DisplayMaker Legacy X-12

User Manual

Part Number 0706149 Rev C

Caution **SEVERE DAMAGE TO THE PRINTHEAD CARRIAGE CIRCUIT BOARD AND PRINT-HEAD WILL OCCUR IF A PRINTHEAD IS REMOVED WHILE POWER IS SUPPLIED TO THE PRINTHEAD.** Repairing this damage will require a service call and replacement of the printhead carriage circuit board and printhead at customer expense.

To avoid electrical damage to the printhead carriage circuit board and printhead:

Follow the instructions in this manual to replace printheads.

DO NOT remove any printhead without first pressing the **Carriage** key on the Front Page screen or selecting **Prime Pens** from the menu. Pressing the Carriage key will move the printhead carriage to the center of the platen; selecting Prime Pens will move the carriage out of the service station to the manual prime position. Pressing either key will cut power to the printheads, allowing you to safely remove and replace printheads.

DO NOT disable the "cover open" switches on the top cover or prime access door. When the printer detects that either of these doors is open, it cuts power to the printheads, making it safe to remove and replace printheads. If these switches are disabled, the printer can no longer detect whether the doors are open, making electrical damage more likely.

Revision Log

The following is a list of major changes and additions that have been made to this manual since it was first released.

See the accompanying *Release Notes* for specific changes to the software and hardware between manual updates.

Release Date	Description
Nov 2002	Manual first released.
July 2003	Manual revised to version 1.20 of the embedded software.

Regulatory Statements

FCC-A   This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

This equipment must be installed exactly as instructed in this manual using only the components supplied. If a supplied component ever needs to be replaced, it must be replaced with the same part supplied by the manufacturer. It is your responsibility to follow these instructions in order to maintain compliance with the FCC regulations. Changes or modifications not expressly approved by ColorSpan Corporation could void your authority to operate this equipment. In particular, this device must be operated with shielded cables to maintain FCC compliance.

A booklet is available from the Federal Communications Commission entitled, *How to Identify and Resolve Radio-TV Interference Problems* (#004-000-00345-4). Write to the U.S. Government Printing Office, Washington, DC 20402.

DOC (Canada)   This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Normes de Sècuritè (Canada)

Le présent appariel numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans le réglements sur le brouillage radioélectrique édictés par le Ministére des Communications du Canada.

Telecommunications Network Statement

The ColorSpan VideoNet port on this device is not intended to be connected to a public telecommunications network. Connection of this device to a public telecommunications network in a European Community Member State will be in violation of national law implementing Directive 91/263/EEC on the approximation of laws of the Member States concerning telecommunication terminal equipment, including the mutual recognition of their conformity.

Der VideoNet port ist nicht dafür vorgesehen an ein öffentliches Telefonnetz angeschlossen zu werden. Der Anschluß dieses Gerätes an ein öffentliches Telefonnetz in einem Mitgliedstaat der EU, verstößt gegen nationale Gesetze zur Ausführung der Direktive 91/263/EEC, die sich mit der Annäherung von Gesetzen von Mitgliedstaaten beschäftigt, betreffend Telekommuniktionsanlagen und die gegenseitige Anerkennung ihrer Konformität.

About This Manual

Read this manual to unpack, set up, and use the printer.

◆ **Chapter 1** shows you how to unpack and assemble the printer, and introduces you to its main features.

◆ **Chapter 2** shows you how to use the control panel.

◆ **Chapter 3** shows you how to install ink and media.

◆ **Chapter 4** shows you how to calibrate the printer.

◆ **Chapter 5** shows you how to maintain the printer.

◆ **Appendix A** shows you how to troubleshoot common printing problems.

◆ **Appendix B** lists the printer's technical specifications.

For further information, refer to the following ColorSpan documentation:

◆ *Quick Start Guide* - **START HERE** to set up and install a brand new ColorMark print server, and connect and configure printers to it.

◆ *Site Preparation Guide* - explains how to prepare your site for the printer's arrival and installation.

◆ *Watch Me First* - a multimedia "how-to" guide on CD-ROM (available on VHS cassette from MacDermid ColorSpan Technical Services).

◆ ColorSpan Print Server Documentation - the *System Control User Guide* and *Printing Tools User Guides* shows you how to print and RIP files through the ColorSpan print server. If the printer is connected to a non-ColorSpan print server (RIP), refer to the documentation that accompanies the server.

◆ *Release Notes* and *Update Notes* - late-breaking information, update descriptions, and update instructions.

For further information about all ColorSpan products is also available over the Internet at the ColorSpan World Wide Web site at http://www.colorspan.com.

Conventions

This manual uses the following informational conventions:

	Note	A special technique or information that may help you perform a task or understand a process.

	Hinweis	Ein Hinweis beschreibt eine spezielle technik zur Lösung einer Aufgabe oder enthällt Informationen, die Ihnen eine Prozedur näher erläutert.

	Caution	Alerts you to something that has the potential to cause damage to hardware, software, or data.

	Vorsicht	Dieses Feld weist auf einen Umstand hin, der einen Hardware-oder Software-Schaden oder Datenverlust verursachen könnte.

	WARNING	Alerts you to something that has the potential to cause physical harm to you or others around you.

	WARNUNG	Eine Warnung auf weist auf einen Umstand hin, durch den Ihnen und anderen Personen ein physischer Schaden erwachsen könnte.

Other WARNING symbols used:

Electrical Hazard

Vorsicht steht unter Spannung

Lifting Hazard

Vorsicht beim Anheben

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1 Getting Started

2 Using the Control Panel

3 Installing Ink and Media

4 Calibrating the Printer

5 Maintaining the Printer

A Technical Specifications

B Troubleshooting

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CHAPTER 1

Getting Started

This chapter shows you how to get started using your printer. It includes these topics:

◆ Operating Requirements (page 1-2)

◆ Unpacking and Assembly (page 1-5)

◆ Workflow Overview (page 1-16)

◆ Parts Overview (page 1-17)

◆ Special Features (page 1-21)

Operating Requirements

Choose a location for the printer before you unpack it. Keep the following requirements in mind:

Electrical

◆ See "Specifications" on page A-2 for detailed power requirements.

◆ Use the supplied power cord. Plug it directly into a grounded electrical outlet. Do not lengthen the power cord with an extension cord; the resulting voltage drop could damage the printer.

◆ Make sure the line voltage does not vary more than 10 percent from the voltage marked on the back of the printer. Install a voltage regulator or similar device if the power source is not stable.

◆ Unplug the printer during power failures. Wait for the power to return before plugging it back in.

◆ Connect the print server to a separate electrical circuit from the printer.

Environmental

◆ Make sure the room is well ventilated, with a temperature and relative humidity within specifications (see "Specifications" on page A-2). Optimal printing and drying occurs within these ranges. Printing slows automatically to aid drying in high humidity conditions.

◆ Store media and ink in an area with similar temperature and humidity conditions as the printer.

◆ Locate the printer close enough to the print server (RIP) so that they can be connected with the required cable.

◆ Locate the printer on a flat, level surface.

◆ Locate the printer where its normal operating noise will not disturb quiet work areas.

- DO NOT install the printer near humidifiers, refrigerators, fans, water faucets, heaters or similar equipment.

- DO NOT install the printer in areas where the temperature changes abruptly, such as near air conditioners or in the path of direct sunlight.

- DO NOT expose the printer to flames, dust or solvents.

Refer to Appendix A for detailed specifications.

Important Operating Notes
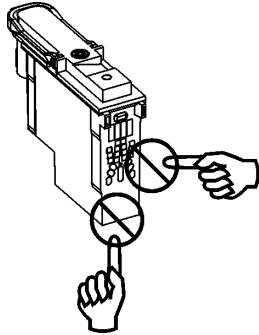
- Wear cotton gloves (provided with each roll of ColorSpan media) when loading media to prevent fingerprints that could show after printing.

- Protect the media at all times from creases and tears, and ensure that the media is cut cleanly. Do not rest or store a media roll on end, or you could cause edge creases that could strike the printheads during printing.

- Always use a lint-free cloth moistened with plain water to clean the printhead.

- DO NOT touch the printhead's ink jet nozzles (the metal plate on the bottom of the printhead) with your fingers. Any contaminants could clog the ink jet nozzles.

- DO NOT touch the electrodes on the back of the ink printhead. This could result in a faulty electrical connection, which would cause jets to misfire.

- DO NOT clean the printhead surfaces with a dry cloth or paper towel.

- DO NOT set heavy objects on the power cord or printer cable; do not bend the cables or force them into contorted positions.

- DO NOT place heavy objects anywhere on the printer.

Safety Warnings

WARNING WITH THE POWER SWITCH IN THE OFF POSITION, POWER MAY STILL BE SUPPLIED TO THE PRINTER COMPONENTS. To completely cut power from the printer, you must unplug the power cords from the power outlets.

WARNUNG WENN DER NETZSCHALTER IN OFF POSITION STEHT, WIRD DEN KOMPONENTEN TROTZDEM STROM ZUGEFÜHRT. Um den Drucker komplett stromfrei zu machen, müssen Sie den Netzstecker ziehen.

WARNING The printer is too heavy to be lifted safely by one person. At least two persons are required to lift the printer.

WARNUNG Der Drucker ist zu schwer für eine Person. Mindestens 2 Personen sind erforderlich um den Drucker anzuheben.

WARNING THE PRINTER ELECTRONICS ASSEMBLY CONTAINS A LITHIUM BATTERY DEVICE. THERE IS A DANGER OF EXPLOSION IF THE BATTERY IS INCORRECTLY REPLACED. The battery must be replaced only by ColorSpan authorized personnel, and must be replaced only with the same or equivalent type. Dispose of this lithium battery device in accordance with local, state (or province), and Federal (or country) solid waste requirements.

WARNUNG DIE ELEKTRONIK DES DRUCKERS ENTHÄLT EINE LITHIUM BATTERIE. ES BESTEHT EXPLOSIONSGEFAHR WENN DIESE UNSACHGEMÄSS AUSGEWECHSELT WIRD. Die Batterie darf nur durch einen ColorSpan authorisierten Techniker ausgewechselt werden und muss mit dem gleichen oder einem gleichwertigen Typ Batterie ersetzt werden. Bitte entsorgen Sie die Lithium Batterie gemäss Ihren Landes- oder Bundesgesetzen.

WARNING Moving parts. Keep fingers away from media path.

WARNUNG Bewegliche Teile, Verletzungsgefahr.

Unpacking and Assembly

This procedure assumes that the printer is in its final location. See the *Site Preparation Guide* for moving and unpacking hints.

	WARNING	The printer is too heavy to be lifted safely by one person. At least two persons are required to lift the printer.

	WARNUNG	Der Drucker ist zu schwer für eine Person. Mindestens 2 Personen sind erforderlich um den Drucker anzuheben.

	Note	If you will be installing a ColorSpan Print Server, set it up now and power it on. This will allow the server to perform its automatic one-time new system check while you unpack and assemble the printer.

Unpacking

1. The printer is delivered to your site packed in one cardboard box, attached to a plywood platform on two wooden pallets. Examine the shipping packaging for shipping damage.

   Report any damage or apparent rough handling immediately to the shipper.

2. Remove the Unpacking and Assembly diagram, Watch Me First CD-ROM, and other documents from the outside of the box, and set them aside for reference.

   You can use the Unpacking and Assembly diagram for reference during the unpacking and assembly process. The Watch Me First CD-ROM contains useful "getting started" information, including a demonstration of unpacking, assembly, and setup.

3. Remove the bands that secure the box to the pallet and open the top flaps of the box.

4. Carefully cut the corners of the outer box and remove it from the pallet.

5. Remove the packing material from the printer.

6. Remove the stand crossbar and media spools, which are packed on top of the printer (item ❸ as shown on the Unpacking and Assembly diagram).

7. Remove the cardboard shipping end caps from each end of the printer.

8. Remove the ink tray boxes, stand legs, and accessory boxes, which are packed together at the bottom of the pallet.

Do not remove the printer module from the pallet at this time. The printer rests on two shipping supports. You will use these supports and two assembly supports to help assemble the printer.

Note Replacement shipping packaging and instructions are available from MacDermid ColorSpan Technical Services (phone: 800-925-0563).

9. Refer to the following list to verify that you received all of the parts and accessories.

Notify ColorSpan immediately if you are missing any of the components listed in the following table.

Parts List

Main Box	**Outside of Box:** ◆ "Watch Me First" CD-ROM ◆ Unpacking & Assembly Diagram ◆ Declaration of Conformity **Inside of Box:** ◆ (1) Printer Module ◆ (1) Stand crossbar ◆ (2) Media spools with collets ◆ (2) Stand legs ◆ (1) Ink tray box ◆ (1) Accessory box
Ink Tray Box	◆ (2) Ink trays
Accessory Box	◆ (2) Spare ink tubes ◆ (2) Red-headed bolts with washers ◆ (4) Silver Phillips head screws ◆ (8) Black Phillips head screws ◆ (1) Phillips screwdriver ◆ (1) VideoNet or Ethernet cable ◆ (1) Ink maintenance kit: manual priming bulb, purge clip ◆ (1) Fill system drain tube and drain bottle ◆ (1 set) Color Map cards ◆ (1 sheet) ink type/color labels ◆ (1 sheet) ink position number labels ◆ (1) Service station ◆ (1) Power cord (U.S. or European) ◆ Documentation, warranty, and software license agreement

Stand Assembly

1. Locate the stand legs ❶ and ❷, and the crossbar ❸.

2. Using the Phillips head screwdriver and eight of the screws provided, assemble the stand.

   Start by positioning the two stand legs upright, at approximately the width of the crossbar. Align the holes on the crossbar with the holes in the stand legs, and secure them with the screws.
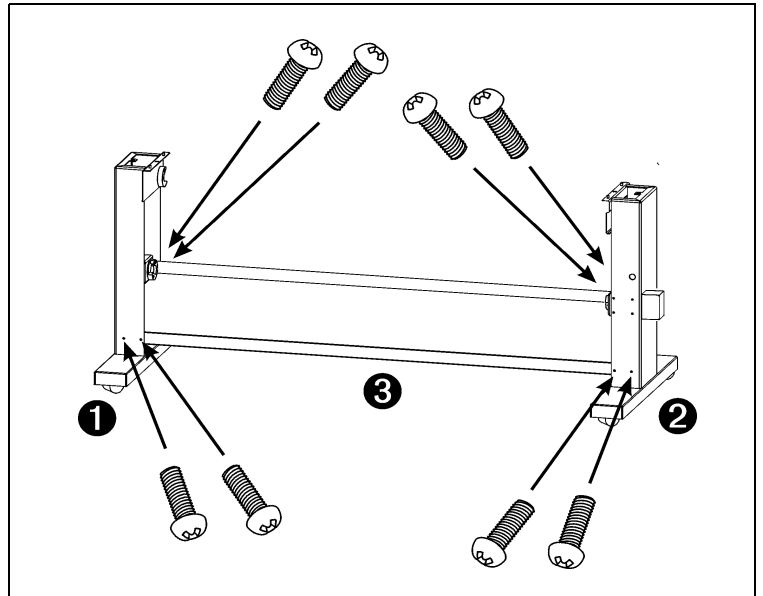
Fig. 1-1. Stand assembly

Final Assembly

1. Remove the two red-headed bolts from the right-hand shipping support.
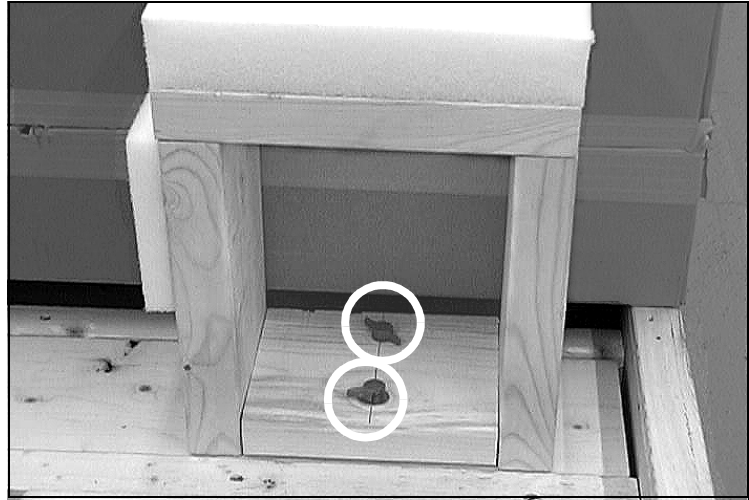
Fig. 1-2. Remove the red-headed bolts

2. Locate the assembly supports ❹.

   The assembly supports are mirror images of each other; the foam pad should be positioned toward the ends of the printer.

3. Align the assembly supports ❹ with the shipping supports ❺, at the rear of the pallet as shown.
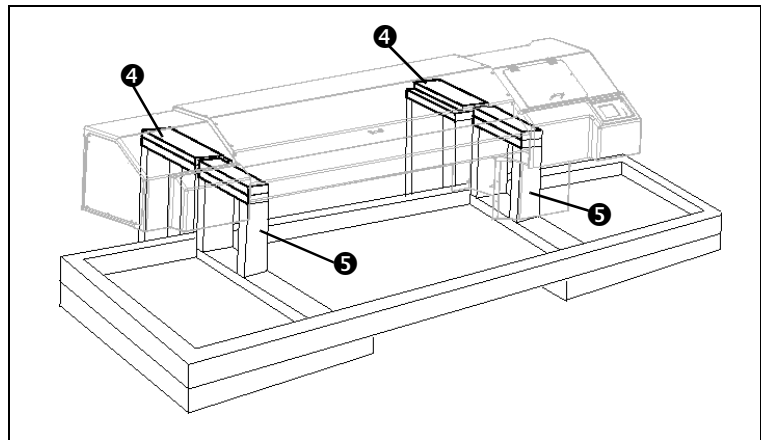
Fig. 1-3. Assembly supports ❹, shipping supports ❺

4. Thread one of the red-headed bolts that you removed from the shipping support ❺ through the assembly support into the pallet.

   The pallet contains a threaded nut that will accept the bolt. Tighten the bolt hand-tight.

5. Attach the other assembly support to the pallet with the other red-headed bolt.

**WARNING** The printer is too heavy to be lifted safely by one person. At least two persons are required to lift the printer.

WARNUNG Der Drucker ist zu schwer für eine Person. Mindestens 2 Personen sind erforderlich um den Drucker anzuheben.

6. With two to four persons, roll the printer onto its back, on the assembly supports.

   The printer is now resting entirely on the assembly supports. The right-hand shipping support is trapped with the printer and will roll with it.
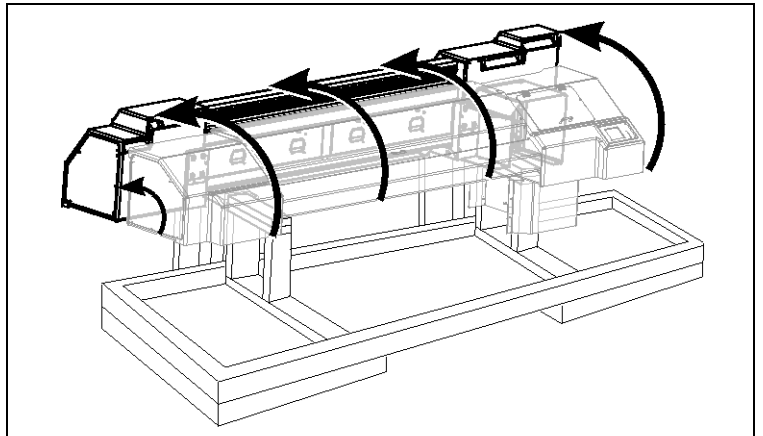
Fig. 1-4. Roll the printer onto its back

Caution Ensure that the blue power inlet on the bottom of the electronics box clears the assembly support during this process.

7. Remove the right-hand shipping support from the printer, and bolt it to the pallet as shown, using the two red-headed bolts provided. **Do not remove the bolts from the rear supports.**

Note that the "tower" of the support is now at the front of the pallet.
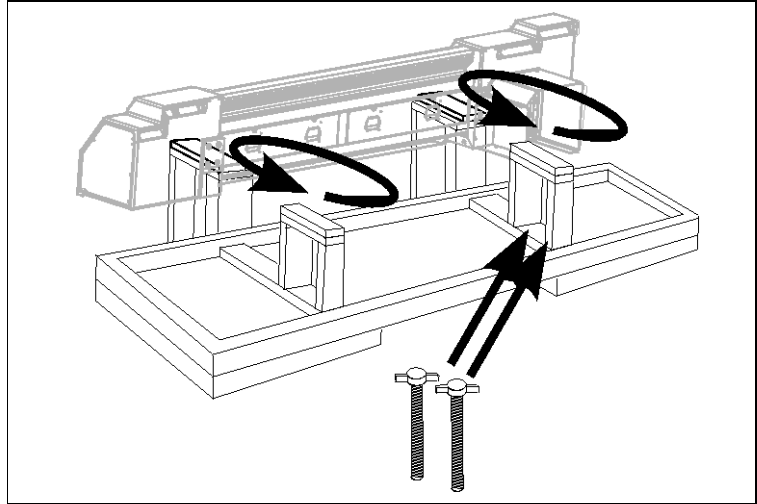
Fig. 1-5. Shipping supports reversed and bolted

8. Lift the left-hand shipping support from the pallet, reverse it, and replace it into its guides on the pallet.

The "tower" of the support is now at the front of the pallet.

9. Gently tip the assembled stand on its back, and set it down on top of the shipping supports as shown in Fig. 1-6.
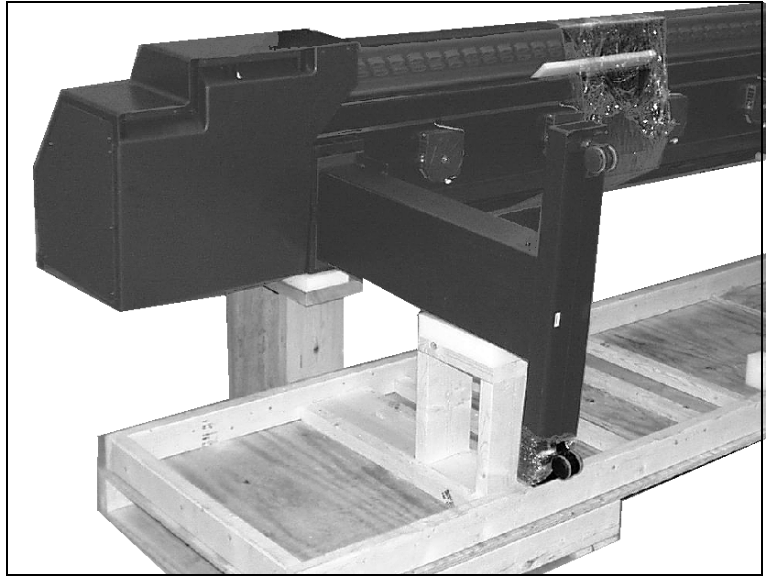
Fig. 1-6. Assemble the printer module and stand

10. Using the four silver Phillips head screws provided (two per leg), attach the stand to printer module.

    The silver screws are required to establish an electrical ground connection between the printer and stand.

11. Press the caster locks down to prevent the printer from rolling.

12. With the aid of one or more persons, carefully rotate the assembled printer upright.

    Be ready for the printer's center of gravity to shift, so you can tip the printer to its upright position in a controlled manner.

13. Unlock the casters and roll the printer to its final location. Then lock down the casters.

14. Locate the printer on a flat, level floor, with all four wheels of the stand resting stationary on the floor. The printer must remain stationary and level for proper ink flow and best print quality.

15. Locate and connect the profiler docking station cable on the left end of the printer, and connect it from the left-hand ink tray to the port on the printer.

16. Locate and connect the profiler docking station cable from the right-hand ink tray to the port on the printer.

17. Using the screws installed in the back of the printer, attach the ink trays ❸ and ❹.

    The right and left trays are mirror images of each other. Position the trays so that the inks load from the front.

    Loosen the screws, drop the trays into place onto the screws through the cutouts in the tray supports, then tighten the screws to secure the trays to the printer.
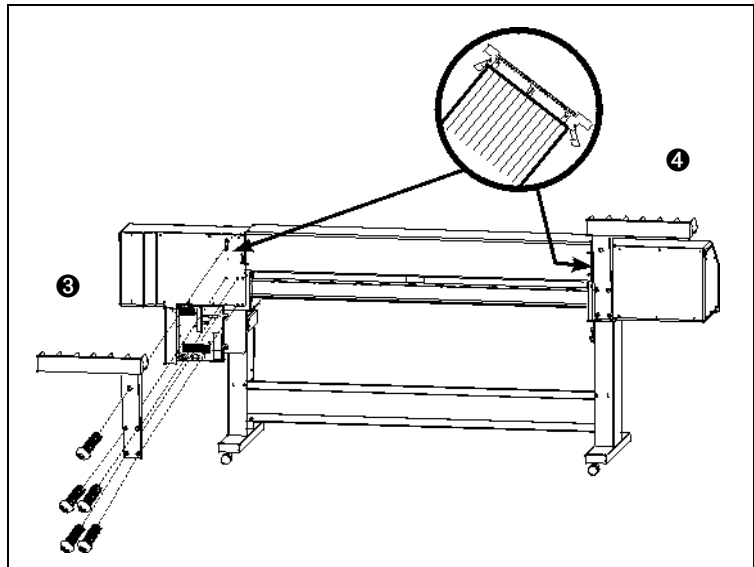

Fig. 1-7. Attach the ink trays,
connect docking station cable

18. Remove the shipping bands from the long black chain connected to the printhead carriage.

19. Remove the foam blocks that immobilize the carriage for shipping.

20. Install the service station by inserting it into the rectangular cutout inside the right endcap (behind the control panel).

    Position the service station so that the edge with the word "FRONT" is closest to the front of the printer. Slide the service station fully to the left end of the cutout.

21. Join the connector on the twisted wires from the takeup motor to the connector on the electronics assembly.

    The connector on the electronics assembly is on the side of the electronics enclosure, near the takeup spool bracket.

Connecting to Power

See Appendix A, Technical Specifications, or refer to the *Site Preparation Guide,* for detailed power requirements.

The print server may be connected to the same circuit as the printer if the circuit's amperage is sufficient for both devices. Refer to the print server's documentation for its amperage requirement. Consult a qualified electrician if you have any doubt as to how the circuits in your facility can accommodate the printer and print server.

