

# *QMS<sup>®</sup> 860 Print System User's Guide*

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**1800261-001D**

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# Chapter 1

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## Introduction

### Chapter highlights:

- Printer overview
  - Documentation overview
  - User's guide overview
-

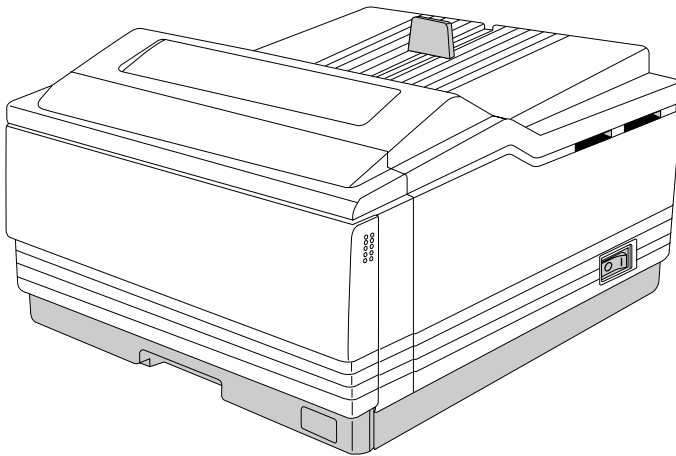




## Printer Overview

The QMS 860 Print System (fig. 1.1)

- Prints 8 pages per minute (letter/A4 paper size) and is the highest quality 600 x 600 print resolution desktop printer available with 11" x 17" print capability.
- Is the most powerful printer in its class, offering the unique QMS Crown multitasking operating system features, superior performance, extensive connectivity, upgradability, and flexible emulation support.
- Provides scalable, rotatable fonts for text and graphics.



**Fig. 1.1** *QMS 860 Print System*

## Features

The major features of the QMS 860 Print System are listed below:

- Exceptional print quality

Produces 8 pages per minute (ppm) of high-quality letter/A4 output at 600 x 600 print resolution. The QMS 860 Print System is a desktop printer with multiple-resolution capability. The 600 x 600 print resolution provides smooth dense blacks, fine lines, quality halftones, and sharp images—excellent for high-quality photo reproductions.

- 11" x 17"/A3 output at 600 dpi

Provides the frequently requested 11" x 17"/A3 feature with high-quality 600 dpi output.

- PostScript Level 2 page description language capability

Allows you to take full advantage of your printer's high print resolution. PostScript Level 2 capabilities are provided in the QMS 860 Print System via the QMS Level 2 page description language, a program which is compatible with Adobe's PostScript Level 2 language while providing additional capabilities. QMS Level 2 supports extensive graphics capabilities to control the appearance of text, geometric shapes and images, and improves memory and resource management.

- Emulation Sensing Processor (ESP) Technology

Allows your printer to recognize and switch to any incoming printer emulation loaded on the printer. When your printer is in ESP mode, you can easily print PostScript, HP PCL 4, or HP-GL documents.

■ Simultaneous Interface Operation (SIO)

Gives you the ability to have more than one computer printing to the printer simultaneously. Although many other printers have multiple interface ports and automatically designate a “hot port,” only one port actively receives data at a time. Your QMS 860 Print System is unique because SIO allows all three interface ports—AppleTalk, parallel, and serial—to be active and to receive data at the same time.

You can have more than one computer printing to the printer. Each interface has an input buffer (which may be expanded with additional memory) that receives data while another interface is being used to print. See chapter 3, the “Simultaneous Interface Operation (SIO)” section, for more information.

The multiple interfaces let you connect to any IBM PC compatible or Macintosh. The printer also works in many mainframe computer and minicomputer environments.

■ Crown Architecture

Uses the QMS Crown multitasking operating system that provides faster processing speeds, networking capability, and higher printer performance while maintaining outstanding print quality.

■ 3 resident emulations

Supports printing in HPPCL 4, HP-GL 7475A/7550A, and PostScript Level 1 compatibility mode and PostScript Level 2 emulations.

■ RISC-based Intel controller

Produces outstanding print quality and increases processing speed. The 80960CA RISC microprocessor operates at a clock speed of 25 Mhz and produces fast first-page-out performance.

■ 39 resident fonts for PostScript emulation printing

Includes 12 typeface families that contain 39 different fonts. All typeface families have multilingual character sets.

■ 12 megabytes (MB) of resident RAM (Random Access Memory) upgradable to 32 MB and 4 MB of ROM (Read-Only Memory)

Allows you to expand your printer's memory. Additional RAM provides room for downloading and caching fonts, and it increases the printer's buffer (area where data sent from the computer is stored). Large data-intensive files can be sent to the printer, freeing the host for other tasks. Your printer's ROM includes 2 MB of system and 2 MB of font memory.

■ Flexible paper handling

Supports paper in 12 different sizes (11" x 17"/A3, legal/B4, letter/A4, A5, B5, A6, B6, executive, and universal). The printer supports print media in sizes ranging from 3.9" to 11.7" (101 mm to 297 mm) wide, and from 5.8" to 17" (147 mm to 432 mm) long.

■ Optional 250-sheet or 500-sheet paper cassette

Increases the printer's paper feed capacity. Your printer comes standard with two 250-sheet paper cassettes: letter/A4 and 11" x 17"/A3. You can install only one paper cassette at a time in the printer unless you purchase the

optional paper feeder that allows you to install dual paper cassettes, increasing paper feed capacity to 600 sheets (including the multipurpose tray). Attaching an optional cassette supporter to the paper feeder allows you to install a 500-sheet paper cassette, increasing paper feed capacity to 850 sheets (including the multipurpose tray).

■ **Optional font and emulation cards**

Increase the printer's functionality. Extra fonts allow you to create more distinctive documents. Emulations allow you to print documents created in a wide range of printer languages. Fonts (such as the ProCollection for the HP emulation on your printer) and printer emulations are contained on small printer circuit boards called cards. These cards can be plugged into the slots on the right side of the printer under the output tray. Contact your QMS vendor for a complete list of available cards.

■ **Optional security card**

Restricts printer Configuration menu access to users with valid passwords.

■ **Optional network interface**

Attaches your printer to other network interfaces, such as Ethernet and Token-Ring. These interfaces support the DECnet, TCP/IP, and Novell NetWare protocol. An additional interface provides greater flexibility and fast data transfer when working in complex network environments.

■ **Hard disk expandability**

Provides hard disk storage for a cache of character bitmaps, downloaded outline fonts, and other files. The

resident 25-pin SCSI interface port allows up to 7 external hard disk drives to be attached to the printer.

■ Convenient control panel operation

Provides a control panel to quickly configure the printer for your printing needs. The 2-line (16 character-per-line) panel displays status and error messages in a user-selected language (English, French, Spanish, or German).

## About the Documentation

The documentation provides a window into the many capabilities of your printer. The more familiar you are with the documentation, the easier it will be for you to achieve the results you want from your printer.

### Standard Product Documentation

The following section gives you an overview of the standard product documentation that comes with your printer:

■ *QMS 860 Print System User's Guide*

You're now looking at your detailed guide to installing and using your printer. Refer to it as you unpack and set up your printer, connect it to a host, configure it through the control panel, replace print media, and maintain and troubleshoot the printer. The "About This Manual" section later in this chapter, details the contents of the user's guide.

■ *QMS 860 Print System Control Panel Guide*

Keep this fold-out card near your printer so you can quickly get to it when you need a guide to the control panel or Configuration menu. The card lists Configuration menu

options and identifies control panel indicators and keys. For a detailed discussion of the information found on the Control Panel Guide, see chapter 4, “Printer Configuration,” in this user’s guide.

■ *QMS Crown Network Notes*

Refer to this manual for tips on using your QMS 860 printer on a network. It discusses 3Com 3+Open, Banyan VINES, LAN Manager-based LANs, Novell NetWare, TCP/IP, UNIX, and VMS/DECnet. In most cases, only advanced network users and system administrators need this information.

■ PS Executive Series Utilities

Refer to this documentation as you install and use the PS Executive Series Utilities software that accompanies your printer. The PS Executive Series Utilities were designed specifically for QMS printers. You install this software on your host and use its user friendly utility programs to access Macintosh screen fonts, print PC screens, name your printer, download fonts and emulations, and print sample files that demonstrate some of your printer’s capabilities. It includes printer description files required by your Windows driver and by various applications. A Windows 3.x driver is also included with this software.

■ Printer Option Documentation

If you purchased a printer option (for example, a network interface), you may have received separate documentation for it. See chapter 8 (“Printer Options”) of this manual for additional option information.

## Optional Purchase Documentation

The following manuals are optional purchases and are included with your printer only if you ordered them. (If you did not order them and decide you want them, you can obtain them from your QMS vendor.)

- *QMS Crown Document Option Commands* (optional purchase)

This is a reference manual that lists and explains Document Option Commands (DOCs), which provide another way to control the printer. DOCs are software codes you insert into documents to enable printer features that cannot be accessed by your application or your page description language. Printer command languages (PostScript, HP PCL, and HP-GL) typically differ in the way they access and use printer features and capabilities.

Using QMS DOC, you can develop one driver to support all languages and emulations for your printer. Also, you can use host network management software to create customized network printer queues for all users connected to the printer. In most cases, only advanced users and system administrators need this information. See appendix E, “Document Option Commands,” for a list of the DOC commands supported on the QMS 860 printer.

- *QMS Crown II Technical Reference Manual* (optional purchase)

This manual provides advanced technical information, including information on communication protocols, HP-GL emulation, and PostScript emulation. In most cases, only advanced users and system administrators need to access this information.



## Related Documentation

Don't forget that your application documentation, your host operating system documentation, and your network documentation all contain useful printing information. See appendix D, "QMS Customer Support," to find out how to use the modem or fax machine to access information on QMS printers.

## About This Manual

This user's guide provides information on how to install, operate, and maintain the QMS 860 Print System. Each chapter begins with highlights of its contents. The appendixes contain supplementary information, the glossary defines printing and computing terms, and the index helps you to locate specific topics quickly.

## Contents

### ■ Chapter 1 - Introduction

Provides an overview of the printer's features and the documentation.

### ■ Chapter 2 - Printer Installation

Provides information on selecting a printer location and explains how to unpack and install your printer.

### ■ Chapter 3 - Printer-Host Interface

Provides information about Simultaneous Interface Operation (SIO) and Emulation Sensing Processor (ESP) technology, and explains how to connect to an Apple Mackintosh or an IBM PC or compatible computer.

■ **Chapter 4 - Printer Configuration**

Describes how to operate the control panel and how to use the menu to configure the printer.

■ **Chapter 5 - Daily Operations**

Provides information about printing on paper and transparencies, loading paper, clearing media jams, and canceling and ending print jobs.

■ **Chapter 6 - Print Quality**

Provides information on how to improve the print quality.

