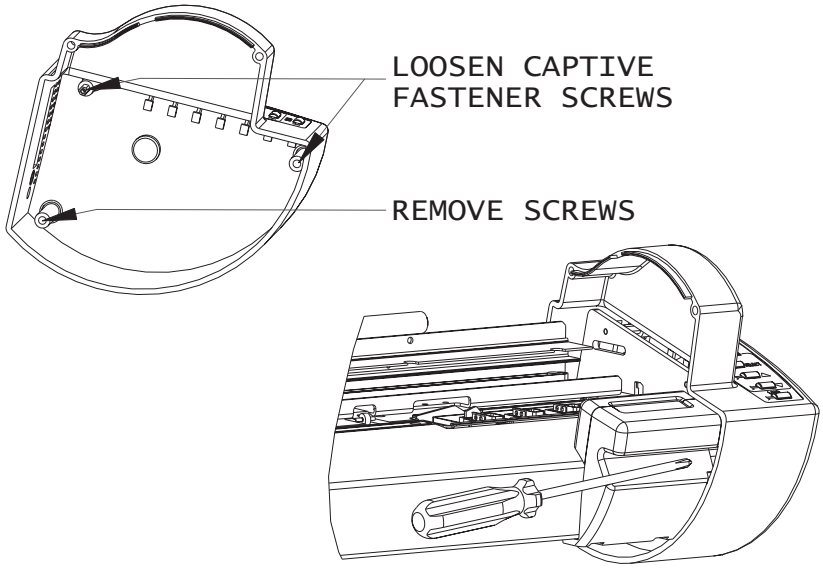

Figure 5-1. Removal of Right Cover Assembly.

5. Remove the Right Cover. Move the Right Cover towards the back of the unit as you remove it so that it clears the parallel port on the back of the unit. Be very careful when removing the Right Cover so that the LED's on the MPWA are not damaged.

Removing the MPWA Connectors

CAUTION

Do not pull the cables from the connectors on the J3 location (Display Cable) and J6 location (Trailing Cable) ubtil they are unlocked. Doing so may cause damage to the cable. Do not pull the lock too hard as you unlock the connectors or the lock may break off.

Disconnect all 6 connectors on the MPWA so that the MPWA can be removed (see Figure 5-2 for positions of the connectors), as follows:

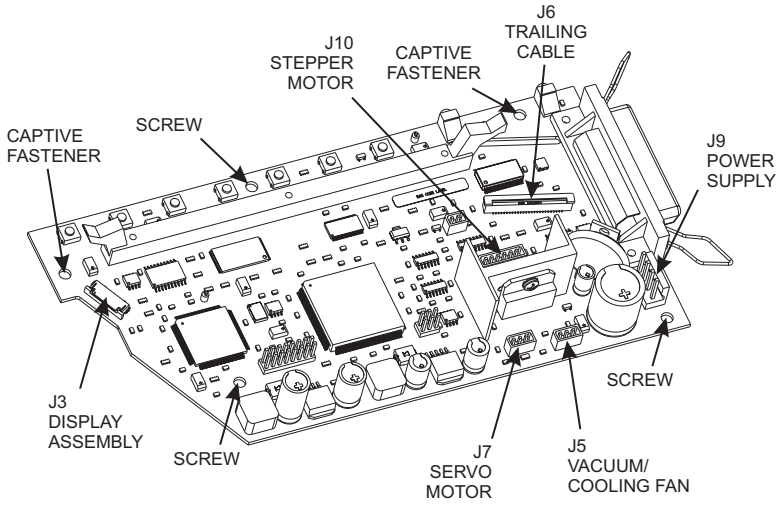

Figure 5-2. MPWA Connection and Screw Locations.

1. Disconnect the Display Cable connector at the J3 location. Pull forward on the connector lock and remove the flex cable from the connector.
2. Disconnect the Trailing Cable connector at the J6 location. Use the thumb and forefinger to pull forward on the connector lock and remove the Trailing Cable from the connector.
3. Disconnect the Servo Motor connector (Red and Blue wires) at the J7 location. Grasp the Servo Motor connector with the thumb and forefinger and pull straight out.
4. Disconnect the Fan connector (Red and Black wires) at the J5 location. Grasp the Fan connector with the thumb and forefinger and pull straight out.
5. Disconnect the Stepper Motor connector at the J10 location. Grasp the Stepper Motor connector with the thumb and forefinger and pull straight out.
6. Disconnect the Power Supply connector at the J9 location. Grasp the Power Supply connector with the thumb and forefinger and pull straight out.

Removing the MPWA

CAUTION

Integrated circuits can be weakened or inactivated by electrical discharge. It is recommended that you be grounded to a static station by an ESD wrist strap to prevent ESD damage.

To remove the MPWA:

1. Put on an ESD wrist strap.
2. Use a #2 6" Phillips screwdriver to remove the three remaining screws holding the MPWA onto the side plate. See Figure 5-2 for locations. Hold the top of the MPWA while removing the screws.
3. Place the MPWA in an ESD bag (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.

Removing the Right Side Plate

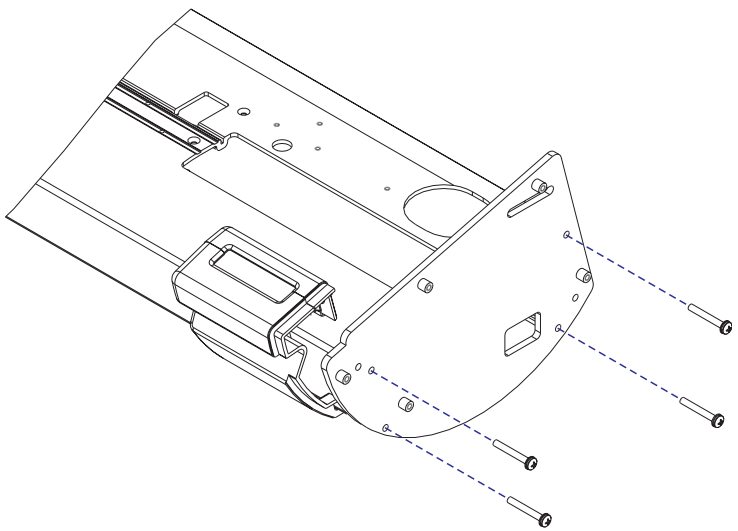

Figure 5-3. Removal of the Right Side Plate.

To remove the Right Side Plate:

1. Remove the Top Cover.
2. Remove the Right Cover Assembly.
3. Disconnect the MPWA connections and remove the MPWA.

4. While holding the Right Side Plate, remove the screws securing the side plate to the Platen. See Figure 5-3.
5. Slowly pull the Right Side Plate away from the Platen while feeding the cables through the side plate.

Reinstalling the Right Side Plate

To reinstall the Right Side Plate, reverse the steps followed when removing the Right Side Plate:

1. Feed the cables through the appropriate holes in the side plate then hold it in place against the Platen.
2. Reinstall the Right Side Plate to the Platen by securing with the screws. Torque to 15 in-lbs.
3. Reinstall the MPWA and all MPWA connections.
4. Reinstall the Right Cover Assembly and the Top Cover.

Reinstalling the MPWA

To reinstall the MPWA, reverse the steps followed when removing the MPWA:

1. Put on an ESD wrist strap.
2. Remove the MPWA from the ESD bag.
3. Hold the MPWA in place on the Right Side Plate while putting in the correct three screws in the holes located on Figure 5-2. Use a #2 Phillips screwdriver to torque the screws to 6 in-lbs.

Reinstalling the MPWA Connectors

1. Reinstall the Stepper Motor connector at J10.
2. Reinstall the Fan connector (Red and Black wires) at J5.
3. Reinstall the Servo Motor connector (Red and Blue wires) at J7.

4. Reinstall the Trailing Cable at J6.

   When inserting the Trailing Cable connector, apply pressure on the locking clip towards the MPWA in order to lock the connector in place. Test to make sure the connector is locked by pulling slightly on the cable to see if it comes out.

5. Reinstall the Display Cable at J3.

   When inserting the Display Cable connector, apply pressure on the locking clip towards the MPWA in order to lock the connector in place. Test to make sure the connector is locked by pulling slightly on the cable to see if it comes out.

Memory Module Removal

This printer ships with a 32MB memory module installed on the MPWA. If the MPWA is to be returned to ENCAD it will be returned with a factory installed 32MB module.

If a module of higher capacity has been installed by the customer, it is recommended that this memory module be replaced with the original module before returning the MPWA to ENCAD.

CAUTION

Integrated circuits can be weakened or inactivated by electrical discharge. It is recommended that you be grounded to a static station by an ESD wrist strap to prevent ESD damage.

The memory module is secured by locking tabs located at both of the narrow edges of the module. To remove the memory module, pry both tabs away from the module at the same time. This will unlock the module and lift it out of the slot for easy removal.

Memory Module Installation

The memory module is secured by locking tabs located at both of the narrow edges of the module. To install the memory module, verify that the locking tabs are in the unlocked position then align the module over the slot, ensuring that the module is oriented properly. While applying equal pressure to both edges of the module press the module down into the slot until both tabs are locked into the module.

Reinstalling the Right Cover Assembly

1. Make sure that all wires are inside the Right Cover Assembly area as you begin to put the Right Cover Assembly back on so that none of the wires are pinched between the Right Cover Assembly and the Right Side Plate.
2. Align the back of the Right Cover Assembly over the connector clips on the parallel port. Remove the rubber band holding the connector clips together.
3. Reinsert all three screws on the inside of the Right Cover Assembly. See Figure 5-1. All three screws should be torqued to 15 in-lbs. **Do not overtighten.**
4. Put the Top Cover back on.

Removing the Left Cover

Removing the Left Cover provides access to the Power Supply and the Power Entry Module.

To remove the Left Cover, proceed as follows:

1. Remove the Top Cover. Keep the right end of the Top Cover tilted up so that the Retracting Stop and Compression Spring don't fall out.
2. While holding the Left Cover, remove the three screws securing the Left Cover. The three screws are removed from the the left side of the cover as shown on Figure 5-4.

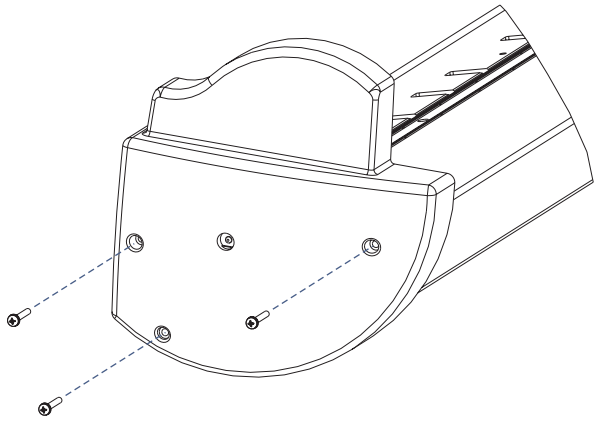

Figure 5-4. Removal of the Left Cover.

Reinstalling the Left Cover

To reinstall the Left Cover, proceed as follows:

1. While holding the Left Cover, reinstall the three screws that secure the Left Cover. The four screws are reinserted as shown on Figure 5-4. All screws should be torqued to 15 in-lbs. **Do not overtighten.**
2. Put the Top Cover back on.

Removing the Servo Motor

To remove the Servo Motor, proceed as follows:

1. Disconnect the power cord and the interface cables.
2. Remove the Top Cover.
3. Remove the Trailing Cable Cover from the Y-Arm Assembly in order to have easier access to the Frame Tensioner and to the screws that hold the Servo Motor in place.