WARNING WITH THE POWER SWITCH IN THE OFF POSITION, POWER MAY STILL BE SUPPLIED TO THE PRINTER COMPONENTS. To cut power completely from the printer, you must unplug the power cords from the power outlets.

WARNUNG WENN DER NETZSCHALTER IN OFF POSITION STEHT, WIRD DEN KOMPONENTEN TROTZDEM STROM ZUGEFÜHRT. Um den Drucker komplett stromfrei zu machen, müssen Sie den Netzstecker ziehen.

Connecting to the Print Server

Connect the printer to the print server with the included VideoNet (for ColorSpan print servers) or Ethernet cable (non-ColorSpan RIPs). See Fig. 1-8.

Note   Do not connect the printer VideoNet cable to your local area network. The VideoNet protocol is not compatble with other network protocols.

Refer to the print server (RIP) documentation for further instructions on connecting the printer to the print server.
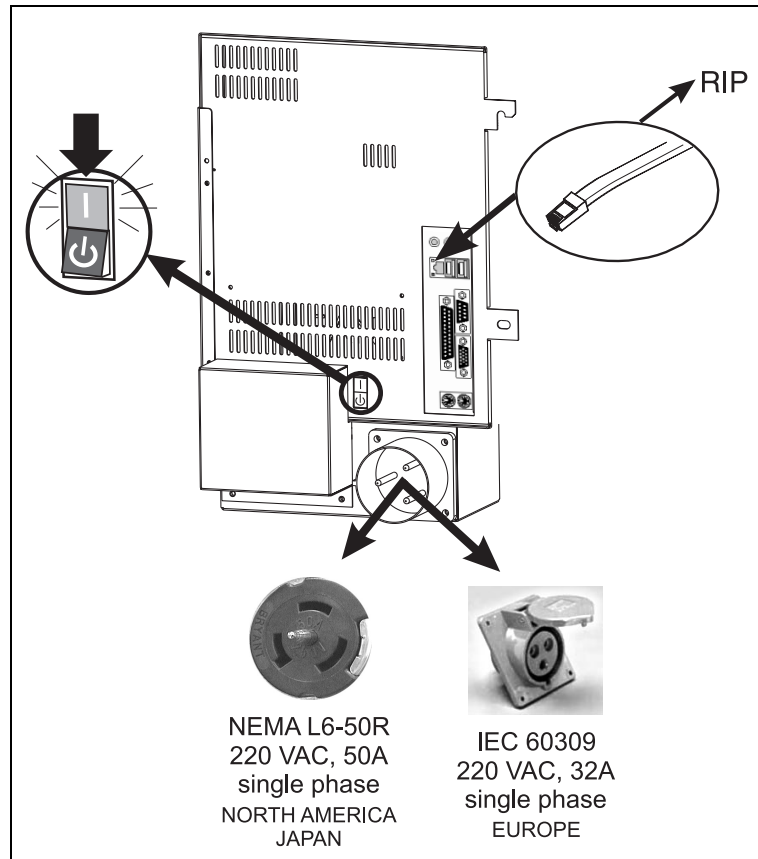
Fig. 1-8. Power and RIP connections

Power-Up Sequence   Turn on the power switch to observe the typical power-up sequence:

1. The control panel backlight illuminates. Move the contrast lever (located to the right of the control panel screen) up and down until the control panel graphics and messages are easily visible.

2. The printer runs a series of self-tests, and reports any errors it finds.

3. The camera searches for the location of the installed media's home and far edges. If media is installed, this data tells the printer the width of the installed media. If no media is installed, the printer will prompt you to load media when the next print job is sent to the printer.

4. The control panel displays the status screen.
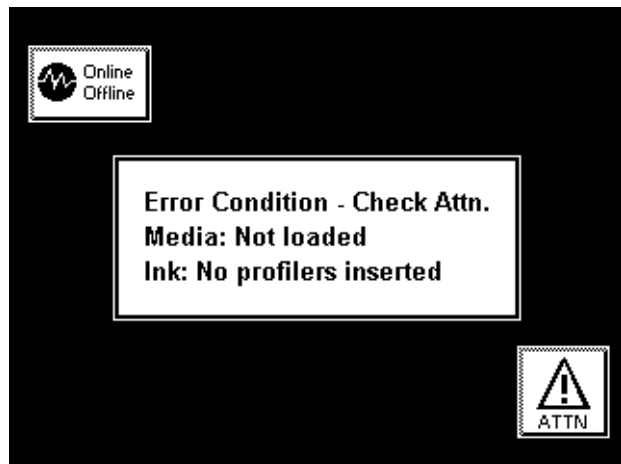
Fig. 1-9. Initial status screen after first power-up

What's Next?   ◆ To familiarize yourself with the printer, refer to the remainder of this chapter.

◆ To proceed with installation, see Chapter 3, Installing Ink and Media.

◆ For a complete description of using the control panel, see Chapter 2, Using the Control Panel.

Workflow Overview

When the printer is connected to a ColorMark Pro print server, here is how a typical print job progresses from the client workstation to the printer. If you are using a non-ColorSpan RIP, refer to the documentation that accompanies it for details.

1. The operator sends a file to be printed from a client workstation.

2. The print job is received by the print server.

    Once it reaches the print server, the print job may be reprioritized, combined with other jobs, re-routed, or otherwise manipulated. Refer to the print server online help or manual for instructions.

3. The print server RIPs the job.

    The raster image processing (RIP) process translates the PostScript language data that comprises the print job into the data required by the printer.

4. The server sends the image to the printer for printing.

Parts Overview

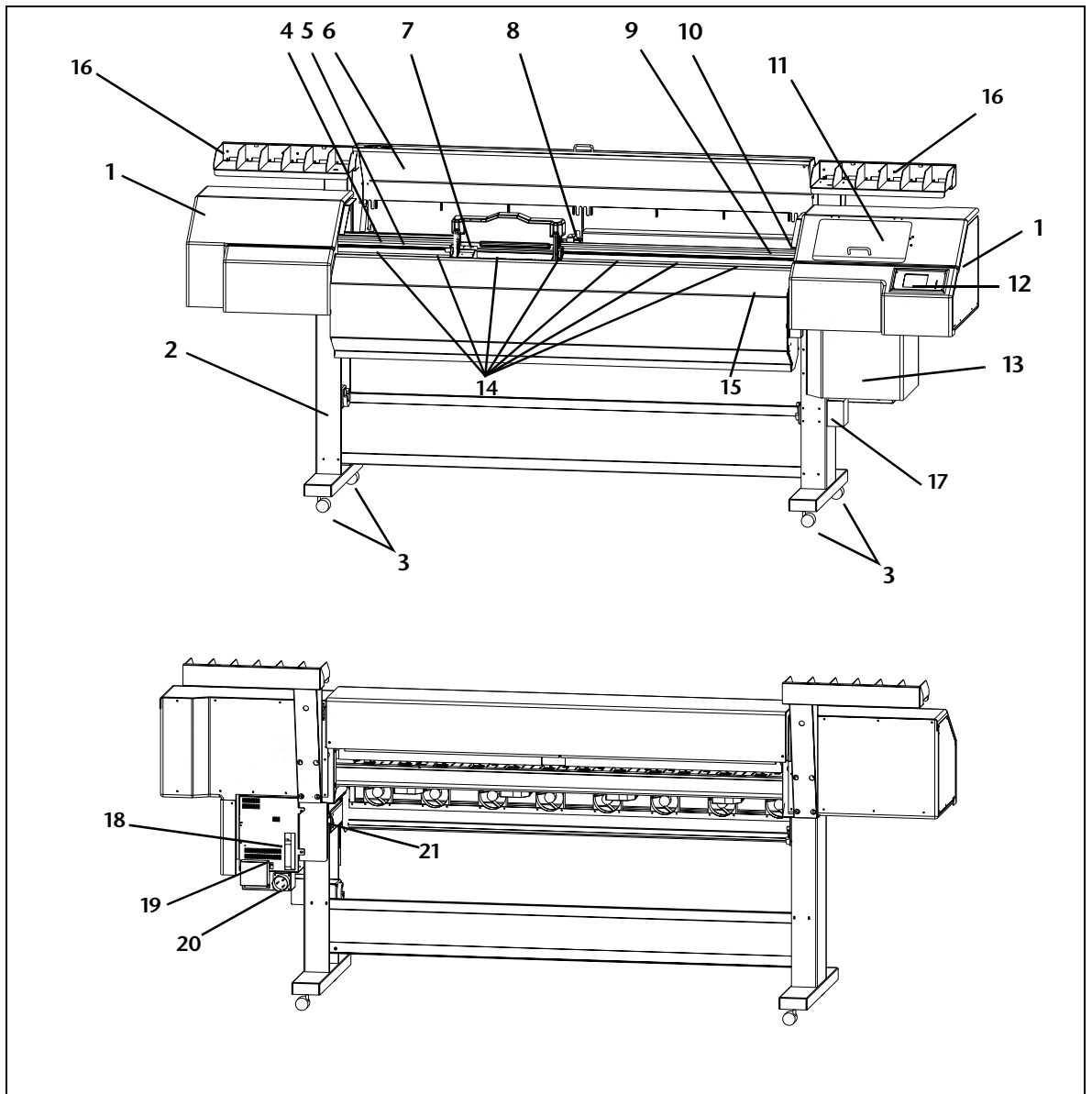Fig. 1-1. Major parts of the printer

Index	Description
1	**End cap (two places)** —includes removable end covers for maintenance access.
2	**Stand** — supports the printer.
3	**Casters (four places)** — enables easy location of the printer, can be locked in place.
4	**Encoder strip** — allows precise positioning of the print-head carriage across the length of the platen.
5	**Main carriage drive belt** — moves the carriage across the length of the platen.
	Transport chain (not shown) — supports the ink supply tubes that carry ink from the ink reservoirs to the printheads.
6	**Top cover** — protects the user from the rapid motion of the printhead during printing. A safety interlock switch stops printing and cancels the print if the cover is raised.
7	**Platen** — supports the media under the printheads during printing.
8	**Printhead carriage** — carries the printheads, digital imaging sensor, and photodiode across the length of the platen. (See also detail in Fig. 1-2. and Fig. 1-3. on page 1-20.)
9	**Media out sensor** — detects whether media is loaded.
10	**Service station (behind access door)** —catches excess ink from the printheads, wipes and caps the printheads to prevent drying and clogging while not in use.
11	**Prime access door** — provides access to the carriage for manually priming the printheads. A safety interlock switch stops printing and cancels the print if the cover is raised.
12	**Control panel** —displays messages and allows control of certain printer operations. Includes a contrast adjustment lever and audio feedback.
13	**Electronics module** — contains the printer's power supply and control electronics. Includes a humidity sensor to enable the printer to compensate for high-humidity conditions by slowing the speed of printing.
14	**Pinch rollers (12 places)** — grip the media during loading and printing.

| Index	Description
15	**Dryer** — carries air blown from the dryer fans to the printed output.
16	**Ink reservoir tray (two places)** — holds ink reservoir boxes.
17	**Takeup gearbox** — powers the takeup spool to automatically take up printed output.
18	**VideoNet port** — connects printer to print server.
19	**Standby power switch** — places printer in standby mode (to disconnect from power, disconnect power cord).
20	**Power inlet** — connects the printer to electrical power.
21	**Media advance switch** — enables user to advance media manually during loading.
22	**Printhead carriage lock lever (two places)** — locks and unlocks the printhead assembly, for tilting it to the upright position and returning it to the printing position.
23	**Printhead cover (three places)** — secures the printheads to the carriage.
24	**Printhead cover latch (three places)** — locks the printhead cover in place.
25	**Printhead (replaceable, up to twelve places)** — delivers ink to the media.
26	**Digital image sensor** — detects the location of printed pixels for precise alignment of the printheads, enables the automatic replacement of poorly-printing ink jets with substitute jets.
27	**Photodiode** — enables the creation of color transforms without an external spectrophotometer (requires print server support), and the linearization of existing transforms.
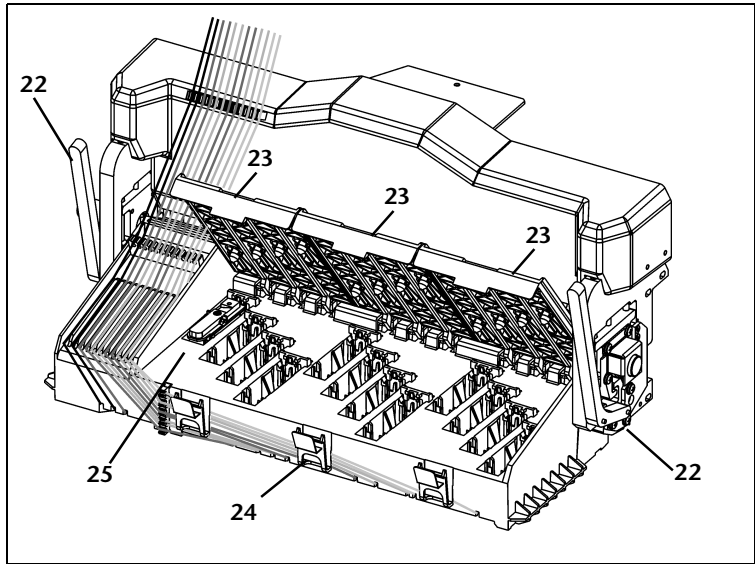
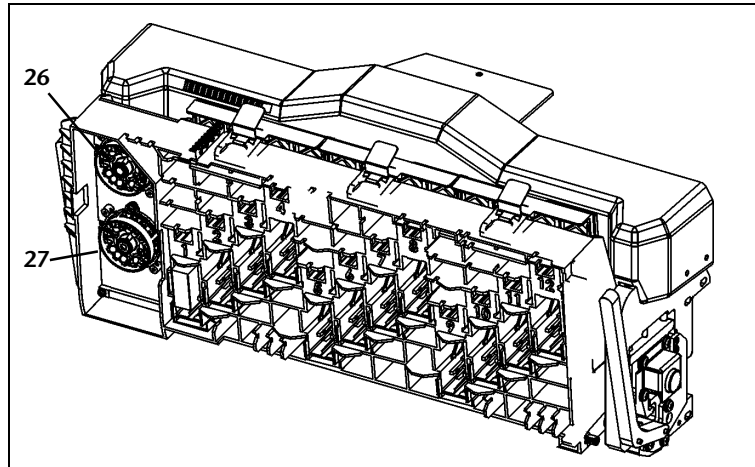Fig. 1-2. Printhead carriage, printhead covers open

Fig. 1-3. Printhead carriage, tilted position for
cleaning and accessing ink tubes

Special Features

The printer has many advanced features to help you produce the best printed output with the least effort.

Performance Features

◆ **AutoSet Calibration** — uses a high-resolution digital imaging sensor to align printheads automatically in the x-y directions and bidirectionally for precise positioning of ink jet pixels, also compensates for lost or misfiring jets by using substitute jets *without* slowing printing speed.

◆ **AutoTune** — can run AutoSet at user-defined intervals, for highest quality during unattended printing. Optionally, if print quality falls below a user-defined level, printing stops until the problem is corrected.

◆ **Onboard linearization** — uses the onboard photodiode to linearize output over the entire density range (with print server or RIP support).

◆ **Integrated heated dryer** — dries output as it prints. Optionally, the dryer fans may be turned off to avoid streaking on poly and film media.

◆ **Humidity sensor** — slows printing in high humidity conditions to ensure drying, and alerts the user when the ambient humidity is outside of optimal range.

◆ **Temperature sensor** — prevents overheating by halting printing when the temperature exceeds specification.

Ease-Of-Use Features

◆ **Modular ink delivery system** — the ink system consists of three components—ink reservoir, ink tube, printhead—each of which can be replaced independently of the others as needed.

◆ **Tilt-up print-head carriage** — printhead carriage tilts up for easy access to the ink tubes, printheads, and image sensors.

◆ **Manual priming system** — recovers clogged ink jets without removing the printhead from the printer.

◆ **Manual air purging system** — recovers printheads that are disabled due to too much air being introduced.

◆ **Integrated bidirectional takeup system** — takes up printed output onto a spool for extended unattended printing. Output may be wound image-side out or image-side in.

◆ **Automatic head height setting** — uses the onboard image sensor to set the print head height and level the print head carriage.

◆ **Media width sensing** — automatically detects the width and position of the media loaded, for precise image placement.

◆ **Simplified control panel interface** — Front Page screen presents frequently-used functions, with recommended preset configurations. A menu provides access to less-frequently used functions and troubleshooting help.

◆ **Media Wizard** — whenever you specify any one of four key settings (Media Feed Calibration, Head Height, Vacuum Fan Level, Head Acceleration), the printer saves them for subsequent recall when reloading media. The Media Wizard option on the menu provides a quick shortcut to these four settings.

◆ **User assistance** — control panel features online help, interactive procedures, and diagnostics to assist the user "on-the-fly," reducing training and troubleshooting time.

CHAPTER 2

Using the Control Panel

This chapter describes the functions of the control panel.

◆ Overview (page 2-2)

◆ Front Page (page 2-5)

◆ Navigation Keys (page 2-9)

◆ Menu (page 2-10)

◆ Menu Tree (page 2-20)

Overview

The touch-screen control panel shows you the printer's current status, and enables you to interact with the printer when changing media and ink, respond to an error condition, or configure options. There are three main control panel screens:

◆ Ready (Status) Screen

◆ Front Page

◆ Menu

Ready Screen

When you press the Online/Offline button from the Front Page screen, the printer goes online and the Ready or Status screen appears. The Ready screen displays the current status of the printer and any currently printing job. It displays when the printer is online (communicating with the print server) and either ready to print or printing.
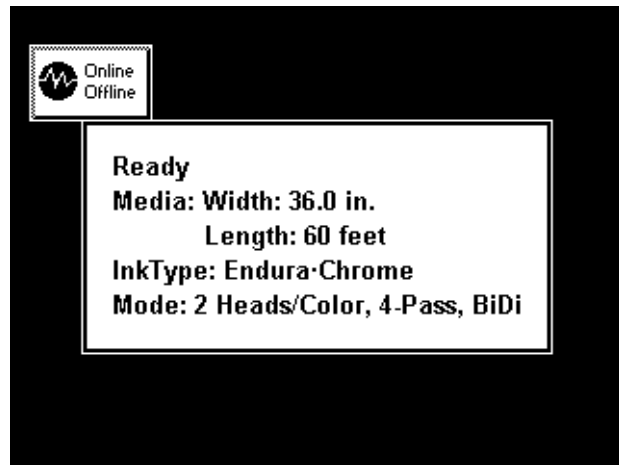

Fig. 2-1 Ready screen

Front Page

When you press the Online/Offline button from the Ready Screen, the printer goes offline and the Front Page screen appears. This screen is the top level of the printer's menu system. It provides access to the most frequently-used offline functions. For details, see "Front Page" on page 2-5.

Menu

When you press the Menu key on the Front Page screen, the Menu appears. The Menu provides access to advanced configuration options. For details, see "Menu" on page 2-10.

User Assistance   The control panel provides various forms of online user assistance:

The **? button** provides an explanation of the current function, with some guidance for what to do next.

The **ATTN (Attention) key** blinks on the control panel when the printer detects an error condition, potential error condition, or when you make a change that suggests recalibration or other action to ensure best print quality. There are three types of ATTN messages:

◆   **Actions** — the printer has detected an error condition that stopped printing or will prevent printing from starting. You must correct the error before the printer will be ready to print. When the printer senses that the error condition has been addressed, the Action will be deleted the next time the ATTN key is pressed.

◆   **Warnings** — the printer has detected a condition that, if left unaddressed, could result in substandard prints or a condition that will require an action before printing can continue. Any action on your part is optional, printing is not interrupted for a Warning message.

◆   **Changes** — the printer has detected a change to the inks, media, or printer that could affect print quality. Pressing the ATTN key displays a message that suggests the actions to perform for optimal print quality, such as recalibration. You can dismiss the message with or without actually performing the suggested action, although ignoring the messages could result in substandard output quality. Printing is not interrupted for a Change message.

When the printer issues one of these messages, the ATTN key will blink, and an alert beep will sound. Press the ATTN key to display a list of message titles, and select a title to display a detailed cause-and-recovery screen.

If you choose to not correct a Warning or Change condition and resume printing, the ATTN key will remain displayed, but will not blink until the printer issues a new Warning, Action, or Change message. The messages can be dismissed by correcting the condition, or by pressing the applicable key on the detail screen.

| **Tip** | See page 2-13 for instructions for choosing an Expert or Novice mode for displaying these messages (Expert mode routes most messages to the Actions & Warnings menu), and for disabling or enabling the audible alarm. See the table beginning on page B-5 for a list of errors and recovery procedures. |

Front Page

The Front Page provides access to the most frequently-used printing and maintenance functions. For advanced configuration options, press the Menu key (see "Menu" on page 2-10 for instructions).
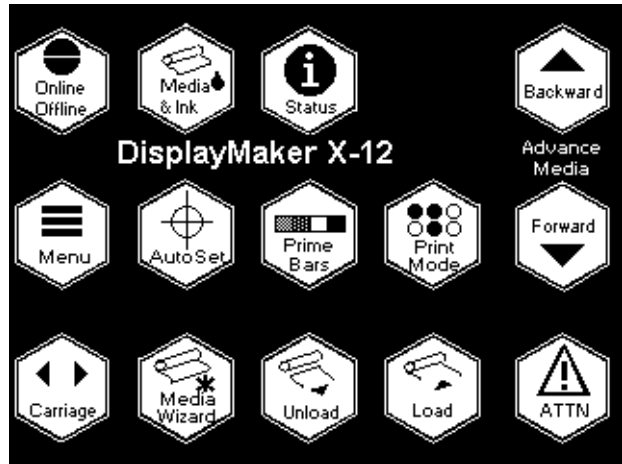

Fig. 2-2. Front Page

◆ **Printer Name** — displays the name of the printer as defined on the print server.

◆ **Online/Offline** — returns the printer to the Ready screen.

◆ **Media & Ink** — displays a listing of the media and ink currently installed in the printer. Press the ▼ and ▲ keys to highlight "Media" or one of the inks, then press ▶ (Proceed) to display information about the selection. From this screen, you can press the ◀ and ➡ keys to scroll between screens. Press ▶ (Proceed) to return to the list, then ↶ (Menu Out) to display the Front Page screen.
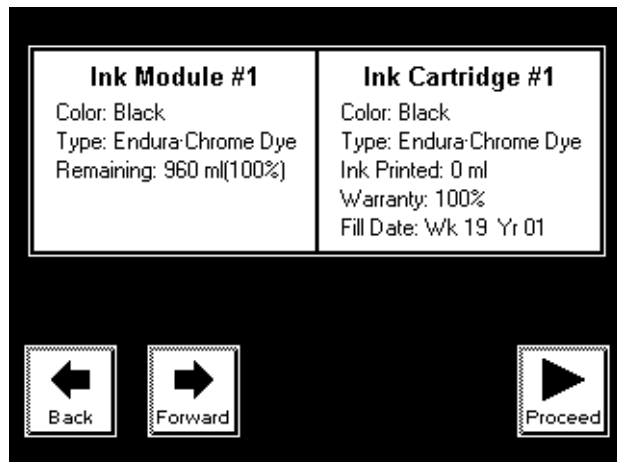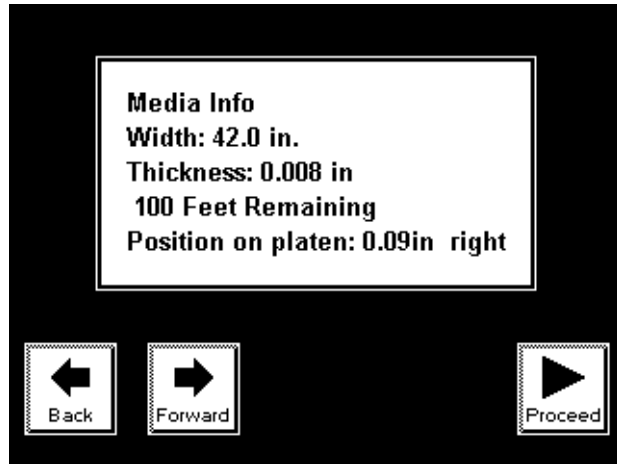

Fig. 2-3. Media Info, Ink Info screens

◆ **Status** — displays the status of all user-configurable options. Press ☐ (Page) to scroll between pages. To change an option, go to the Printer Configuration section of the menu. Page 4 contains the current Media Wizard settings (see "Media Wizard" on page 2-19).
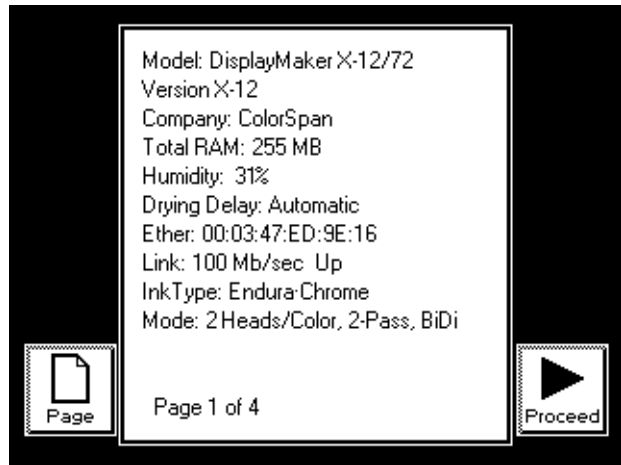


```
Model: DisplayMaker X-12/72
Version X-12
Company: ColorSpan
Total RAM: 255 MB
Humidity: 31%
Drying Delay: Automatic
Ether: 00:03:47:ED:9E:16
Link: 100 Mb/sec Up
InkType: Endura·Chrome
Mode: 2 Heads/Color, 2-Pass, BiDi

Page 1 of 4
```

Fig. 2-4. Status page 1

◆ **Advance Media** — press the ▼ key to advance the media forward. When you press and hold the ▼ key, the media moves faster. You can also press the Media Advance switch on the rear of the printer, below the left profiler docking station, to advance the media. Press the ▲ key to advance the media back onto the supply spool. When you press and hold the ▲ key, the media moves faster.

◆ **Menu** — displays the complete printer menu for access to advanced configuration options (see "Menu" on page 2-10 for instructions).