■ **Chapter 7 - Professional Printing**

Provides information on typefaces and page design.

■ **Chapter 8 - Printer Options**

Explains how to install optional printer hardware, such as the paper cassette, paper feeder, cassette supporter, font and emulation cards, security cards, and external hard disks. The installation process for SIMM upgrades and network interfaces is also described although this installation should be performed only by a qualified QMS service technician.

■ **Chapter 9 - Troubleshooting**

Provides paper jam prevention tips, lists printer error messages, outlines printer and print quality problems and solutions, and describes how to place a service call.

■ **Appendix A - Cable Pinouts**

Provides the recommended pinouts for AppleTalk, parallel, serial, IBM PC/XT, and IBM PC/AT cables.

■ **Appendix B - Technical Specifications**

Provides printer specifications and lists consumable supplies and replacement parts.

■ **Appendix C - Character Encoding Tables**

Provides character location tables for the printer's typeface families.

■ **Appendix D - QMS Customer Support**

Provides product sales and support telephone numbers and describes how to communicate with QMS through the QMS Bulletin Board, CompuServe, and Q-FAX.

■ **Appendix E - Document Option Commands**

Lists the Document Option Commands (DOC) supported by your printer.

■ **Appendix F - Additional Technical Information**

Explains how to use the End Job Mode feature, provides advanced information on configuring memory, describes how PS protocol operates, and provides the equation for converting HP-GL emulation pen colors to grayscales.

■ **Appendix G - Manual Notices**

Contains the manual notices, regulatory statements, and colophon.

■ **Glossary**

Defines important printing and computing terms.

## Conventions

The following typographic conventions are used throughout this manual:

Mixed-Case Courier Text you type, and messages and information displayed on the screen

*Mixed-Case  
Italic  
Courier* Variable text you type; replace the italicized word(s) with information specific to your printer or computer

UPPERCASE COURIER Information displayed in the printer message window

**lowercase bold** PostScript operators and DOS commands

*lowercase italic* Variable information in text and PostScript variables

UPPERCASE File and utility names

↵ Press the Enter key (PC) or Return key (Mackintosh)

^ Press and hold down the Ctrl key (PC)

**NOTE:** Notes contain tips, extra information, or important information that deserves emphasis or reiteration.

---

**CAUTION:** Cautions present information that you need to know to avoid equipment damage, process failure, or extreme annoyance.

---

**WARNING!** Warnings indicate the possibility of personal injury if a specific procedure is not performed exactly as described in the manual.

# Chapter 2

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## Printer Installation

### Chapter highlights:

- Selecting your printer's location
  - Unpacking your printer
  - Installing your printer
-



## Selecting Your Printer's Location

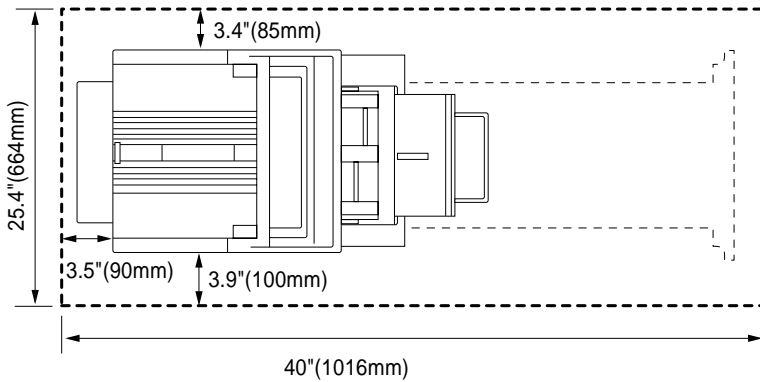
Your QMS 860 Print System operates in almost any computing environment. However, when selecting your printer's location, use the guidelines in the "Location Requirements" and "Power Requirements" sections of this chapter.

### Location Requirements

Your printer's locations should

- Be away from cooling sources, heating sources, extreme temperature changes, direct sunlight, excessive dust, and corrosive chemicals or vapors.
- Be away from any strong electromagnetic field (such as that created by an air conditioner) and excessive vibration.
- Have a temperature range of 50° F (10° C) to 90° F (32.5° C).
- Have a relative humidity range of 20% to 80%.
- Be level and capable of supporting the printer weight, which is about 50 lbs (22.68 kg) for the printer only.
- Be located an appropriate distance from the host computer, based on your operating environment—6 feet (1.8 meters) or less for parallel connection or 25 feet (7.5 meters) or less for a serial connection.
- Be well ventilated. Leave space on each side of the printer for adequate ventilation.

- Have enough space (with less than .04"/1 mm degree slope) to hold the four printer legs and have enough space in front of the printer for you to open the front cover, to access the multipurpose tray, and to slide out the paper cassette. Figure 2.1 shows your printer with the 11" x 17"/A3 paper cassette installed and enough room to remove and load the paper cassette.



**Fig. 2.1** *Space Requirements*



## Power Requirements

Your printer requires a properly grounded AC outlet with a power range of  $\pm 10\%$  of the rated voltage. Noise-generating equipment should not be connected to the same electrical outlet as the printer. The recommended frequency is 50/60 Hz  $\pm 2$  Hz.

---

**CAUTION:** The supplied power cord is equipped with a 3-wire grounding plug, for safety purposes. Connect the plug to the proper grounding-type power outlet.

---

## Unpacking the Printer

Use the following procedure to unpack your printer. The packing materials—cardboard, Styrofoam, tape, and shipping spacers—that protect your printer during shipment must be removed.

You may want to save the packing materials in case you ever have to move or ship the printer to a new location.

**WARNING!** The printer weighs about 50 lbs (22.68 kg). Do not attempt to lift it by yourself.

**ACHTUNG!** Der Drucker wiegt ca 23 kg; bitte versuchen Sie niemals, das Gerät alleine anzuheben oder zu tragen.

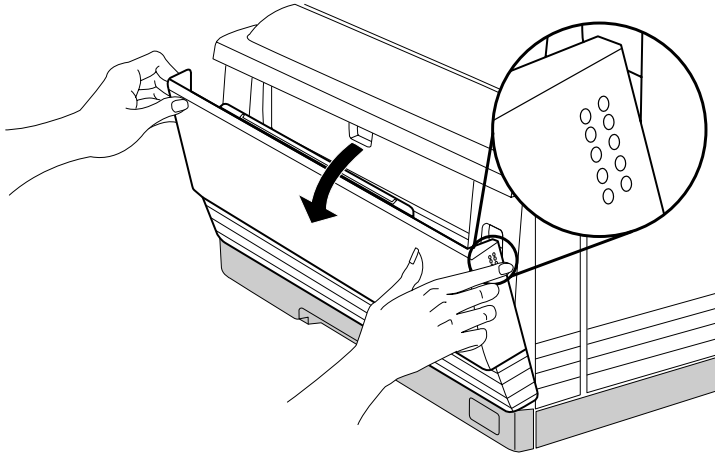
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**CAUTION:** If you turn on the printer before all packing materials are removed, you may damage the printer.

---

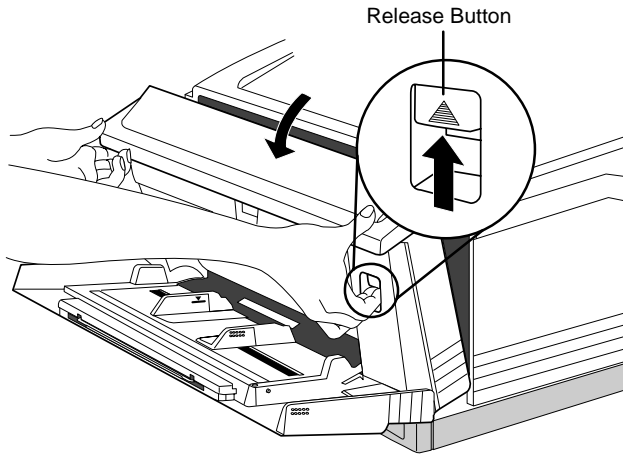
1. Remove everything except the printer from the shipping carton.

2. Lift the printer out of the shipping carton. The printer is heavy, so two people should be available to lift it. Hold the printer by the carrying grips located on the bottom of the printer.
3. Remove the tape from the printer body.
4. Open the multipurpose tray using both hands (fig. 2.2).



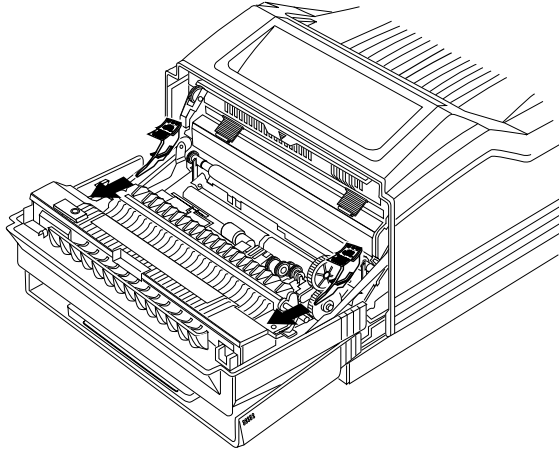
**Fig. 2.2** *Open the Multipurpose Tray*

5. Push up on the release button and open the printer's front cover (fig. 2.3).



**Fig. 2.3** *Open the Front Cover*

6. Remove the two orange shipping spacers from inside the printer (fig. 2.4).



**Fig. 2.4** *Remove the Shipping Spacers*

7. Remove the packing materials from inside the paper cassette.

## Checking Shipment Contents

Your shipment consists of the following items:

- QMS 860 Print System
- 250-sheet 11" x 17" or A3 paper cassette
- 250-sheet letter or A4 paper cassette
- Rear cassette cover
- Power cord
- Warranty card
- Toner cartridge
- *QMS 860 Print System User's Guide* and binder
- *QMS 860 Print System Control Panel Guide*
- *QMS Crown Network Notes*
- PS Executive Series Utilities documentation and software
- Dataproducts (short-line only) adapter kit (boxed separately, if ordered)

Make sure that all items are included in your shipment before installing your printer. If any items are missing or damaged, contact your QMS vendor. See appendix D, "QMS Customer Support," for product sales and support information.

## Completing QMS Product Registration

Register your QMS product. In the US call QMS toll-free at (800) 637-8049. In other countries, refer to appendix D, “QMS Customer Support,” for the appropriate telephone number.

Please take a few minutes to call. Your input helps us to continue developing new products to address your dynamic printing needs.

## Installing Your Printer

Complete all printer installation tasks (installing the toner cartridge, installing and loading the paper cassette, connecting the power cord, and printing the start-up page) before installing any options.