4. Remove the Right Cover, MPWA and Right Side Plate for removal of the Servo Motor.

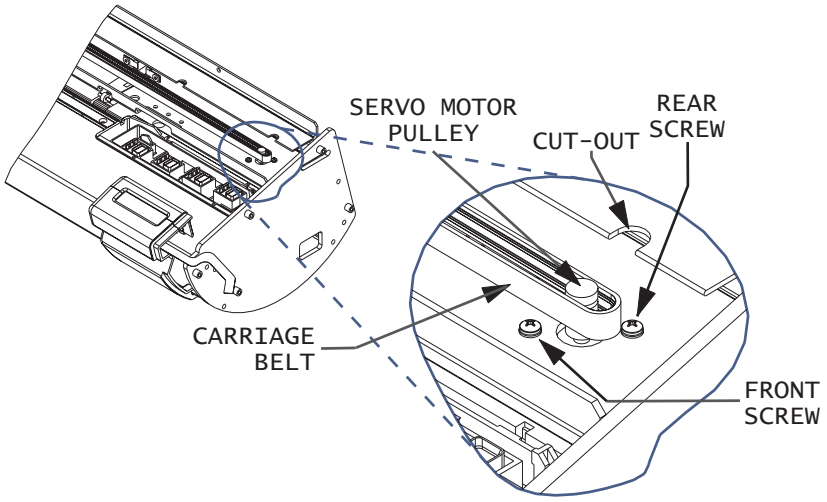

Figure 5-5. Removal of Servo Motor.

5. Use a #2 Phillips screwdriver to remove the back screw on the Servo Motor. See Figure 5-5. While using extreme care not to damage the Trailing Cable, align the screwdriver through the cut-out on the Stabilizer Bracket to get a good angle on the screwhead.

6. Loosen the front screw on the Servo Motor.

7. See Figures 5-5 and 5-6. While you compress the back of the Frame Tensioner with your left index finger, use your right hand to gently remove the Carriage Belt from the Servo Motor pulley.

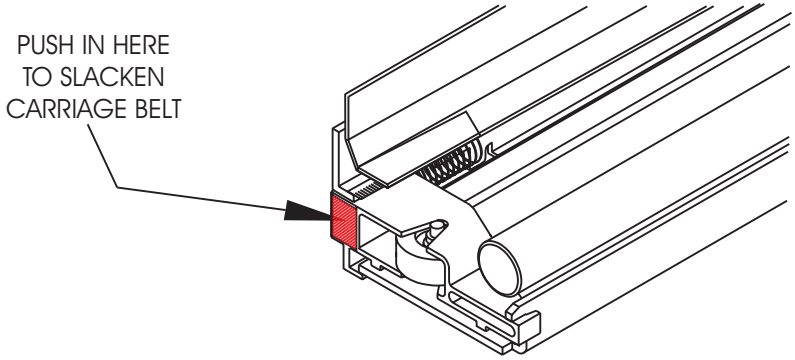

Figure 5-6. Compression of Frame Tensioner.

8. Support the Servo Motor with one hand and remove the front screw.
9. Remove the ServoMotor out of the right side of the Platen.

Reinstalling the Servo Motor

1. Reinsert the Servo Motor inside the opening on the right of the Platen.
2. Guide the Servo Motor into the Platen.
3. Push the Servo Motor pulley through the top of the Platen and Y-Arm and, at the same time, rotate the Servo Motor so that the connector is facing the **BACK** side of the Platen. Align the screw holes with the screw hole openings.
4. Insert one screw into the Servo Motor and tighten it slightly.
5. Insert the second screw into the Servo Motor and tighten it. Make sure both screws are torqued to 15 in-lbs.
6. Compress the back of the Frame Tensioner with your left index finger and wrap the Carriage Belt over the Servo Motor pulley. Make sure that the three guides on the inside of the belt are inserted in the three pulley grooves.

7. Move the Carriage Assembly back and forth to check the Carriage Belt tension.

8. Reinstall the Trailing Cable Cover and the Top Cover.

Removing the Display Assembly

1. Disconnect the power cord and the interface cables.

2. Remove the Right Cover Assembly.

3. Disconnect the Display Cable connector at the J3 location on the MPWA. Pull forward on the connector lock and remove the flex cable from the connector.

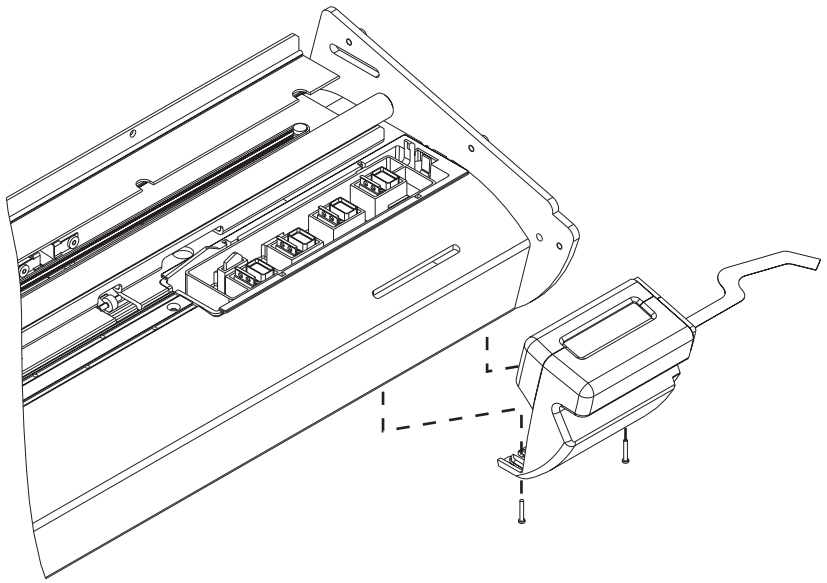

Figure 5-7. Removal of Display Assembly.

4. Using a #1 Phillips screwdriver, remove the 2 screws from the bottom of the Display Assembly. See Figure 5-7.

Reinstalling the Display Assembly

Reinstall Display Assembly by reversing the procedure used to remove it. When reinserting the Display Cable, make sure that the silver fingers on the end of the cable face the Display PWA. Route the Display Cable over the groove on the top of the Right Side Plate, down between the Right Side Plate and the MPWA and around to the front of the MPWA near the J3 connector. Torque Display Assembly screws to 6 in-lbs.

Removing the Service Station Assembly

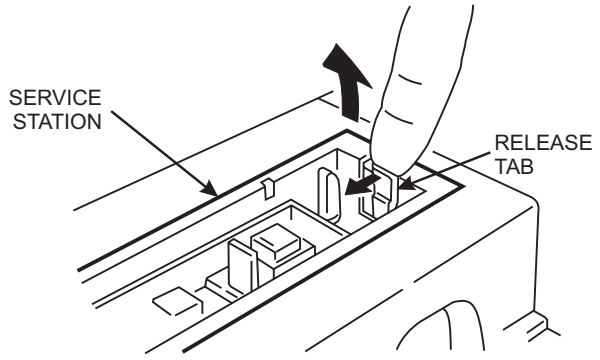

Figure 5-8. Service Station Removal.

1. Place the Top Cover in the open position.
2. Move the Carriage 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 5-8.

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.

Reinstalling the Service Station Assembly

1. To install the Service Station, position the Service Station inside the Right Cover and place the left side of the Service Station into the Platen.

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

3. Slide the Carriage Assembly to the right and back into the home position. Lower the Top Cover.

Remove the Carriage Assembly, Carriage Belt and the Frame Tensioner

1. Remove the Top Cover and Trailing Cable Cover.
2. Remove the Left and Right Covers.

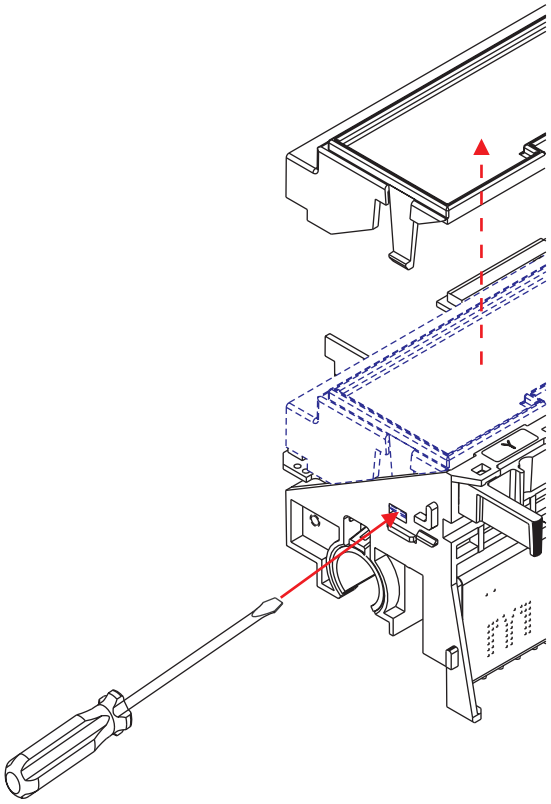

Figure 5-9. Electronics Cover Removal.

3. With a flathead screwdriver, press the Electronics Cover tab located in the upper slot on the left side of the Carriage Assembly. See Figure 5-9. Lift up on the front left side of the Carriage Cover until it comes part way off of the Carriage Assembly. Then lift up on the front right side of the Carriage Cover and move the Carriage Cover slightly to the left so that the back of it clears the Back Support Bracket.

4. Lift up on the connector lock to unlock the Trailing Cable connector (J6) on the Carriage PWA and remove the end of the Trailing Cable.

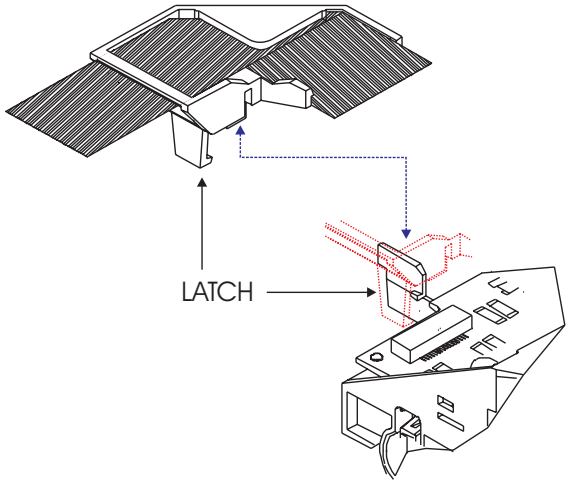

Figure 5-10. Strain Relief Removal/Installation.

5. Remove the Trailing Cable and Strain Relief from the Carriage Assembly by releasing the latch on the left lower side of the Strain Relief and lifting it off of the Carriage Assembly. See Figure 5-10.

6. Compress the back of the Frame Tensioner and use the end of a screwdriver to remove the Carriage Belt from the Servo Motor pulley. See Figures 5-5 and 5-6.

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

8. Push the Carriage 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 5-11.

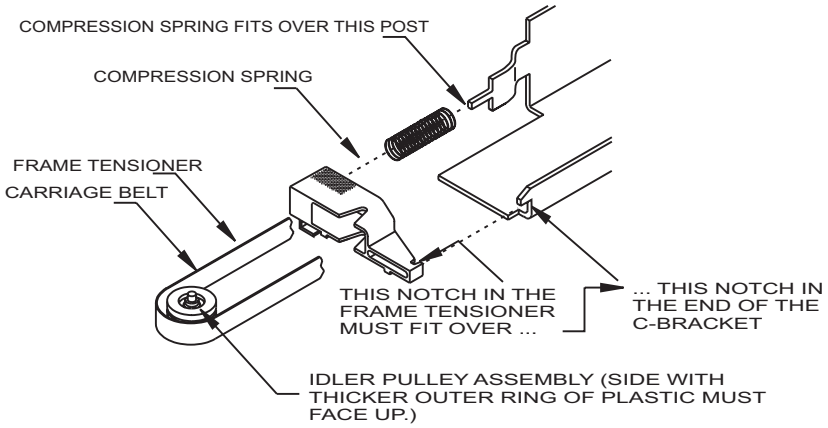

Figure 5-11. Frame Tensioner.