◆ **AutoSet** — performs a "one touch" calibration of the printer: bidirectional and head-to-head alignment of printheads, and AutoJet substitution mapping of deflected or missing jets. See "AutoSet" on page 4-2 for instructions.

◆ **Prime Bars** — fires all jets by drawing a set of lines called prime bars. This is a good way to inspect and prepare the jets for printing after they have been idle for more than a few hours. Choose **Quick Prime Bars** for most primes, or **Detailed Prime Bars** when you want to locate individual missing jets that AutoSet may have missed, so you can map them manually under **Calibrate Printer - Manual Calibrations - Manual Jet Mapping** (see "Manual Jet Mapping" on page 4-12 for instructions).

◆ **Print Mode** — interactively assists you in installing printheads in the correct positions, and setting the number of print passes. See "Selecting a Print Mode" on page 3-7 for instructions.

◆ **Carriage** — moves the carriage out of the service station so you can load or clean the printheads and ink tubes, clean the image sensors, and remove the service station.

◆ **Media Wizard** — provides access to the four settings that the printer are saves and associates with a particular media: **Media Feed** (page 4-4), **Head Height** (page 4-22), **Platen Vacuum Control** (page 2-12), and **1-Pass Coverage** (Full or Reduced, select Reduced for less ink in 1-pass mode). Page 4 of the Status screen contains the current Media Wizard settings (see previous page).

◆ **Unload** — when unloading media, prints the calculated amount of media remaining on the roll for reference (on the lower right edge). When removing the partial roll from storage and re-loading on the printer, the user can report this value to the printer during the Media Load operation. If using the takeup, cut the media from the takeup spool before pressing the Media Unload key (see "Cutting and Unloading Media" on page 3-35).

◆ **Load** — measures the width of the media installed in the printer, checks for proper media positioning on the platen (for good vacuum contact), asks the user to enter the amount remaining on the supply roll, and asks the user to select a takeup option. See "Loading Media" on page 3-26 for instructions. You can also access this function from the menu (see "Load Takeup" on page 2-18).

◆ **ATTN** (Attention) — blinks on the control panel when the printer detects an error condition, potential error condition, or when you make a change that requires recalibration or other action to ensure best print quality. See "User Assistance" on page 2-3 for further details.

Navigation Keys

The following table shows you how to move through the menu system and perform printer control functions.

Key	Description
☰	**Display Menu** — displays the printer menu.
▲ ▼	**Menu Up/Down** — moves the menu highlight up and down the menu.
⊼ ⊻	**Menu Top/Bottom** — moves the menu highlight to the top or bottom for the menu.
↰ ↱	**Menu Out, Menu In** — moves to the next higher menu in the hierarchy, or selects the highlighted option.
◄ ►	**Back/Forward** — moves between pages or screens, or selects printheads to calibrate.
▶	**Proceed** — initiates the selected function.
▯	**Page** — switches between pages of a multi-page screen.
❓	**Help** — displays a summary description of the highlighted menu options.
▮▮ ▶	**Pause/Resume** — pauses or resumes printing during a calibration.
✕	**Cancel** — cancels the current menu function or choice.
→	**Continue** (error screen) — proceeds to the next step in a troubleshooting dialog.
↱	**Ignore** (error screen) — specifies "ignore" in a troubleshooting dialog.
↺	**Retry** (error screen) — specifies "retry" in a troubleshooting dialog.
↻	**Reboot Printer** (error screen) — specifies "restart printer" in a troubleshooting dialog.
i	**Information** (error screen) — displays further information about the error.
✓ ✗	**Yes/No** (error screen) — indicates a Yes or No in a troubleshooting dialog.

Menu

The menu has five main sections:

◆ Calibrate Printer (see below)

◆ Configure Printer (page 2-11)

◆ Service Printer (page 2-16)

◆ Warnings & Actions (page 2-18), shown in Expert Messages Mode only

◆ Load Takeup (page 2-18)

This section explains each of the functions on the printer menu. See "Menu Tree" on page 2-20 for a listing of all menu options.

Calibrate Printer

For details on these options, see Chapter 4, Calibrating the Printer.

◆ **Manual Calibrations** — allow you to calibrate the media feed advance accuracy, and perform the various components of the automatic AutoSet calibration visually, without the printer's digital imaging sensor. Inaccurate judgments by the operator during these tests could result in substandard output. In most cases, use AutoSet instead. See "Manual Calibrations" on page 4-3 for instructions.

◆ **Auto Calibrations** — enables you to run a portion of the AutoSet calibration, to save time. See "Auto Calibrations" on page 4-18 for instructions.

◆ **AutoTune** — schedules AutoSet to run automatically after a certain number of prints have printed. See "AutoTune" on page 4-19 for instructions.

◆ **Calibration Summary —** prints summary information with the AutoSet calibration test patterns, or transmits registration or jet data to a log file on the print server. "Calibration Summary" on page 4-20 for details.

Configure Printer   Configure Printer enables you to set many options that control how the printer operates.

Printer Settings

◆ **Gutter Settings** — determines the appearance of the top and side gutters.

  ◆ Top Gutters — allows you to turn **On** or **Off** the gutter pattern at the top edge of the print, which shows data about the print such as date and time printed and print mode, plus write-in blanks for other data.

Color set reported in the print job

Job name

Media name from the print server/RIP

Ink type

Date and time printed

```
Job: award_3.tif  Ink: Endura•Chrome Dye  Media: Satin Photobase PXS  Date/Time: 2002-02-20  14:20
Transform: (CMYK) _____  Calibrated:  Y  N  Printed by: _____
```

```
Job: award_3.tif  Ink: Endura•Chrome Dye  Media: Satin Photobase PXS  Date/Time: 2002-02-20  14:20  Printmode: 2 Heads/Color, 4-Pass, BiDi, HQ, C2M2YK  Printer: DisplayMaker Mach 12/72  Version : Mach 2.000.000
Transform: (CMYK) _____  Calibrated:  Y  N  Printed by: _____
```

```
Printmode: 2 Heads/Color, 4-Pass, BiDi, HQ, C2M2YK  Printer: DisplayMaker Mach 12/72  Version : Mach 2.000.000
```

Embedded software version

Print mode selected at control panel:
Heads per color, number of passes,
direction of printing, HQ mode,
ink color set

Printer

Fig. 2-5. Top gutter data

  ◆ Side Gutters — sets the side gutter pattern to **Narrow**, **Medium**, or **Wide** sizes, or turns them **Off**. Side gutter patterns help keep the ink jets open by firing ink through them in a pattern outside the printed image area.

◆ **Takeup Direction** — sets the direction of the takeup motor to wind the media **Printed Side In** (default), or **Printed Side Out**.

◆ **Margin Settings**

  ◆ Space Between Prints — sets the blank space between print jobs, between 0 and 10 inches (25 cm).

- ◆ Right and Left Margin — sets the amount of blank space for the right and left margins, between 0 and 5 inches (13 cm).
- ◆ **Drying Settings** — sets parameters for the operation of the dryer:
  - ◆ Drying Delay — select the printer's preprogrammed algorithm for slowing the print speed when the ambient relative humidity is excessive, or specify a custom drying delay in seconds per print swath. A longer delay allows the output to remain under the dryer longer, which ensures adequate drying under higher ambient relative humidity.

    To increase the media advance speed, you can specify a manual drying delay. If you specify a manual drying delay interval that will be insufficient to dry the output, the printer will display a warning message on the control panel. Be aware that if you override this warning without increasing the drying delay, you should not use the takeup system, and take care to remove output from the printer before it reaches the floor, and store it flat until it dries. Using the takeup to collect wet output, or allowing wet output to pile on the floor, would likely result in ruined prints.
  - ◆ Drying Rate — sets the rate of media advance during post-print drying. Select **Standard** for fastest throughput. Select **Same as print speed** to slow the advance if additional drying time is needed.
- ◆ **Platen Vacuum Control** — turns on the vacuum fans, then allows you to raise or lower the speed of the vacuum fans. Raise the speed if the media is rising off the platen, lower the speed if the media is buckling or wrinkling.

◆ **Service Station Settings** — sets parameters for the operation of the service station:

   ◆ Service Station Algorithm — choose **Optimized** (default), which wipes while moving the carriage; or **Original**.

   ◆ Service Station Interval — sets the printhead service station cycle: every **30 seconds, 60 seconds, or 90 seconds.** The service station cycle helps keep the ink jets open by expelling ink and wiping the jets. A shorter period can keep jets cleaner, a longer period increases printing throughput with less frequent service station "visits."

   ◆ EnduraChrome Spits, PermaChrome Spits — allows you to set the number of spits per service station visit for each ink type. A lower setting saves ink usage. Increase from the default setting only if jets are clogging (in this case, service station wipers may be worn and need to be replaced).

◆ **Expert/Novice Messages** — **Novice** mode presents Warnings & Changes (alerts that do not prohibit printing) and Actions (conditions that require user intervention before printing can proceed). **Expert** mode presents Actions only, presents fewer "press Proceed" prompts after an Action has been addressed, and does not require you to press Proceed after manually winding back a service loop. The default is Novice mode.

When in Expert mode, active Warnings, Changes, and Actions can be displayed by selecting **Warnings & Actions** from the menu, since Warnings will not cause the ATTN icon will appear in Expert mode. See "User Assistance" on page 2-3 for further information about Actions and Warnings. See "Warnings & Actions" on page 2-18 for further information about this menu option.

◆ **Head Height** — sets the height of the printhead to **Normal** (0.050 inches/1.27 mm) or **Custom**. Use Normal unless the media is curling or the printhead carriage is striking the media. Lower settings reduce ink overspray, but increase the chances of the printhead striking the media. When the head height is 0.070 inches (1.78 mm) or higher, do not run AutoSet, run the manual calibrations instead.

◆ **Units** — sets **English** or **Metric** units of measure for data displayed by the control panel.

◆ **Audible Alarm** — when **On** and one or more Actions are pending, sounds a beep until the ATTN key is pressed.

Printer Options

◆ **Dryer** — turns the dryer fans **On** or **Off**. Disable the dryer fan to avoid streaking output on poly media and films.

◆ **Print White Space** — when **Print White Space** is selected, the printhead carriage always travels the width of the media, even when there is a white (blank) space in the image. When **Do Not Print White Space** is selected, the printhead remains in its home position and the media advances past white spaces in the image. This increases throughput on print jobs that have large areas of white space.

◆ **Quality Check** — determines how AutoTune errors are handled (see "AutoTune" on page 4-19 for information about AutoTune). When enabled, the printer determines the number of misfiring or not firing ink jets that are not being replaced by other jets. If this number exceeds a maximum value, an error occurs. This can give the operator a chance to print anyway, or cancel printing so the problem can be resolved.

  ◆ Attended Mode — user must press ▶ (Proceed) to acknowledge the error and print the job (if one is pending), or ✘ (Cancel) to cancel printing.

  ◆ Unattended Mode — no user acknowledgment of errors is required. When a quality check fails, print jobs are sent to the ColorSpan print server's Attention queue with a disposition of "Uncalibrated Printer" (this feature may not be supported on non-ColorSpan print servers).

  ◆ OFF — no quality check is performed, all jobs will print.

◆ **Print Position** — positions the print in the horizontal (x-axis) direction, either in the center or flush right.

◆ **Create Custom ColorMaps** — enables you to define custom ink sets (color maps), using any combination of ink colors, in any order. See "Creating a Custom Color Map" on page 3-11 for instructions.

◆ **FineLine Mode** — allows you to tune the printheads for improved fine line quality, and eliminate the "ghost" image on backlit media, caused by ink transfer during takeup. Select **FineLine Mode Off** (the default setting) for most printing with large areas of high ink coverage. Select **FineLine Mode On** to reduce the jagged appearance of fine lines and eliminate "ghosting."

FineLine Mode is effective during the earlier portion of the printhead's service life. When excessive jet-outs or banding occurs, select FineLine Mode Off, and operate the printhead in this mode for the remainder of its service life.

Reset All Defaults

◆ **Restore All Defaults** — restores all Printer Configuration settings to their factory default values, and zeroes all registration data. After running this option, all calibration values must be reestablished by running AutoSet.

◆ **Zero Platen Width** — sets the platen width to zero, which forces the printer to measure the platen on the next power up.

◆ **Measure Platen** — measures the platen width.

Service Printer

User Diagnostics

User Diagnostics presents an interactive troubleshooting program to diagnose problems before calling MacDermid Color-Span Technical Services. It walks you through a series of tests and checks for certain printer functions. The printer asks you to make observations or run simple tests to help it diagnose problems and suggest corrective actions. It has the following sections:

◆ **VideoNet Status**

◆ **Head Statistics**

◆ **Carriage Motion**

◆ **VideoNet Connection**

◆ **Calibration**

◆ **Error History**

◆ **Actions and Warnings List** — table of all actions and warnings with cause and recovery. This is an abbreviated version of the table "Actions and Warnings" on page B-5.

◆ **Log Error History**

Service Tests

These tests are for factory, service, and technical support use.

◆ **Profiler Test** — identifies and verifies profilers in each position. The printer will report the profiler number, color, and ink percentage remaining. Particularly useful when the printer is connected to a non-ColorSpan RIP that cannot display profiler status.

◆ **Print Test** — the user selects a print width, one or more printheads to test, and (if multiple heads are selected) whether to print multiple heads side-by-side or on top of each other, then the printer begins firing the printhead(s) continuously until canceled by the user. The test can help to identify intermittently failing printheads.

◆ **Color Sensor Tests** — **Blackpoint and Whitepoint** tests the ability of the photodiode to get black point and white point readings. **Print and Read Patches** prints and reads patches from across the color spectrum and compares the readings with expected values. **Visually Inspect LEDs** switches on and off the LEDs, allowing you to compare their appearance with the expected colors listed on the control panel.

◆ **Horizontal Dot Accuracy** — for factory/service use only.

◆ **Vertical Dot Accuracy** — for factory/service use only.

◆ **Print Image on Image Sensor** — the printer prints a small set of lines which are scanned by the digital image sensor. Then the printer prints an enlargement of the image as the sensor captured it.

◆ **Spit and Wipe Jets** — tests the functionality of the service station by firing ink (spit) and drawing the printheads over the service station wipers (wipe).

◆ **Takeup Test** — tests the functionality of the takeup system.

◆ **Vacuum Fan Test** — runs the platen vacuum fans to test for correct operation.

◆ **Dryer Test** — runs the dryer heater assembly to test for correct operation.

◆ **Isolation Print Test** — for factory/service use only.

◆ **Control Panel Test** — tests the functionality of the control panel display.

◆ **Pod Test** — for factory/service use only.

Calibrations

These calibrations are performed at the factory. If any of them are detected as out-of-specification, a message is displayed on the control panel, recommending that you perform the applicable calibration:

◆ **Head Height** — provides a head height reset, automatic and manual carriage height calibrations, and head height adjustment. See "Head Height Calibration" on page 4-22 for instructions.

◆ **Media Sensor** — locates the platen to establish the "media out" head height

Home Head

Recalibrates the home position of the printhead carriage. If the printhead carriage will not return to the service station between prints, select this option. Cycling the power off and on will also run the Home Head function.

Measure Media Width

Measures the width of the media.

Prime Pens

Moves the carriage out of the service station home position so that it can be accessed behind the access door for manual priming (for instructions, see "Manual Priming" on page 5-8).

Prime Bars

Prints a wide-swath version of the prime bars.

Disable Media Sensor

If the media sensor is malfunctioning, disable it to continue printing. Note that with the media sensor disabled, the printer will not be able to detect when there is no media in the printer.

Disable Latch Sensor

If the carriage latch sensor is defective, this function allows you to disable the sensor until a replacement can be installed. Do this only at the direction of MacDermid ColorSpan Technical Services.

New Carriage

Select this option when installing a new carriage, to set the head height to "uncalibrated." After doing so, printing is not allowed until the head height is calibrated (see Chapter 4, Calibrating the Printer, for instructions).

Warnings & Actions   When in Expert mode, active Warnings, Changes, and Actions can be displayed by selecting Warnings & Actions from the menu, since Warnings will not cause the ATTN icon will appear in Expert mode. This option does not appear in Novice mode.

See "User Assistance" on page 2-3 for further information about Actions and Warnings, and the table beginning on page B-5 for a list of recovery procedures. See page 2-13 for a description of the Expert/Novice Messages mode.

Load Takeup   This option helps you to load media: it measures the width of the media, checks for proper media positioning on the platen (for good vacuum contact), asks the user to enter the amount remaining on the supply roll, and asks the user to select a takeup option. See "Loading Media" on page 3-26 for instructions.

You can also access this function from the Front Page screen, under **Load** (see page 2-8).

Media Wizard   This option provides access to the four settings that the printer saves and associates with a particular media: **Media Feed** (page 4-4), **Head Height** (page 4-22), **Platen Vacuum Control** (page 2-12), and **1-Pass Coverage.** Page 4 of the Status screen contains the current Media Wizard settings (see page 2-7). The settings are saved automatically whenever they are changed, and can be recalled when the media is subsequently reloaded.

Menu Tree

Front Page

Online/Offline   Media & Ink Status   Printer Status   Advance Media

Show Menu

Run AutoSet

Print Prime Bars

Select Print Mode

Attention

Access Carriage   Media Wizard   Unload Media   Load Media

DisplayMaker X-12
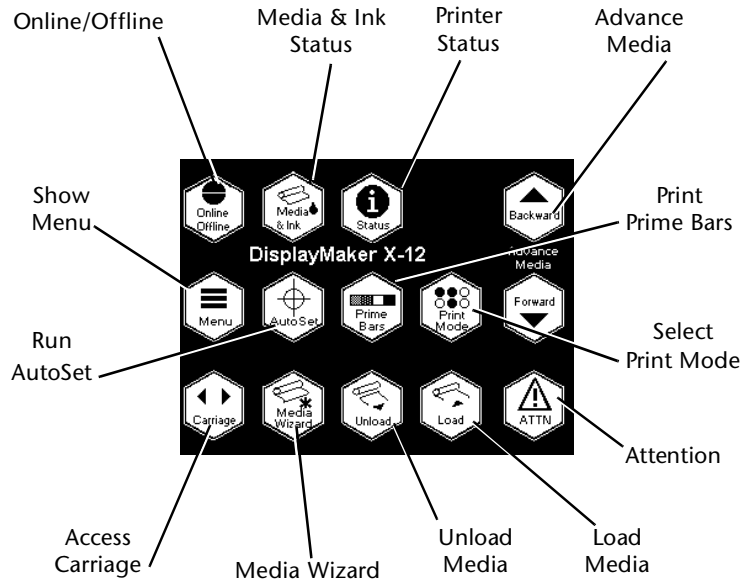
Menu   This menu tree reflects version 1.20 of the embedded printer software. Refer to the *Release Notes* for more recent versions.

Calibrate Printer
- **Manual Calibrations**
    - Media Feed
    - Manual Bidi Registration
    - Manual Head Registration
    - Manual Jet Mapping
    - Jet Status Lines
    - Default Registration Data
- **Auto Calibrations**
    - Auto Bidi & H2H Calibration
    - AutoBidi Calibration
    - AutoH2H Calibration
    - AutoJet Calibration
- **AutoTune**
- **Calibration Summary**
    - AutoSet Summary
    - Log Head Registration Data
    - Log Jet Data

Configure Printer
- **Printer Settings**
    - Gutter Settings
        - Top Gutters
        - Side Gutters
    - Takeup Direction
    - Margin Settings
        - Space Between Prints
        - Right and Left Margin
    - Drying Settings
        - Drying Delay
        - Drying Rate
    - Platen Vacuum Control
    - Service Station Settings
        - Service Station Algorithm
        - Service Station Interval
        - EnduraChrome Spits
        - PermaChrome Spits
    - Expert/Novice Messages
    - Head Height
    - 1-Pass Coverage
    - Units
    - Audible Alarm
- **Printer Options**
    - Dryer
    - Print White Space
    - Quality Check
    - Print Position
    - Create Custom ColorMaps
    - FineLine Mode

Reset All Defaults
- Restore All Defaults
- Zero Platen Width
- Measure Platen

Service Printer
- **User Diagnostics**
    - VideoNet Status
    - Head Statistics
    - Carriage Motion
    - VideoNet Connection
    - Calibration
    - Error History
    - Warnings and Actions List
    - Log Error History
- **Service Tests**
    - Profiler Test
    - Print Test
    - Color Sensor Tests
    - Horizontal Dot Accuracy
    - Vertical Dot Accuracy
    - Print Image on Image Sensor
    - Spit and Wipe Jets
    - Takeup Test
    - Vacuum Fan Test
    - Dryer Test
    - Isolation Print Test
    - Control Panel Test
    - Pod Test
- **Calibrations**
    - Head Height Reset
    - Auto Carriage Height
    - Manual Carriage Height
    - Adjust Head Height
- **Home Head**
- **Measure Media Width**
- **Prime Pens**
- **Prime Bars**
- **Disable Media Sensor**
- **Disable Latch Sensor**
- **New Carriage**

Warnings & Actions (Expert mode only)

Load Takeup

CHAPTER 3

Installing Ink and Media

This chapter describes:

Variable Mode Printing

The printer uses these techniques to vary the quality of a print and speed of printing:

◆ **Color Set** — ink sets may contain one each of a different color, two each of a different color, varying densities of certain colors, or combinations. Using two sets of colors speeds printing, while using multidensity inks creates smoother transitions between light tones, and increases the perceived resolution of the print.

◆ **Jet Replacement** — jets on the printhead that are misfiring or not firing at all can be replaced with alternate jets. Ideally, every pixel called for in a print is printed. In reality, some pixels are not printed because the ink jets tend to become partially or completely clogged with ink, which reduces print quality. AutoJet mapping substitutes an otherwise unused jet for a missing or deflected jet.

◆ **Passes** — number of times the printhead passes over a given area of the image. A greater number of passes makes a greater number of substitute jets available, but slows printing speed.

Print quality (apparent resolution and smooth gradients) is improved by:

◆ Increasing the number of different ink colors (and/or densities); see "Selecting a Print Mode" on page 3-7

◆ Increasing the number of passes (see "Selecting a Print Mode" on page 3-7)

Print speed is increased by:

◆ Reducing the number of passes (see "Selecting a Print Mode" on page 3-7)

◆ Reducing the number of different colors or using smaller ink sets (four or six colors instead of eight or more)

◆ Printing with two heads per color (see "Selecting a Print Mode" on page 3-7)

◆ Printing in low relative humidity to avoid drying delays

◆ Selecting "Do not print white space" under **Configure Printer - Printer Options - Print White Space** (see "Printer Options" on page 2-14)

◆ Selecting "Optimized" under **Configure Printer - Printer Settings - Service Station Settings - Service Station Algorithm**

◆ Using MediaSaver (ColorSpan Print Server feature) to group jobs together, eliminating the end-of-job drying delay between jobs

◆ Using MediaSaver or N-UP (ColorSpan Print Server features) to print as wide as possible, thereby minimizing the number of times the printhead has to change directions during printing

Ink System Overview

The printer's ink system consists of three main components:

◆ **Ink reservoir** — a plastic box containing the ink supply and an electronic profiler, which specifies the ink type, color, and amount remaining. The profiler plugs into a connector on the ink tray, allowing it to communicate with the printer and print server. The reservoir is self-contained and seals automatically for easy handing.

◆ **Ink tube** — carries the ink from the reservoir to the printhead, self-sealing on both ends for ease of handling.

◆ **Printhead** — delivers the ink to the media.

Each of these components can be replaced independently of the others. This enables you to consume the ink from two or more reservoirs before replacing the printhead when an excessive number of clogged jets cannot be recovered with priming or cleaning. The ink tubes need not be replaced unless you switch ink types (for example, from a dye ink to a pigmented ink, or to a different set of colors), or if a tube becomes damaged.
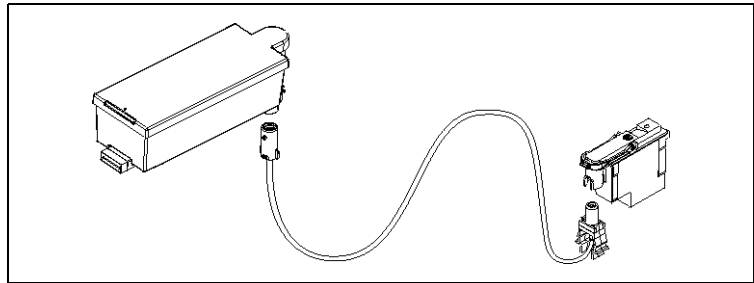

Fig. 3-1. Ink system components

The ink system also includes a labeling system to help keep the components of each ink color together:

◆ **Color Map Cards** — lists all of the supported ink sets, fits in plastic sleeve inside the printer's top cover for easy reference during installation and printing.
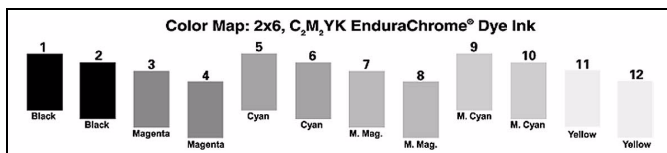

Fig. 3-2. Color Map card

Tip If you cannot locate the color map card for a particular ink set, use the color map display on the control panel. To access, press the Print Mode key on the Front Page (for details, see "Selecting a Print Mode" on page 3-7).

◆ **Ink Type Label** — used to identify the ink type used in each ink tube.

◆ **Ink Tube Number Label** — used to label each end of each ink tube (ink reservoir end and printhead end) from 1 to 12; corresponds to the factory-labeled ink tray positions 1 to 12.
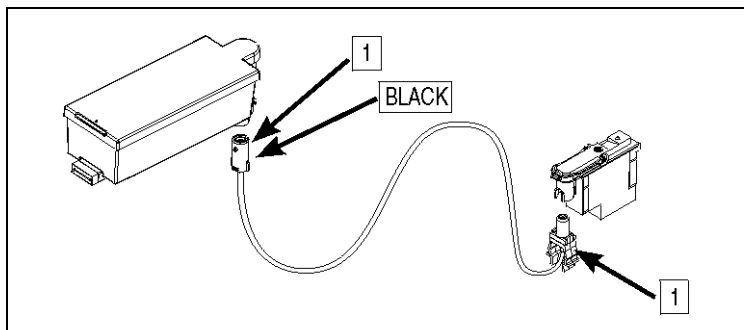

Fig. 3-3. Ink type and ink number labels

Spare Ink and Printheads

For maximum productivity and minimum down time, ColorSpan recommends stocking extra ink reservoirs and printheads. When the ink supply runs low, or a printhead needs to be replaced, having spares will ensure that printing can resume as quickly as possible.