### Installing the Toner Cartridge

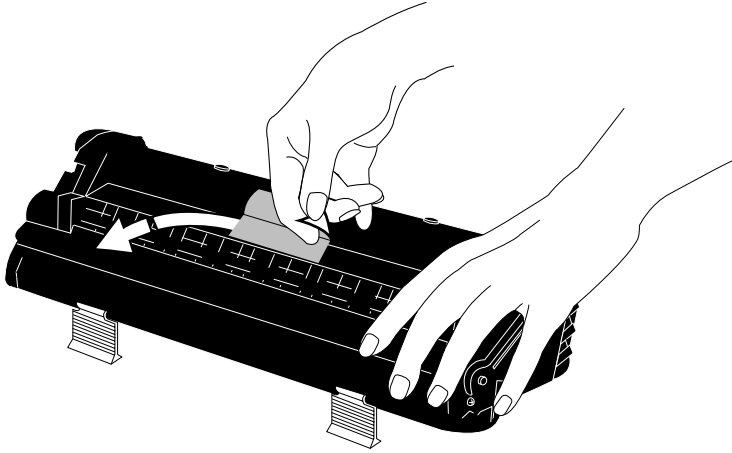
The toner cartridge contains the toner and photosensitive drum needed to operate the laser printer. You may purchase additional cartridges from your QMS vendor.

**NOTE:** The toner cartridge is sensitive to bright light. Do not remove the cartridge from its protective bag until you are ready to install it.

Keep the toner cartridge away from your computer system. The magnets in the cartridge can damage data, particularly on your floppy disks.

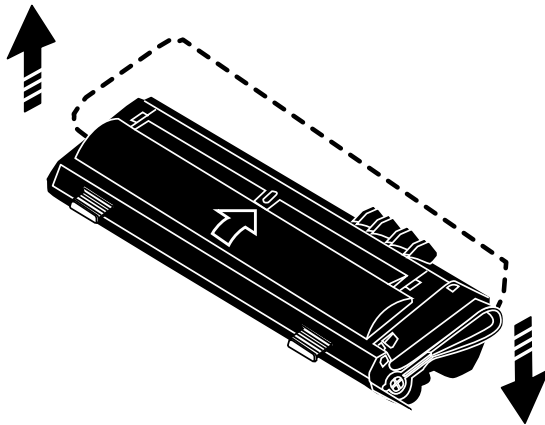
1. Lift the toner cartridge out of its shipping carton, open the aluminum protective bag, and remove the cartridge.

2. Place the cartridge on a flat, stable surface. Then remove the black protective sheet (fig. 2.5) and discard it.



**Fig. 2.5** *Remove the Protective Sheet*

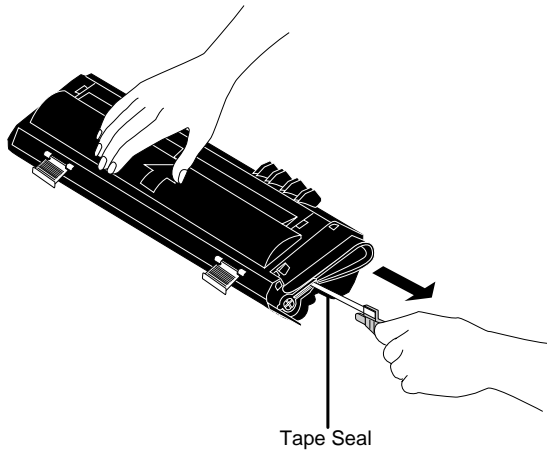
3. Hold the cartridge with both hands, and gently rock it from side to side five or six times to distribute the toner (fig. 2.6).



**Fig. 2.6** *Distribute the Toner*

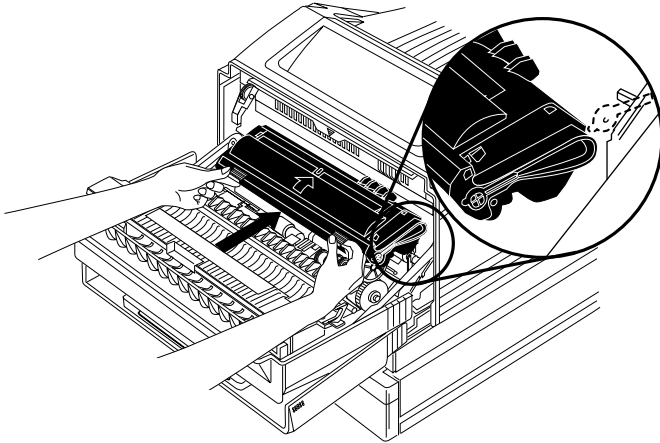


4. Hold the cartridge in place with one hand, and using your other hand grasp the orange tab on the right side of the tape seal. Keep the cartridge parallel with the flat surface and pull the orange tab (26.4"/67 cm) straight out (fig. 2.7). Discard the orange tab and tape seal.



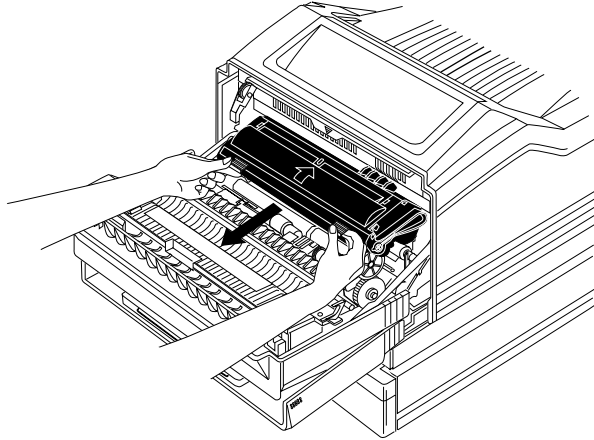
**Fig. 2.7** Remove the Tape Seal

5. Grasp the green tabs on the toner cartridge and place the cartridge on the rails inside the printer (fig. 2.8).



**Fig. 2.8** *Place Toner Cartridge on Rails*

6. Lift the green tabs slightly and slide the cartridge straight back into the printer until it is firmly seated (fig. 2.9).



**Fig. 2.9** *Install the Toner Cartridge*

7. Close the front cover and close the multipurpose tray (if it is not being used).

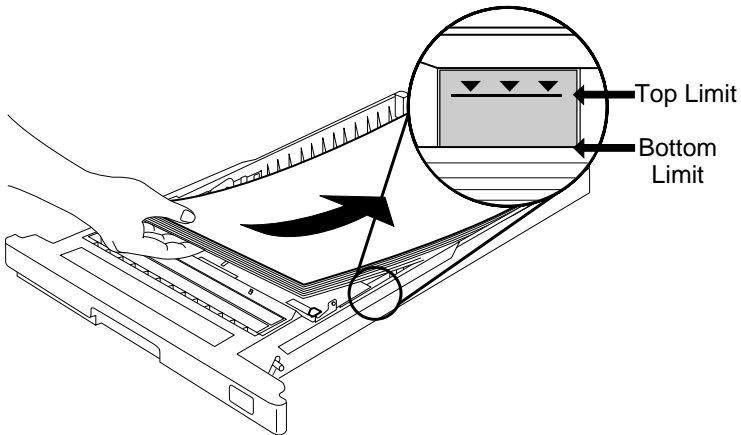
**NOTE:** When the toner cartridge is installed and the printer's front cover is only halfway opened or closed, the drum protective shutters open and the drum surface is exposed to light. This may deteriorate the drum and reduce print quality.

## Loading the 250-Sheet Paper Cassette

The QMS 860 Print System comes standard with two 250-sheet paper cassettes (letter/A4 and 11" x 17"/A3). Load paper in either 250-sheet paper cassette as follows.

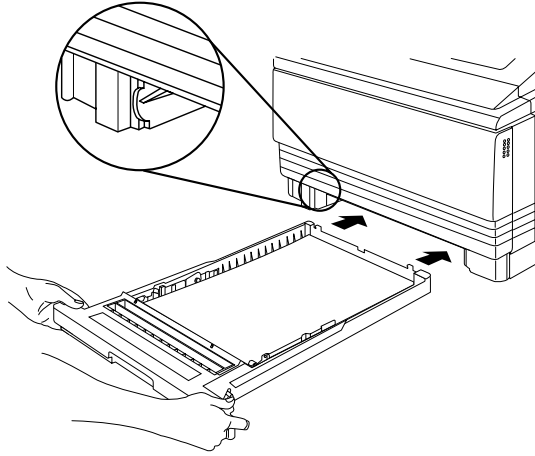
**NOTE:** Use the paper size that matches the paper cassette size. The paper cassette sends a paper size signal to the controller when the cassette is inserted into the printer.

1. Align the paper stack on a flat surface.
2. Insert the paper stack into the cassette so that it lies flat, does not exceed the top limit mark (fig. 2.10), and rests under the retaining clips. The cassette holds about 250 sheets of 20 pound (75 g/m<sup>2</sup>) paper.



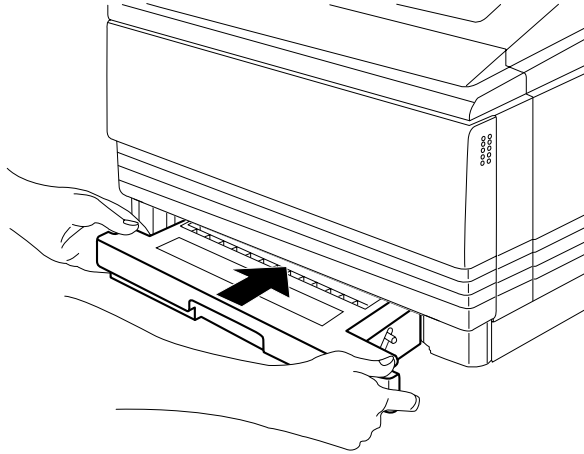
**Fig. 2.10** Load the Paper

3. Insert the paper cassette into the paper cassette installation slot (fig. 2.11).



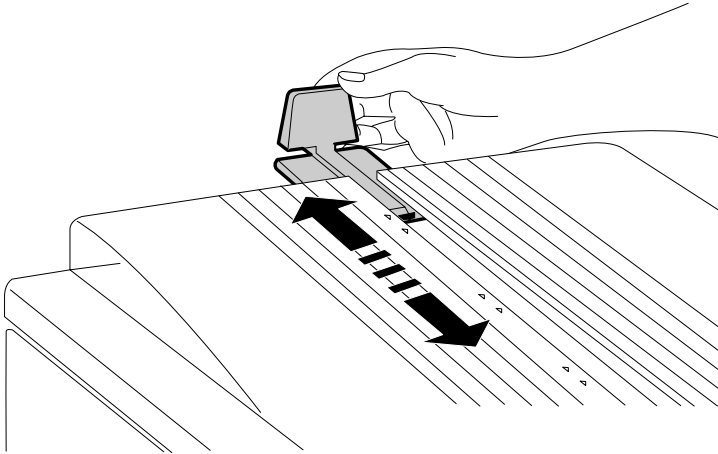
**Fig. 2.11** *Insert the Paper Cassette*

4. Push the filled paper cassette straight into the installation slot until it is firmly seated (fig. 2.12).



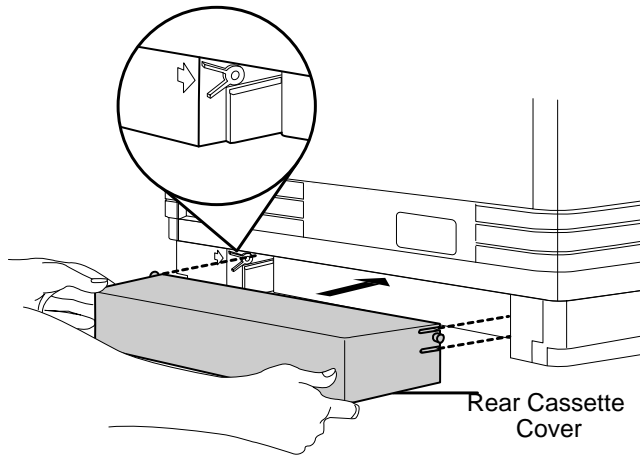
**Fig. 2.12** *Seat the Paper Cassette*

5. Adjust the paper stop to fit the paper size (fig. 2.13). The printer delivers your output, print-side down, to the output tray at the top of the printer. The paper stop keeps the paper positioned in the output tray.