9. Slide the Carriage Assembly and Drive Belt off the left side of the Slide Shaft.

10. Once the Carriage Assembly is removed from the Slide Shaft, turn it over so that you can see the Belt Clamp. See Figure 5-12.

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

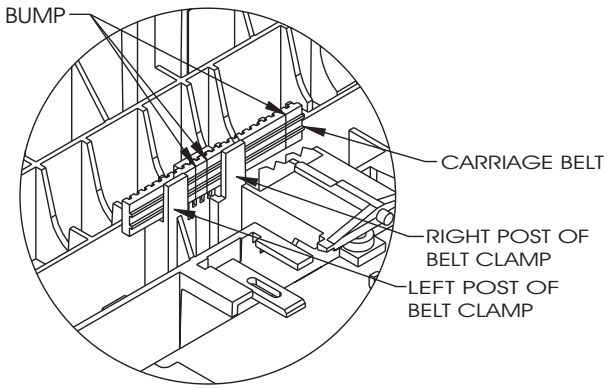

Figure 5-12. Carriage Belt Clamp.

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

CAUTION

Failure to use an approved antistatic bag for storage or shipment may cause damage to the MPWA and affect the Warranty.

13. Place the Carriage Assembly in an ESD (antistatic) bag in preparation for shipment to ***ENCAD*** for replacement or repair, or if it is to be stored for repair at your facility.

Remove the Carriage PWA

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 the Carriage Assembly, Carriage Belt, and the Frame Tensioner Removal procedures to remove the Carriage Assembly from the Slide Shaft.
2. Put on an ESD wrist strap.
3. Unlock the connectors and remove all flex cables on the Carriage PWA.

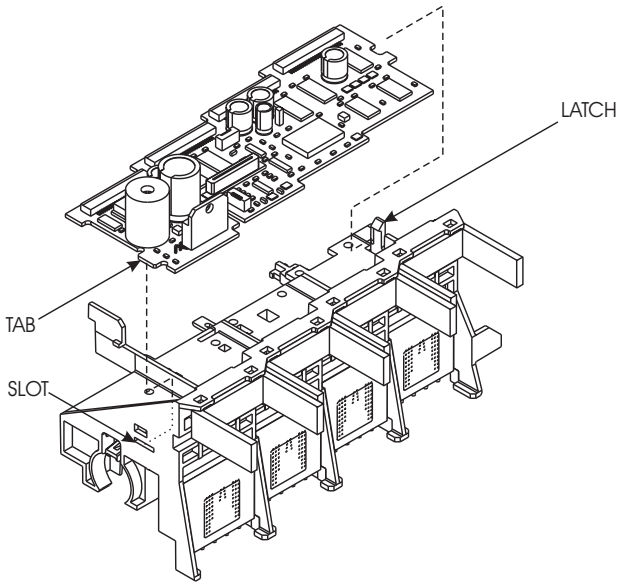

Figure 5-13. Carriage PWA Removal/Installation.

4. Unlock the latch on the right end of the Carriage Assembly and lift up the right end of the Carriage PWA. See Figure 5-13.

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

CAUTION

Failure to use an approved antistatic bag for storage or shipment may cause damage to the Carriage PWA and affect the Warranty.

6. Place the Carriage PWA in an ESD bag (antistatic 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 Carriage PWA

1. Put the tab on the left end of the Carriage PWA into the slot in the left side of the Carriage Assembly. See Figure 5-13.

2. Ensure that no flex cables are underneath the Carriage PWA.

3. Push down the right end of the Carriage PWA until the latch snaps into place.

4. Reattach all flex cables on the Carriage PWA.

5. Perform the Install the Carriage Assembly, Carriage Belt, and the Frame Tensioner procedures to reinstall the Carriage Assembly.

Remove the Paper Sensor or the Encoder Sensor

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

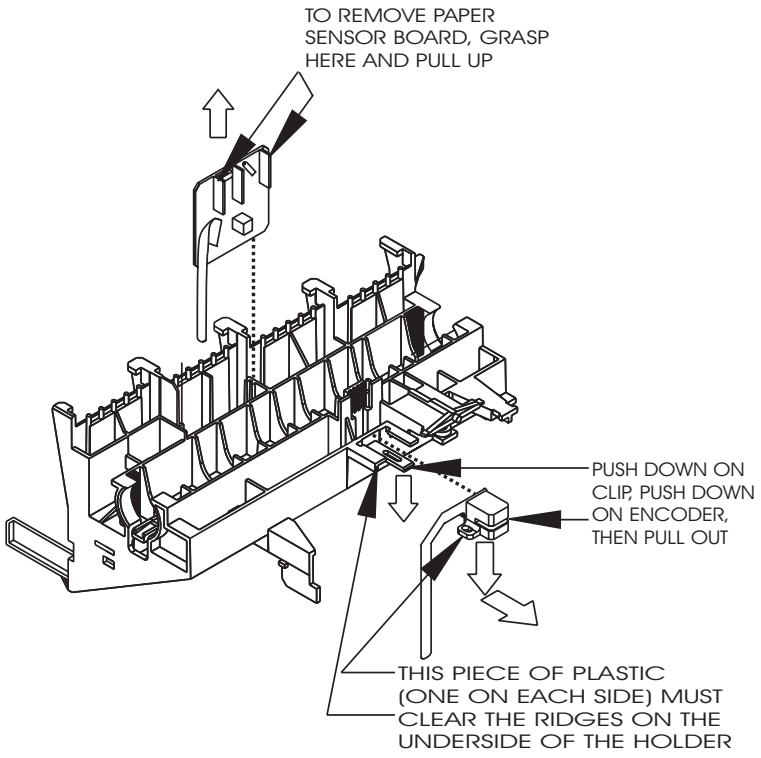

Figure 5-14. Paper and Encoder Sensor Removal.

2. To remove the Paper Sensor:

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

   b. Turn the Carriage Assembly over and hold it while firmly grasping the Paper Sensor between thumb and index finger. See Figure 5-14.

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

3. To remove the Encoder Sensor:

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

   b. Turn the Carriage 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 5-14.

Install the Paper Sensor or the Encoder Sensor

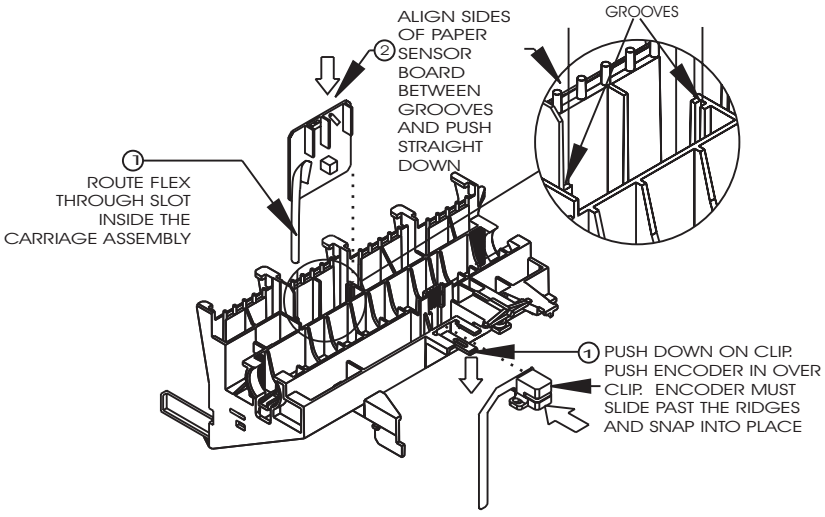

Figure 5-15. Paper and Encoder Sensor Installation.

1. To install the Paper Sensor:

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

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

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 5-15.

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

e. Turn the Carriage Assembly over and insert the Paper Sensor flex cable into the connector at J7.

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

2. To install the Encoder Sensor:

a. Turn the Carriage 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 Carriage Assembly over and insert the Encoder flex cable into the connector at J5.

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

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

Replacing the Carriage Bushings

1. If there is not enough space on both sides of the Slide Shaft to remove the Carriage bushings, perform the Carriage Assembly, Carriage Belt, and the Frame Tensioner Removal procedures to remove the Carriage Assembly from the Slide Shaft.

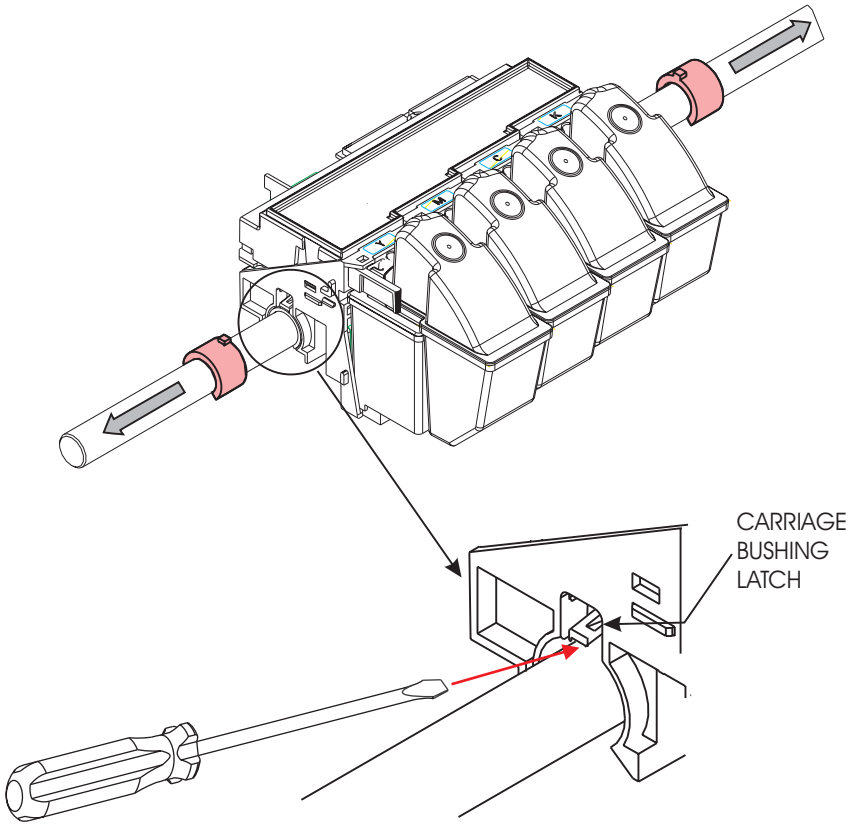

Figure 5-16. Carriage Bushing Removal.

2. Use a flat tip screwdriver to push up on the latch which holds the Carriage Bushing in place. See Figure 5-16.
3. Pull the Carriage Bushing out of the Carriage Assembly.
4. Repeat Steps 2 and 3 for the other Carriage Bushing.

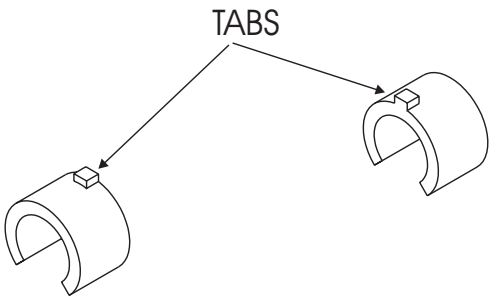

Figure 5-17. Carriage Bushing Installation.

5. Orient the new Bushing as shown in Figure 5-17 so that the metal tab on top of the Bushing goes into the Carriage Assembly first.

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

7. Perform the Reinstall the Carriage Assembly, Carriage Belt, and the Frame Tensioner procedures to reinstall the Carriage Assembly if Carriage was removed.

Reinstalling the Carriage Assembly, Carriage Belt and the Frame Tensioner

1. To install the Belt onto the Carriage 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 5-12.

2. Slide the Carriage Belt between the right post and the middle post and guide it down into the Belt Clamp. Then slide the Carriage Belt between the left post and the middle post and finish placing the Carriage Belt into the Belt Clamp.