Since ink and printhead usage will vary depending on the amount and types of printing you do, experience will help you determine how to stock an efficient spare inventory. For example, in a "2x6" configuration (two six-color sets of ink), ColorSpan recommends stocking two six-color sets of ink reservoirs, plus six printheads (one for each color). Both ink reservoirs in a pair tend to run out of ink at the same time, so two spares per color would allow you to continue printing with a minimum of delay. The printheads tend to need replacement one at a time, so one spare per color would be sufficient most of the time.

Tip	To clean a printhead with jet-outs, see "Cleaning Ink Jets" on page 5-3.
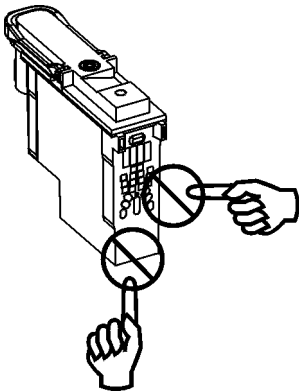
Printhead Handling Tips

◆ **DO** hold the printhead by the plastic body only.

◆ **DO** clean the printheads with a clean lint-free cloth moistened with plain water.

◆ **DO NOT** touch the ink jet nozzles on the bottom of the printhead.

◆ **DO NOT** touch the electrodes on the back of the printhead. The printhead is fired by an electrical signal. The electrodes that carry this signal are easily contaminated.

◆ **DO NOT** set the printhead down anywhere before you install it.

◆ **DO NOT** wipe the printhead with any fiber-cellulose material, such as a paper tissue.

◆ **NEVER APPLY ISOPROPYL ALCOHOL ON THE PRINTHEAD OR SERVICE STATION. USE PLAIN WATER.** Alcohol reacts with pigmented inks, rendering the printhead unusable. To clean ink clogs, see "Cleaning Ink Jets" on page 5-3.

Selecting a Print Mode

Before installing ink, report to the printer how you will use the ink you will install (the "print mode"). This is necessary because although the printer can detect which inks are installed, a given ink set may be usable in several different modes.

For example, consider an installation of two six-color (C2M2YK) sets of ink. By changing the color map selected at the control panel, and without moving or removing any of the ink reservoirs or printheads, these twelve inks may be used as:

◆ 2 six-color ink sets

◆ 1 six-color ink set

◆ 2 four-color ink sets

◆ 1 four-color ink set

See "Switching Between Ink Sets" on page 3-12 for further details.

To configure the print mode:

1. From the Front Page screen on the control panel, press the Print Mode key.

   The control panel displays the Current Selection screen. This shows the current settings for the options you are about to specify.

2. Press the ▶ (Proceed) key.

   The control panel displays the Print Direction menu.

3. Press the ▲ and ▼ keys to select the number of printheads per color you plan to use, then press the ✓ key.

   The Select Ink Type menu appears. Select **User Defined** to select one of four available custom color maps. For more information about custom color maps, see "Creating a Custom Color Map" on page 3-11.

Selecting a Print Mode
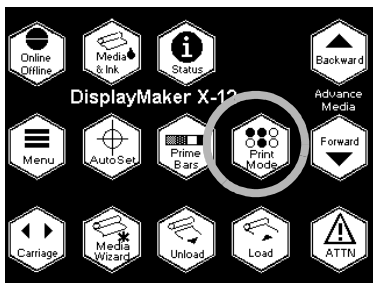
4. Press the ▲ and ▼ keys to select the ink type, then press the ✓ key.

The control panel displays the Select Color Map screen. At the top of this screen are the color sets that are valid for the number of heads per color you selected. At the bottom of the screen is a schematic diagram showing the placement of the printheads in the printhead carriage.
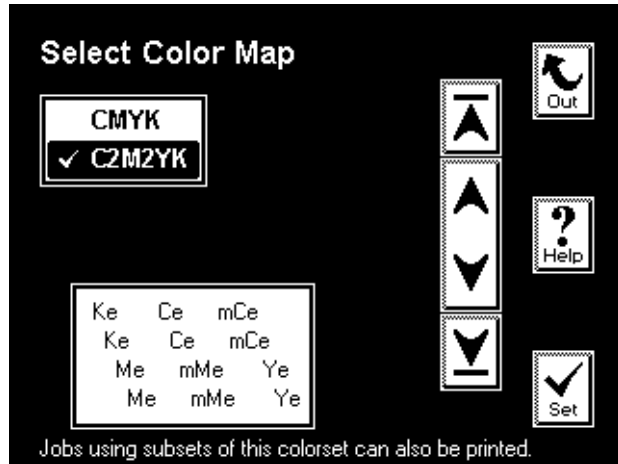

Fig. 3-4. Select Color Map screen

Printhead Positions

1		5		9	
2		6		10	
3		7		11	
4		8		12	

Ink Colors

C	Cyan	lK	LIght Black
mC	Medium Cyan	mlK	Medium Light Black
lC	Light Cyan	mK	Medium Black
M	Magenta	B	Blue
mM	Medium Magenta	O	Orange
lM	Light Magenta	R	Red
Y	Yellow	G	Green
K	Black	xxx	Ignored/Not used

Ink Type (Suffix)	
E	Endura•Chrome
P	Perma•Chrome

AutoInk Maps
There are three AutoInk maps, which allow you to load and print with one Endura•Chrome dye ink set, and one Perma•Chrome pigment ink set, as follows:

◆ **1x6E-1x6P** — one six-color Endura•Chrome set and one six-color Perma•Chrome set

◆ **1x6P-1x6E** — one six-color Perma•Chrome set and one six-color Endura•Chrome set. This configuration eliminates rough edge effects in black lines when printing on Perma•Chrome FineArt Paper.

◆ **1x8E-1x4P** — one eight-color Endura•Chrome set and one four-color Perma•Chrome set.

5. Press the ▲ and ▼ keys to select the color map you will use.

   The color map diagram changes with your selection.

6. Press ✓ to continue.

   The control panel displays the Select Passes menu.

7. Press the ▲ and ▼ keys to select the number of print passes you want to use.

   A higher number of passes produces the best print quality, but a lower number of passes will increase print speed. The default is 8 passes.

8. Press ✓ to continue.

   The control panel displays this message:

   USE MEDIA WIZARD VALUES?

   followed by the current settings for platen vacuum, head height, and 1-pass coverage.

9. Press ✗ to use the setting values you entered, or ▶ to ignore the new values and use the currently-saved values.

   The Front Page screen appears. The print mode is now selected. If you changed the number of passes by more than one pass, you should run a Media Feed Calibration (see "Media Feed Calibration" on page 4-4) and Head-to-Head

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registration ("Auto Calibrations" on page 4-18) before printing.

10. Install the Color Map card that corresponds to the mode you selected into the plastic sleeve on the printer's top cover.

Refer to the Color Map card to help you load inks into the correct locations. See the figure on page 3-5 for an illustration of a Color Map card.

Creating a Custom Color Map
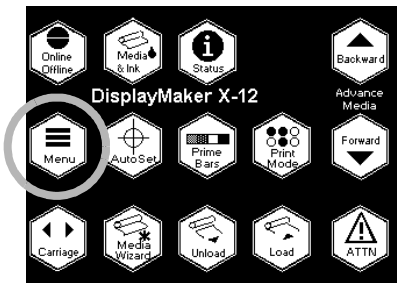
You can create a custom ink set that uses colors of your choosing, in the positions where you want to place them.

1. From the Front Page screen, press the Menu key to enter the menu system.

2. Press the ▼ key to highlight Configure Printer.

3. Press the ↘ (Menu In) key to display the menu.

4. Press the ▼ key repeatedly until Printer Options is highlighted.

5. Press the ↘ (Menu In) key to display the menu.

6. Press the ▼ key repeatedly until Create Custom Colormaps is highlighted.

7. Press the ↘ (Menu In) key.

   The printer prompts you to insert the ink reservoirs.

8. Load the ink modules into the ink trays in the order you intend to use them.

9. Press ▶ (Proceed) to continue.

   The choices for heads per color appear.

10. Select the number of heads per color (press ▼ or ▲ if necessary), then press ▶ to continue.

11. Select the ink type, then press ▶ to continue.

12. Press ▼ or ▲ to select one of the User Defined color maps from the list, then press ▶ to continue.

    The printer displays a summary of your selections, including a schematic diagram of the new color map.

13. Press ▶ to confirm your settings, or ✕ to cancel.

    If you pressed Proceed, your new color map is saved.

14. Press ▶ to continue.

    The **Printer Options** menu appears. The new ink set (color map) you defined is now available under the Print Mode button on the Front Page. To replace this user-defined color map, repeat this procedure and select the map you want to replace in step 12.

Switching Between Ink Sets

The inks are located in specific numbered locations on the printer for optimal print and color quality. The software ignores ink positions that are not needed for a print mode, so any ink (or no ink) can be present in these positions. This provides flexibility while minimizing the need to swap or reposition inks. For example, by loading a 2x6 C2M2YK ink set, you can switch between 2x6, 1x6, 2x4, and 1x4 print modes at the control panel without moving or changing any inks (see below).
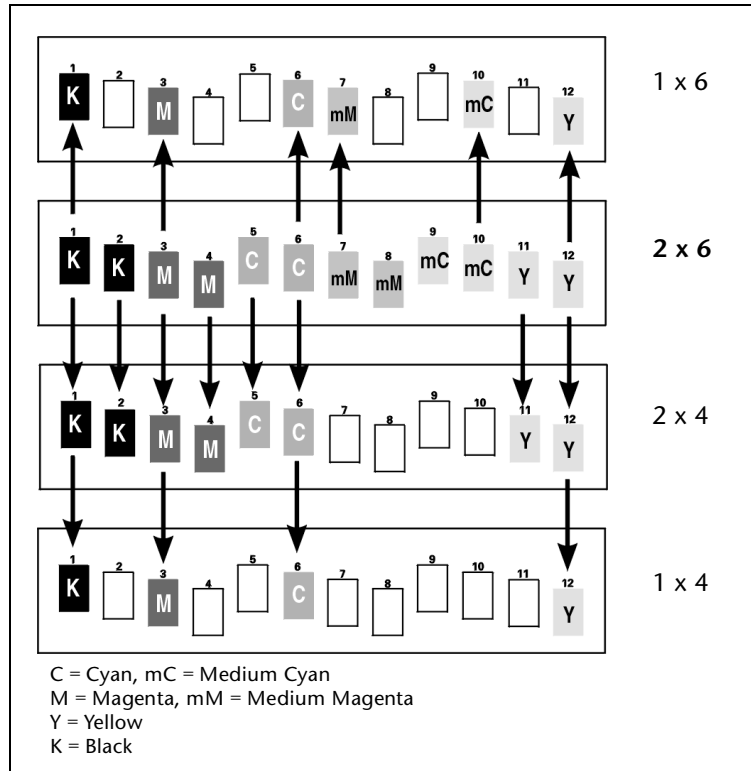

Fig. 3-5. Possible modes with a 2x6 ink set

Switching between eight-color and six-color modes, however, does require switching ink(s):
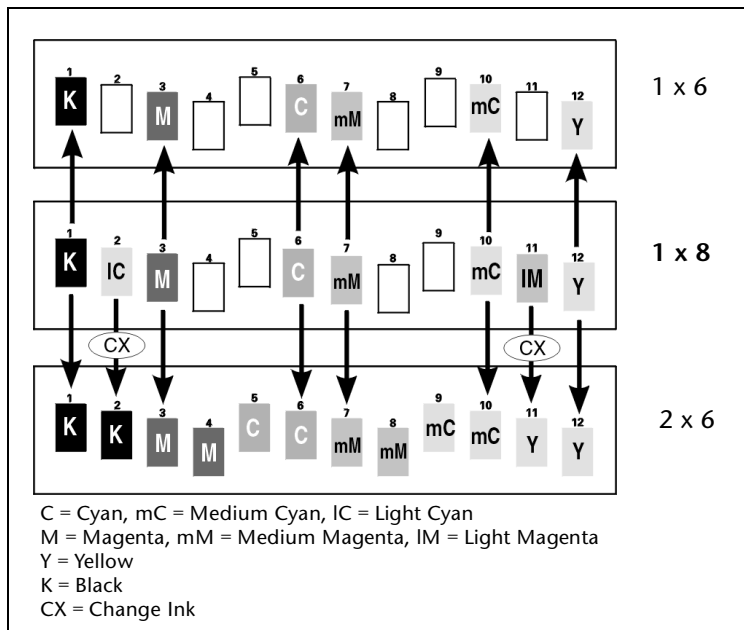

Fig. 3-6. Possible modes with a 1x8 ink set

Caution   When changing ink colors, if you change the print-head and reservoir without changing the existing ink tube, ink from the reservoir will mix with the different ink in the ink tube, producing a third color. When you change ink colors, you must replace the existing printhead, tube, and reservoir with the printhead, tube, and reservoir containing the new ink color.

The printer will display an error if you install a print-head and/or reservoir in the wrong position for the selected ink set, but it cannot detect whether the ink tube does not match the other components.

Since inks of different dilutions are very difficult to visually discern in the ink tubes, be sure to label all components and replace them one color at a time, as described in "Replacing Ink System Components" on page 3-19.

Installing Ink for the First Time in a New Printer

When you receive a new printer, numbered empty ink tubes are preinstalled at the factory. This prepares the printer to accept ink reservoirs and printheads with any ink type or color set. It also avoids introducing air into the ink, which would occur gradually if ink tubes filled with ink were installed and stored unpressurized (without an ink reservoir connected).

During the ink installation process, you will displace the air inside the ink tube with ink *before* you connect the tube to the printhead.
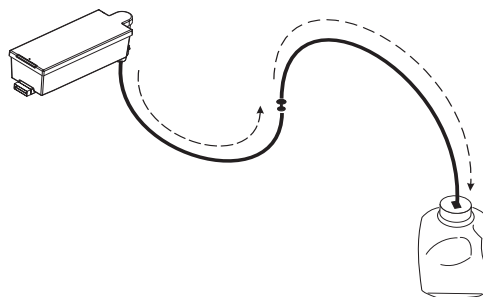
| | Caution | Always fill an empty ink tube with ink *before* connecting it to a printhead. Connecting an empty ink tube to a printhead will result in enough air to be introduced to cause the printhead to fail. This condition may be recoverable by purging the cartridge of air (see "Purging the Printheads" on page 5-14 for instructions), and then priming them (see "Manual Priming" on page 5-11). |
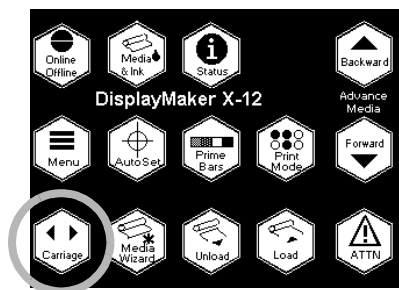
1. On the printer's Ready screen, press the Online/Offline key.

   The Front Page screen appears.

2. On the control panel Front Page screen, press the Carriage key.

   The printhead carriage moves to the center area of the platen so you can load the printheads.

3. Open the printer's top cover.

4. If desired, label the ink tubes at the reservoir end.

   Referring to the Color Map card, affix the labels showing the ink color and ink type onto the ink tubes at the reservoir end. This will identify the ink used in each tube, and help

reconnect any tubes that are removed and stored to the correct ink reservoir and printhead.

5. If not pre-assembled, insert the drain tube into the connection on top of the drain bottle.

Fig. 3-7. Assembling the drain tube to the top
of the drain bottle.

6. Place the drain bottle on the floor and tape the drain tube to the dryer tube, providing a descent from carriage-level to the drain bottle.
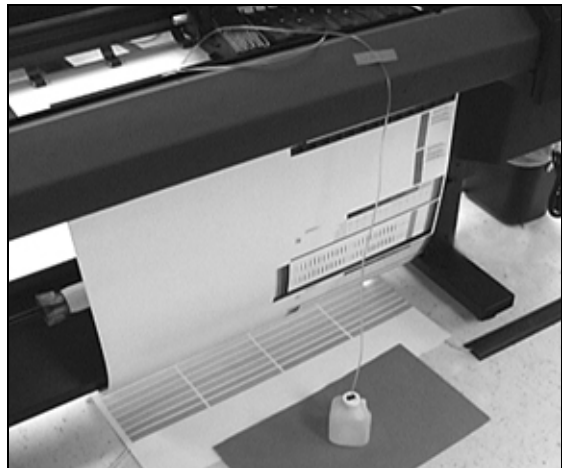

Fig. 3-8. Placing the drain bottle

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7. Referring to the Color Map card, place an ink reservoir into its numbered position (1 through 12) in the ink tray.

    Be sure to insert the profiler into its port in the ink tray. Work with the ink reservoir, tube, and printhead that correspond to one position at a time. This will help prevent cross-connecting components.

8. Referring to the Color Map card, affix the labels showing the ink color and ink type onto the connectors of the ink supply tube (see Fig. 3-3 on page 3-5).

9. Open one of the carriage covers to expose the printhead slots.

    Release the cover by pressing its latch at the front of the carriage.

10. Insert the needle end of the drain tube into the nozzle end of the supply tube that is located in the printhead slot in the carriage assembly (see Fig. 3-9).

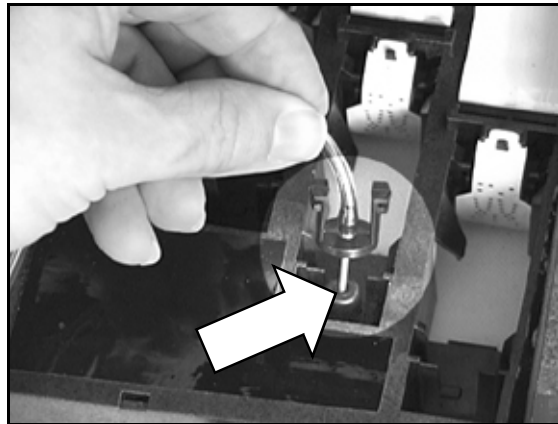   This will allow air to escape from the supply tube.

Fig. 3-9. Connecting the drain bottle tube to the supply tube

11. Connect the ink supply tube into its corresponding fitting on the ink reservoir.

    The ink will begin to flow from the reservoir toward the ink bottle. The ink will displace the air in the tube, filling it with ink. To ensure that the drain tube needle does not slip out of the ink tube, hold the drain tube needle in place during the fill process.

The ink should flow for a few inches into the drain tube, then stop.

◆ If the ink continues to flow, this may indicate that the seal between the printhead and the supply tube is faulty. Replace the supply tube (see "Replacing An Ink Tube" on page 3-22for instructions).

◆ If ink leaks out of the seal between the supply tube and the printhead, replace the supply tube.

◆ If ink does not flow out of the ink module into the supply tube, the seal between the ink module and supply tube may be faulty. Replace the supply tube.

12. As soon as you see ink flowing into the drain tube, pinch the drain tube and remove it from the nozzle end of the ink tube.

By pinching the drain tube, a vacuum is formed between the pinched tube and the end of the needle, keeping any residual ink from draining from the needle as it is removed.
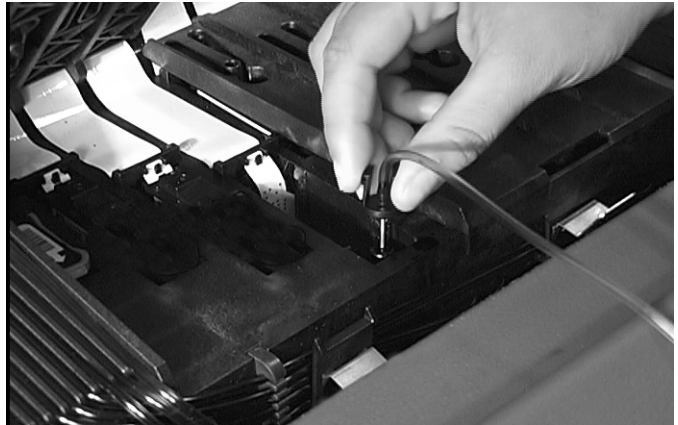

Fig. 3-10. Removing the drain tube

13. Wipe clean the needle end of the drain tube, and set it aside, keeping the ink inside from spilling out.

14. Remove the packaging from a printhead that contains the same ink as the ink reservoir.

Remove the tape covering the electronic contacts, and remove the plug from the ink inlet. Do not touch any of the metallic electronic contacts.

15. Install the printhead into the carriage.

    Install the printhead into the correct position. You can use the built-in handle to help position the printhead.

16. Repeat steps 7 through 15 for each ink tube you want to fill.

17. Close and latch the carriage cover(s).

18. Close the printer's top cover.

    On the control panel Front Page screen, press the ▶ (Proceed) key to park the printhead carriage into the service station.

    See "Loading Media" on page 3-26 for media loading instructions.

After installing one or more printheads, always run AutoSet. See "AutoSet" on page 4-2 for instructions.

Replacing Ink System Components

This section shows you how to replace the individual components in the ink system:

◆ Replacing an ink reservoir in an idle printer (below)

◆ Replacing ("hot swapping") an ink reservoir during printing (page 3-20)

◆ Replacing a printhead (page 3-21)

◆ Replacing an ink tube (page 3-22)

Replacing an Ink Reservoir in an Idle Printer

Replace an ink reservoir when there is insufficient ink to print, or when you want to use a different color or type of ink. If you replace an ink reservoir with the *same* color and type of ink, there is no need to replace the printhead and ink tube.

⚠	Caution	When switching to a new ink color or ink type, replace the ink reservoir, printhead, and ink tube as a matched set. Failure to do so will contaminate the ink system and compromise performance or output quality.

When installing ink tubes, avoid placing excessive tension on the tube end connected to the printhead. Excessive tension may cause kinking and blockage of the ink flow, and could cause the tube to separate from its connector, resulting in an unrestricted flow of ink from the tube.

1. Remove the ink reservoir from the ink tray. Do not disconnect the ink tube at this time.

   This disconnects the profiler, which is built into the ink reservoir, from its port on the back of the tray. The printer detects that the profiler has been disconnected, but will not report an error condition unless you try printing.

2. Install the new ink reservoir into place in the ink tray. Carefully connect the profiler into its port at the back of the tray.

   If you install ink of a different color or type than was originally installed, the printer will report this as an error message on the printer control panel.

3. Disconnect the ink tube from the old ink reservoir, and connect it to the new ink reservoir.

Replacing an Ink Reservoir During Printing ("Hot Swapping")

You can replace an ink reservoir during printing ("hot swap") only with an ink reservoir of the same color and ink type.

Caution	When switching to a different ink color or ink type, wait for printing to finish, then replace the ink reservoir, printhead, and ink tube as a matched set. Failure to do so will contaminate the ink system and compromise performance or output quality.

1. Place the new ink reservoir near the reservoir to be replaced.

2. Remove the ink reservoir from the ink tray. Do not disconnect the ink tube at this time.

    This disconnects the profiler, which is built into the ink reservoir, from its port on the back of the tray. The printer detects that the profiler has been disconnected, but will not report an error condition unless you fail to connect the new ink reservoir to the profiler docking station within ten seconds.

3. Install the new ink reservoir into place in the ink tray. Carefully connect the profiler into its port at the back of the tray.

    Do this promptly. Since the printer keeps track of ink used, the longer it takes for you to replace the ink reservoir, the less accurate this "count" will be. If you install ink of a different color or type than was originally installed, the printer will report this as an error message on the printer control panel, and printing will stop.

4. Disconnect the ink tube from the old ink reservoir, and connect it to the new ink reservoir.

    Connect the new ink reservoir within five seconds, or the printhead may deprime, which will damage printed output.
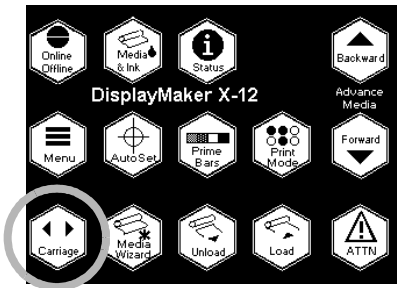
Replacing a Printhead

Replace a printhead when the printer:

◆ When the printer can no longer compensate for missing or deflected jets by increasing the number of print passes, and you cannot recover these jets (see "Cleaning Ink Jets" on page 5-3 for instructions).

◆ When the number of passes required increases print times to unacceptable levels.

◆ When switching ink color or type.

To replace a printhead:

1. Wait for the printer to stop printing.

2. From the ready screen, press the Online/Offline button.

   The Front Page screen appears.

3. Press the Carriage button.

   The printhead carriage moves out of the service station.

4. Open the top cover.

5. Open the carriage cover of the printhead that you want to replace.

   Press the cover's latch at the front of the carriage.

6. Remove the printhead from the carriage by lifting the printhead straight up.

   Use the printhead handle to help you lift it up.

7. Install the new printhead into the carriage.

   Remove the tape covering the electronic contacts, and remove the plug from the ink inlet.

8. Close and latch the carriage cover.

9. Close the top cover.

10. On the control panel, press the ▶ (Proceed) key to park the printhead carriage into the service station.

11. Run an AutoSet calibration.
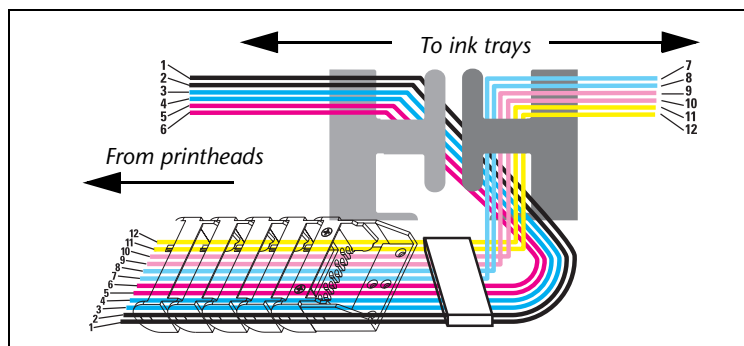
Replacing An Ink Tube

Fig. 3-11. Ink tube routing

Replace an ink tube when switching ink colors or types, or if the ink tube leaks. You need not replace an ink tube when you change an ink reservoir and/or printhead *without* changing ink color or type, if the tube is functioning normally.

Each of the ink tubes is routed to a specific ink tray position, to enable the replacement of individual tubes without crossing or tangling with other tubes.