**Fig. 2.13** *Adjust the Paper Stop*

**NOTE:** If using the 11" x 17"/A3 or the optional legal/B4 paper cassette. Place the rear cassette cover on the end of the cassette at the rear of the printer (fig. 2.14).



**Fig. 2.14** *Attach the Rear Cassette Cover*

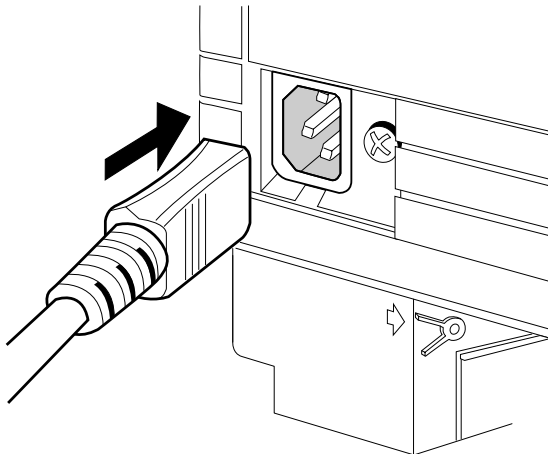


## Connecting the Power Cord

The power cord connector is located at the rear of the printer. The power switch is located at the lower right of the printer.

**CAUTION:** Make sure that the printer power switch is turned off (the O is pressed down).

1. Align the power cord with the connector on the rear of the printer, and plug the power cord into the connector (fig. 2.15).



**Fig. 2.15** *Connect the Power Cord*

2. Connect the opposite end of the power cord to a grounded AC outlet.
3. Turn on the printer (press | down). After a brief warm-up, maximum 2 minutes, the printer produces a start-up page.

## Printing a Start-up Page

When you turn on the printer, a start-up page prints. This page gives you an overview of your QMS 860 Print System.

Information printed on the start-up page follows:

- Printer product name
- Cumulative number of printed sheets
- Amount of resident RAM (in bytes)
- Number of typefaces in ROM
- Standard interfaces, optional network interfaces, emulation modes, and printer communication protocol information
- Software version number
- Firmware version number

If the start-up page prints with all the start-up page information, and the print quality is good, go to chapter 3, “Printer-Host Interface.”

Otherwise, see chapter 9, “Troubleshooting,” for more information on printing a start-up page.

**WARNING!** Turn the printer off and unplug the power cord before checking for correct printer installation.

**ACHTUNG!** Schalten Sie bitte den Drucker aus und ziehen Sie auch den Netzstecker heraus, bevor Sie die korrekte Installation des Druckers überprüfen.

## Enabling/Disabling the Start-up Page

Save time and supplies by disabling the start-up page. The system automatically enables the start-up page to print when the printer is turned on.

The start-up page contains information that Customer Technical Support needs to solve your printer problems. If you only need a start-up page occasionally, use the PS Executive Series Utilities or the printer control panel to print a status page instead of a start-up page. See the “Printing a Status Page” section of this chapter, for more information on printing a status page. You can disable the start-up page in two different ways:

1. Use the PS Executive Series Utilities. See the *PS Executive Series Utilities* manual for more information.
2. Use the printer control panel.

### How to Enable/Disable the Start-up Page

Press the control panel keys in the order listed in the following instructions. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>ONLINE/ OFFLINE</b>	IDLE	Turns off the indicator.
<b>MENU</b>	CONFIGURATION OPERATOR CON- TROL	Accesses the Configura- tion menu.
<b>NEXT</b>	CONFIGURATION ADMINISTRATION	Advances to the Configu- ration / Administration menu.

<b>SELECT and NEXT</b>	ADMINISTRATION STARTUP OPTIONS	Accesses the Administration menu and advances to Administration / Startup Options.
<b>SELECT</b>	STARTUP OPTIONS DO START PAGE	Accesses Startup Options and Do Start Page displays.
<b>SELECT and NEXT</b>	DO START PAGE OPTION	Accesses Do Start Page and advances to the Do Start Page option. OPTION is either YES or NO, depending on whether you want to disable or enable the start-up page.
<b>SELECT</b>	OPTION IS SELECTED	Confirms that the Do Start Page option is selected.
	STARTUP OPTIONS DO START PAGE	Returns to Do Start Page.
<b>ONLINE/ OFFLINE</b>	SAVE CHANGES? NO	Prompts you to save changes.
<b>NEXT</b>	SAVE CHANGES? YES	Advances to the next Save Changes option.
<b>SELECT</b>	IDLE	Finishes printing any print jobs in process, saves changes, and idles or reinitializes the printer.
<b>ONLINE/ OFFLINE</b>	IDLE	Turns on the indicator and puts the printer in a ready state.



# Chapter 3

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## Printer-Host Interface

### Chapter highlights:

- Simultaneous Interface Operation (SIO)
  - Emulation Sensing Processor (ESP) technology
  - Connecting via the AppleTalk port
  - Connecting via the parallel port
  - Connecting via the serial port
-



## **Introduction**

Interface is the point at which two elements connect so they can work together. Printer-host interface is the way a printer connects to and works with a host (for example, a microcomputer, minicomputer, mainframe computer, or a network), and it involves both hardware and software. The way your printer interfaces with a host depends on many things, including host type, host ports available, interface cabling, application software, printer emulations, and printer drivers.

This chapter first explains your printer's Simultaneous Interface Operation (SIO) and Emulation Sensing Processor (ESP) technology. Both of these resident features enhance printer-host interface. Then this chapter describes how to connect a host to the printer's AppleTalk, parallel, or serial port, and test the communication on that port.

## **Optional Network Interfaces**

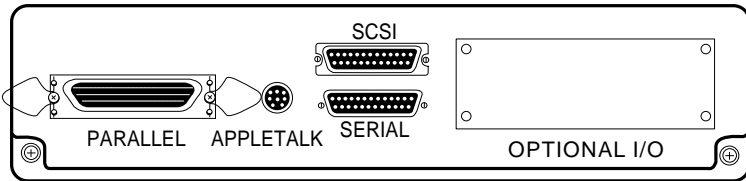
In addition to the three standard interfaces—AppleTalk, parallel, and serial—the QMS 860 Print System has the option of using another network interface, such as DECnet, TCP/IP, and EtherTalk on Ethernet networks, and Novell NetWare on Ethernet and Token-Ring networks. This additional interface option allows greater flexibility when working in a complex network environment. See your QMS vendor for a list of available network interfaces.

If you have purchased an optional network interface for the printer, see chapter 8, "Printer Options," for installation instructions, and see your network and your interface kit documentation for

additional information. See also *QMS Crown Network Notes*, which came with your printer.

## Simultaneous Interface Operation (SIO)

Simultaneous Interface Operation (SIO), a standard feature of QMS Crown architecture, enables your QMS 860 Print System to communicate simultaneously with hosts through the AppleTalk, parallel, serial, and optional network interface (if installed) ports. In other words, SIO allows you to have more than one host communicating with the printer at one time. These ports are located on the interface panel on the back of the printer and are labeled (fig. 3.1).



**Fig. 3.1** *The QMS 860 Print System Interface Ports*

**NOTE:** The printer's SCSI port, also located on the interface panel, is used to connect up to seven optional hard disks to the printer. It is covered by a metal bracket so it is not confused with the serial port. This metal bracket needs to be removed before installing a SCSI drive.



## **ESP Technology**

ESP technology is another standard feature of QMS Crown architecture. ESP technology, which works with most popular commercially available applications, uses a form of artificial intelligence to analyze incoming file data and select the appropriate printer emulation (for example, PostScript emulation, HP-GL emulation, HP-PCL emulation or another optional emulation) from those installed on the printer.

The print job is processed without the user having to change printer switch settings or send software commands to accommodate different printer emulations.

When your printer is in ESP mode, you can easily print files prepared for a PostScript printer, an HP LaserJet, or an HP-GL plotter. The file prints correctly as long as it begins with the traditional PostScript or HP-GL commands for such items as page formats and job parameters (number of copies, page margins, fonts).

The QMS 860 Print System prints almost any file sent in a language ESP technology understands, whether you have one, two, or more hosts, and whether you are communicating through a AppleTalk, parallel, serial, or optional network interface. Most users never have to change from ESP mode to another mode.

These are a few of the many applications that have been successfully tested in ESP mode: Adobe Illustrator, Aldus FreeHand, Aldus PageMaker, AutoCAD, DisplayWrite, Dreams, Harvard Graphics, Label Matrix, Lotus 1-2-3, Lotus Manuscript, Microsoft Excel, Microsoft Windows and all Windows applications, Microsoft Word, MultiMate, PowerPoint, PSPlot,

Sprint, SuperPaint, Ventura Publisher, WingZ, WordPerfect, and WordStar.

## Communication Modes

You can either allow your printer to operate in its default ESP mode or configure its ports to accept jobs in only a particular emulation mode (for example, PostScript emulation only, HP PCL only, or HP-GL emulation only).

Generally, it is best to keep your printer in ESP mode. Since ESP mode is the factory default, all you have to do to use it initially is connect your host and printer and then send a file.

If you do want to reconfigure the interface ports for specific emulations (or if you need to return the printer to ESP mode), the easiest way is to use the printer's control panel (the Administration/Communications menu). Configuring the printer through the control panel is described in chapter 4, "Printer Configuration" (and is outlined on your *Control Panel Guide*).

You can also use PostScript operators to reconfigure printer ports. The *QMS Crown Technical Reference Manual*, which is an optional purchase available from your QMS vendor, contains information about PostScript operators.

**NOTE:** We recommend changing printer emulations only on the serial and parallel ports. The AppleTalk port supports only PostScript emulation.