3. Check the position of the Carriage Belt to make sure it matches Figure 5-12.

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 Carriage 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 Carriage PWA. Guide the belt while sliding the Carriage Assembly from left to right on the Slide Shaft.

6. Move the Carriage Assembly to the left end of the Slide Shaft and align the left bushing on the Carriage Assembly with the left end of the Slide Shaft.

7. Insert the Strain Relief (with Trailing Cable) onto the Carriage Assembly by sliding it onto the Strain Relief Support until it snaps firmly into place. See Figure 5-10.

8. Place the Trailing Cable into the J6 connector lock on the Carriage PWA. 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 Carriage Assembly.

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

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

12. Holding the Carriage 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 5-11.

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 Y-Arm Assembly.

16. Fit the notch in the front end of the Frame Tensioner over the notch in the front of the Y-Arm Assembly.

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

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

Removing the Trailing Cable

1. Remove the Top Cover.

2. Remove the Trailing Cable Cover.

3. Remove the Right Cover Assembly.

4. Disconnect the Trailing Cable connector at the J6 location on the MPWA. Use the thumb and forefinger to pull forward on the connector lock and remove the Trailing Cable from the connector.

5. With a flathead screwdriver, press the Electronics Cover tab located in the upper slot on the left side of the Carriage Assembly. See Figure 5-9. Lift up on the front left side of the Carriage Cover until it comes part way off of the Carriage Assembly. Then lift up on the front right side of the Carriage Cover and move the Carriage Cover slightly to the left so that the back of it clears the Back Support Bracket.

6. Lift up on the connector lock to unlock the Trailing Cable connector (J6) on the Carriage PWA and remove the end of the Trailing Cable.

7. Remove the Trailing Cable and Strain Relief from the Carriage Assembly by releasing the latch on the left lower side of the Strain Relief and lifting it off of the Carriage Assembly. See Figure 5-10.

8. Pull the Trailing Cable away from the double-sided tape on the Stabilizer Bracket. Remove the Trailing Cable from the plotter unit.

Reinstalling the Trailing Cable

1. Apply two new pieces of double sided tape to the Stabilizer Bracket. Ensure that the tape is in the same location as the original tape was. Do not remove the top protective cover on the tapes yet.
2. Place the Trailing Cable on the Stabilizer Bracket.
3. Route the right end of the Trailing Cable through the Right Side Plate and connect the Trailing Cable connector at the J6 location on the MPWA. Be sure to slide both sides of the connector lock shut at the same time.
4. Insert the Trailing Cable into the Strain Relief Assembly. Insert the Strain Relief (with Trailing Cable) onto the Carriage Assembly by sliding it onto the Strain Relief Support until it snaps firmly into place.
5. Connect the Trailing Cable to the J6 connector on the Carriage PWA. Slide both sides of the connector lock shut at the same time.
6. Press the Trailing Cable down onto the double-sided tape on the Carriage PWA.
7. Move the Carriage Assembly to the very left end of the Slide Shaft.
8. Remove the top protective cover on the 2" double-sided tape on the right end of the Stabilizer Bracket and press the right end of the Trailing Cable onto the tape.
9. With the Carriage Assembly still at the very left end of the Slide Shaft and with the Trailing Cable still in line remove the top protective cover on the 2" double-sided tape in the center of the Trailing Cable and press the Trailing Cable onto the tape.
10. Slide the Carriage Assembly back and forth several times to make sure that the Trailing Cable does not catch on anything and to make sure that the Carriage Assembly will travel the full length of the Slide Shaft.
11. Reinstall the Electronics Cover and Right Cover Assembly. Also reinstall the Trailing Cable Cover and Top Cover.

Removing the Power Supply and ON/OFF Switch

NOTE

To gain access to all the screws that secure the Power Supply to the Platen the left leg must be loosened and turned or removed entirely from the Platen. To the left leg assembly first remove the media basket. Then remove three screws and loosen the last screw (see Figure 5-18) that connects the left leg assembly to the platen. While holding the plotter up, turn the leg assembly in a clockwise direction to reveal the other two Power Supply Assembly screws. Once the screws are revealed, tighten the leg assembly to support the plotter.

1. Remove the Top Cover and the Left Cover.
2. Using a #2 Phillips screwdriver, remove the 4 screws on the bottom of the Platen which hold the Power Supply in place.
3. Pull the Power Supply part way out of the Platen, grasp the connector on the black and white ON/OFF Switch Cable, and remove the cable from the Power Supply.
4. Pull the Power Supply the rest of the way out of the Platen, grasp the connector on the Power Cable coming from the MPWA, and remove the Power Cable from the Power Supply.
5. If the ON/OFF Switch needs to be replaced, push the top of the switch out of the back of the Platen, pry up on the bottom of the switch with a screwdriver (from inside the Platen), and push the switch out of the Platen. Remove the ground wire from the Platen.

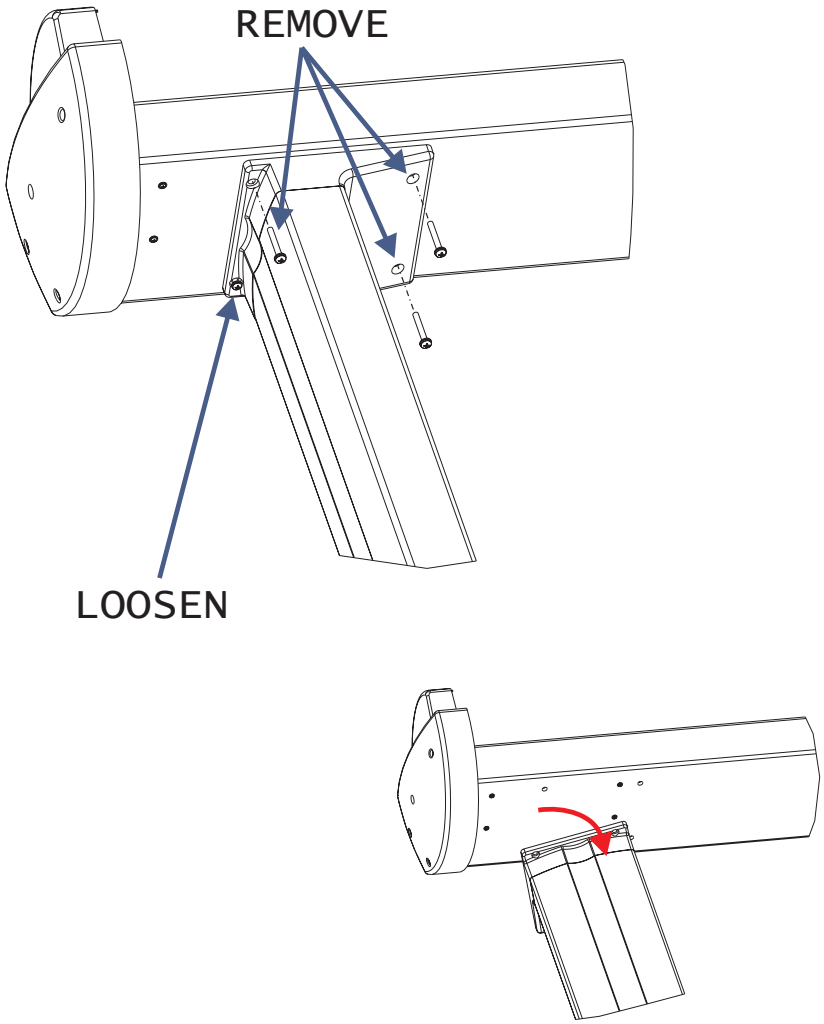

Figure 5-18. Revealing the Power Supply Screws.

Reinstalling the Power Supply and ON/OFF Switch

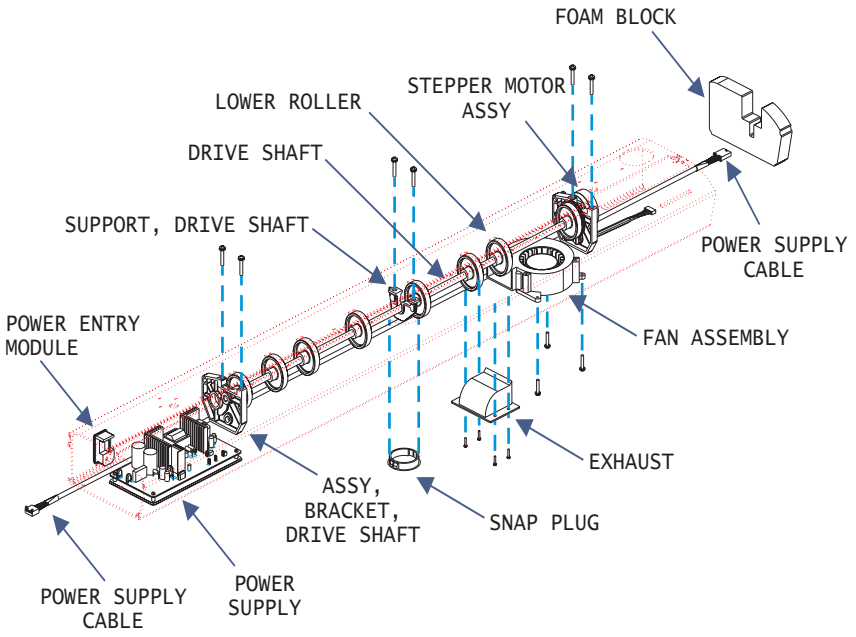

Figure 5-19. Inner Platen Parts.

1. If the ON/OFF Switch was removed, push the new switch into place. Position it so the switch is on top and the prongs for the Power Cord are on the bottom. Connect the ground wire to the inside of the Platen. Torque to 6 in-lbs.

NOTE

The ground wire from the power entry module must be on the bottom and make good contact with the platen surface.

2. Connect the Power Cable coming from the MPWA to the connector on the Power Supply. Make sure that the ground from the Power Cable is still connected to the inside of the Platen, at the same location as the ground from the ON/OFF Switch.
3. Insert the Power Supply part way into the Platen.
4. Connect the Power Switch cable to the connector on the Power Supply.
5. Position the Power Supply in place inside the Platen and insert the screws through the bottom of the Platen and into the Power Supply. Use a #2 Phillips screwdriver to torque the screws to 6 in-lbs. (Do not overtighten them).
6. Reinstall the Left Cover and the Top Cover.

Removing the Stabilizer Bracket and Encoder Strip

1. Remove the Cartridges and the Top Cover.
2. Remove the Left Cover.
3. Remove the Trailing Cable Cover, Frame Tensioner and Carriage Assembly.
4. Remove the Trailing Cable from the tapes on the Stabilizer Bracket. Discard the Trailing Cable, it cannot be reused.

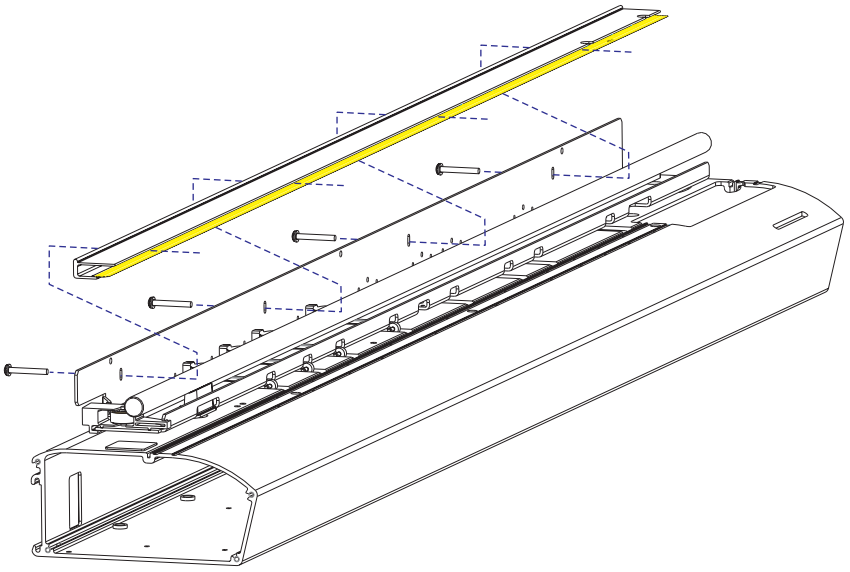

Figure 5-20. Stabilizer Bracket Removal.