Caution	Always remove and replace ink tubes one at a time, to ensure correct routing of the tube. Although the printer can detect the proper placement of the ink reservoirs and printheads, it cannot detect whether the ink tubes are routed correctly. Incorrectly routed ink tubes would likely mix inks in the printhead, and cause printing problems.

Tip	Wear protective gloves during this procedure to protect your hands from ink stains.
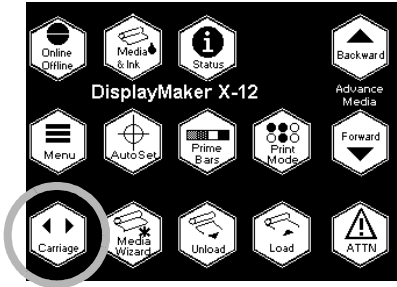
1. Wait for the printer to stop printing.

2. From the ready screen, press the Online/Offline button.

   The Front Page screen appears.

3. Press the Carriage button.

   The printhead carriage moves out of the service station.

4. Open the printer top cover.

5. Disconnect the ink tube from the ink reservoir.

   The tube automatically seals when you disconnect it. This prevents ink from spilling out.

6. Depress the lock levers to unlock the penholder assembly, and swing the carriage up to expose the printheads.

7. Disconnect the ink tube from the printhead.

8. Carefully remove the ink tube from its clips, beginning at the ink tray end.

   Unless the tube is damaged, you can store the tube (with ink sealed inside) for future use. Be sure that it is labeled with position number and ink type. At the end of the track, open the stabilizer clip, and remove its top cover and pad. Save them for reinstallation.

9. Remove the corresponding printhead, handling with care. Set it in a safe location where it will not be bumped or dropped.

10. Clip the new ink tube into the bottom of the penholder and begin installing the tube into its guides.

    Beginning at the penholder end ensures that the slack portion of the tube ends up at the ink tray end.

11. At the end of the track, route the tube through the stabilizer clip (see Fig. 3-12. on page 3-24).

    Push the tube into the clip (some stretching and wiggling of the tube may be necessary), replace the stabilizer clip pad ❶ on top of the tubes, then replace its top cover ❷ and snap it shut to hold the tubes securely. Leave some slack in the S-shaped curve between the chain and the rear of the printer.

⚠	**Caution**	Ensure that the ink tubes will not be pinched or severed when the stabilizer clip is closed.

Ink tray
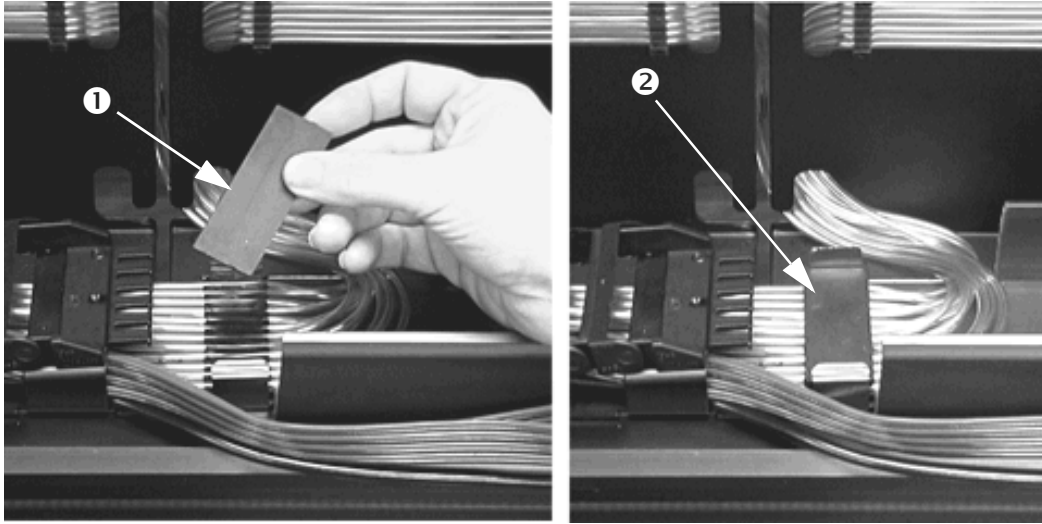
Tube guides inside the tube chain
(shown empty with cable)
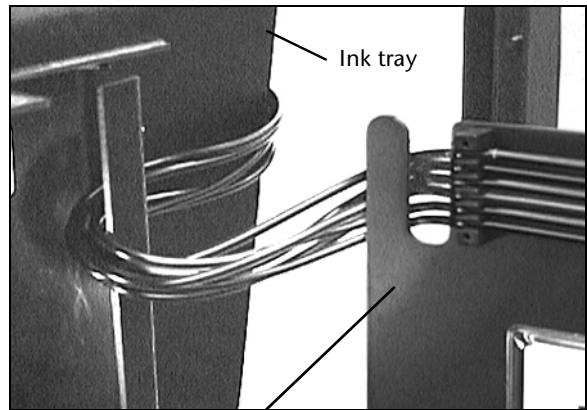
Tube guides along rear of printer

Fig. 3-12. Location of tube guides and routing

12. Fill the empty ink tube by following steps 10 through 12 beginning on page 3-16.

⚠️ | **Caution** | Always fill an empty ink tube with ink before connecting it to a printhead. Attempting to print with an empty ink tube connected to a printhead will result in enough air to be introduced to cause the printhead to fail. This condition may be recoverable by purging the cartridge of air (see "Purging the Printheads" on page 5-11 for instructions).

13. Label the new ink tube with the ink color on the connector to the ink reservoir, and with the tube number (1 through 12) on the connector at both ends.

    Proper labeling will help ensure that the tubes are always connected to the right ink reservoirs and printheads. This will help reduce the possibility of reconnecting tubes to the wrong printheads.

14. Wipe clean the needle end of the drain tube, and set it aside, keeping the ink inside from spilling out.

15. Reinstall the printhead into the carriage.

    Install the printhead into the correct position. You can use the built-in handle to help position the printhead.

16. Connect the new ink tube to the printhead.

17. Swing the printhead assembly down into the printing position, and push the printhead assembly down into position until it engages the lock levers with a click.

18. Close the printer top cover.

19. On the control panel Front Page screen, press the ▶ (Proceed) key to park the printhead carriage into the service station.

20. Run an AutoSet calibration (see "AutoSet" on page 4-2 for instructions).

Loading Media

Wear cotton gloves during this procedure, or handle the media only by its very outside edges. This will prevent skin oils from being deposited on the media, which could render output quality unacceptable.

	Tip	For best results, use genuine ColorSpan media. All ColorSpan media is provided on two-inch cores in lengths to ensure accurate media advance.

	Caution	Do not store or rest a media roll on either end before loading it onto a spool. This could result in an indentation on the edge of the media, which can be struck by the printhead carriage during printing.
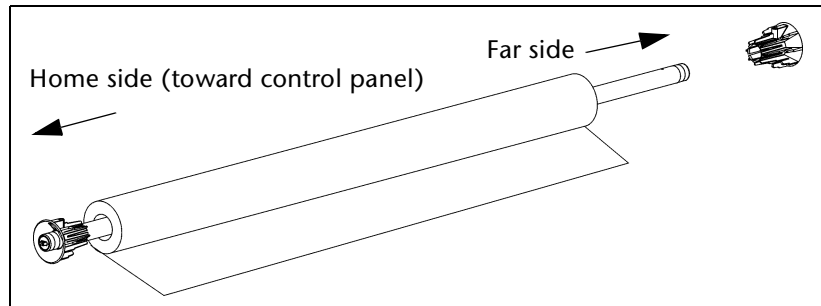
Fig. 3-13. Installing media roll and collets onto the spool

1. Ensure that the fixed collet (with the metal pin) is in the proper location on the supply spool.

    The collet is designed to accommodate 2-inch and 3-inch cores.

    ◆ If you are loading media with a 2-inch core, set the collet into the outside (closest to the home side) hole of the spool. This is how the collet is installed at the factory.

    ◆ If you are loading media with a 3-inch core, set the collet into the inside hole (closest to the far side) of the spool. Tighten the pin with a 5/16-inch hex wrench.

2. Load the media roll onto the spool.

3. Load and secure the other collet against the end of the media roll.

    The far-side collet does not have a metal pin. Push the collet into the core, and friction will hold it in place.

4. From the rear of the printer, load the media and spool into the printer's supply spool holder.

   Press the home side of the supply spool into the home side holder (on the left from the rear of the printer), then swing the far side of the supply spool into the far side holder (on the right).

5. With your right hand, feed the leading edge of the media into the printer's pinch rollers and hold it in place until the following step.

   If loading 72 inch media, see "Loading 72-Inch Media" on page 3-31.

ℹ	**Note**	The printer automatically locates the right and left edges of the media, so it is not necessary to align the media edges to a reference mark on the platen.

6. With one hand, press the Media Advance button to advance media a few inches (several centimeters).

   The Media Advance button is located to the left of the installed supply spool, on the rear of the printer next to the ink module tray and electronics enclosure.

7. While holding the left collet stationary, press the Media Advance button a few seconds, until the media web is tight with no wrinkles.

   Ensure that the right and left edges of the media web are perpendicular to the sides of the printer, that the tension appears uniform across the media web, and that the media is not unrolling unevenly ("telescoping") from the supply spool.

ℹ	**Note**	These checks ensure that the tension is uniform across the width of the media. This is critical to trouble-free printing.
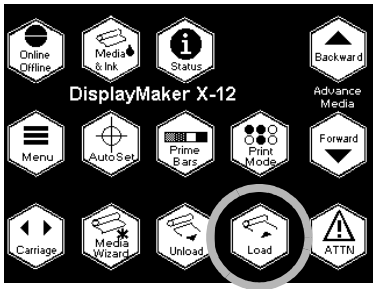
8. On the Front Page screen of the control panel, press the Load Media key.

   The control panel prompts you to press the ▶ key to load media, or ✕ to cancel.

9. Press the ▶ key to proceed.

   The control panel prompts you to advance the media.

10. Press the ▼ key to advance the media past the front edge of the platen.

11. Press the ▶ key to proceed.

12. Select a media thickness from the list.

   You can select a ColorSpan media from the list, or select Custom (at the end of the list) to specify a custom thickness.

   If Media Wizard values are present for the media you selected, the control panel displays this message:

   USE MEDIA WIZARD VALUES?

   followed by the current settings for platen vacuum, head height, and 1-pass coverage.

13. Press ✕ to use the setting values you entered, or ▶ to ignore

   The control panel displays a numeric keypad.
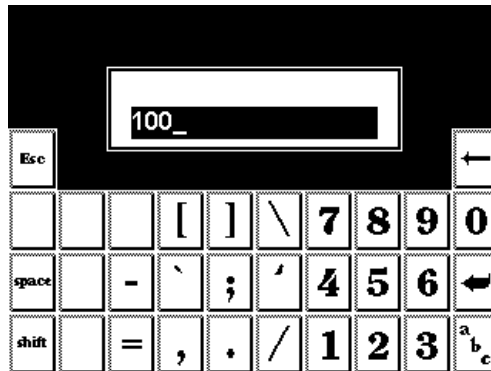
Fig. 3-14. Numeric entry screen

14. Enter the length of the media roll (if it is a new roll) or the length remaining (if it is a partially used roll), and press the Enter key to continue.

To skip this step, press Esc or Enter without entering a value. The printer will not track the amount of media remaining on the roll, and it will be unable to display a warning when the amount of media runs low. The media length will display as "undefined," and the Unload Media process will be unable to print the amount of media remaining on the supply spool.

15. The control panel asks whether you want to use the takeup system.

    See "Takeup Options" on page 3-32 for details on using the takeup system.

    ◆ If you will be printing without using the takeup system, or if you will be performing a Media Feed Calibration, press the ✕ key to skip loading the takeup. See "Media Feed Calibration" on page 4-4 for instructions.

    ◆ To use the takeup system, press the ▶ key.

16. Press and hold the ▼ key until the end of the media reaches past the takeup spool.

17. Grasping the middle of the media web, pull straight back and tape the middle of the web to the takeup core.

🛈	**Note**	Be sure that the direction you wrap the media around the takeup spool is consistent with the direction specified in the **Takeup Direction** option of the menu (see "Takeup Options" on page 3-32 for details). The default direction is **Printed Side Out**.

18. Press the ▶ key to continue.

    The control panel displays an informational message suggesting that you perform a Media Feed calibration.

19. Press the ▶ key to perform a Media Feed calibration, or ✕ to skip the calibration.

    See "Media Feed Calibration" on page 4-4 for instructions.

    You are now ready to begin printing. The printer will verify that the media is wide enough for each print job it receives.

Tip   The media should be consistently tensioned across its width when attached to the takeup spool. Ensure that the web is straight and smooth from side to side.

Loading 72-Inch Media

The width of the 72-inch media makes it impossible for most persons to load it by grasping its left and right edges at the same time. Follow this procedure to more easily load 72-inch wide media.

Wear cotton gloves during this procedure, or handle the media only by its very outside edges. This will prevent skin oils from being deposited on the media, which could render output quality unacceptable.

1. With one hand, grasp the media at the center of its leading edge, and pull it forward into the center grip rollers.

2. While continuing to hold the center of the leading edge of the media in place, grasp the left edge of the media with your left hand.

3. Pull the left edge of the media into the leftmost grip rollers.

4. Hold the media in place with your left hand.

5. Grasp the right edge of the media with your right hand, and pull it into the rightmost grip rollers.

6. With both hands, feed the media web evenly into all grip rollers.

7. With your right hand, hold the media spool at the collet to prevent the spool from moving.

8. With your left hand, press the media advance button for 2-3 seconds. The grip rollers will spin beneath the stationary media, thus equalizing the tension on the roll.

9. Press the Media Advance button to finish loading the media.

10. Verify that the media web is even and unwrinkled across its width.

11. When loading the media onto the takeup spool, ensure that the media is tightly wound onto the spool across its width.

    Uneven or excessive tension may cause the spool to pull out of the left spool holder.

Takeup Options	## Automatic Disable

The takeup is automatically turned on (enabled) when you load the takeup. The takeup is turned off (disabled):

◆ When you press the **Load** key or **Unload** key on the Front Page

◆ When you select the **Load Takeup** or **Restore All Defaults** option from the menu

◆ If you skip loading the takeup during the **Load** process

◆ If the takeup was loaded and the printer detects that the takeup is no longer loaded (for example, if the media is cut from the takeup spool and not reloaded, or if the supply spool runs out of media)

◆ If the printer detects that the takeup spool is full (by estimating the diameter of the media on the takeup spool); this condition also generates an Action message that requires the full spool to be removed, followed by a **Load** or **Load Takeup** operation

Not Using the Takeup

When printing one print at a time, you may choose to not use the takeup system at all. In this case, advance the media, cut the finished print from the roll, then back up the media for the next print. (To advance and back up the media using the control panel, see "Front Page" on page 2-5).

⚠	Caution	If you do not use the takeup system, the software assumes that you are cutting individual prints as they are printed. If you send a large number of jobs to the printer without the takeup system loaded, and allow printing to continue unattended, the prints will pile onto the floor.

Takeup Direction

You can also configure the takeup system so it winds the image facing to the inside or outside of the spool. This is useful for compatibility with a laminator or other finishing equipment. See Takeup Control under "Printer Settings" on page 2-11 for instructions.

Linearization   When changing media types, you should perform a color cali-
                      bration or linearization (if supported by the RIP). This compen-
                      sates for the differences between medias that affect color
                      accuracy.

                      For further information, see "Linearization" on page 4-30.

                      When replenishing the media supply with the same type of
                      media, relinearization is unnecessary unless print color quality
                      has changed noticeably.

Dryer Options

As the printed output advances past the dryer outlets, the dryer blows air over the output to dry it. The print will continue to advance until the trailing edge of the print has passed under the dryer. The print remains stationary for twenty seconds, then will reverse or advance according to the print mode. To cancel the twenty-second delay, press the ✕ (Cancel) key.

Drying Delay

The printer's relative humidity sensor enables the printer to adjust the media advance speed to ensure adequate drying. Higher relative humidity will result in slower printing. You can adjust the amount of delay from the control panel; for instructions, see page 2-12.

Relative Humidity	Printer Action
0–29%	Low humidity warning displayed, jets may drop out and media may lift from the platen
30–59%	Optimal, no warning or drying delay
60–79%	High humidity warning displayed, media advance is delayed automatically as humidity increases
> 80%	Action displayed, printing stops. User must specify a manual drying delay to proceed with printing (see Drying Delay on page 2-12)

Drying Rate

There are two rates of media advance during post-print drying. Select **Standard** for the fastest throughput. Select **Same as print speed** to slow the advance if additional drying time is needed. See Drying Rate on page 2-12.

Fans and Heater

To turn off the dryer fans, select **Configure Printer - Printer Options - Dryer** from the menu.

Caution	Output on polyester films can be streaked by the dryer air flow. To avoid this, turn off the dryer fans from the control panel.	

Cutting and Unloading Media
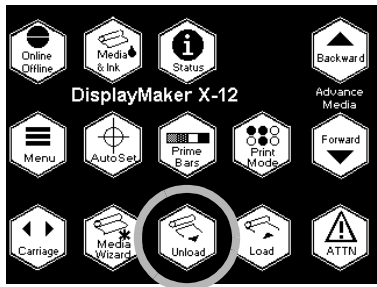
1. Press the ▼ key on the Front Page screen to advance the printed portion of the media past the cutter anvil (on the front edge of the platen).

2. From the front of the printer, place a utility knife blade in the cutter channel and draw the cutter across the media.

   Support the trailing edge of the media as you cut it from the supply spool.

3. On the Front Page screen of the control panel, press the Unload Media key.

4. The control panel prompts you to press ▶ to unload media, or ✕ to cancel.

5. Press ▶ to continue.

   The control panel asks if you want to print the calculated length of media remaining on the supply spool onto the media for reference. When reloading the media later, the control panel will prompt you to enter this value so it can continue to track the amount of media remaining.

6. Press ▶ to print the length remaining, or ✕ to skip printing.

7. As desired, take the single print or takeup spool with printed output to your finishing area, and re-load the takeup system.

   To re-load the takeup, from the menu, select **Load Takeup** (located at the end of the menu).

CHAPTER 4

Calibrating the Printer

This chapter explains how to calibrate the printer for the best possible output:

◆ AutoSet (page 4-2)

◆ Manual Calibrations (page 4-3) — Media Feed, Manual BiDi Registration, Manual Head Registration, Manual Jet Mapping, Jet Status Lines, Default Registration Data

◆ Auto Calibrations (page 4-18) — AutoBiDi Calibration, AutoH2H (Head-to-Head) Calibration, AutoBiDi & H2H Calibration, AutoJet Calibration

◆ AutoTune (page 4-19)

◆ Calibration Summary (page 4-20)

◆ Head Height Calibration (page 4-22)

◆ Linearization (page 4-30)

AutoSet

AutoSet is an advanced printer calibration feature that uses an onboard digital imaging sensor and sophisticated software to detect and compensate for variations in ink jet printing. It can be initiated by the user or run automatically at specified intervals (AutoTune). AutoSet is designed to be a "one-button" calibration, the only calibration you need to run in most cases for superior quality output.
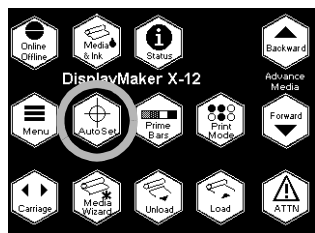
When you press the AutoSet key on the Front Page control panel screen, these functions are performed automatically:

◆ **Bidirectional Registration** — ensures that every working jet fires a pixel at precisely the same location, regardless of the carriage's direction of travel.

◆ **Head-to-Head Registration** — ensures that the printheads are in alignment relative to each other.

◆ **AutoJet substitution mapping** — detects and disables individual ink jets that are misfiring or not firing at all. During subsequent printing, the printer compensates for these jets by using other jets in their place, ensuring maximum print quality without reducing print speed.

Note	Clean printheads produce the best printed output and accurate calibration patterns.

Note	AutoSet does not work with transparent media. In this case, you should run AutoSet on a white media that is similar in thickness to the clear media, then switch to the transparent media; or manually run the calibrations under the Calibrate Printer menu using the transparent media.

Tip	If the printhead carriage head height is set to 0.070 inches (1.78 mm) or higher, do not run AutoSet. For best accuracy, run the manual calibrations instead. For instructions on running the manual calibrations, see "Manual Calibrations" on page 4-5.

Manual Calibrations

When you run the calibrations from this menu, you evaluate the calibration test patterns visually and enter the calibration values via the control panel. In most cases, AutoSet is more accurate and should be used instead (see "AutoSet" on page 4-2).

Note	Manually performing the component calibrations of AutoSet is time-consuming and can be error-prone, but is necessary when the head height is 0.070 inches (1.78 mm) or greater, or when calibrating transparent media. (There is no automatic media feed calibration, so you must always perform it manually.)

If you decide to manually calibrate the printer, first clean the printhead jets as described in "Cleaning Ink Jets" on page 5-3.

The Manual Calibration menu consists of these options:

◆ **Media Feed** (page 4-4) — enables you to calibrate the printer's media advance accuracy by printing and visually inspecting your choice of test patterns.

◆ **Manual BiDi Registration** (page 4-6) — prints bidirectional registration patterns and allows you to report which pattern is the most precise.

◆ **Manual Head Registration** (page 4-9) — precisely aligns the printheads relative to each other, for accurate colors and precise registration of images.

◆ **Manual Jet Mapping** (page 4-12) — enables you to detect and report nonfiring or misfiring ink jet nozzles, which enables the printer to "fill in" for them.

◆ **Jet Status Lines** — prints a quick test pattern that shows which jets are out.

◆ **Default Registration Data** — sets all registration data to zero.

After calibration and jet mapping, perform a linearization, or color calibration (as supported by your print server or RIP). For further information, see "Linearization" on page 4-30.

Media Feed Calibration

This calibration allows you to calibrate the accuracy of the media feed process. You perform this calibration when loading media, if print quality is poor, or if prints requiring very accurate length (for example, output that will be tiled) are found to be the wrong length. The Media Wizard stores this value by media type.

◆ **Before** performing a Media Feed calibration, print the Prime Bars and clean the ink jets to get the maximum number of jets working.

◆ **After** performing a Media Feed calibration, run AutoSet.

1. If you will be performing this calibration with a new roll of media, advance the media to the floor, back it up to the platen, and remove the supply loop (see page 2-14).

   This will remove the advance error that would be introduced by the tighter winding at the beginning of a new roll of media.

2. Press the ☰ (Menu) key from the Front Page screen on the control panel to display the menus.

3. Press the ↘ (Menu In) key display the Calibrate Printer menu.

4. Press the ▼ key to highlight Manual Calibration.

5. Press the ↘ (Menu In) key.

6. Press the ↘ (Menu In) key to select the Media Feed option.

   The following prompt appears:

   > Press Proceed to print pattern
   > Press Cancel to adjust without printing

7. Press the Proceed key to print a test pattern, or Cancel to skip printing.

   If you press Cancel, to go step 12.

   When you press Proceed, you can choose between the following calibrations:

   ◆ **34-Inch (900 mm) Calibration** — prints two reference marks along the direction of media feed; measure the distance between the marks to determine advance accuracy.

   ◆ **12-Inch (305 mm) Calibration** — same as previous calibration, uses less media but may be less accurate.
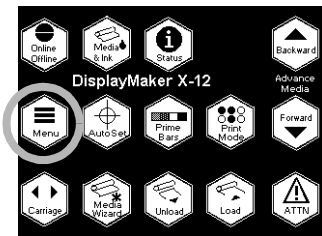
8. Select one of the options and press the ➘ (Menu In) key to continue.

   The printer asks whether you want to print the media feed calibration.

9. Press the ▶ key to continue.

   The printer asks whether you want to print the media feed calibration.

10. Press the ▶ key to continue.

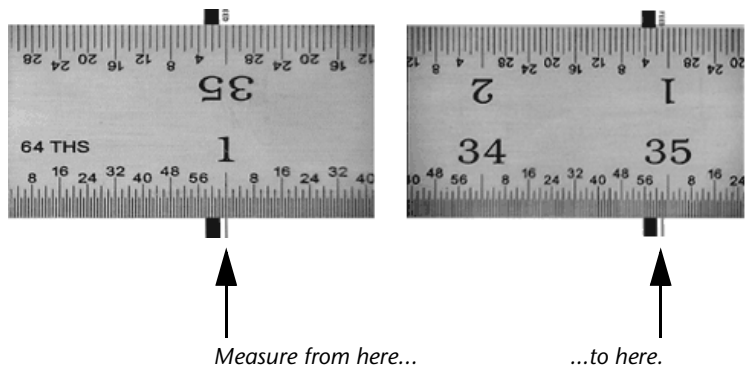   The printer prints the calibration marks, and prompts you to adjust the advance.

Measure from here...   *...to here.*

Fig. 4-15. Media Feed Calibration pattern

11. With a metal yardstick, measure the distance between the hairline marks (the thicker marks are to ensure working jets).

    A measuring stick with 1/64 inch markings works best. For maximum accuracy, begin measuring at the 1-inch mark, and subtract 1 inch from the result.

12. Adjust the media feed advance using the control panel.

    You can increase the advance by pressing the ▲ key, or decrease it by pressing the ▼ key.

13. Press ▶ (Proceed) to save the advance value you entered.

14. Press ▶ (Proceed) to return to the menu.

Manual Bidirectional Registration

Bidirectional registration is a method to align each of the printheads so that dot placement is accurate in both directions along the X axis (along the direction of print head travel).

The bidirectional registration pattern consists of a series of vertical lines. Half the pixels in this pattern are printed in one direction, half of them in the other direction. When the pixels are accurately aligned, the pattern is clear. When the dots are not aligned, the pattern appears fuzzy and ill-defined.

Tip	AutoSet incorporates an automatic version of this calibration. Try AutoSet first before running this manual calibration (see "AutoSet" on page 4-2 for details).

There are three bidi patterns from which to choose:

◆ **Fine** — allows 0.25 pixel adjustments

◆ **Medium** — allows 0.5 pixel adjustments

◆ **Coarse** — allows 1 pixel adjustments

For the most precise image reproduction, perform these calibrations one after the other, starting with Coarse, then Medium, then Fine.
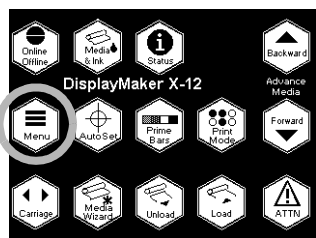
1. Press the ☰ (Menu) key from the Front Page screen on the control panel to display the menus.