## **Connecting via the AppleTalk Port**

Connecting to the LocalTalk port involves basically three steps: assembling the proper interface cabling (use a LocalTalk-type kit such as Farallon's PhoneNET, available from your QMS vendor), making the connection, and making sure the necessary printing files are installed on the Macintosh

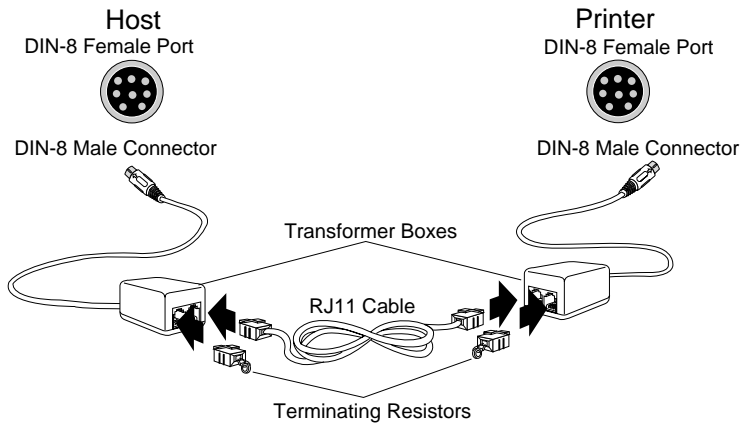
The AppleTalk port is used to print if

- Your host is any member of the Apple Macintosh family, such as the Macintosh SE, II, IIfx, IIfx, IIfx, or Quadra. The instructions in this chapter explain how to connect a Macintosh to the QMS 860 Print System.
- Your host is an IBM PC or compatible microcomputer, workstation, minicomputer, or mainframe computer that connects through a print network (such as TOPS or AppleShare) using LocalTalk-type connectors and boxes. If you are connecting to a host such as these, you may need additional hardware or software. See your host or network documentation for details specific to your setup.

### **Macintosh Interface Cabling**

To connect your printer to a Macintosh (fig. 3.2), you must have two PhoneNET-type transformer boxes: one with a DIN-8 connector for the printer port and one with a DIN-8 connector for the Macintosh port. You also need an RJ11 (telephone) cable and enough terminating resistors to close any open sockets left in the transformer boxes after the connection is made. (You need two terminating resistors if you are connecting the printer to a single Macintosh.)

Your PhoneNET and Macintosh documentation contain further information on AppleTalk networks and the proper termination of the transformer boxes.



**Fig. 3.2** *Printer Interface Cables and Connections*

## Making the Connection

Use the following procedure to connect your printer to the host.

---

**CAUTION:** Turn off both the printer and the host before making the connection.

---

1. Connect the DIN-8 connector from one transformer box to the printer's AppleTalk port.
2. Plug the DIN-8 connector from the other transformer box into the Macintosh printer port.
3. Plug one end of the RJ11 cable into the transformer box at the printer and the other end of the cable into the transformer box at the host.

4. Insert terminating resistors into any open sockets in the connector boxes. This ensures proper communication and helps speed up transmission.
5. Turn on the printer. A start-up page should print if it has not been disabled.

## Macintosh Printing Software

Once the Macintosh and printer are physically connected by the LocalTalk cable, you must make sure the necessary printer software files (for example, drivers and printer description files) are installed on the Macintosh so it can communicate with the printer.

### PS Executive Series Utilities

We strongly recommend that you now install PS Executive Series Utilities that came with your printer because it contains, among other things

- Printer drivers and printer description files required for printing from many Macintosh applications
- Utilities for installing printer-resident screen fonts, renaming the printer, downloading fonts, and managing hard disks
- A Paper Handler utility, which gives Macintosh users additional paper handling capabilities on multitray printers
- Font sample files

The PS Executive Series Utilities documentation explains how to install and use the program.

## Macintosh Printer Drivers

A printer driver converts generic commands from applications into printer-specific commands. You must have a driver designed for your particular printer to print from your application.

Most Macintosh applications use the Apple LaserWriter driver that comes with the Macintosh system software. However, we recommend installing the LaserWriter driver included in PS Executive Series Utilities because it supports additional page sizes specific to your printer.

If you are adding the printer to an existing network, the printing software you need is probably already installed on your Macintosh. To determine whether you already have the necessary software, do the following at your Macintosh:

1. Choose Chooser from the Apple menu. The Chooser window is displayed.
2. If a LaserWriter icon appears in the Chooser window, click the icon to display a list of available printers. Highlight *QMS 860 Print System* to select your printer; then close the Chooser window.

If a LaserWriter icon *does not* appear in the Chooser window, you must copy the LaserWriter file from PS Executive Series Utilities onto the System Folder icon on your hard disk or start-up disk; then close the Chooser window. In order to install the LaserWriter driver, use the following procedure:

- a. Double-click the hard disk or start-up disk icon to display a window showing the disk contents, including the System Folder.
- b. Insert the PS Executive disk called Drivers in a disk drive and double-click the disk icon to display a window showing the disk contents, including Paper Handler. Double-click the Paper

Handler icon to display a window containing LaserWriter (among other things).

- c. Copy the LaserWriter file by dragging the icon onto the System Folder icon on your hard disk or start-up disk. **System 6** users should have the LaserWriter file located in the System Folder. **System 7** users should have the LaserWriter file located in the Extensions Folder within the System Folder.

**NOTE:** All Macintosh users on a network must use the same version of the LaserWriter and Laser Prep files to run correctly. For example, if the network has a mixture of LaserWriter 6.0 and 7.0, the printer will experience frequent reinitialization problems. To check the version number, select the LaserWriter icon and then hold down the Command key and press I. The driver version number appears in the Info window on the second to last line. LaserWriter 7.xx does not require a Laser Prep file to work correctly with your printer. The Laser Prep information is located within the LaserWriter driver itself.

## Printer Description Files

In addition to LaserWriter and Laser Prep, many Macintosh applications, including Aldus PageMaker, Aldus FreeHand, Adobe Separator, and QuarkXPress, use special printer description files. PS Executive Series Utilities includes these special files, called APD (Aldus Printer Description), PPD (PostScript Printer Description), PDX (Printer Description eXtension), and PDF (Printer Description File). See “Using the Macintosh Utilities” in the PS Executive Series Utilities documentation for details.

**Adobe Separator** uses the PPD file. You have to tell Separator where the PPD is located on your Macintosh. Check your Adobe documentation for details.

**QuarkXPress** uses the file called PDF. Each QMS printer model requires its own PDF. You must load the PDF in the same folder as the QuarkXPress application. Check your QuarkXPress documentation for details.

**Aldus PageMaker 4.2 and higher** use PPD and PDX files. The PDX works in conjunction with the standard PPD to expand printer capabilities. The PPD and PDX must be placed in the PPDs folder within the Aldus folder inside your System Folder.

**Aldus PageMaker 4.01 and earlier** use the APD file. The APD gives PageMaker information specific to your printer type. Different versions of PageMaker require the APD to be installed in different ways. Check your PageMaker documentation for details.

**NOTE:** In PageMaker 4.0 and higher, if you use these printer description files and have installed the QMS Paper Handler, you will not be able to access QMS Paper Handler features from the default menu. To overcome this problem, hold down the Option key when selecting Print from the File menu and use the Apple Driver window.

**Aldus FreeHand 3.0 and higher** use PPD and PDX files. The PDX works in conjunction with the standard PPD to expand capabilities. The PDX and PPD must be placed in the PPDs folder inside the Aldus folder inside your System Folder.

**Aldus PrePrint** uses PPD and PDX files. The PDX works in conjunction with the standard PPD to expand capabilities. The PDX and PPD must be placed in the PPDs folder inside the Aldus folder inside your System Folder.



If you do not install these files for your printer, you can still print from the applications using other printer options. However, you may get some error messages informing you to change the name of the printer, and you may not have all your printer capabilities available to you.

## Testing Macintosh Communication

You can check that the printer selected in the Chooser and the Macintosh are communicating by printing a directory:

1. Display a disk or folder window.
2. Choose Page Setup from the File menu. Select paper size, printing orientation, and any other necessary options. Then select OK.
3. Choose Print Directory or Print Window from the File menu. A dialog box appears.
4. Select the printing options you want; then click OK. If no page prints, check chapter 9, “Troubleshooting.”

## Connecting via the Parallel Port

Parallel communication is faster than serial communication, so it is best if

- A parallel port is available on your host
- The host and printer are within 6 feet (approximately 1.8 meters) of each other
- You print a lot of graphics

A parallel cable has a 36-pin male connector on the printer end and a 25-pin male connector on the host end. This cable is available from your QMS vendor. A Dataproducts adapter kit (short-line only) is also available from your QMS vendor. See chapter 8, “Printer Options,” for installation instructions.

---

**CAUTION:** If you are connecting the printer to a single host, turn off both systems first.

---

Use the following procedure to connect your printer to your host via the parallel port:

1. Attach the 36-pin printer end of the cable to the parallel port on the printer (fig. 3.3); then close the clips.



**Fig. 3.3** *Host and Printer Parallel Interface Ports*

2. Attach the other end of the cable to the host’s parallel port.
3. If necessary, use the printer control panel to set up parallel communication. The factory default parallel settings are appropriate for most parallel communications. See chapter 4, “Printer Configuration,” if you need more information.

## Testing Parallel Communication

To test communication between your printer and host, first create a short file that ejects a page from the printer. Then send the file to the printer.

**Creating the Test File** To create the test file, type the following commands at the DOS prompt (you can use either uppercase or lowercase letters; however, you must type the PostScript **showpage** operator in lowercase letters). The ↵ symbol means to press the Enter key. To produce the ^D and ^Z, press and hold down the Ctrl key while you type the appropriate letters (d and z). These characters signify the end of the file and must always be included.

```
copy con printest.ps↵  
showpage↵  
^D^Z↵
```

**Sending the Test File** To test parallel communication, type the following command at the DOS prompt to send the PRINTEST.PS file you just created to the printer:

```
print printest.ps↵
```

If prompted for the name of the list device, type

```
lpt1↵
```

or type the name of the parallel port that the printer is connected to.

If the printer and host are communicating, a blank page ejects from the printer.

If a blank page does not eject and you typed the file correctly, you may want to check your AUTOEXEC.BAT file to see if LPT1 (the parallel port) is being directed to COM1 (the serial port):

1. If the AUTOEXEC.BAT file contains the line

```
MODE LPT1 :=COM1 :
```

**delete it.**

2. Then type

```
MODE LPT1: , , P
```

in the AUTOEXEC.BAT file so that print jobs are sent until the printer accepts them.

3. Reboot the host and try the communication test again.

See chapter 9, “Troubleshooting,” and refer to your DOS documentation for more information.