5. Use a 7/64 Hex Nut Driver to remove the three screws from the back of the Y-Arm which hold the Stabilizer Bracket on the Y-Arm and remove the Stabilizer Bracket. See Figure 5-20.

Reinstalling the Stabilizer Bracket and Encoder Strip

The new Stabilizer Bracket will already have the new Encoder Strip as well as new tapes for the Trailing Cable attached to it. Refer to Figure 5-20 during this procedure.

To reinstall the Stabilizer Bracket:

1. Attach the Stabilizer Bracket to the Y-Arm with the three screws which go through the back of the Y-Arm into the Stabilizer Bracket. It is easier to do this if you first attach one end, then the other end, and then the center. Put the screws down to the bottom of the slot

in the Y-Arm and use the 7/64 Hex Nut Driver to tighten them. (The exact positioning of the screws in the slot will be done later during the Carriage Height Adjustment in Chapter 3.)

2. Reinstall the Carriage Assembly. (The Trailing Cable Cover will be reattached later.)
3. Slide the Carriage Assembly back and forth a few times to make sure it moves easily. Make certain that it travels easily all the way to the left end of the Slide Shaft so that the Cutter activates.
4. Once you have checked the movement of the Carriage Assembly, follow the procedures for attaching the Trailing Cable to the tapes on the Stabilizer Bracket.
5. Reattach the Trailing Cable Cover.
6. Reattach the Left Cover.
7. Reinstall the Cartridges and the Top Cover.
8. Perform the Carriage Height Adjustment procedure located in Chapter 3.

Disassembly of Plotter Before Removing the Inner Platen Parts

Refer to previous sections of this chapter and Figure 5-21 as necessary during this procedure. To obtain access to the Inner Platen Parts:

1. Remove the Top Cover and the Left Cover.
2. Remove the Right Cover Assembly.
3. Disconnect all the connectors from the MPWA.
4. Remove the MPWA.
5. Remove the Right Side Plate.
6. Remove the Display Assembly.

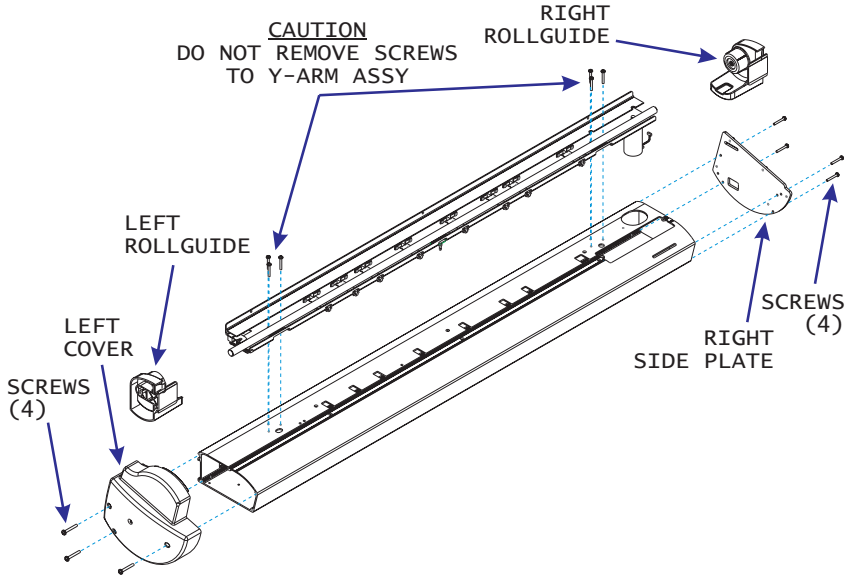

Figure 5-21. Disassembly of Plotter Prior to Removing the Inner Platen Parts.

7. Remove the Left and Right Rollguides from the back of the Platen.
8. Remove the Trailing Cable Cover.
9. Remove the Power Supply.
10. Remove the Servo Motor.
11. Clean and remove the entire Service Station.

Removing the Inner Platen Parts

Refer to Figure 5-20 and Figure 5-22 during this procedure.

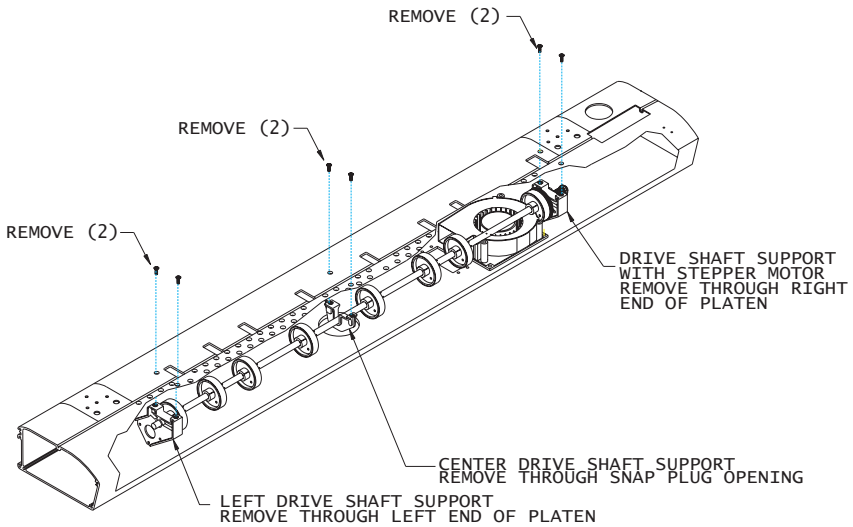

Figure 5-22. Removal of Lower Drive Shaft Screws.

1. Lay Platen on its back.
2. Use a flat screwdriver to pry out the Snap Plug on the bottom side of the Platen.
3. Using a #1 6" or 8" Phillips screwdriver, remove the four screws on the bottom of the Platen which hold the Exhaust in place.
4. Insert your left hand into the opening for the Exhaust and hold the Fan Assembly in place while using a #2 6" or 8" Phillips screwdriver to remove the 3 flat-head screws on the bottom of the Platen which hold the Fan Assembly in place. Do not allow the screws to come out at an angle.
5. Lay the Platen on its bottom.

6. Using a #1 6" or 8" Phillips screwdriver, remove the 4 black flat-head screws which hold the left and middle Drive Shaft Supports in place. There are two screws in the center of the Platen, and two screws approximately three inches to the left of the left brass bracket. See Figure 5-22.

7. Remove the left Drive Shaft Support through the left end of the Platen and the middle Drive Shaft Support through the Snap Plug opening.

NOTE

Be very careful when removing the Foam Block so that it does not tear. If it does tear, however, it must be replaced with a new one so that the Inner Platen has sufficient vacuum.

8. Remove the Foam Block which is beside the Stepper Motor Assembly by putting your index finger into the opening in the top of the Foam Block and pulling it towards you. See Figure 5-23.

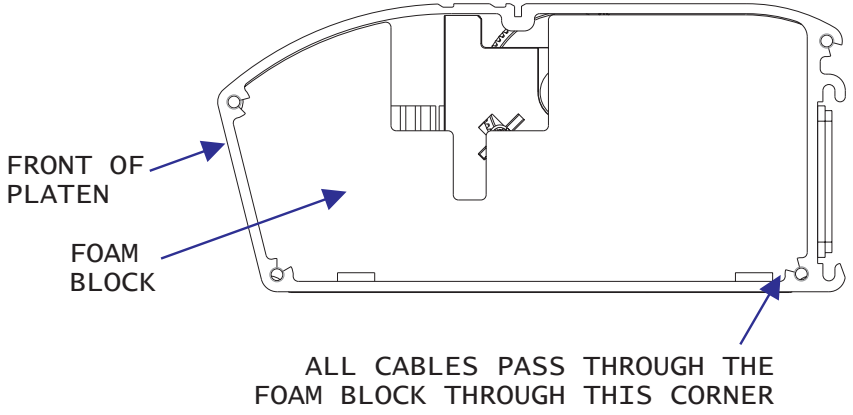

Figure 5-23. Removing the Foam Block.

9. Using a #1 6" or 8" Phillips screwdriver, **loosen but do not remove** the 2 black flat-head screws which hold the Stepper Motor Assembly. Hold the Stepper Motor Assembly with your right hand so it does not drop suddenly and use your left hand to finish unscrewing the two screws and remove them.

10. Reach into the Fan opening on the bottom of the Platen and use your fingertips to hold up the Fan Assembly so that it clears the openings, screws, and cap nuts on the inside of the Platen while simultaneously pulling the Stepper Motor Assembly and Lower Drive Shaft Assembly out of the right end of the Platen.

Removing the Stepper Motor

NOTE

If removing only the Stepper Motor, do not remove the Bowed Washer, Washer and Retaining Ring which are between the end of the Lower Drive Assembly and the Stepper Motor Bracket.

NOTE

Do not remove the 20 Teeth Gear from the Stepper Motor.

NOTE

Do not remove the Oilite Bushing from the Stepper Motor Bracket. (If it should happen to fall out, press it back in as far as it will go.)

NOTE

Do not clean the Oilite Bushing with alcohol. Wipe it with a clean, dry cloth only.

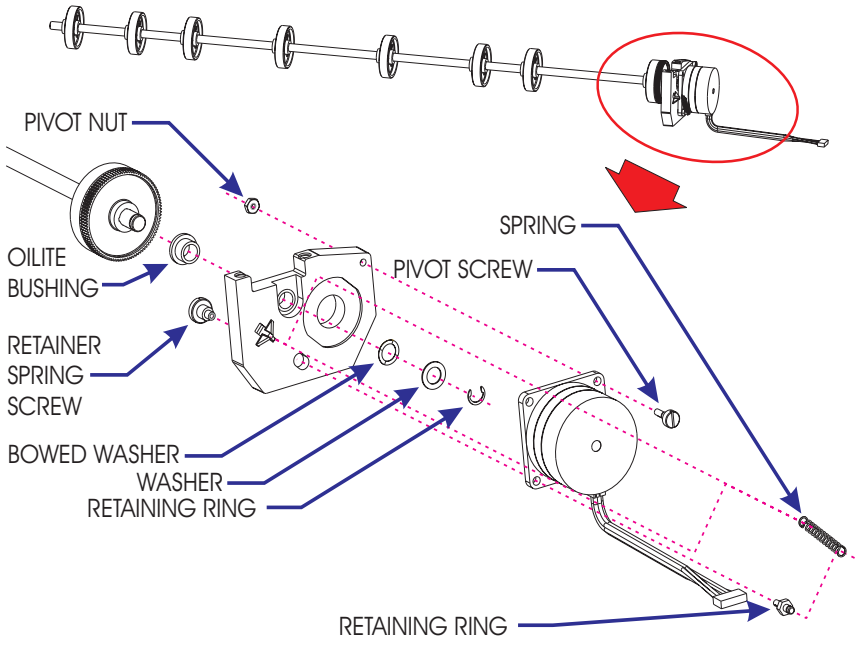

Figure 5-24. Lower Drive Assembly and Stepper Motor Assembly.

1. Once the Inner Platen Parts have been removed, remove the Stepper Motor from the Stepper Motor Bracket by unhooking the Extension Spring from the post on the Stepper Motor Bracket. See Figure 5-24.