2. Press the ↘ (Menu In) key display the **Calibrate Printer** menu.

3. Press the ▼ key to highlight **Manual Calibrations.**

4. Press the ↘ (Menu In) key.

5. Press the ▼ key to highlight **Manual BiDi Registration.**

6. Press the ↘ (Menu In) key to select the option.

7. Press ▶ (Proceed).

   The control panel displays this prompt:

   > Print a manual bidi registration page?

8. Press ▶ (Proceed).

9. Press the ▼ key repeatedly to highlight the **Fine, Medium, or Coarse** option.

10. Press ▶ (Proceed).

   The printer prints the calibration pattern you selected.

11. When the calibration page has printed, the control panel displays this prompt:

   Bidi registration
   Head 1: 0

12. Examine the BiDi Registration pattern for the current head, and determine which pattern is the closest to perfectly aligned.

   Use a printer's loupe to select the pattern, since the lines in the patterns may be difficult to discern.
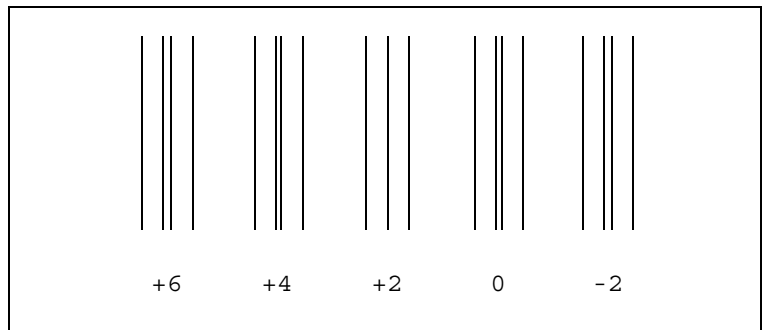
Fig. 4-16. BiDi Registration pattern.

13. Press the ▲ or ▼ control panel keys repeatedly until the number next to the pattern that is closest to aligned perfectly is displayed.

   For example, if pattern +2.0 is the closest aligned, press the ▲ key to change the display to:

   HEAD-1   +2.0

   If a printhead is extremely out of alignment, there may be no pattern in alignment. Since the black vertical bars are nominally five pixels apart, you can add +5 or -5 to a pattern number to shift the colored bars right or left by one black bar. Alternatively, you can perform the BiDi Registration repeatedly, which will move the head in smaller increments, until the head is aligned.

14. Press ▶ (Proceed).

   The control panel message increments the head number by one.

15. Repeat steps 12 through 14 for each of the twelve heads.

When you have entered registration values for all heads, the control panel displays this message:

Registration Successful

Manual Head Registration

The printer creates images by firing dots of ink onto a sheet of media. Precise positioning of each dot is essential for optimal print quality. This is possible only if you register all printheads in the printhead assembly to each other in both the **X** (along the length of the platen) and **Y** (along the length of the media) directions.

This is a two-part process:

◆ Print a registration pattern.

◆ Enter the X and Y registration data for each head.

	Tip	AutoSet incorporates an automatic version of this calibration. Try AutoSet first before running this manual calibration (see "AutoSet" on page 4-2 for details).
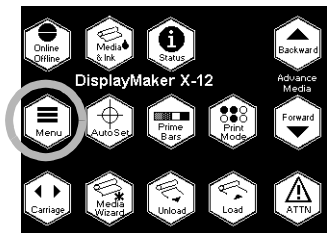
1. Press the ☰ (Menu) key from the Front Page screen on the control panel to display the menus.

2. Press the ➘ (Menu In) key display the **Calibrate Printer** menu.

3. Press the ▼ key to highlight **Manual Calibration.**

4. Press the ➘ (Menu In) key.

5. Press the ▼ key to highlight **Manual Head Registration.**

6. Press the ➘ (Menu In) key to select the option.

   The control panel asks whether you want to print a manual head-to-head calibration page.

7. Press the ▶ key.

   The control panel displays a menu to allow you to select a Fine, Medium, or Coarse registration pattern.

8. Press the ▼ and ▲ keys to select a pattern, then press the ▶ key.

   If you have a calibration pattern from a recent print, you can use it to calibrate the heads. Press ✗ (Cancel) and go to step .

If you need to print a new calibration pattern, press ▶ (Proceed). The printer prints a calibration page.

X-direction patterns   Y-direction patterns
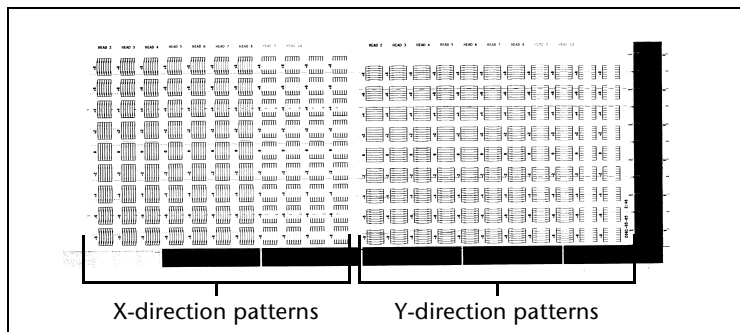
Fig. 4-17. Head-to-Head Registration patterns

When the calibration page has printed, the control panel displays this prompt:

Take readings from left side of pattern.

9. Press the ▶ key.

The control panel displays this message:

X Direction Registration
Head 2: +0

10. Examine the X direction pattern (in the left-hand group of patterns) for the current head, and determine which pattern of colored and black lines are the closest to perfectly aligned.

Use a printer's loupe to select the pattern, since the lines in the patterns may be difficult to discern otherwise.

+0   +1   +2
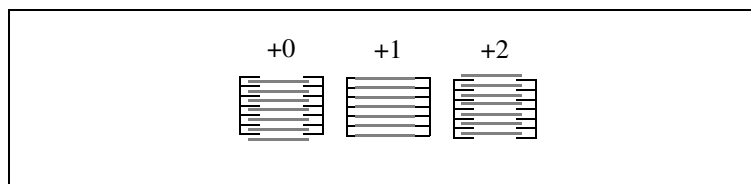
Fig. 4-18. Sample head calibration patterns.
In this example, pattern "+1" is aligned the closest,
so "+1" would be entered.

11. Press the ▲ or ▼ control panel keys repeatedly until the number next to the pattern that is closest to aligned perfectly is displayed.

For example, if pattern +2 is the closest aligned, press the ▲ key to change the display to:

X REG
HEAD-1   +2

If a printhead is extremely out of alignment, there may be no pattern in alignment. Since the black vertical bars are five pixels apart, you can add +5 or -5 to a pattern number to shift the colored bars right or left by one black bar. Alternatively, you can repeatedly perform an X calibration, which will move the head in smaller increments, until the head is aligned.

12. Press ▶ (Proceed).

The control panel message increments the head number by one.

13. Repeat steps 10 through 12 for each of the heads.

When you have entered registration values for all the heads, the control panel displays this message:

Take readings from right side of pattern.

14. Press the ▶ key.

Y Direction Registration
Head 2: 0

X registration is complete. You are now ready to begin Y registration.

15. Examine the Y registration pattern (in the right-hand group of patterns) for the current head, and determine which pattern of colored and black lines are the closest to perfectly aligned.

16. Press the ▲ or ▼ control panel keys repeatedly until the number next to the pattern that is closest to aligned perfectly is displayed.

17. Press ▶ (Proceed).

The control panel message increments the head number by one.

18. Repeat steps 15 through 17 for each of the Y patterns.

When you have entered registration values for all of the patterns, the control panel displays this message:

Registration successful.

Manual Jet Mapping

Each of the printheads used by the printer has 512 ink jet nozzles (jets). If any one of these jets is clogged or has a bad electrical connection, print quality may be affected. A certain number of non-firing jets is within the performance specifications of most printers that use this technology.

Using a patent-pending technique, the printer "fills in" the pixels that were not printed by the non-firing jets, without reducing print speed. The end result is that every print is made with no missing pixels.

The printer automatically maps out missing jets that are not firing for electrical reasons. Jets that are missing or misfiring for other reasons are usually detected during the AutoSet or AutoJet calibrations. You may also map jets manually using the following procedure.

	Tip	AutoSet incorporates an automatic version of this calibration. Try AutoSet first before running this manual calibration (see "AutoSet" on page 4-2 for details).

	Tip	For best results, before performing this procedure, clean the printhead jets as described in "Cleaning Ink Jets" on page 5-3. Autodetected missing jets sometimes can be recovered by carefully wiping the electrical contacts on the printhead and their corresponding contacts on the printhead carriage with a lint-free wipe moistened with plain water.
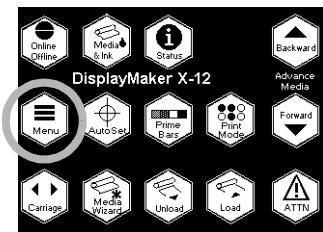
1. Press the ☰ (Menu) key from the Front Page screen on the control panel to display the menus.
2. Press the ↘ (Menu In) key display the **Calibrate Printer** menu.
3. Press the ▼ key to highlight **Manual Calibration.**
4. Press the ↘ (Menu In) key.
5. Press the ▼ key to highlight **Manual Jet Mapping.**
6. Press the ↘ (Menu In) key to select the option.

   The control panel displays this message:

   <div align="center">Print Jet Map
Page 1 of 2 now?</div>

If you have a calibration pattern from a recent print, you can use it to calibrate the heads. Press ✕ (Cancel) and go to the next step. Otherwise, press ▶.

The printer prints a jet map test pattern for printheads 1-6.
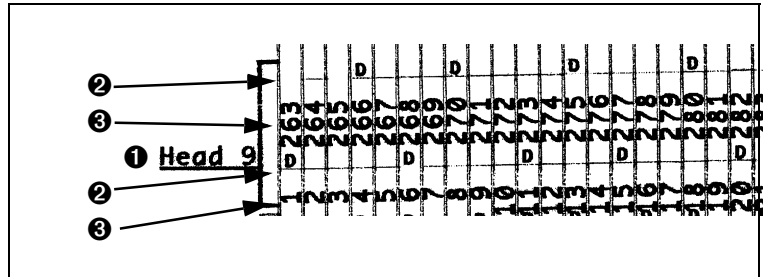
Fig. 4-19. Sample jet mapping pattern

❶ Head number
❷ Test pattern and codes
❸ Jet number

◆ If a line segment is missing or broken, the jet listed in the same column is out. In Fig. 4-19, jets 263 and 265 are out.

◆ If a line segment is marked with a code letter, it has already been detected by the software, so no further action by you is required. This data, however, may be requested by MacDermid ColorSpan Technical Services (phone: 800-925-0563) to help diagnose printing problems.

🛈	**Note**	If this test auto-detects (marks with an E) that more than twelve jets are missing on any one printhead, the printhead may be improperly seated. Try reseating the printhead, and print another Jet Coverage pattern.

7. When the calibration pattern has printed, the control panel displays a menu with the following options:

   ◆ **Report individual bad jets** — enables you to report a bad jet.

   ◆ **Clear individual bad jets** — enables you to clear (mark as good) a jet.

   ◆ **View current bad jets** — lists the bad jets on a given printhead.

◆ **Clear all bad jets** — clears (marks as good) all jets currently marked as unusable.

Select an option and follow the corresponding procedure below.

Report Individual Bad Jets

When you select Report Individual Bad Jets, the control panel displays the following prompt:

Head 1:
Press Proceed to report a bad jet.

8. Press ▲ and ▼ to select a head number, then press ▶ (Proceed).

The control panel displays a numeric keyboard that you can use to enter the number of the bad jet.
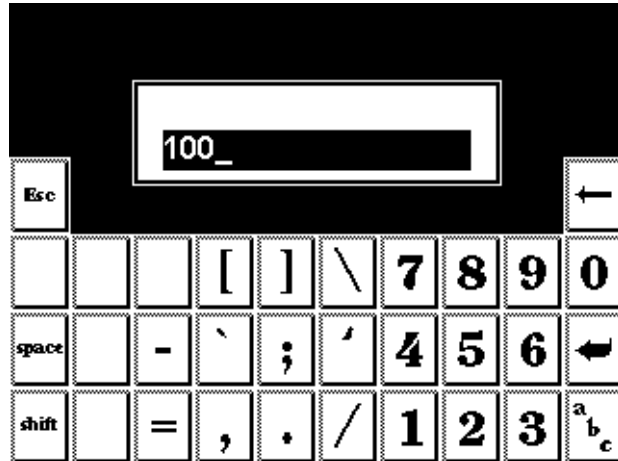
Fig. 4-20. Numeric entry screen

9. Enter the jet number, then press the Enter key.

10. When you are finished entering jet numbers, press the Esc key.

The control panel displays the head selection message again.

11. Press ▲ and ▼ to select the next head number, then press ▶ (Proceed).

12. Repeat steps 9 through 11 for each head containing bad jets you want to report.

13. When you are finished reporting bad jets, press ✕.

    The control panel displays the previous menu.

Clear Individual Bad Jets

When you select Clear Individual Bad Jets, the control panel displays the following prompt:

<div align="center">

Head 1:
Press Proceed to clear a bad jet.

</div>

14. Press ▲ and ▼ to select a head number, then press ▶ (Proceed).

    The control panel displays a numeric keyboard that you can use to enter the number of the bad jet.

15. Enter the jet number, then press the Enter key.

16. When you are finished entering jet numbers, press the Esc key.

    The control panel displays the head selection message again.

17. Press ▲ and ▼ to select the next head number, then press ▶ (Proceed).

18. Repeat steps 15 through 17 for each head containing bad jets you want to clear.

19. When you are finished clearing bad jets, press ✕.

    The control panel displays the previous menu.

View Current Bad Jets

When you select View Current Bad Jets, the control panel displays the following prompt:

<div align="center">

Head 1:
Press Proceed to view bad jets.

</div>

20. Press ▲ and ▼ to select a head number, then press ▶ (Proceed).

    The control panel displays a message that lists the bad jets by number.

21. Press ▶ to return to the head selection screen.

22. Repeat steps 20 and 21 for each head you want to check for bad jets.

23. When you are finished clearing bad jets, press ✕.

The control panel displays the previous menu.

Clear All Bad Jets

When you select Clear All Bad Jets, the control panel displays the following prompt:

> Are you sure you want to clear
> ALL reported bad jets?

◆ Press ✗ to cancel this function, or

◆ Press ▶ (Proceed). The control panel displays this message:

> All reported bad jets have been cleared.

24. Press ▶.

The following prompt appears:

> Print Jet Map
> Page 2 of 2 now?

25. Press ▶.

26. Repeat steps 7 through 24.

When you have finished mapping jets, the following summary appears on the control panel:

> x jets currently reported bad.
> x new bad jets reported.
> x previous bad jets cleared.

where x is the number of jets.

Jet Status Lines   This option prints a test pattern that shows which jets are working, and which jets are out.

Zero Registration Data   This option resets all registration data. Since there is no registration data after running this option, all calibration values must be reestablished by running the calibrations.

Auto Calibrations

AutoSet is a convenient "one button" action to run three different calibrations automatically. You can also run each one individually, from the Auto Calibrations menu.

To evaluate the calibration test patterns visually and enter the calibration values via the control panel, run the Manual Calibrations. For instructions, see "Manual Calibrations" on page 4-3.
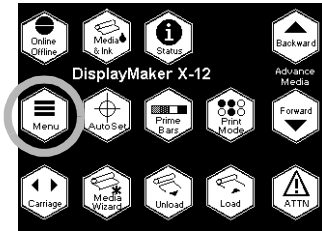
1. On the Front Page screen, press the ☰ (Menu) key to enter the menu system.

2. Press the ⬃ (Menu In) key display the **Calibrate Printer** menu.

3. Highlight **Auto Calibrations** and press the ⬃ (Menu In) key.

4. Select one of the Auto Calibrations.

   ◆ AutoBiDi Calibration

   ◆ AutoH2H (Head-to-Head) Calibration

   ◆ AutoBiDi & H2H Calibration

   ◆ AutoJet Calibration

AutoTune

AutoTune runs AutoSet automatically at intervals you specify. When you use the AutoTune scheduler to run AutoSet, AutoSet always performs its three calibrations without prompting the user or canceling due to too many bad jets. You can use the Quality Check Mode feature to handle AutoSet errors, with or without user intervention.
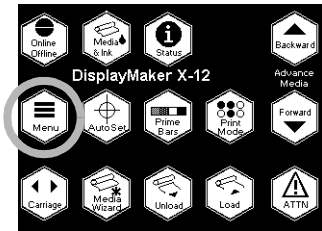
To run AutoSet at specified intervals (AutoTune):

1. On the Front Page screen, press the ☰ (Menu) key to enter the menu system.

2. Press the ➘ (Menu In) key display the **Calibrate Printer** menu.

3. Press the ▼ key to highlight **AutoTune.**

4. Press the ➘ (Menu In) key.

   The control panel prompts you to specify an AutoTune interval.

5. Press ▶ (Proceed).

   The control panel displays this message:

   Run AutoSet every 0 prints.

6. Press the ▲ key repeatedly to increment the AutoTune interval to the number of prints you desire.

7. Press ▶ (Proceed).

8. Press the ↖ (Menu Out) key repeatedly until the Front Page screen is displayed. Press the Online/Offline button to return the printer to the Ready state.

Quality Check Mode

When you run AutoSet manually, the software notifies you if there are any jet or alignment problems so that they can be addressed. When AutoTune runs AutoSet at scheduled intervals, you can use the Quality Check Mode feature to handle AutoSet errors. For instructions on setting the Quality Check Mode, see page 2-14.

Calibration Summary

These options allow you to print a summary of the AutoSet calibration, or transmit calibration data to a log file on the print server.

◆ **AutoSet Summary** — when enabled, a table of the results of the AutoSet calibration is printed after the AutoSet test patterns. If you enable the AutoSet Summary, you can show or hide the detailed calibration data.

◆ **Log Head Registration Data** — sends head registration data to a log file on the print server.

◆ **Log Jet Data** — sends jet data to a log file on the print server.

Fig. 4-21. AutoSet Summary (Show Details Version)

Description	Show Details Version	Hide Details Version
Calibration Results — Reports whether the printer was calibrated successfully.	Shown	Shown
Header — Date and time of the AutoSet calibration, printer software version, printer model, estimated head height	Shown	Shown
Ink Sample — Sample color block, for identification only (not a print quality test).	Shown	Shown
Head — Printhead position number.	Shown	Shown
Profiler/Pen Present — The ink type (EC-Endura·Chrome or PC-Perma·Chrome) and color reported by the profiler.	Shown	Shown
Cartridge Needs Cleaning — No: passed all calibrations, or Yes: failed one or more calibrations.	Shown	Shown
Total Bad Jets — The number of missing and deflected jets on the printhead. Use this number and the Jets Disqualified, Jets Out, and Jets Unfixed numbers to evaluate cartridge performance.	Shown	Hidden if no bad jets present, Shown if bad jets present

Description	Show Details Version	Hide Details Version
Sabre Angle — Troubleshooting data for MacDermid ColorSpan Technical Services.	Shown	Hidden
Head-to-Head Registration — OK indicates that the printhead was successfully registered relative to the other printheads; if not, the amount of error in pixels is shown.	Shown	Hidden if no errors found, Shown if offset errors present
Bidirectional Registration — OK indicates the printhead was successfully registered in both X (horizontal) directions; if not, the amount of error in pixels is shown.	Shown	Hidden if no errors found, Shown if bidi errors present
AutoJet Registration — OK indicates that AutoJet was successful; otherwise, a reference number appears and a corresponding error message is printed under the header.	Shown	Hidden if no errors found, Shown if errors present.
Jets Disqualified by AutoJet — Number of jets that AutoJet determined must be substituted by other working jets.	Shown	Hidden if no errors found, Shown if errors present.
Jets Out for X Offset — Number of jets that are out of registration in the X (horizontal) direction.	Shown	Hidden if no errors found, Shown if errors present.
Jets Out for Y Offset — Number of jets that are out of registration in the Y (vertical) direction.	Shown	Hidden if no errors found, Shown if errors present.
Jets Unfixed — Shows the print mode and the number of unfixed jets on each printhead. This number should be zero for all printheads; more substitute jets are available with a higher number of print passes.	Shown	Shown

Head Height Calibration

The printer offers an automatic head height calibration, in addition to two manual options.

◆ **Auto Carriage Height** uses the onboard image sensor to precisely set the height of the printheads above the media and level the carriage. This method can be used if at least one pair of ink reservoirs and printheads are installed in certain positions, so that the carriage can be automatically leveled. Due to the use of the image sensor, this method does not work with film or canvas media.

◆ **Manual Carriage Height** uses sheets of paper as "shims" to set the head height and level the carriage.

◆ **Adjust Head Height** can be used to raise or lower the left or right side of the carriage without performing a full calibration, using paper shims as with Manual Carriage Height.

◆ **Head Height Reset** resets the head height to its position after the previous **Auto Carriage Height** or **Manual Carriage Height** operation.

These options are designed to be used as follows:

Ink Configuration	If Image Sensor is OK...	If the Image Sensor is disabled...
Ink reservoirs and printheads installed in at least one of the following positions: 1 and 9, 2 and 10, 3 and 11, or 4 and 12.	**Auto Carriage Height**	**Manual Carriage Height**
Ink installed in all other configurations	**Manual Carriage Height**	**Manual Carriage Height**

The procedures for using **Auto Carriage Height, Manual Carriage Height,** and **Head Height Adjust** appear in the following sections.

Auto Carriage Height

This procedure calibrates the head height relative to the platen, then uses the on-board image sensor to precisely set the head height and level the carriage.

1. Verify that the appropriate Head Height setting is selected.

   The options under **Configure Printer - Printer Settings - Head Height** determine whether the head height will be set to the Normal (0.050 inches/1.27 mm) or Custom height rel-

ative to the media. Use Normal unless you need to raise the head height to avoid printhead strikes against the media.

2. On the menu, select Service Printer.

    The **Service Printer** menu appears.

3. On the Service Printer menu, select Calibrations.

    The **Calibrations** menu appears.

4. On the Calibrations menu, select Head Height.

    The **Head Height** menu appears.

5. Select Auto Carriage Height.

    The control panel displays this message:

    > This procedure will reset head height information. Press Proceed to continue, or cancel to leave the head height information as is.

    If you press ✕ (Cancel) at this screen, you will simply exit this process and the current calibration settings will be retained.

    If you press ✕ (Cancel) later during this process, all head height calibration data will be lost, and you will have to run **Auto Carriage Height** or **Manual Carriage Height** before printing.

6. Press ▶ to continue.

    A message appears warning you to unload media. The first part of the calibration sets the head height relative to the platen without media present.

    If media is installed, cut the media from the takeup, then back up the media using the ▲ key on the control panel.

⚠️ **WARNING**   Keep the printer cover closed during this procedure. The carriage moves out of the service station to the access position quickly, without further warning. Operator injury or damage to the carriage could occur if the carriage movement is blocked.

---

7. Press ▶ to continue.

    The control panel displays a series of messages as the carriage is raised and is moved to the carriage access position on the platen.

Next, the control panel displays a message asking you to place one sheet of copier paper under the right side of the carriage, and another sheet of copier paper under the left side of the carriage. Use standard 20 lb. copier paper. One letter-size sheet cut in half to make two 8-1/2 x 5-1/2 inch sheets works well for this purpose.

8. Place sheets of copier paper under the carriage as specified by the control panel, and press ▶ to continue.

   The control panel displays the ▲ and ▼ (Up/Down) keys and this message:

   > Use the arrow keys to carefully move the entire carriage up/down until one side or the other is LIGHTLY resting on the paper. Press Proceed when ready.

Note   The purpose of this measurement is to give the software a *rough estimate* of the head height relative to the platen, to allow the software to use the image sensor to set the head height precisely. In contrast, the Manual Carriage Height and Adjust Head Height procedures use the copier paper "shims" rather than the image sensor to set the head height.

9. Press the ▼ key to move the carriage down, and move the right and left sheets of paper repeatedly, until you feel resistance from the carriage touching the paper on either side of the carriage.

   If the carriage is so low that you cannot move the paper at all, press the ▲ key to raise the carriage until you can move the paper, yet still feel some resistance. Raise and lower the carriage as necessary before you proceed.

10. Press the ▶ key.

    The control panel prompts you to load media for the second portion of the calibration, which will set the head height relative to the selected media.

11. Load the media for setting the head height.

12. Press the ▶ key.

    The control panel displays the ▲ and ▼ (Media Advance) keys and prompts you to load media, then press ▶ (Proceed) to continue.

13. After loading the media, press the ▶ key.

The control panel displays a list of standard ColorSpan media types.

14. Select a media type from the menu, and press the ▶ key.

    If your media type is not displayed, select a media that most closely matches the thickness (caliper) of the media you are using.

15. Press the ▶ key.

    The printer measures the width of the media. Then the control panel displays an alphanumeric keyboard, and prompts you to enter the length of media remaining on the supply spool. The printer uses this value to calculate the amount of media remaining as printing proceeds.

16. Enter the length of media remaining and press the Enter key, or press the Enter key without entering a length if it is unknown.

    The control panel prompts you to load the takeup.

17. Press the ▶ key to use the takeup; otherwise, press ✗ (Cancel) and go to step 21.

    A menu appears allowing you to specify the **Printed Side Out** or **Printed Side In** option for the takeup.

18. Select a takeup direction, then press the ✓ key to save your choice.

19. Press the ↰ (Out) key to exit the menu.

    The control panel displays this message:

    > Takeup is now off. Press Proceed when takeup is ready to load, up/down to advance media.

20. Load the takeup and press ▶, or press ✗ (Cancel) if you do not want to use the takeup.

    The control panel notifies you that next the printer will print a set of prime bars so you can check the performance of the printheads. If too many jets are out or misfiring, the accuracy of the automatic head height process will be compromised.

21. To print the prime bars press ▶, or press ✗ (Cancel) to skip printing the prime bars.

    If you skip the prime bars, go to step 24. Otherwise, the control panel prompts you to adjust the width of the prime bars.

22. Adjust the width of the prime bars, and press ▶.

The printer prints the prime bars, and prompts you to evaluate the pattern.