## Connecting via the Serial Port

Serial communication is best if

- A parallel port is not available on your host
- The host is more than 6 feet (approximately 1.8 meters) but less than 25 feet (approximately 7.5 meters) from the printer
- You want the printer to return information to the host

The standard serial cable has a 25-pin male (DB-25) connector on the printer end and either a 9-pin female connector or a 25-pin female connector on the host. See appendix A for pinouts.

---

**CAUTION:** Turn off both the printer and the host before making the connection.

---

Use the following procedure to connect your printer to your host via the serial port:

1. Insert the 25-pin male printer end of the cable into the printer's serial port (fig. 3.4); then tighten the screws on the cable to attach it to the printer.



**Fig. 3.4** *Host and Printer Serial Interface Ports*

2. Plug the other end of the cable into the host's serial port. On some hosts, the 25-pin parallel port and the 25-pin serial port may look similar, but the parallel port is female and the serial port is male.

The following sections, “Testing Serial Communication” and “Changing Serial Port Settings,” explain how to establish serial communication between the printer and the host.

## Testing Serial Communication

Before you can print to the serial port, the printer, host, and application must all communicate using the same serial port settings. If your printer is replacing another printer, and if you are using the same cable to connect it to the host, the host is probably already configured correctly. However, if the host has not been connected to a printer before, or if you are using a different cable, use the information in this section to test the communication between printer and host.

To test communication between your printer and host, first create a short file that ejects a page from the printer and then send it to the printer.

**Creating the Test File** To create the test file, type the following commands at the DOS prompt (you can use either uppercase or lowercase letters; however, you must type the PostScript **showpage** operator in lowercase letters). The ↵ symbol means to press the Enter key. To produce the ^D and ^Z, press and hold down the Ctrl key while you type the appropriate letters (d and z). These characters signify the end of the file and must always be included.

```
copy con printest.ps↵  
showpage↵  
^D^Z↵
```

**Sending the Test File** To test serial communication, type this command at the DOS prompt to send the PRINTEST.PS file you just created to the printer:

```
print printest.ps↵
```

If prompted for the name of the list device, type

```
com1↵
```

If the printer and host are communicating, a blank page ejects from the printer. If a blank page does not eject and you typed the file correctly, see chapter 9, “Troubleshooting.” You may also want to check your AUTOEXEC.BAT file in DOS to make sure that the printer’s serial port settings match those of the PC. Look for a command line like this in your AUTOEXEC.BAT file:

```
MODE COM1 : 9600 ,N , 8 , 1 , P
```

In this example, the serial port settings are 9600 for baud rate, n (no) parity, 8 data bits, and 1 stop bit. The p stands for infinite retry.

Now check the start-up page, which prints when you turn on the printer (unless you disabled it). This tells you the current serial port settings for the printer. If the serial settings (baud rate, parity, data bits, and stop bits) shown on the start-up page match those in your AUTOEXEC.BAT file, you need make no further changes. Go to the section “Special PC Concerns” later in this chapter.

If the printer’s serial port settings are different from your PC’s, you must make them match. Refer to the following section, “Changing Serial Port Settings,” to do this.

## **Changing Serial Parameters**

Since your printer is configured at the factory for the most typical printing environments, the serial parameters in your AUTOEXEC.BAT file and on the start-up page should be the same. However, if they differ, you must configure the printer to use the serial parameters specified in the AUTOEXEC.BAT file.

Press the control panel keys in the order shown in the following instructions to change the printer’s serial parameters. The printer responds by displaying a status message in the message window.

You may need to press the Next key one or more times through the list of selections or options. If you need to change other serial parameters, refer to chapter 4, “Printer Configuration,” for complete information.

**NOTE:** The printer must be off line and idle to change printer configuration.

### How to Access Serial Mode

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>ONLINE/ OFFLINE</b>	IDLE	Turns off the indicator and takes the printer off line.
<b>MENU</b>	CONFIGURATION OPERATOR CON- TROL	Accesses the Configura- tion menu.
<b>NEXT</b>	CONFIGURATION ADMINISTRATION	Advances to the Configu- ration / Administration menu.
<b>SELECT</b>	ADMINISTRATION COMMUNICATIONS	Accesses the Configura- tion / Administration menu and displays Administra- tion / Communications.
<b>SELECT</b>	COMMUNICATIONS TIMEOUTS	Accesses the Administra- tion / Communications menu and displays Ad- ministration / Communica- tions / Timeouts.
<b>NEXT</b>	COMMUNICATIONS SERIAL	Advances through the Ad- ministration /Communica- tions menu.



<b>SELECT</b>	SERIAL MODE	Accesses the Administration / Communications / Serial menu and displays the Mode option.
---------------	----------------	--

### How to Change the Baud Rate

<b>NEXT</b>	SERIAL BAUD RATE	Advances through the Serial options.
-------------	---------------------	--------------------------------------

<b>SELECT</b>	BAUD RATE *9600	Accesses the Baud Rate option and displays the currently selected baud rate.
---------------	--------------------	--

<b>NEXT</b>	BAUD RATE RATE	Advances through the Baud Rate options. (RATE is any Baud Rate option.)
-------------	-------------------	---

<b>SELECT</b>	RATE IS SELECTED	Confirms the selected baud rate.
---------------	---------------------	----------------------------------

	SERIAL BAUD RATE	Returns to the Administration / Communications / Serial menu. If you are done changing serial parameters, then go to the “How to Save Changes” section later in this chapter for save changes information.
--	---------------------	--

### How to Change the Parity

<b>NEXT</b>	SERIAL PARITY	Advances through the Administration / Communications / Serial menu.
-------------	------------------	---

<b>SELECT</b>	PARITY *NONE	Accesses the Parity option and displays the currently selected parity.
---------------	-----------------	--

<b>NEXT</b>	PARITY TYPE	Advances through the Parity options. (TYPE is any parity option.)
<b>SELECT</b>	TYPE IS SELECTED	Confirms the selected parity.
	SERIAL PARITY	Returns to the Administration / Communications / Serial menu. If you are done changing serial parameters, then go to the “How to Save Changes” section later in this chapter for save changes information.

### **How to Change Data Bits**

<b>NEXT</b>	SERIAL DATA BITS	Advances through the Serial menu.
<b>SELECT</b>	DATA BITS 8 BITS	Accesses the Data Bits option and displays the currently selected data bits.
<b>NEXT</b>	DATA BITS 7 BITS	Advances through the Data Bits options.
<b>SELECT</b>	7 BITS IS SELECTED	Confirms the selected data bits.
	SERIAL DATA BITS	Returns to the Administration / Communications / Serial menu. If you are done changing serial parameters, then go to the “How to Save Changes” section later in this chapter for save changes information.

## How to Change Stop Bits

<b>NEXT</b>	SERIAL STOP BITS	Advances through the Administration/Communications / Serial menu.
<b>SELECT</b>	STOP BITS 1 BIT	Accesses the Stop Bits option, and displays the currently selected stop bits.
<b>NEXT</b>	STOP BITS 2 BITS	Advances through the Stop Bits options.
<b>SELECT</b>	2 BITS IS SELECTED	Confirms the selected stop bits.
	STOP BITS SERIAL	Returns to the Administration / Communications / Serial menu. If you are done changing serial parameters, then go to the “How to Save Changes” section next in this chapter for save changes information.

## How to Save Changes

<b>ONLINE/ OFFLINE</b>	SAVE CHANGES? NO	Displays the default Save Changes option.
<b>NEXT</b>	SAVE CHANGES? YES	Advances through the Save Changes options.
<b>SELECT</b>	IDLE	Finishes printing any print jobs in process, saves changes, and idles or reinitializes the printer.
<b>ONLINE/ OFFLINE</b>	IDLE	Turns on the indicator and puts the printer in a ready state.

To verify the serial parameter changes you just made, turn the printer off, then back on. Compare the printer's start-up page to your AUTOEXEC.BAT file.

## Special PC Concerns

### PC Printer Drivers

To communicate with your printer, a printer driver that supports PostScript and the QMS 860 Print System must be installed in your application.

A printer driver converts generic printer commands from applications into printer-specific commands. Many applications have drivers built in, and you only have to choose a driver from a menu.

If you already use a PostScript-compatible printer, the driver defined for that printer will work with your new QMS printer, but you may not be able to access all of the printer's features. If your application does not offer a driver for any QMS printers, you can use a PostScript driver (if you are working in PostScript emulation or ESP modes), a LaserJet driver (if you are working in HP PCL emulation or ESP modes), or a HP-GL 7475A or 7550 plotter driver (if you are working in HP-GL emulation or ESP modes).

However, if your QMS 860 Print System has features your old printer did not, such as additional resident fonts, you may want to install a new driver capable of handling these features. If your application does not offer a multiple-tray printer driver, it may not support paper tray selection. Any PostScript printer driver supporting 11" x 17" output ensures that you get basic printer functions and 11" x 17" capability. To benefit from all the functions

available on your printer, you need to use the QMS 860 Print System driver.

Sometimes drivers are available from application manufacturers. Some drivers for QMS printers are also available through the QMS Corporate Bulletin Board System and through CompuServe; see appendix D, “QMS Customer Support,” for information.

**NOTE:** The QMS 860 printer driver, including the Windows driver, support all printer supported paper sizes, trays, and cassettes. Depending on your version of Windows and your printing environment, you may encounter printing problems with the Windows driver. If so, use Microsoft’s Windows driver with the WPD file included with the PS Executive Series Utilities. See the PS Executive Series Utilities documentation for more information on the WPD file.

## PC Screen Fonts

Screen fonts allow you to see on the screen how your document looks before it is printed. You may be able to obtain PC screen fonts from your application manufacturer or from QMS’s electronic fax system “Q-FAX,” which will fax you a request form to order the PC screen fonts. (See appendix D, “QMS Customer Support,” for information.) However, you can use the printer fonts without having the corresponding screen fonts.



# Chapter 4

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## Printer Configuration

### Chapter highlights:

- Printer control panel operation
  - Printer menu structure
-





## **Introduction**

Now that you have your QMS 860 Print System set up (chapter 2), connected to a host computer, and ready to print (chapter 3), you need to learn more about how to control the printer and the printing process. This chapter describes the printer's menu structure, which you access through the printer's control panel. The *Control Panel Guide* that came with the printer also contains this information, in summary form. However, you should read this chapter to make using the *Control Panel Guide* easier and to become familiar with your printer's capabilities.

## **Control Panel**

The control panel keys allow you to configure the printer through menu selections that control printer operations. The control panel LED (light emitting diode) indicators and LCD (liquid crystal display) message window provide information about the printer and about the status of print jobs. The first part of this chapter identifies each control panel part and describes its function. You should read this section to learn how to use the keys and how to interpret messages and indicators.

## **Menu Structure**

The second part of this chapter describes the menu structure and lists the default for each option. A default is a preset value for the most common printing environment.