2. Unscrew the Retainer Spring Post from the Spring Post and remove them from the Stepper Motor Bracket and Stepper Motor Assembly.

3. Unscrew the Pivot Screw and Pivot Nut and remove them from the Stepper Motor Bracket and Stepper Motor Assembly.

4. Remove the Stepper Motor from the end of the Lower Drive Assembly.

5. If you are replacing the Stepper Motor Bracket, you will need to remove the Retaining Ring, Washer, and Bowed Washer which are between the end of the Lower Drive Assembly and the Stepper Motor Bracket.

Reinstalling the Stepper Motor

1. If you are replacing the Stepper Motor, put the Stepper Motor Bracket onto the Lower Drive Assembly and then put the Bowed Washer, the Washer, and the Retaining Ring on over the end of the Lower Drive Assembly. Make sure that the Retaining Ring snaps into the groove in the end of the Lower Drive Assembly.
2. Gently place the Stepper Motor Assembly onto the Stepper Motor Bracket. Be careful not to damage the gears. Make sure that the gears are meshing with each other.
3. Use the Pivot Screw and Pivot Nut to secure the Stepper Motor Assembly to the Stepper Motor Bracket. Torque to 6 in-lb.
4. Hook the Extension Spring onto the Spring Post.
5. Place the Spring Post through the Stepper Motor Assembly and the Stepper Motor Bracket and secure it with the Retainer Spring Post. Torque to 6 in-lb.
6. Hook the Extension Spring onto the post on the Stepper Motor Bracket.
7. Complete the reinstallation of the Inner Platen Parts.

Reinstalling the Inner Platen Parts

Refer as needed to Figure 5-20, Figure 5-22 and Figure 5-23 during this procedure.

1. Insert the Lower Drive Shaft Assembly and Stepper Motor Assembly part way into the right end of the Platen.
2. Place the Fan Assembly under the Lower Drive Shaft beside the right Lower Drive Gear. Make sure that the Fan Assembly wires face the right end of the Platen and the opening in the Fan Assembly faces the left end of the Platen.

3. Lay the Stepper Motor Assembly on the palm of your right hand and use your fingertips to hold up the Fan Assembly as you push the Lower Drive Shaft into the Platen. While inserting, you must lift the Fan Assembly over the cap nuts on the inside of the bottom of the Platen and make sure you do not strike the Lower Rollers or the Gear on the Lower Drive Shaft against the screws, cap nuts, or openings in the Platen.

4. Align the right Lower Drive Shaft Support with the screw holes and insert the screws. Using a #2 6" or 8" Phillips screwdriver, tighten them slightly.

5. Insert the middle Lower Drive Shaft Support through the Snap Plug opening (see Figure 5-22), align it with the screw holes, and insert the screws. Using a #2 6" or 8" Phillips screwdriver, tighten them slightly.

6. Insert the left Lower Drive Shaft Support in the left end of the Platen so that the shaft goes through the brass bushing in the support. The support should be oriented in the same manner as the support which is by the Stepper Motor. See Figure 5-22. Align it with the screw holes, and insert the screws. Using a #2 6" or 8" Phillips screwdriver, tighten them slightly.

7. Torque all the screws in the supports to 6 in-lbs.

8. Insert the Foam Block. Make sure that the Power Supply Cable is in the opening in the back of the Foam Block. Also make sure that the Stepper Motor Assembly and Fan Assembly cables are also at the back corner of the Foam Block. See Figure 5-23. Push the Foam Block in until it is flush against the Stepper Motor Assembly. Make sure it is not tilted at an angle.

9. Turn the Platen onto its back.

10. Reach through the opening for the Fan Assembly with your left hand, align the opening in the Fan Assembly with the right edge of the opening in the Platen, and align the three screw holes. If necessary, push the Power Supply Cable towards the back edge of the Platen so that it is out of the way of the Fan Assembly.

11. Hold the Fan in place with your left hand and insert the screws. Make sure that the screws go in straight. Using a #2 6" or 8" Phillips screwdriver, torque them to 15 in-lbs. Do not overtighten or the threads on the screw holes will strip.

12. Reinstall the Exhaust on the outside of the bottom of the Platen. Using a #2 6" or 8" Phillips screwdriver, torque to 8 in-lbs.

13. Reinsert the Snap Plug in the bottom of the Platen and turn the Platen onto its bottom side.

Reassembly of Plotter After Reinstalling the Inner Platen Parts

1. Reinstall the Servo Motor.

2. Reinstall the Display Assembly.

3. Reinstall the Service Station Assembly.

4. Make sure the Ground from the Power Cable is still connected to the inside of the Platen, at the same location as the ON/OFF Switch Ground. Reinstall the Power Supply.

5. Reinstall the Left and Right Rollguides.

6. Route all the wires from the Servo Motor Assembly, Stepper Motor Assembly, Fan Assembly, and Power Supply through the bottom opening on the Right Side Plate. See Figure 5-23. Secure the Right Side Plate to the Platen with four screws. See Figure 5-3.

8. Route the Trailing Cable (with the silver fingers facing up) through the top slot in the Right Side Plate.

9. Secure the MPWA to the Right Side Plate using three screws. Make sure the Trailing Cable is not pinched between the stand off and the MPWA.

10. Bring the Trailing Cable around the bottom of the MPWA and connect it at the J6 connector. **Make sure the silver fingers face down when the Trailing Cable is inserted into the connector.**

11. Route the Display Cable through the top left edge in the Right Side Plate. Bring the Display Cable down around the flat edge of the MPWA. Connect the Display Cable at the J3 connector on the MPWA. **The silver fingers must face the back side of the plotter when the Display Cable is inserted into the connector.**

12. Reconnect the Servo Motor wire (Red and Blue) to the J7 connector, the Stepper Motor wire to the J10 connector, and the Fan wire (Red and Black) to the J5 connector. Reference Figure 5-2.

13. Reinstall the Trailing Cable Cover.

14. Reinstall the Right Cover Assembly. Make sure that none of the harnesses or cables are pinched between the cover assembly and the Right Side Plate.

15. Reinstall the Left Cover.

16. Reinstall the Top Cover.

The entire plotter is now reassembled.

Removing the Upper Pinch Roller Supports

1. Remove the Top Cover and Left Cover.

2. Use the #1 Phillips Screwdriver to remove the 3 screws which secure the Trailing Cable Cover to the back of the Y-Bracket and remove the Trailing Cable Cover.

3. Depress the back of the Frame Tensioner (see Figure 5-6) and slip the Carriage Belt off the Servo Motor Pulley. (The Carriage Belt only needs to be loose during this procedure; it does not need to be removed. Lift both sides of the Carriage Belt out of the Y-Bracket and loop them over the front of the Slide Shaft.)

4. Use the #1 Phillips Screwdriver to remove the screws which hold the far left Upper Pinch Roller Support on the Y-Bracket. (The screws are located on the back of the Y-Bracket. See Figure 5-25.) **MAKE SURE YOU ARE LOOSENING THE CORRECT SCREWS AND NOT THE ONES WHICH HOLD ON THE STABILIZER BRACKET!**

5. Using your fingers, pull the Upper Pinch Roller Support forward. Thie will seperate it from the Pinch Roller Spacer. Move the Pinch Roller Spacer to the side.

6. Push the Upper Pinch Roller Support towards the back of the unit and turn it 90 degrees and carefully lift it away from the Y-Arm assembly. Guide the lower tab of the Upper Pinch Roller Support up past the front of the Stabilizer Bracket. Make sure the Upper Pinch Roller Support does not catch on the front edge of the Trailing Cable and that it does not damage the Slide Shaft or the encoder strip.

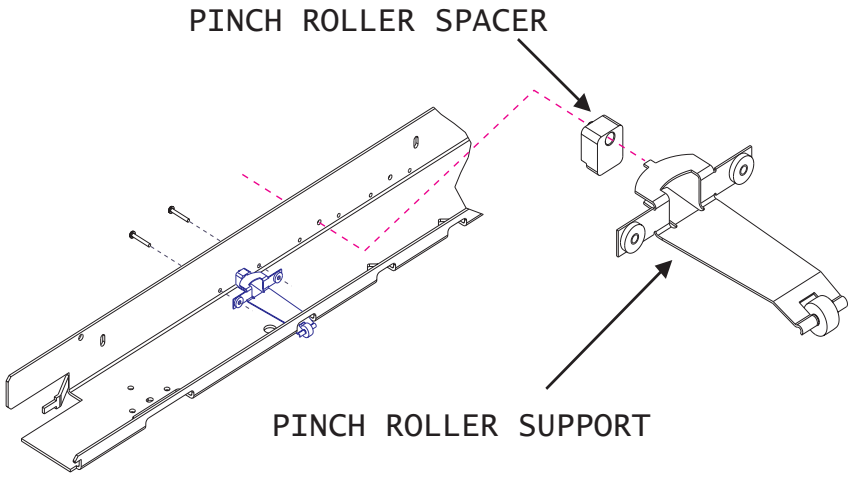

Figure 5-25. Removing the Upper Pinch Roller Support.

7. Working from the far left Upper Pinch Roller Support to the far right Upper Pinch Roller Support, follow Steps 4 through 7 for each of the remaining Upper Pinch Roller Supports. As you do so, be sure to keep the Carriage Belt looped over the front of the Slide Shaft so it is not damaged. **ALSO, MAKE SURE YOU ARE LOOSENING THE CORRECT SCREWS AND NOT THE ONES WHICH HOLD ON THE STABILIZER BRACKET!**

Installing the Upper Roller Supports

Make sure that the Carriage Belt is kept looped over the front of the Slide Shaft while installing the new Upper Pinch Roller Supports, as follows:

1. Place the roller end of an Upper Pinch Roller Support behind the Slide Shaft (between the back of the Slide Shaft and the front of the Stabilizer Bracket) and push it forward as far as possible through the Upper Pinch Roller Support opening in the front of the Y-Bracket. See Figure 5-25.
2. Insert and place the Pinch Roller Spacer into position. Ensure that the tab on the back of the spacer is inserted into the hole in the Y-Bracket.
3. Move the Upper Pinch Roller Support into place. Make sure the point on top back of the Upper Pinch Roller Support is in its hole in the Pinch Roller Spacer. See Figure 5-25.
4. Keep pressure on the front of the Upper Pinch Roller Support while putting in the screws. Make sure the Upper Pinch Roller Support is centered in its opening. Tighten the screws until snug (no more than 3.0 In.-Lbs. $\pm$ 0.5 if using a torque screwdriver). **MAKE SURE YOU ARE TIGHTENING THE CORRECT SCREWS AND NOT THE ONES WHICH HOLD ON THE STABILIZER BRACKET!**
5. Repeat Steps 1 through 4 for the rest of the Upper Pinch Roller Supports.
6. Put the Carriage Belt back into place in the Y-Bracket by installing the Frame Tensioner Assembly.

NOTE

Make sure that the Carriage Belt is not twisted. One way to check this is by standing at the left end of the plotter and looking down the length of the inside of the Y-Bracket.

You can also check for twisting by moving the Carriage Assembly as far as possible to the left end of the Slide Shaft.

Once you are certain there is no twisting of the Carriage Belt, slide the Carriage back and forth a few times to make sure that it slides smoothly.

7. Reattach the Trailing Cable Cover to the Y-Bracket.
8. Reattach the Left Cover.
9. Because you have replaced the Upper Pinch Roller Supports, it is necessary to perform the following portions of Chapter 3:

   - "Paper Skew Setup"
   - "Paper Skew Adjustment"

   Because the Carriage Belt was loosened during this procedure, you will need to verify the Deadband Adjustment by performing the following portions of Chapter 3:

   - "Deadband Calibration"

10. Replace the Top Cover after you have finished Step 9.

Parts List 6

This chapter lists the items and their associated numbers for the parts and assemblies of the **CadJet T-200** 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 assemblies may be ordered through your local authorized dealer or ***ENCAD, Inc.'s*** Technical Support and Service department.