23. Evaluate the prime bars.

◆ If the prime bars look good, press ▶.

◆ If the prime bars reveal an excessive number of jet-outs, press ✕ (Cancel) to exit the Auto Carriage Height process and clean the printheads. Then run Auto Carriage Height again.

If you press ▶, the printer begins the automatic head height procedure. When it finishes, the control panel displays this message:

The head height is calibrated.

24. Press ▶ to park the carriage and return to the Calibrations menu.

Manual Carriage Height

This procedure calibrates the head height relative to the platen, and levels the carriage, using paper shims and your input. Once calibrated, the printer raises the carriage to the appropriate height relative to the media.

1. Verify that the appropriate Head Height setting is selected.

The options under **Configure Printer - Printer Settings - Head Height** determine whether the head height will be set to the Normal (0.050 inches/1.27 mm) or Custom height relative to the media. Use Normal unless you need to raise the head height to avoid printhead strikes against the media.

2. On the menu, select Service Printer.

The Service Printer menu appears.

3. On the Service Printer menu, select Calibrations.

The Calibrations menu appears.

4. On the Calibrations menu, select Head Height.

The head height menu appears.

5. Select Manual Carriage Height.

A message appears that describes this function.

6. Press ▶ to continue.

A message appears warning you to unload media. The first part of the calibration sets the head height relative to the platen without media present.

If media is installed, remove or cut the media from the takeup, then back up the media using the ▲ key on the control panel.

<table>
<tr><td>⚠</td><td>WARNING</td><td>Keep the printer cover closed during this procedure. The platen moves out of the service station to the access position quickly, without further warning. Operator injury or damage to the carriage could occur if the carriage movement is blocked.</td></tr>
</table>

7. Press ▶ to continue.

   The control panel displays a series of messages as the carriage is raised and moved to the carriage access position on the platen.

   The control panel displays a message asking you to place one sheet of copier paper under the right side of the carriage, and another sheet of copier paper under the left side of the carriage. Use standard 20 lb. copier paper. One letter-size sheet cut in half to make two 8-1/2 x 5-1/2 inch sheets works well for this purpose.

8. Place sheets of copier paper under the carriage as specified by the control panel, and press ▶ to continue.

   The control panel displays the ▲ and ▼ (Up/Down) keys and this message:

   > Use the arrow keys to carefully move the entire carriage up/down until one side or the other is LIGHTLY resting on the paper. Press Proceed when ready to level the carriage.

9. Press the ▼ key to move the carriage down, and move the right and left sheets of paper repeatedly, until you feel resistance from the carriage touching the paper on either side of the carriage.

   If the carriage is so low that you cannot move the paper at all, press the ▲ and ▼ keys to raise or lower the carriage until you can move the paper, yet still feel some resistance.

10. Press the ▶ key.

    The control panel displays two sets of ▲ and ▼ keys, one for the right and one for the left side of the carriage.

---

11. Level the carriage by using the right and left sets of ▲ and ▼ keys with the sheets of copier paper, as you did in step 9.

12. When the carriage is level, press the ▶ key.

The control panel displays this message:

> The head height is calibrated.

13. Press ▶ to park the carriage and return to the Calibrations menu.

Adjust Head Height

This procedure allows you to use paper shims to make small adjustments to the right or left side carriage height, without going through the full Auto or Manual Carriage Height calibration.

1. Verify that the appropriate Head Height setting is selected.

The options under **Configure Printer - Printer Settings - Head Height** determine whether the head height will be set to the Normal (0.050 inches/1.27 mm) or Custom height relative to the media. Use Normal unless you need to raise the head height to avoid printhead strikes against the media.

2. On the menu, select Service Printer.

The Service Printer menu appears.

3. On the Service Printer menu, select Calibrations.

The Calibrations menu appears.

4. On the Calibrations menu, select Head Height.

The head height menu appears.

5. Select Adjust Head Height.

A message appears that describes this function.

WARNING   Keep the printer cover closed during this procedure. The platen moves out of the service station to the access position quickly, without further warning. Operator injury or damage to the carriage could occur if the carriage movement is blocked.

6. Press ▶ to continue.

The carriage moves to the access position on the platen.

The control panel displays two sets of ▲ and ▼ keys, one for the right and one for the left side of the carriage.

7. For one side of the carriage, press the ▼ key to move the carriage down, and move the sheet of paper repeatedly, until you feel resistance from the carriage touching the paper on either side of the carriage.

   If the carriage is so low that you cannot move the paper at all, press the ▲ and ▼ keys to raise or lower the carriage until you can move the paper, yet still feel some resistance.

8. Repeat step 7 for the other side of the carriage.

9. When the carriage is level, press the ▶ key.

   The control panel displays this message:

   > The head height is calibrated.

10. Press ▶ to park the carriage and return to the Calibrations menu.

Linearization

As the density of an image varies from highlights to shadows, or from lighter tints to darker tints, the printer should accurately reproduce these areas in a predictable, or linear, fashion. The process of linearization (or color calibration) involves printing and reading color test patches, and calibrating the printer to ensure that the expected and printed densities will match. This in turn will ensure optimal color matching.

You should perform a linearization when:

◆ You notice a shift (change) in color output

◆ Changing ink types or sets

◆ Changing media types

◆ Changing print mode (only if the most precise color matching is required)

Linearization is a feature of the print server or RIP connected to the printer. Refer to the documentation that accompanies the print server for further information.

Tip	For best results, be sure that the linearization patches are dry before taking readings. Use the printer's dryer with heat to ensure complete drying.

CHAPTER 5

Maintaining the Printer

This chapter describes how to maintain the printer:

- ◆ Maintenance Schedule (page 5-2)
- ◆ Cleaning Ink Jets (page 5-3)
- ◆ Cleaning Jet Outs (page 5-5)
- ◆ Cleaning the Service Station (page 5-8)
- ◆ Printing Prime Bars (page 5-10)
- ◆ Manual Priming (page 5-11)
- ◆ Cleaning the Top Cover (page 5-13)
- ◆ Purging the Printheads (page 5-14)
- ◆ Cleaning the Encoder (page 5-17)
- ◆ Cleaning the Carriage Rail (page 5-18)

Maintenance Schedule

The following types of maintenance are recommended:

◆ Daily and "as needed" maintenance

◆ Printing interval warning — the printer maintains a periodic maintenance clock that tracks the total amount of time the printer has spent printing. After the periodic maintenance interval has been reached, the ATTN key will appear on the control panel, and the user will be advised to perform the periodic maintenance items described in this chapter. When you dismiss the warning message, the maintenance clock is reset. The printer does not verify that the periodic maintenance is actually performed.

See the following table and the remainder of this chapter for details and instructions.

| Item	Action
Interval: Daily	
Printhead jets	Clean (see page 5-3)
Service station	Clean (see page 5-8)
Ink tubes	Inspect for kinks, potential snags or tangles
Pinch rollers	Inspect for ink, dust buildup
Carriage rail	Inspect for ink, dust buildup
Interval: As needed	
Print prime bars	See page 5-10
Manual priming	See page 5-11
Top cover cleaning	See page 5-13
Purge air and/or water	See page 5-14
Interval: When printing interval warning appears	
Encoder strip	Clean (see page 5-17)
Carriage rail	Clean (see page 5-18)
Service station	Clean (see page 5-8)
Spools and collets	Inspect for slippage, reposition and tighten collet screws if necessary

Cleaning Ink Jets

Maintenance interval: daily.

Before running AutoSet, which compensates for missing and misfiring ink jets, you should clean the jets as described in the following paragraphs to help keep them clear of accumulated ink.

The effectiveness of the high-resolution printing process used by the printer can be impaired by printheads that are improperly maintained. Partially clogged nozzles may cause the jets to misfire intermittently, or deflect ink slightly in the wrong direction.

Cleaning the ink jets daily should be sufficient in most cases. Cleaning will likely be required more often if the printer sits idle for extended periods.
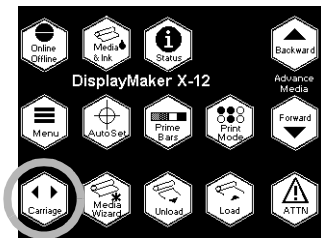
1. From the Front Page screen of the control panel, press the Carriage key.

   The carriage moves out from the service station and stops.

2. Open the printer's top cover.

3. Depress the lock levers to unlock the printhead assembly, and swing up the carriage to expose the ink jets.

4. Gently wick the ink jet nozzles with a nonfibrous, lint-free swab moistened with water. DO NOT USE ALCOHOL, use plain water.

   If you find excessive buildup on the bottom of the printhead, clean off the excess using a moistened pad, and then wipe the bottom of the printhead with the swab.

Caution	Do not to touch the contacts or orifice plate (jet nozzles) with your bare fingers. Also, take care not to use excessive force when wiping the printheads with the swabs or pads.

5. Close the printer's top cover.

6. Swing the printhead assembly down into the printing position, and push the printhead assembly down into position until it engages the lock levers with a click.

7. Clean the service station as described in "Cleaning the Service Station" on page 5-8.

8. On the control panel Front Page screen, press the ▶ (Proceed) key to park the printhead carriage into the service station.

Evaluating Printhead Performance After Cleaning

The Jet Status Lines test provides a quick method of determining the effectiveness of (or the need for) cleaning. This test prints a pattern of lines, each segment of which corresponds a single jet. If there are any missing segments in the lines, then a cleaning is recommended. If, however, the lines appear solid and consistent, then cleaning is most likely not required at this time.

The Jet Status Lines function is on the **Calibrate Printer - Manual Calibrations** menu.

Cleaning Jet Outs

Follow these instructions to recover clogged printheads when other cleaning methods or priming are ineffective. Daily (or after each roll of media, whichever occurs first) cleaning of the printer service station, and wiping the printheads with a lint-free cloth moistened with water, will reduce the need to use the ultrasonic cleaner, extend the life of the printheads, and reduce the cost of printing.

A printhead may be ultrasonically cleaned as needed to recover clogged jets. Cleaning a printhead more than twice during its service life may cause automatic ink counting to under-report ink usage. Discard the printhead when ultrasonic cleaning fails to recover enough jets for AutoJet jet replacement to replace all missing jets, or when enough jets are intermittently working or deflected to affect print quality.

> **Recommended equipment:** Bransonic Tabletop Cleaner Mechanical Timer & Heat Unit, (110V Model B1510R, 230V Model B1510E) Branson Ultrasonics Corp.
> Web site: http://www.bransonultrasonics.com
> E-mail: info@bransoncleaning.com; telephone: 1-800-732-9262

Tip   Print an image before cleaning the printheads, and print the same image after cleaning. This enables you to evaluate the effectiveness of the cleaning. If there is a noticeable color shift between the "before" and "after" prints, additional purging of air or water may be necessary.

1. Read and follow all manufacturer's safety precautions and operating instructions for the ultrasonic cleaner.

2. Fill the ultrasonic cleaner tank with distilled water (if available) or clean tap water, up to the fill line as shown on the tank and in the manufacturer's instructions.

3. Switch on the ultrasonic cleaner's heater.

4. Set the timer for 30 minutes.

5. Immerse the bottom of the printhead only to the bottom of the label on the printhead (as shown in the diagram). Suspend the printhead from in this position by its blue handle until cleaning is complete. An improvised stand (for example, fashioned out of a coat hanger) works well for this purpose. If necessary, you may clean multiple printheads at once.
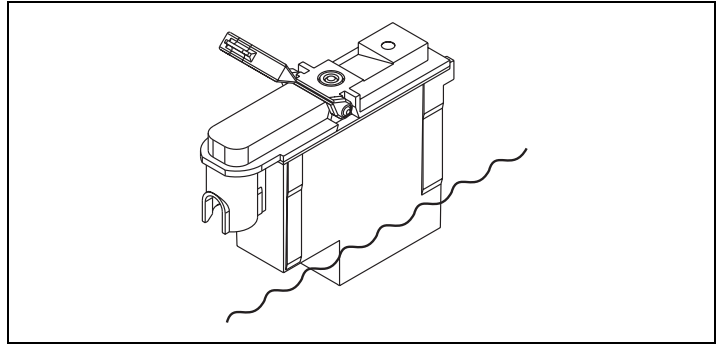

Fig. 5-1. Immersing the printhead for cleaning

6. After 30 minutes of cleaning, purge the printhead of air and water. Insert the printhead as shown into the purge clip ❶.
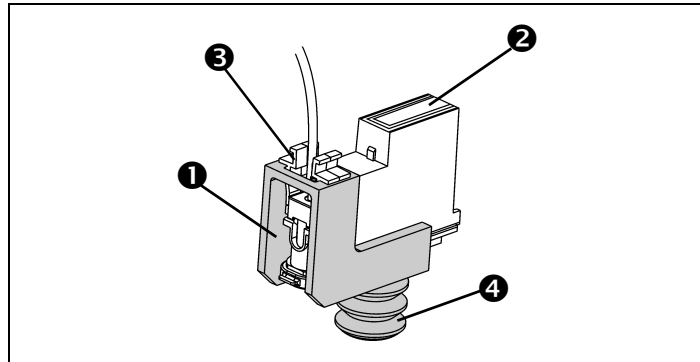

Fig. 5-2. Printhead and purge clip

7. Hold the printhead so its jet orifice plate ❷ points up.

8. Connect the ink tube from the corresponding ink module into the ink inlet ❸ on the printhead.

9. Gently press and hold the purge bulb ❹ for a few seconds, allowing the air to escape as bubbles or foam. Be sure that the hole on the end of the purge bulb is covered by your finger as you press.

10. Blot the ink with a paper towel, but do not wipe (wiping could clog the ink jets). Keep the ink from dripping onto the printhead's electrical contacts.

11. Release the bulb and wait five seconds, to allow the printhead to fill with ink.

12. Gently press and hold the purge bulb down again, this time tilting the printhead from side to side, and front to back, to allow the release of trapped pockets of air.

13. Repeat steps 11 and 12 until ink is expelled without foaming. The color of the ink return to normal during this process.

14. Disconnect the ink tube from the printhead.

15. Reconnect the ink tube to its clips and connector on the printhead carriage. Match the number label on each ink tube to the number molded into the plastic holder assembly. The positions are numbered 1-12, from left to right.

16. Swing the printhead assembly down into the printing position, and push the printhead assembly down into position until it engages the lock levers with a click.

17. Replace the printhead into its position in the carriage.

18. Repeat steps 5 through 17 for each printhead you want to purge.

19. Snap the carriage cover closed.

20. Close the printer's top cover.

21. From the control panel Front Page screen, press the Carriage key. The printhead carriage returns to the home position.

22. To verify a successful purge, run the following test prints:

   ◆ **Quick Prime Bars (twice)** — compare the output with the output printed before priming. If it is noticeably discolored, run the Print Test.

   ◆ **Print Test (60 seconds)** — this should flush the remaining water and/or air from the printhead(s).

   ◆ AutoSet

23. Resume printing.

Cleaning the Service Station

Maintenance interval: daily, and when switching between dye and pigment inks.

Cleaning the service station helps to prevent dried ink from clogging the ink jets. Keep a replacement set of wipers on hand to replace damaged or worn wipers. A set of and twelve spare wipers is included with the printer.
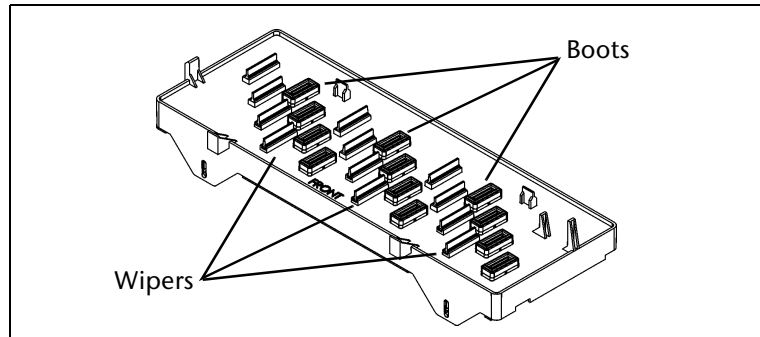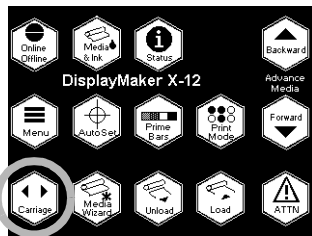

Fig. 5-3. Service station parts

1. From the Front Page screen on the control panel, press the Carriage key.

    This moves the printhead carriage to the center of the platen.

2. Open the service station access door.

3. Reach inside the right endcap (behind the control panel) and lift the service station out of the printer.

    Hold the service station level to avoid spilling any ink that may be present.

4. Hold the service station with the wipers under running water.

    Rinse as much ink as possible from the wipers.

5. Blot any remaining water from the service station with a clean, lint-free cloth.

    To avoid contaminating the ink, be sure to dry all water from the boots and boot holders.

6. Replace the service station into the printer.

7. Close the service station access door.

8. On the Front Page screen, press the Carriage key.

    The printhead carriage returns to the service station.

Replacing the Wipers

When you notice that one or more wipers are worn or damaged, replace them. This may be indicated visually or by ineffective wiping of the orifice plate, which would result in a greater number of clogged jets. A replacement set of wipers is included with the printer.

Early service station units had replaceable boots, but the boots on recent units are glued in for reliability, and are not replaceable. In the latter case, if the boots become damaged and no longer cap the printheads effectively (indicated by clogged jets after extended idle periods), replace the service station.

The 0900833 Productivity Kit contains commonly-used spare parts and accessories (including wipers and a service station) in a convenient kit. Contact your ColorSpan reseller or ColorSpan Technical Services for details.

Printing Prime Bars

Maintenance interval: as needed.

To keep the printhead jets firing properly, you can print solid blocks of ink from each printhead. By inspecting these prime bars for blank bands, you can also do a quick check for nonfiring and deflected jets. Based on this quick test, you may want to proceed to more detailed jet tests (see Chapter 4, Calibrating the Printer, for instructions).
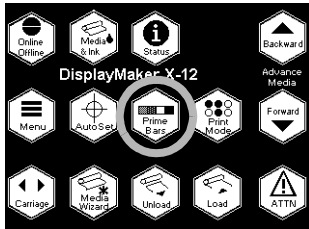
1. From the control panel Front Page screen, press the Prime Bars key.

2. Choose Quick Prime Bars or Detailed Prime Bars.

   Choose Quick Prime Bars for most primes, or Detailed Prime Bars when you want to locate individual missing jets that AutoSet may have missed, so you can map them manually under **Calibrate Printer - Manual Calibrations - Manual Jet Mapping** (see "Manual Jet Mapping" on page 4-16 for instructions).

   The control panel displays a prompt asking you to enter the total width of the prime bar pattern you wish to print.

3. Enter a width for the prime bar pattern by pressing the ▼ and ▲ keys.

4. Press the ▶ (Proceed) key to continue.

   The printer prints the prime bar pattern.

Manual Priming

Maintenance interval: as needed.

If you discover that an excessive number of jets are out on a printhead (after cleaning or printing the prime bars or other test), you can attempt to recover jets by performing a manual prime.

This procedure requires a special priming bulb, included with the printer. Each prime will expel approximately 1 ml of ink. To keep ink counting as accurate as possible. you will report the number of primes to the printer via the control panel.
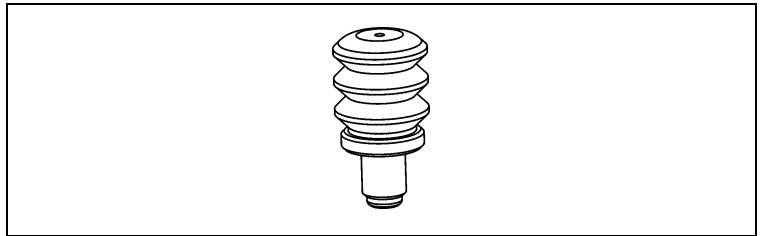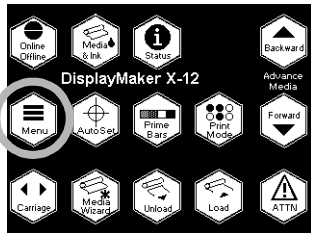

Fig. 5-4. Manual prime bulb

1. From the control panel Front Page screen, press the Menu key.

2. From the Menu, select **Service Printer.**

3. From the Service Printer menu, select **Prime Pens.**

   This moves the carriage out of the home position, in back of the service station access door.

4. Open the service station access door.

5. Insert the priming bulb into one of the priming access holes in the top cover of the carriage.

Fig. 5-5. Inserting the priming bulb

6. Depress and release the priming bulb to prime the printhead.
7. On the control panel, report how many primes you performed.
8. Repeat steps 5 and 6 for any other printheads needing manual priming.
9. Close the service station access door.
10. Press the ▶ key to return the carriage to the home position.

Cleaning the Top Cover

Maintenance interval: as needed.

The printer's top cover is designed to protect you from the carriage when it is moving (it moves very fast during printing) and reduce noise, while providing an unobstructed view of the print area.

Careful cleaning when needed, according to the following guidelines, will preserve the cover's appearance:

◆ Do not use cleaners that contain ammonia (such as glass cleaner) or alcohol.

◆ Do not use paper towels or abrasive cloths or pads.

◆ Use only 100% cotton cloths and mild detergents (such as dishwashing liquid) and water, or cleaners and polishes developed for plastics (such as NOVUS Plastic Polishes, see your ColorSpan reseller for details). Blot dry; wiping could scratch the surface and create an electrostatic charge.

Purging the Printheads

Maintenance Interval: as needed.

During normal printing, a small amount of air is introduced into the printheads. An excessive amount of air in a printhead may cause individual jets to stop working. The printheads may need to be purged of this air at least once during their lifetime. Since removing, purging, replacing, and recalibrating a printhead is a time-consuming process, purge all printheads currently installed in the carriage in a single session.

Besides preventive maintenance, you should purge a printhead of water introduced during the ultrasonic cleaning process. The following procedure covers purging air and purging water.

To perform this process, you will need the purge clip, included with the printer, and paper toweling to blot the ink that will come out of the printhead during purging. You may also want to wear gloves to avoid staining them with ink.

1. If you are purging a single printhead after ultrasonic cleaning, go to step 13.

2. From the control panel Front Page screen, press the Carriage key.

   The printhead carriage moves to the access position.

3. Open the printer's top cover.

4. Open the carriage cover.

5. Remove the printhead from the carriage.

6. Depress the lock levers to unlock the printhead assembly, and swing it up to expose the bottom of the carriage.

7. Disconnect the ink tube from its attachment clips on the carriage.
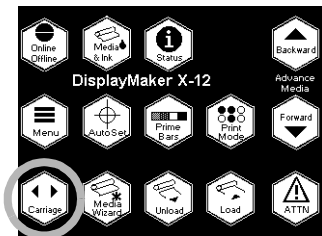
Purging Water   8.   If you just want to purge air from the printhead (if an ultasonic cleaning was not performed), go to step 13.

9.   Insert the printhead into the purge clip.

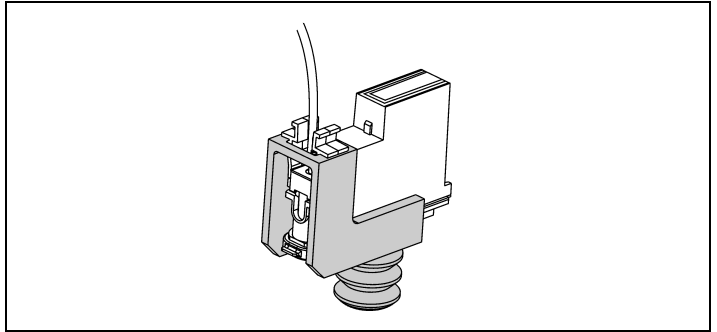Hold the printhead so its jet orifice plate points up.

Fig. 5-6. Printhead installed in the purge clip

10. Connect the ink tube from the corresponding ink module into the ink inlet on the printhead.

11. Hold the printhead over a bucket or other receptacle with the jet nozzles facing down.

12. Depress the bulb on the purge clip five to seven times, or until the color of the ink looks undiluted.

Purging Air   13. Insert the printhead as shown into the purge clip.

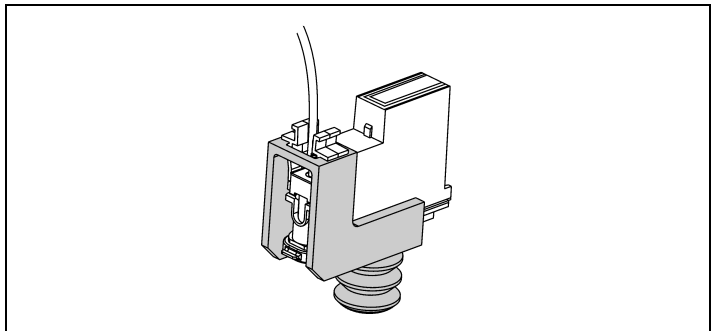Hold the printhead so its jet orifice plate points up.

Fig. 5-7. Printhead installed in the purge clip

14. Connect the ink tube from the corresponding ink module into the ink inlet on the printhead.

15. Gently press and hold the purge bulb down for a few seconds, allowing the air to escape as bubbles or foam.

   Be sure that the hole on the end of the purge bulb is sealed with your finger as you press. Blot the ink with a paper towel, but do not wipe (wiping could clog the ink jets). Keep the ink from dripping onto the printhead's electrical contacts.

16. Release the bulb and wait five seconds, to allow the printhead to fill with ink.

17. Gently press and hold the purge bulb down again, this time tilting the printhead from side to side, and front to back, to allow the release of trapped pockets of air.

18. Repeat steps 16 and 17 until ink is expelled without foaming.

19. Disconnect the ink tube from the printhead.

20. Reconnect the ink tube its clips and connector on the printhead carriage.

   Match the number label on each ink tube to the number molded into the plastic holder assembly. The positions are numbered 1-12, from left to right.

21. Swing the printhead assembly down into the printing position, and push the printhead assembly down into position until it engages the lock levers with a click.

22. Replace the printhead into its position in the carriage.

23. Snap the carriage cover closed.

24. Repeat steps 5 through 23 for each printhead you want to purge.

25. Close the printer's top cover.

26. From the control panel Front Page screen, press the Carriage key.

   The printhead carriage returns to the home position.

27. To verify a successful purge, run the following test prints:

   ◆ **Quick Prime Bars (twice)** — compare the output with the output printed before priming. If it is noticably lighter, run the Print Test.