This chapter provides basic printer configuration information about all menu options because most users do not have to use the printer's Configuration menu often. The *QMS Crown Technical Reference*

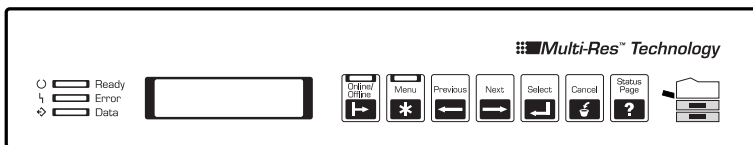
*Manual*, which is an optional purchase available from your QMS vendor, contains more extensive configuration information.

**NOTE:** The Administration / Miscellaneous menu Restore Defaults option allows you to restore factory defaults. See the “Administration/Miscellaneous” section of this chapter for more information on this option.

## Printer Control Panel

The control panel (fig. 4.1) consists of the following parts:

- Five indicators that display printer status information, three print engine indicators that display the current input bin, and a message window that provides configuration and status information.
- Seven control panel keys (three function keys and four menu keys) that allow you to access frequently used printer options.



**Fig. 4.1** *Printer Control Panel*

## Control Panel Indicators

Five indicators on the control panel display printer status information:



Ready

Flashes when the printer is warming up. Remains on when the printer is ready to receive a print job and during printer operation unless an error is encountered.



Error

Lights when the printer requires operator intervention. This indicator is usually accompanied by a status message in the message window.



Data

Lights when the printer is receiving data from one or more of the simultaneous interfaces.

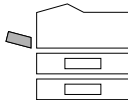


Lights when the printer is on line and ready to accept and process new print jobs. Pressing it once takes the printer off line (the indicator is not lighted), making the printer ready for configuration.

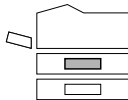


Lights when the Configuration menu is accessed and remains on until the Online/Offline key is pressed.

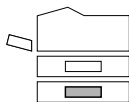
Three indicators on the control panel's print engine diagram show the current input bin:



Lights when the multipurpose tray is the current input bin.



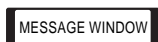
Lights when the lower paper cassette is the current input bin.



Lights when the optional paper cassette is the current input bin.

## Control Panel Display

The message window provides configuration and status information.



Displays two lines of text (with 16 characters on each line) and presents status messages and configuration menus.

Status messages are displayed by priority. Priority indicates the severity of the message. The highest priority message displays on the top line. If a message uses only the top line of the display, the next highest priority message displays on the bottom line. However, if either message display exceeds one line, only the highest priority message is displayed.

When the status associated with a displayed message has changed, the message is cleared from the window and the next highest priority message is displayed. See chapter 9, “Troubleshooting,” for a list of the status messages that display in the message window.

## Control Panel Function Keys

The three function keys (Online/Offline, Cancel, and Status Page) access frequently used printer options. The four menu keys (Menu, Select, Next, and Previous) access the Configuration menu and select options. Keep in mind that some of the function keys may be used in combination with the menu keys.

**NOTE:** Always make sure the printer is idle and off line before making configuration changes. You must take the printer off line before using the control panel keys (except for the Online/Offline key, Cancel key, and Status Page key). If the printer is not idle, jobs may be lost.

**Online/Offline Key** When the printer is on line, the indicator on the key is lighted. Press the key once to take the printer off line (the indicator goes out). You must take the printer off line before using all other keys except the Cancel key and the Status Page key.

When the printer goes off line, the communication ports are closed, so no new data is accepted. The engine stops printing when the printer has finished printing all jobs in process. Although jobs continue to compile and print using the data already received, a job may be interrupted, causing it to wait for more incoming data before printing resumes.

When the printer is off line, pressing the Online/Offline key once places it back on line. The indicator lights, and the printer is once again ready to accept and process new print jobs.

**NOTE:** Use the Menu key to stop the print job cancel or end.

**Cancel Key** Press this key to cancel a print job or to send an end-of-job indicator to a print job waiting for incoming data. It is not necessary to take the printer off line first.

### **How to Cancel a Print Job**

Press the control panel keys in the order shown in the following instructions to cancel a print job. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>CANCEL</b>	CANCELLING JOB? YES	Displays the Cancelling Job confirmation message.
<b>CANCEL or SELECT</b>	YES IS SELECTED	Confirms that jobs which are printing or compiling data are to be deleted from the job queue.
	CANCELLING JOB	Cancels the first job in the job queue and displays the Cancelling Job message until the job is completely removed from the printer.
	IDLE	Finishes printing any print jobs in process, saves changes, and idles or reinitializes the printer.

### **How To End a Print Job**

Press the control panel keys in the order shown in the following instructions to send an end-of-job indicator. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
	WAITING FOR INPUT END JOB?	Displays this message and accepts an end-of-job indicator for the currently compiling job if it is the first job in the job queue and is waiting for incoming data.
<b>CANCEL</b>	CANCELLING JOB? YES	Confirms that print jobs are to be cancelled.

<b>NEXT or PREVIOUS</b>	CANCELLING JOB? END JOB	Displays Cancelling Job End Job confirmation mes- sage.
<b>CANCEL or SELECT</b>	END JOB IS SELECTED	Confirms that the print jobs waiting for input are ended.
	IDLE	Finishes printing any print jobs in process, saves changes, and idles or reini- tializes the printer.

**Status Page Key** Use the Status Page key to print a page listing the current printer settings. See chapter 5, the “Printing a Status Page” section, for information on the status page contents. It is not necessary to take the printer off line to print a status page.

### How to Print a Status Page

Press the control panel keys in the order shown in the following instructions to print a status page. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

<b>Control Panel</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>STATUS PAGE</b>	PRINT STATUS YES	Displays Print Status con- firmation message.
<b>SELECT</b>	YES IS SELECTED	Confirms that the Status Page is selected.
	PRINTING STATUS	Prints the status page when the job queue is available and clears the Printing Status message.
	IDLE	Finishes printing any print jobs in process, saves changes, and idles or reini- tializes the printer.

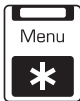
## Control Panel Menu Keys

Use the Menu, Select, Next, and Previous keys to move around the printer menu. The top line of the message window always displays the name of the current menu, and the bottom line displays the name of a selection or option within that menu. The following describes how to use the control panel keys to move around the menu:

### Control Panel    Printer Response



When the printer is on line, the indicator on this key lights. Press the key once to take the printer off line (the indicator goes out). You must take the printer off line before going into the control panel menu for all keys except the Cancel key and the Status Page key.



Press this key to access the Configuration menu after the printer goes off line. When changing printer setup, press this key to cancel a change (before pressing the Select key), to return to a previous menu, or to return to a previous character when entering character information.



Press this key to access a menu or to choose a displayed menu option.



Press this key to advance through the list of selections or options for the current menu. When changing character information, use this key to advance to the next choice for the current input character.

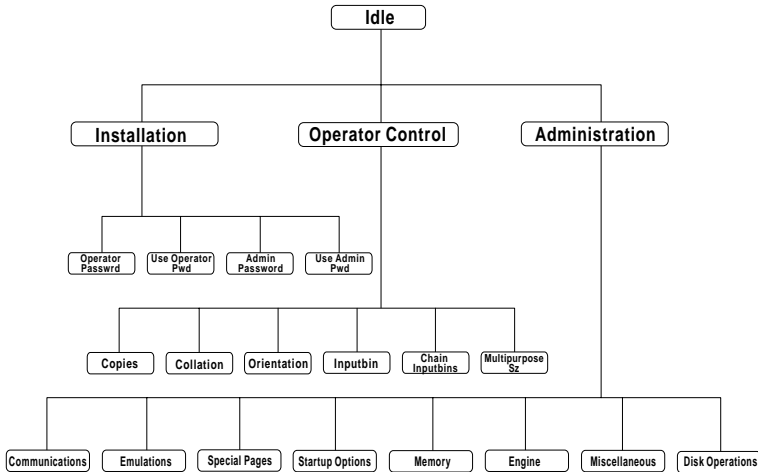


Press this key to return to the previous selection or option for the current menu. When changing character information, use this key to return to the previous choice for the current input character.



## Menu Structure

Use the Configuration menu to access printer configuration selections. The Configuration menu is organized into groups by logical function. The three functions are Installation, Operator Control, and Administration (fig. 4.2). The menu allows you to select a function using the Select key, then another menu appears that displays the list of selections for that function. Functions are further divided into logical groups called submenus. In the case where submenus are needed, the function provides access to the submenu.



**Fig. 4.2** Configuration Menu

■ Installation

Use this function to establish passwords for the Operator Control and Administration menus. This function displays only when an optional security card is installed.

■ Operator Control

Use this function to maintain document processing options (number of copies, media type, and paper orientation). These capabilities are usually handled most efficiently within specific print jobs since each job has its own requirements. However, if there is no way of specifying these options within a job, you may do so from the control panel.

■ Administration

Use this function to maintain host computer communication information for selecting and configuring printer emulations, configuring special pages, printing engine calibration, and configuring hard disks (if installed).

## Accessing the Configuration Menu

Use the menu keys to access the printer Configuration menu.

### How to Access the Configuration Menu

Press the control panel keys in the order shown in the following instructions to access the Configuration menu. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

Control Panel Keys	Message Window	Printer Response
<b>ONLINE/ OFFLINE</b>	IDLE	Turns off the indicator.
<b>MENU</b>	CONFIGURATION OPERATOR CON- TROL	Accesses the Configura- tion menu.

**NOTE:** The printer must be off line and idle to change printer configuration.

## Using Passwords

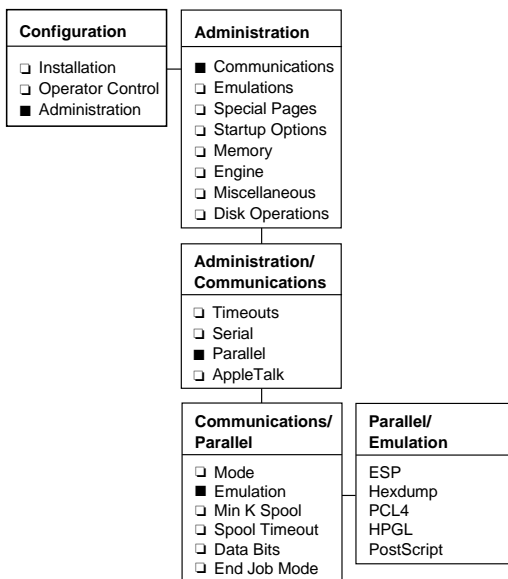
The Operator Control and Administration menus may be password protected using an optional security card. If a password is required, the message window displays `ENTER PASSWORD` when you use the Select key to enter the menu. Enter the password or press the Menu key to return to the menu. See chapter 8, “Printer Options,” for more information on security cards.

If an invalid password is entered, the message window flashes `INVALID PASSWORD` for three seconds and then returns you to

the Configuration menu. If you specify the correct password, access to the selected menu is granted.