FIGURE	ITEM	PART NAME	PART #
6-1	1	ROLLGUIDE, RIGHT, ASSY	206828-5
6-1	2	ROLLGUIDE, LEFT, ASSY	204969-6
6-1	3	COVER ASSY, LEFT	217512-00
6-1	4	POWER ENTRY ASSY	207508
6-1	5	POWER SUPPLY ASSY, 150W	218759-00
6-1	6	CABLE, POWER SUPPLY TO MPWA	218762-00
		HARDWARE KIT	205188
		ASSY, HEIGHT GAGE KIT	209996-1
		LOOPBACK TEST CABLE	205462

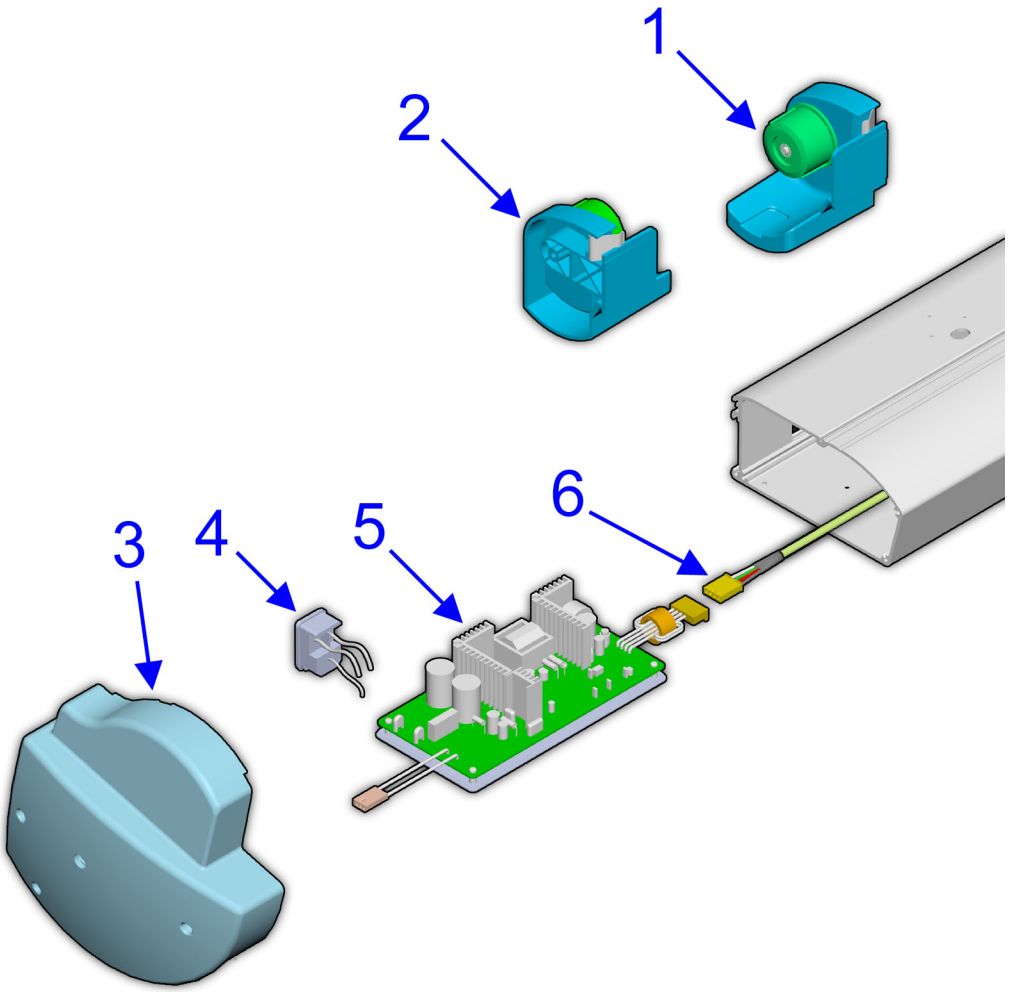

Figure 6-1. Left Side Parts Breakdown.

FIGURE	ITEM	PART NAME	PART #
6-2	1	SPRING, COMPESSION	209052
6-2	2	RETRACTING STOP, ASSEMBLY	204246-1
6-2	3	COVER ASSY, TOP	217860-00
6-2	4	BELT	205678
6-2	5	SPRING, COMPRESSION (IDLER)	203999
6-2	6	IDLER ASSEMBLY	203405-1
6-2	7	FRAME, TENSIONER	203870-1
6-2	8	TRAILING CABLE ASSY	209269-01
6-2	9	PINCH ROLLER ASSEMBLY	204773
6-2	10	STABILIZER ASSY WITH ENCODER STRIP	204550
6-2	11	SLIDE SHAFT	217506-01
6-2	12	KNIFE DAMPER ASSY	202000
6-2	13	PLATEN ASSY	214495-02

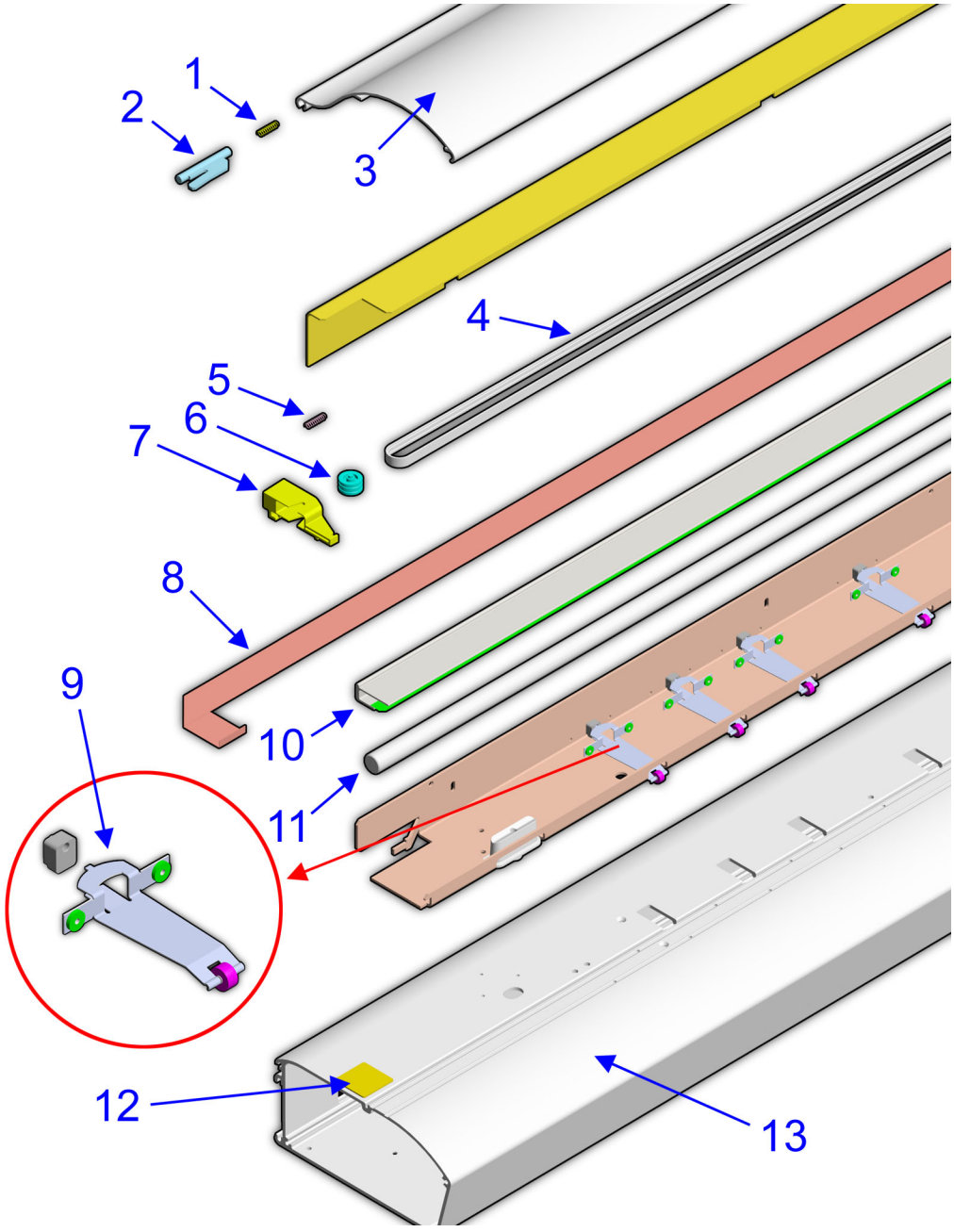

Figure 6-2. Platen and Above Parts Breakdown.

FIGURE	ITEM	PART NAME	PART #
6-3	1	PRINT SERVER (OPTIONAL)	218239-00
6-3	2	SIDE PLATE, RIGHT	217516-00
6-3	3	MAIN PCB, T-200, SERVICE	2119668-025
6-3	4	DRAM DIMM, 32M	212456-00
6-3	5	COVER ASSEMBLY, WITH KEYPAD, RIGHT	217510-00
6-3	6	DISPLAY, HOUSING, ASSY	217543-00

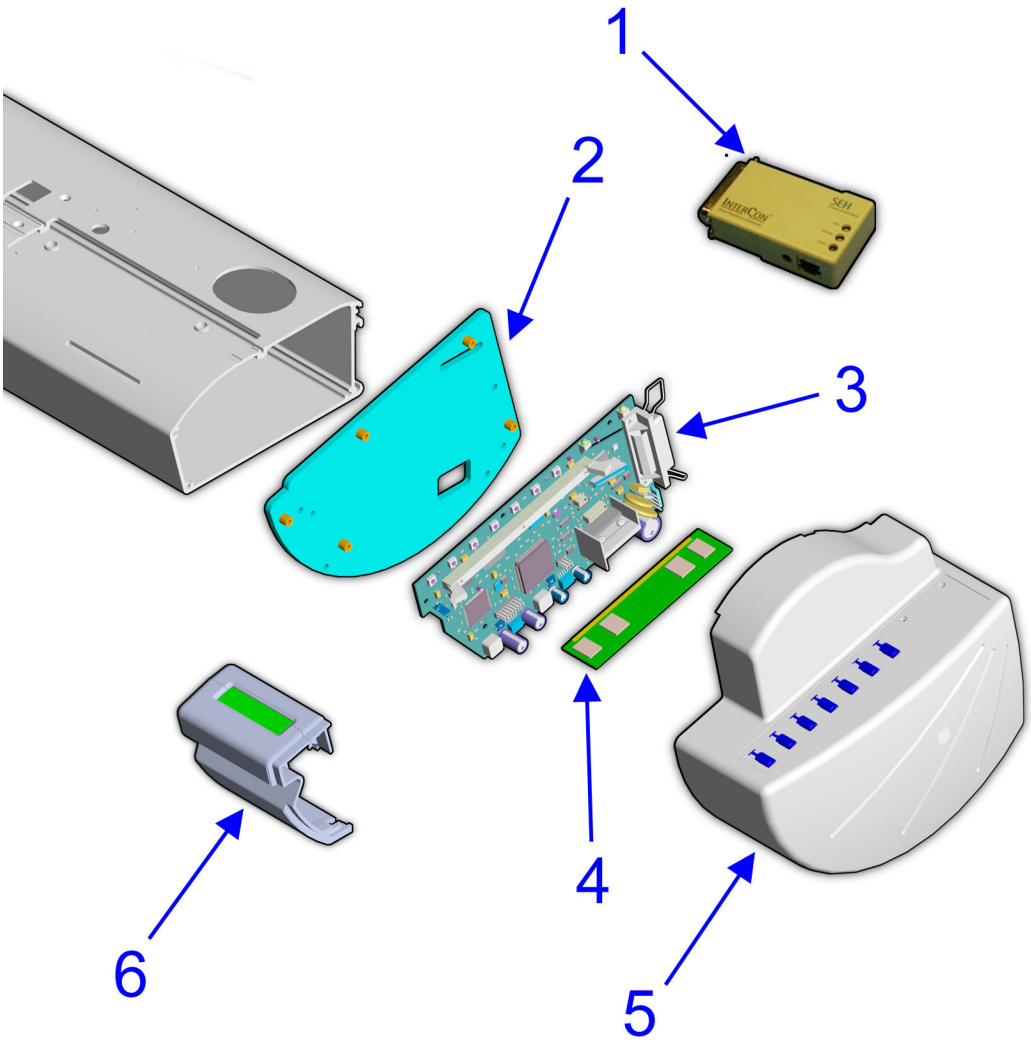

Figure 6-3. Right Side Parts Breakdown.