   ◆ **Print Test (60 seconds)** — this should flush the remaining water and/or air from the printhead(s).

   ◆ **AutoSet**

Cleaning the Encoder

Maintenance interval: at Maintenance Clock Alarm.

The encoder strip allows the printer to precisely locate the print-head carriage across the width of the platen. If the encoder becomes dirty with paper dust or ink, the printer cannot print accurately, and print quality will suffer.

The encoder strip ❶ is a clear plastic strip, imprinted with a precision encoding pattern, and mounted horizontally along the rail ❷. To clean the encoder strip, use a can of compressed air, sold at camera or graphic supply stores, to blow dust and other particles from it.

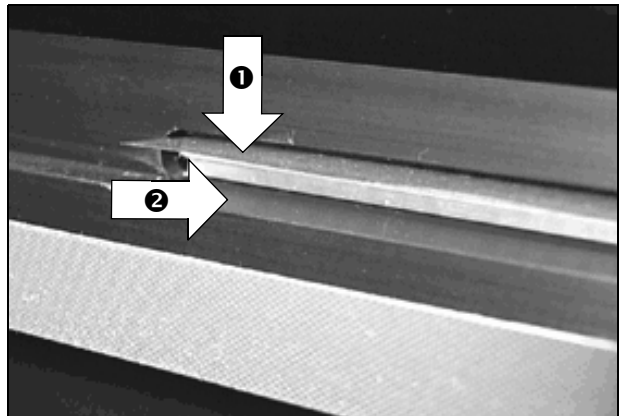Fig. 5-8. Encoder and rail

Cleaning the Carriage Rail

The carriage rail carries the printhead carriage across the width of the platen. If dust or other particles accumulate on the rail, the material could accumulate on the carriage wheels (bearings) and cause banding in printed output or noisy carriage motion.

To clean the rail, wipe it with a water-moistened cloth or paper towel. Be sure to remove any excess water from the rail before resuming printing.

APPENDIX A

Technical Specifications

This chapter lists the printer's specifications and information about ordering supplies.

Specifications

General

Dimensions (Assembled)	**72-inch model:** Length: 132 inches (335.3 cm) Depth: 31 inches (78.7 cm) Height: 58.5 (148.6 cm) **60-inch model:** Length: 122 inches (309.8 cm) Depth: 31 inches (78.7 cm) Height: 58.5 (148.6 cm)
Weights (Assembled)	**72-inch model:** 380 lbs. (173 kg.) **60-inch model:** 355 lbs. (161 kg.)
Temperature	Storage: 0–120° F (-17–49° C) Operating: 60–90° F (16–32° C)
Relative Humidity	Storage: 10–80%, non-condensing Operating: 10–80%, non-condensing, 30–60% optimum Built-in humidity sensing automatically adjusts printing speed to ensure adequate drying for the combination of media and ink selected
Approvals	Safety: UL, c-UL, CE Emissions: FCC-A, CE, VCCI-1 Immunity: CE

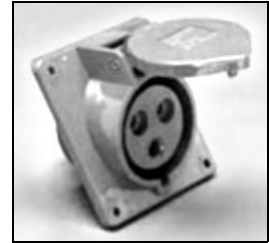| Electrical Power	**Power used:** 200-240VAC, 30 Amps, 50/60 Hz, single phase

Required electrical circuit:
220 VAC, 50 Amps, single phase, with NEMA L6-50R wall receptacle (North America and Japan), **OR**
220 VAC, 32 Amps, single phase, with IEC 60309 wall receptacle (Europe)
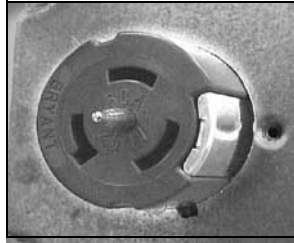
NEMA L6-50R
wall receptacle
(North America/Japan)

IEC 60309
wall receptacle
(Europe)

Required power cord:
Power cord for North American (UL/CSA approved) or European (Harmonized) use is supplied with the product.

If your building receives power from a standard three-phase supply, note that the printer will use only one of the three phases. This means that your building's three-phase power transformer may have an unbalanced load. Check with your electrician to verify that your building has sufficient capacity for this unbalanced load.

Performance

Humidity Compensation	Slows printing in high-humidity environments (within specifications) to ensure complete drying.
Maximum Print Width	72 inches (182.0 cm), 71.5 inches (181.6 cm) image width 60 inches (181.6 cm), 59.5 inches (151.1 cm) image width

Sample Print Speeds

Application	Ink Configuration	Print Speed
Economy	2 x CMYK	150-600 ft^2/hr.
HiRes	2 x C2M2YK	150-600 ft^2/hr.
Film Quality Maximum Gamut	1 x C3M3YKOGRB	75-300 ft^2/hr.
Film Quality Color or Black & White	1 x C3M3YK plus 1 x K4	75-300 ft^2/hr.
HiRes AutoInk Dye/Pigment	1 x C2M2YK Endura•Chrome Dye plus 1 x C2M2YK Perma•Chrome Pigment	75-300 ft^2/hr.
Versatile AutoInk Economy Outdoor/ Quality Indoor	1 x CMYK Perma•Chrome Pigment plus 1 x C3M3YK Endura•Chrome Dye	75-300 ft^2/hr.

Supported Ink and Media   Consult MacDermid ColorSpan or your MacDermid ColorSpan representative for an updated listing of supported ink and media.

Supplies and Accessories

Supplies and accessories are available from MacDermid ColorSpan by calling:

MacDermid ColorSpan Supplies Sales

◆ USA and Canada: (800) 723-3002 or (952) 943-3636

◆ Europe: (+31) 23.5622000

◆ Asia: (952) 943-3300

◆ Latin America: (800) 664-7242 or (952) 943-3600

APPENDIX B

Troubleshooting

This appendix explains how to prevent and diagnose printing problems and provides information about getting help from ColorSpan.

For other software-specific troubleshooting procedures, refer to your application software documentation or the other ColorSpan documentation listed on page vi of this manual.

If your printer is connected to a non-ColorSpan RIP or print server, refer to the accompanying third-party documentation.

Troubleshooting Checklist

Before you troubleshoot your printer, make sure that it is properly installed as described in Chapter 1, Getting Started.

Follow the steps in this checklist to isolate and resolve printing problems.

1. Does the printer's power come ON?

    YES: Go to question 2.
    NO: The following could be the problem:

    ◆   The power cable may not be plugged into an electrical outlet.

    ◆   If the printer is plugged into a surge protector, the surge protector may not be connected to power, or it may be switched off.

2. Did the start-up sequence of the control panel end by displaying a Ready (status) screen similar to the one shown in Fig. 2-1 on page 2-2?

    YES: Go to question 3.
    NO: The following could be the problem:

    ◆   There may be a hardware problem with the printer's internal components. Follow the diagnostic routine on the control panel to determine the problem. Call MacDermid ColorSpan Technical Services as directed by the control panel.

3. Can you send a file from the print server to the printer?

    YES: Go to question 4.
    NO: The following could be the problem:

    ◆   The cable may not be securely connected between the print server and the printer. Refer to the server's documentation for more information.

    ◆   The cable may be connected to the wrong port on the print server. Refer to the server's documentation for more information.

4. Can you send (print or download) a document from a client computer to the server?

    YES: Go to question 5.
    NO: The following could be the problem:

    ◆   The connection from the client to the local area network may not be configured correctly. See your system administrator for assistance.

◆ The cable between your computer or network and the print server may not be securely connected at both ends. Refer to the print server manual for more information.

◆ Your computer may not be working properly. Run an application that you know works correctly and print to be sure.

◆ The computer's port may not be working properly. Print to another output device that you know works correctly (and is not connected to the print server) to check this.

◆ There may be another error condition reported by the print server.

5. Is the print quality good?

YES: Then the problem is not covered in this checklist. Contact MacDermid ColorSpan Technical Services.
NO: The following could be the problem:

◆ The printer may need to be calibrated. See Chapter 4, Calibrating the Printer, for instructions.

◆ One or more ink jets may be clogged or not firing. See "Cleaning Ink Jets" on page 5-3 for instructions.

◆ If the print head is striking the media, check how the media is tracking from the supply spool to the takeup spool. The sides of the media should be parallel to the sides of the printer, with no wrinkling or buckling. If necessary, reload the media. See "Loading Media" on page 3-26 for instructions.

◆ Verify that the print head carriage is at the proper height. See "Printer Settings" on page 2-11 for instructions.

Diagnostics

The printer includes a series of self-diagnostic tests designed to help MacDermid ColorSpan Technical Services solve printer hardware problems. If one of the tests encounters an error, and error message appears, which includes:

◆ Error code - always write down this code for future reference by MacDermid ColorSpan Technical Services.

◆ Brief description of the error

◆ A series of buttons that allow you to respond to the error. In some cases, you can ignore the error or enter a further diagnostic routine. In other cases, you must restart the printer.

During the course of operating the printer, another class of error messages may appear on the control panel. The ATTN (Attention) key blinks on the Ready or Front Page screen when the printer detects an error condition, or potential error condition. When you press this button, the panel displays one or more messages of the following types:

◆ **Warnings** — the printer has detected a condition that, if left unaddressed, could result in substandard prints or a condition that will require an action before printing can continue. Any action on your part is optional.

◆ **Actions** — the printer has detected an error condition that stopped printing or will prevent printing from starting. You must correct the error before the printer will be ready to print.

◆ **Changes** — the printer has detected a change to the inks, media, or printer that could affect print quality. Pressing the ATTN key displays a message that suggests the actions to perform for optimal print quality, such as recalibration. You can dismiss the message with or without actually performing the suggested action, although ignoring the messages could result in substandard output quality. Printing is not interrupted for a Change message.

The following table describes the Actions and Warnings in detail. The cross-referenced page numbers refer to this manual.

Table B-1. Actions and Warnings

Code, Message	Cause	What to Do
(CA) Carriage		
A-CA-1 - Carriage Rotation Sensor	Carriage is not locked into printing position.	Rotate the carriage down into the locked position.
(IS) Ink Sensing		
A-IS-1through A-IS-12 - Module Out of Ink, Slot # *n*	Ink reservoir *n* is out of ink.	Replace ink reservoir.
A-IS-13 through A-IS-24 - Printhead/Module Mismatch, Slot #*n*	Color/type in printhead and module *n* do not match.	Ensure that color & type match in printhead & module.
A-IS-25 through A-IS-36 - Missing Module/Printhead, Slot #*n*	Either module or printhead *n* is not detected.	Ensure that module and printhead are installed.
A-IS-37 - No Print Mode Selected	Print mode incomplete or not specified.	Press Print Mode key on control panel (page 3-7).
W-IS-1 through W-IS-12 - Low Ink, Slot #*n*	Ink reservoir *n* has about 50 ml of ink remaining.	Replace the ink reservoir soon.
(MC) Maintenance Clock		
W-MC-1 - Preventive Maint. Clock Alarm	Encoder strip and service station need cleaning.	Clean encoder strip and service station.
(MD) Media Drive		
A-MD-1 - Media Advance Stalled	The media drive motor has stalled.	Check supply spool for binding, motor for failure.
W-MD-1 - Index Sensor Not Detecting Index	Media drive cannot detect index pulse.	Clean or replace media drive sensor.
W-MD-2 - Media Advance Turnaround Time Exceed	Media is taking too long to advance.	Check supply spool for binding.
W-MD-3 - Media Advance Data Warning	Media advance needs calibration.	Run Media Advance Calibration (service menu).
W-MD-4 Media Advance/Drive Too Slow	Media advance motor is too slow.	Determine the cause of the drag on the media advance servo motor. Listen for unusual noises coming from the grit roll shaft which might indicate sticking or binding. Advance the media with a supply loop in the media supply to eliminate media supply spool tension problems.
(MS) Media Sensing		
A-MS-1 - Media Too Thick at Load	The media you loaded is too thick.	Reload with a media less than 0.125 inches thick.
A-MS-2 - Media Thickness Increased	The media being printed is too thick.	Reload with a media less than 0.125 inches thick.

Table B-1. Actions and Warnings

Code, Message	Cause	What to Do
A-MS-3 - Media Too Far Left/Right	Media is loaded too far to the left or right.	Reload the media; align right edge to reference mark.
A-MS-4 - Media Out	There is no media loaded.	Load media.
A-MS-5 - Media Too Narrow	Media is not wide enough for printing.	Load media that is at least 24 inches wide.
A-MS-6 - Media Too Wide	Media is too wide for printing.	Use narrower media (page A-3).
W-MS-1 - Media Low	Less than 10 feet (3 meters) of media remains.	Load media or adjust Media Remaining value at panel (page 3-26).
W-MS-2 - Non-Standard Media Width	Media loaded may cause head strike.	Continue printing or replace media.
W-MS-3 - Media End Not Detected During Unload	The Unload function cannot find end of media.	Cut media prior to Unload, or do not use Unload.
(PC) Printing Calibrations		
A-PC-1 - Too Many Jets Mapped Out	Too many missing jets could be replaced.	Prime/clean printheads (page 5-13), or increase number of passes (page 3-7).
W-PC-1 - Printhead Removed - Recalibrate	A printhead was repositioned.	Run AutoSet (page 2-7).
W-PC-2 - Media Replaced - Recalibrate	Media caliper may need to be remeasured.	Run AutoSet if media type was changed (page 2-7).
W-PC-3 - Head Height Changed - Recalibrate	Change in head height has invalidated calibration.	Run AutoSet (page 2-7).
W-PC-4 - AutoJet - Jets Not Mapped Out	Not all missing jets could be replaced.	Prime/clean printheads (page 5-3), or increase number of passes (page 3-7).
(PD) Primer Door		
A-PD-1 - Door Opened, Prime Not Selected	The primer door is open.	Close the primer door.
(PG) Purge		
W-PG-1 - Pens Require Purge	The printheads should be purged.	Purge all printheads (page 5-14).
(SC) System Calibrations		
W-SC-1 - Media Adv. Run Out Not Calibrated	Calibration was reset or not performed.	Calibrate media advance (page 4-4).
W-SC-3 - Media Thickness Sensor Not Calibrated	Calibration was reset or not performed.	Calibrate media sensor (page 2-17).
W-SC-4 - Head Height Not Calibrated	Calibration was reset or not performed.	Calibrate head height (page 2-17).
W-SC-5 - Printer Length Not Known	Calibration was reset or not performed.	Calibrate printer length by restarting printer.

Table B-1. Actions and Warnings

Code, Message	Cause	What to Do
(SM) System		
A-SM-1 - Printer Not Imprinted	Defective electronics assembly.	Call service provider for replacement electronics.
A-SM-2 - Release S/W Found Debug S/W	Defective software.	Call service provider for updated software.
(SS) Service Station		
W-SS-1 Service Station Tray Not Present	The service station is not installed, or it is installed too far to the right.	Install service station properly, or defeat service station sensor (page 1-13).
(TC) Top Cover		
A-TC-1 - Cover Open	The top cover is open.	Close the top cover.
(TU) Take Up		
A-TU-1 - Takeup Full	The media takeup spool is full.	Unload the takeup spool and reload media (page 3-26).
A-TU-2 - Takeup Stall	The takeup motor has stalled.	Check for mechanical interference or binding, overloaded spool, out of balance spool, or failure in electronics or motor.
A-TU-3 - The Takeup Has Been Pulled Out of Position	The takeup was pulled out of position by more than two inches, probably due to the operator pulling media off the takeup spool, or the roll on the takeup has become unbalanced.	Press the Reset button displayed on the control panel. The printer now considers the takeup to be unloaded. To reload, press Load on the Front Page screen.
W-TU-1 - Takeup Nearly Full	The media takeup spool is almost full.	Unload the takeup spool and reload media (page 3-26).
W-TU-2 - Takeup Connected - Slipping	The media takeup core is slipping.	Reload the media (page 3-26).
(VN) VideoNet		
W-VN-1 - VideoNet not Connected	The printer cannot detect a print server.	Connect cable, turn on server, add printer to server.

Banding

This is an explanation of the varieties of banding that may occur in output. The names applied to the banding here are also an attempt to generate a common language for describing and discussing types of banding.

Stitch Banding

"Stitch banding" results from inaccurate media advance and/or inaccurate head-to-head Y-axis registration. It can be described as regularly appearing bands, equally spaced according to the width of the print swath. Bands will be darker than the surrounding area if there is too little advance, or lighter than the surrounding area if there is too much advance.

To eliminate or reduce stitch banding:

1. Run an automatic or manual head-to-head calibration to correct any Y-offsets, especially if printing in 2x6 or 2x4 print modes.
2. Run a Media Advance Calibration to correct the media advance rate.
3. Re-run an automatic or manual head-to-head calibration to compensate for any Y-offset changes created by adjusting the media advance. Do this for both 1x and 2x print modes.
4. Run a test print to verify that banding has been eliminated. Repeat steps 2 and 3 if banding persists.

Edge Banding

Edge banding (or "spears") results from either the service station configured for "Spit Only 30 seconds," broken mechanical parts in the service station or carriage, or a missing service station. Without regular wiping, ink builds up on the printhead orifice plates during printing. As the liquid component of the ink evaporates, solids are left behind. New ink is jetted through the dried particles, which are picked up and deposited on the media, creating a dark band. If the build-up on the printhead is sufficiently heavy it will inhibit jetting and lead to light bands.

Prints will generally look good at the beginning, but will deteriorate as their printed length increases. Bands will be equally spaced down the length of the print. Banding will be most apparent at the outside left and right edges of the print and will taper off and possibly disappear altogether toward the center.

To reduce or eliminate edge banding:

1. Clean the printheads.
2. Confirm that the service station is installed.
3. Confirm that the service station algorithm under **Menu - Configure Printer - Printer Settings - Service Station Settings - Service Station Interval** is set to **30 Seconds.**
4. Examine the boots and wipers on the service station. If they appear worn, replace them or the entire service station. Contact your Authorized Service Provider or ColorSpan Technical Services for service.

Supply-Loop Banding

Supply-loop banding results from calibrating the printer with no supply loop present, but printing actual jobs *with* a supply loop. The tension on the media supply and the force necessary to pull media from the supply are factors in the media advance calibration. If calibration has been adjusted to compensate for a certain level of resistance from the supply, but printing takes place with a different resistance, then the output will show bands. The bands will be stitch bands, but they will disappear as soon as the supply loop has been taken up. A common description of the problem would be "The print looks fine except for the first 6 inches or so."

It is also possible to have calibrated the advance with a supply loop; in this case, if the job begins with the loop also, then the job will be band-free initially but will start banding as soon as the loop is taken up. This situation is less likely to occur. If the calibration was performed with a loop, but printing begins with no loop, then the appearance will be stitch banding throughout the print.

To eliminate or reduce supply-loop banding:

1. Confirm that the printer was properly calibrated. Verify that the media advance calibration is performed with no supply loop, and that the calibration is accurate.
2. Ensure that there is no supply loop present at the start of the print job.
3. Reprint the same job with no supply loop present and confirm that the banding is eliminated.
4. Recommended: set **Configure Printer - Printer Options - Supply Loop** to **Prevent Supply Loop.** This will prevent media from reversing and creating a loop in the first place.

Texture Banding

Texture banding results from either unexpected changes in head height during printing, or failure to recalibrate after an intentional head height change. An accurately calibrated engine will produce random, equally distributed concentrations of dots, regardless of the intensity of coverage. A change to the head height without corresponding recalibration of bidirectional accuracy results in overall graininess and banding patterns.

To eliminate or reduce texture banding:

1. Reset the head height through **Menu - Service Printer - Calibrations - Head Height.** This returns the head to a known height in the event that it has moved unexpectedly.

2. Confirm the desired head height setting through **Menu - Configure Printer - Printer Settings- Head Height**.

3. Run AutoBidi and Auto Head-to-Head Calibration, or run AutoSet.

Swath Edge Banding

Swath edge banding occurs at the edges of print swaths, which are the strips of printed output created as the carriage moves across the page.

To eliminate or reduce swath edge banding:

1. Print in HQ mode. See "Selecting a Print Mode" on page 3-7.

2. If you are printing with two printheads per color, determine which color is causing the banding, and switch the printhead positions in the carriage.

Call MacDermid ColorSpan Technical Services at one of the numbers listed at the front of this manual.

Drying

The printer is equipped with a heated forced-air drying system to help the printed output to dry. The effectiveness of this system depends on numerous variables, including:

◆ **Media type** — glossier media and films take longer to dry. Satin and micropore media dry faster.

◆ **Ambient relative humidity** — the higher the relative humidity, the longer it takes to dry printed output. Lower relative humidity enables faster drying.

◆ **Number of print passes** — faster throughput from fewer print passes results in printed output spending less time under the dryer and less effective drying. Slower throughput from more print passes results in more time under the dryer and more effective drying.

By understanding the relationships among these variables, you can adjust the workflow to meet production requirements. This is particularly important when using the takeup system. If the output is not completely dry by the time it reaches the takeup spool, ink could transfer to the back of the media, possibly damaging the print.
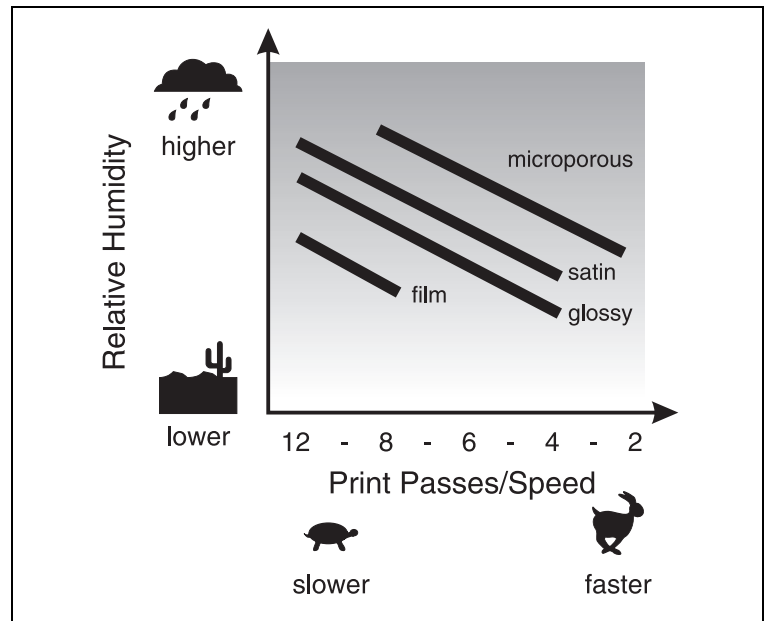
Fig. B-1. Operating curves for various media types

The following table shows the maximum relative humidity that will still allow printed output to dry sufficiently to be spooled onto the takeup without damage, for selected media types and print passes.

Table B-2. Test Results: Maximum Relative Humidity
That Allows Output to Dry Prior to Takeup*

Media	Print Passes	Maximum Relative Humidity
Endura·Chrome Plus White Film	8	35%
	12	45%
Endura·Chrome Plus Backlit Film	4	25%
	8	50%
Satin Photobase PXS	4	50%
	8	60%
Glossy Photobase PXG	4	45%
FineArt UltraWhite Satin Canvas	4	50%
UltraDry Satin Micropore Paper	2	50%

* Test conditions:

Ink set used: 2x6 C2M2YK
Media width: 34 inches
Test image file: Heavy coverage, full-width continuous-tone color image with large areas of Rich Black

Tip   **To increase drying effectiveness, reduce** the relative humidity, **increase** the number of print passes, or **select** a faster-drying media.

Other factors that influence drying performance include:

◆ **Print width** — wider images take longer to print and spend more time under the dryer. Narrower images take less time to print and spend less time under the dryer. When an image does not occupy the entire width of the media, you can slow throughput for more drying by enabling **Print White Space** (see menu at **Configure Printer - Printer Options - Print White Space**). With the ColorSpan print servers, you can print copies of narrower jobs across the media (**N-UP**) or group jobs with **MediaSaver**. This also reduces media waste.

◆ **Coverage** — heavier ink coverage yields more saturated colors, but takes longer dry. Ink coverage is determined by the **image** itself (continuous-tone photograph vs. text or line art), and the **color profile** used (some ColorMark profiles have a High Quality version with more ink coverage and an

Economy version with less ink coverage). You can use the ColorMark+ software or third-party color management software to create color profiles with lower maximum ink levels.

For 1-pass printing, you can specify Full or Reduced coverage (see menu at **Configure Printer - Printer Settings - 1-Pass Coverage**).

	Note	There is no jet replacement in 1-pass mode. If print quality is unacceptable in 1-pass mode, reprint the job in 2-pass or greater mode.

ColorSpan print server software includes a **Lighter Prints - Darker Prints** control that allows you to adjust the maximum ink coverage (see the **Printer Configuration** dialog box in the System Control interface).

◆ **Linearization** — accurate linearization or color calibration ensures accurate ink coverage across all areas of the image, avoiding unnecessarily high coverage that would increase drying time. Linearization is a feature of the ColorSpan print server and third-party RIPs.

◆ **1x or 2x ink sets** — single ink sets (one of each color) print slower, and spend more time under the dryer than double ink sets (two of each color). You can switch between 1x and 2x modes from the printer control panel (see menu at **Front Page - Print Mode**). After doing so you should also perform a new Media Feed calibration and AutoSet, unless you select saved values from the Media Wizard.

◆ **Rich Black or Pure Black** — Rich Black is created by mixing the various colors of ink, and takes more time to dry than Pure Black, which uses black ink only. The type of black can be controlled by the application creating the image, and by the ColorSpan print server (see the **Port Configuration** or **Document Details** dialog box).

◆ **Auto or manual drying delay** — the printer automatically slows the print speed when the ambient relative humidity rises above certain points. If you override this setting and specify less of a delay to speed throughput, there will be less drying. You can specify a Drying Rate of **Same as print speed** to provide more drying time (see menu at **Configure Printer - Printer Settings - Drying Settings**).

◆ **Dryer fans** — the dryer fans can be turned off to avoid streaking the ink on some films, but this results in less effective drying. If output is not drying, check to see whether the fans are turned on (see menu at **Configure Printer - Printer Options - Dryer**).

◆ **Ambient temperature** — the lower the ambient temperature at any given relative humidity, the more effective the dryer will be. This is because a greater difference between the temperatures of the media entering the dryer and leaving the dryer enables more drying.

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