FIGURE	ITEM	PART NAME	PART #
6-4	1	MOTOR ASSY, SERVO, W/FERRITE	213674-04
6-4	2	BLOCK, RIGHT FOAM	217568-00
6-4	3	MOTOR ASSY, STEPPER, W/FERRITE AND GEAR	210848-1
6-4	4	BRACKET ASSY, DRIVE SHAFT, RIGHT	204916-1
6-4	5	LOWER DRIVE E, ASSY, COMPLETE WITH STEPPER MOTOR AND RIGHT BRACKET	204845-1
6-4	6	BRACKET ASSY, DRIVE SHAFT, LEFT	204916
6-4	7	SUPPORT, DRIVE SHAFT	203556-2
6-4	8	FAN ASSEMBLY, VACUUM	210139
6-4	9	EXHAUST, GRILL	204976
6-4	10	PLUG, PLATEN	203742

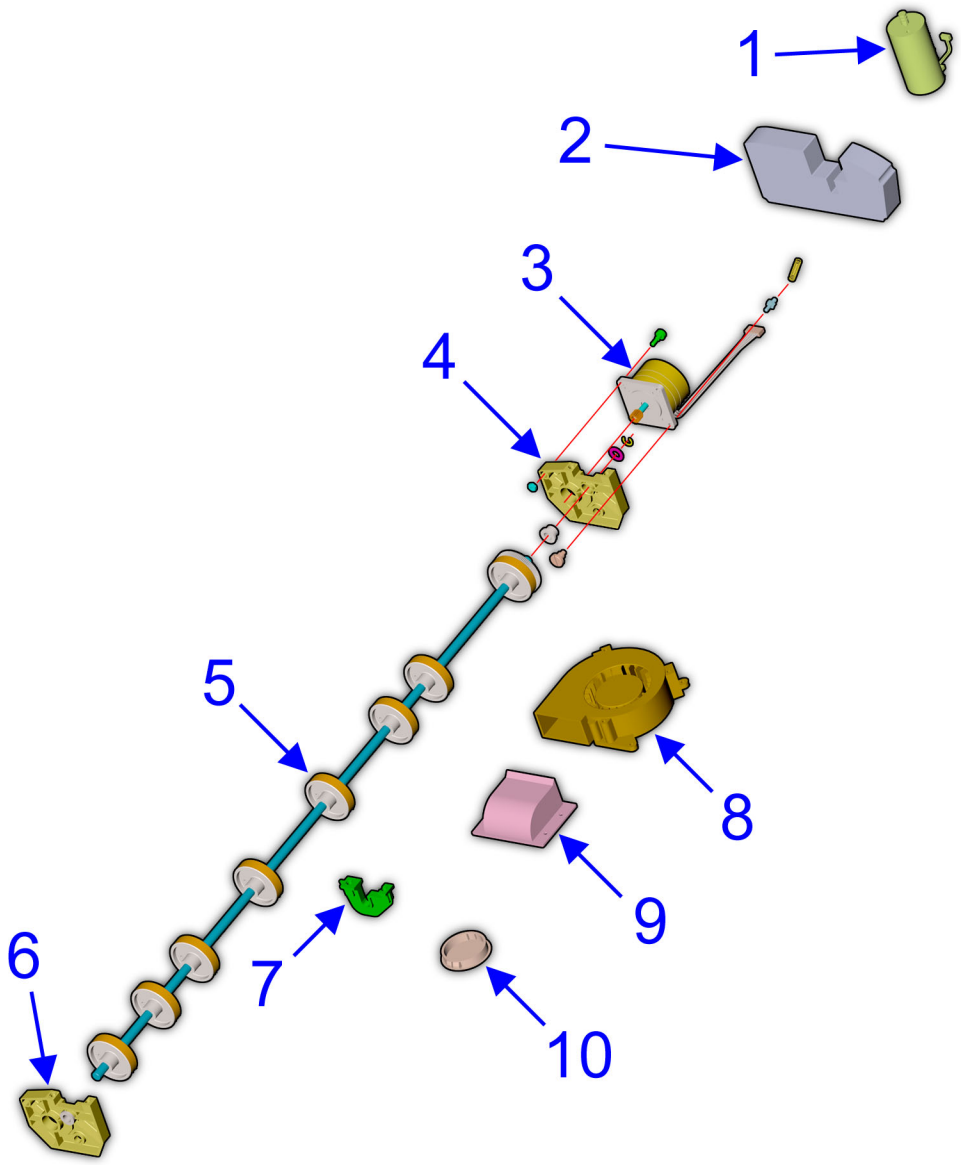

Figure 6-4. Inner Platen Parts Breakdown.

FIGURE	ITEM	PART NAME	PART #
6-5	1	COVER, CARRIER ELECTRONICS	215111-02
6-5	2	CARRIAGE PWA	212151-05
6-5	3	ENCODER SENSOR W/FLEX	209578-101
6-5	4	STRAIN RELIEF	215659-00
6-5	5	PEN CARRIER, 208, PARTIAL	210004
6-5	6	CARRIAGE BUSHING SET (2)	209568
6-5	7	PAD, BUSHING	212426-00
6-5	8	SPRING PAD, 208 JET	207572
6-5	9	FERRITE, FLEX CABLE	210809
6-5	10	PWB, FLEX, QUAD	215174-00
6-5	11	PAPER SENSOR W/FLEX	207180
		PEN CARRIER ASSY, COMPLETE ASSEMBLY	217619-00

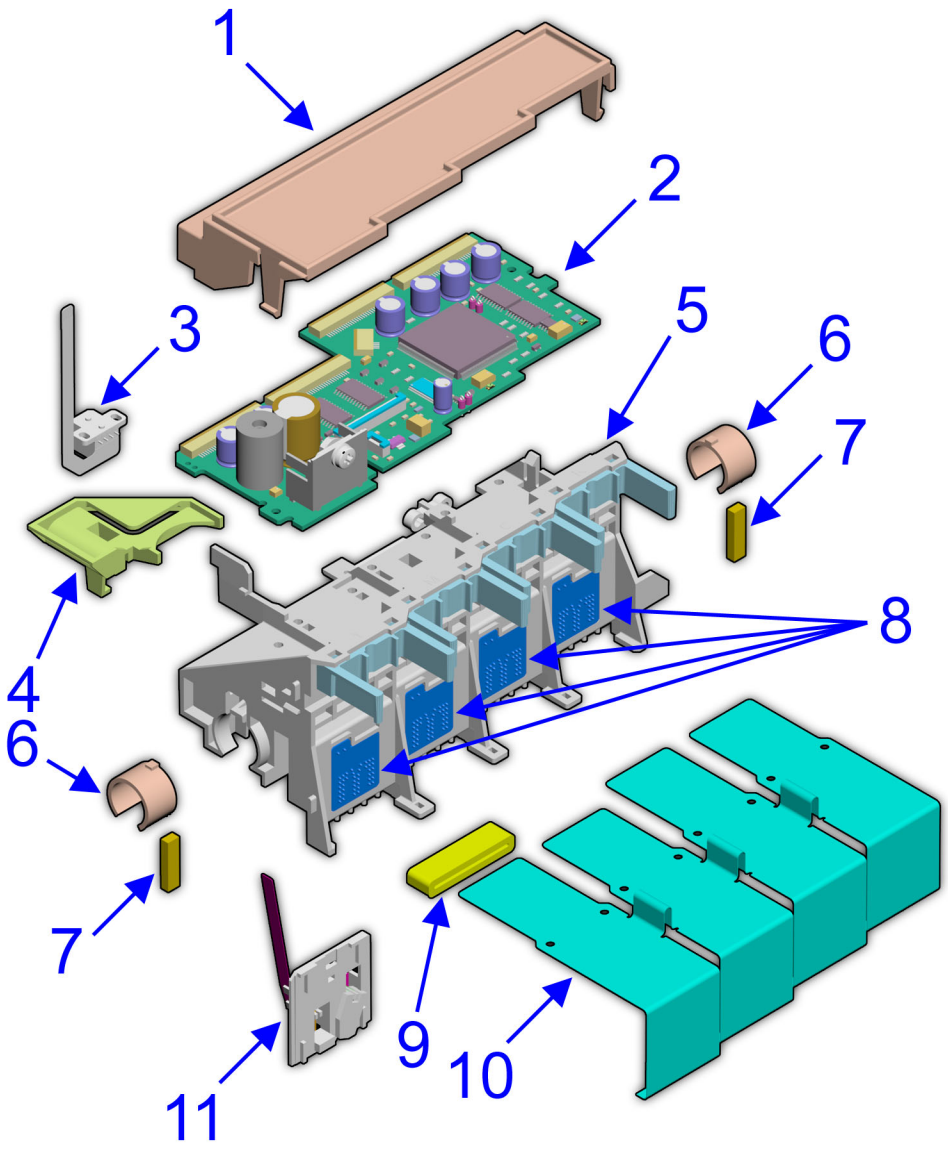

Figure 6-5. Carriage Assembly Parts Breakdown.

FIGURE	ITEM	PART NAME	PART #
6-6	1	SEAL, 104/208	206502
6-6	2	WIPER	209276

SERVICE STATION,
COMPLETE ASSEMBLY 207611-03

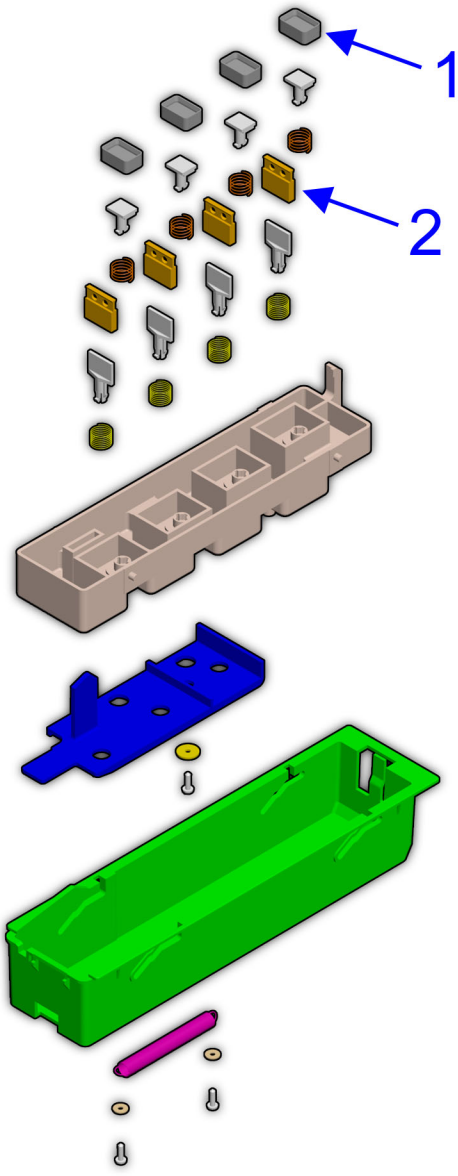

Figure 6-6. Service Station Assembly Parts Breakdown.