## Accessing Selections and Options

Menus list each selection available within a functional group. For example, in figure 4.3 the Administration menu has a Communications submenu that has a Parallel selection. The Parallel/Emulation selection has options, such as ESP, Hexdump, PCL4, HPGL, and PostScript.



**Fig. 4.3** *Menu Access*

## How to Select Configuration Menu Options

Press the control panel keys in the order shown in the following instructions to select Configuration menu options. The printer responds by displaying a status message in the message window. The top line of the message window displays the name of the current menu, and the second line displays the name of the current selection. You may need to press the Next key one or more times to advance through the list of selections or options.

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>ONLINE/ OFFLINE</b>	IDLE	Turns off the indicator.
<b>MENU</b>	CONFIGURATION OPERATOR CON- TROL	Accesses the Configura- tion menu.
<b>NEXT</b>	CONFIGURATION ADMINISTRATION	Advances to the Admini- stration menu.
<b>SELECT</b>	ADMINISTRATION COMMUNICATIONS	Accesses the Administra- tion menu and displays Communications.
<b>SELECT</b>	COMMUNICATIONS TIMEOUTS	Accesses the Administra- tion / Communications menu and Timeouts dis- plays.
<b>NEXT</b>	COMMUNICATIONS PARALLEL	Advances to the Admini- stration / Communications / Parallel menu
<b>SELECT</b>	PARALLEL MODE	Accesses the Administra- tion / Communications / Parallel menu and displays the Mode selection.
<b>NEXT</b>	PARALLEL EMULATION	Advances to Parallel / Emulation.

<b>SELECT</b>	EMULATION ESP	Accesses the Emulation selection and displays the ESP option.
<b>PREVIOUS</b>	EMULATION POSTSCRIPT	Advances to the PostScript option.
<b>SELECT</b>	POSTSCRIPT IS SELECTED	Confirms that the PostScript emulation is selected.
	PARALLEL EMULATION	Returns to Parallel / Emulation.
<b>ONLINE/ OFFLINE or MENU</b>	SAVE CHANGES? NO	Exits from the menu (Online/Offline) or returns to the previous menu (Menu) and prompts you to save changes if changes were made to configuration values. To ignore changes, press the Select key and then press Online/Offline.
<b>NEXT</b>	SAVE CHANGES? YES	Advances to the next save changes option.
<b>SELECT</b>	IDLE	Finishes printing any print jobs in process, saves changes, and idles or reinitializes the printer.
<b>ONLINE/ OFFLINE</b>	IDLE	Turns on the indicator and puts the printer in a ready state.

## Entering Character Information

Use the printer control panel to enter character information in the message window. A character is any letter, digit, or symbol. A field is a group of characters that have meaning. The maximum length of the message window is 16 characters.

Entering character information through the control panel is similar to setting the time and date on a digital watch. You enter one character at a time. The current input character flashes. Use the following keys to change the current input character:

**Next key** Advances to the next choice for the current input character.

**Previous key** Returns to the previous choice for the current input character.

Once you have changed the current input character, use the following keys to move the cursor to the next character:

**Select key** Advances the cursor to the next character.

**Menu key** Returns the cursor to the previous character.

To exit from the process, press the Select key on the last character of the input field (the character farthest to the right) or the Menu key on the first character of the input field (the character farthest to the left). When you exit, the printer verifies the character information and confirms it in the message window. You are returned to the previous menu when the character information is valid; otherwise, you are returned to the input field. Press the Menu key to cancel any changes to the character information.

If the current character information is longer than the value that you need to enter, replace each extra character with a space. The printer interprets a space at the end of character information as a blank.

Press the control panel keys in the order shown in the following instructions to change the HP-GL emulation scaling percent. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

**NOTE:** An underline indicates the current input character in the message window.

### How to Change the Scaling Percent

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>OFFLINE/ ONLINE</b>	IDLE	Turns off the indicator.
<b>MENU</b>	CONFIGURATION OPERATOR CON- TROL	Accesses the Configura- tion menu.
<b>NEXT</b>	CONFIGURATION ADMINISTRATION	Advances to the Admini- stration menu.
<b>SELECT</b>	ADMINISTRATION COMMUNICATIONS	Accesses the Administra- tion / Communications menu.
<b>NEXT</b>	COMMUNICATIONS EMULATIONS	Advances to the Admini- stration / Communications / Emulations menu.
<b>SELECT</b>	EMULATIONS ESP DEFAULT EMUL	Accesses the Emulations and ESP Default Emul dis- plays.
<b>NEXT</b>	EMULATIONS HP-GL	Advances to Emulations / HP-GL.
<b>SELECT</b>	HP-GL PLOTTER	Accesses HP-GL and the Plotter option displays.
<b>NEXT</b>	HP-GL SCALING PERCENT	Advances to the HP-GL / Scaling Percent option.
<b>SELECT</b>	SCALING PERCENT <u>1</u> 00	Accesses Scaling Percent, displays the Scaling Per- cent field, and flashes the current input character.



<b>NEXT (four times)</b>	SCALING PERCENT 500	Advances through the list of choices for the current input character.
<b>SELECT</b>	SCALING PERCENT 500	Advances to the next character of the input field.
<b>SELECT and PREVIOUS</b>	SCALING PERCENT 500	Advances to the next character of the input field and replaces the 0 with a space. (The space changes the value from 500 to 50).
<b>SELECT</b>	50 IS SELECTED	Verifies the Scaling Percent.
	HP-GL SCALING PERCENT	Returns (after 3 seconds) to the previous menu.

## Saving Configuration Changes

Before the printer can accept print jobs with configuration changes, the changes must be saved.

### How to Save Configuration Menu Changes

Press the control panel keys in the order shown in the following instructions to save Configuration menu changes. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

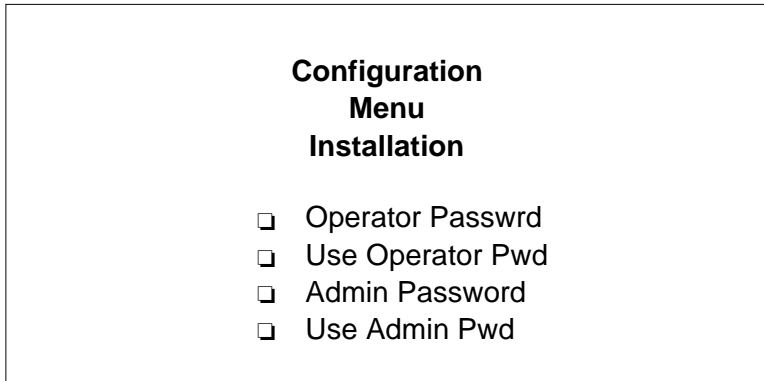
<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>ONLINE/ OFFLINE or MENU</b>	SAVE CHANGES? NO	Exits from menu (Online/Offline) or returns to the previous menu (Menu) and prompts you to save changes when changes were made to configura-

		tion values. To ignore changes, press the Select key and then press Online/Offline.
<b>NEXT</b>	SAVE CHANGES? YES	Advances to the next save changes option.
<b>SELECT</b>	IDLE	Finishes printing any print jobs in process, saves changes, and idles or reinitializes the printer.
<b>ONLINE/ OFFLINE</b>	IDLE	Turns on indicator and puts the printer in a ready state.

**NOTE:** Some Administration menu changes require that the printer be restarted before they take effect; usually the printer does this automatically if necessary. However, if you make configuration changes and they do not take effect, wait until the current jobs have ended, then try turning the printer off and on.

## Installation Menu

Use the Installation menu to password-protect the Operator Control and Administration menus. The Installation menu (fig. 4.4) appears when an optional security card is installed in your printer.



**Fig. 4.4** *Installation Menu*

## Operator Passwrđ

Maintains the Operator Control menu password.

**Prerequisite** Set Use Operator Passwrđ to on.

**Operator Passwrđ** (16 characters, default blank)  
Password used to access the Operator Control menu.

## Use Operator Pwd

Sets the Use Operator Pwd value.

**Use Operator Pwd** (default off; range on, off)

**On** Requires password to access the Operator Control menu.

**Off** Does not require a password to access the Operator Control menu.

## Admin Password

Maintains the Administration menu's password.

**Prerequisite** Set Use Admin Pwd to on.

**Admin** (16 characters, default blank)

**Password** Password used to access the Administration menu.

## Use Admin Pwd

Sets the Use Admin Pwd value.

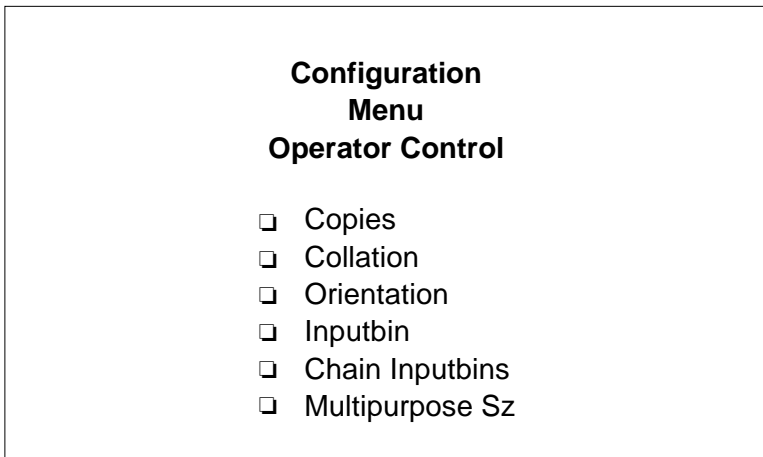
**Use Admin Pwd** (default off; range on, off)

**On** Requires a password to access the Operator Control menu.

**Off** Does not require a password to access the Operator Control menu.

## Operator Control Menu

Use the Operator Control menu (fig. 4.5) to maintain document processing and paper source values. These values are print job specific and should be specified within the print job. However, if there is no way of passing these values to your application's print program, use the control panel to change the values, print the job, and then change the values back to their defaults.



**Fig. 4.5** *Operator Control Menu*

**NOTE:** Changing document processing values through the control panel in a shared environment is not recommended because there is no way of preventing other jobs from printing while the default change is in effect.

## Copies

Maintains the number of copies for each print job.

**Copies** (3 digits; default 001; range 001 - 999)  
Specifies the number of copies for each print job.

## Collation

Arranges multiple copies of a document in sequential order. See chapter 5, the “Collating Output” section, for more information on collation. See the “Administration / Disk Operations / Collation” section, later in this chapter, for information on using collation with a hard disk.

**Collation** (default off; range off, on)

**Off** Does not collate multiple copies of a document. Prints all copies of one page before printing the next page.

**On** Collates multiple copies of a document. Prints the entire copy of a document before printing the next copy.

## Orientation

Maintains the paper orientation.

**Orientation** (default portrait; range portrait, landscape)  
Specifies the orientation of the image on a page.

**Portrait** Places the image from left to right across the narrower dimension of the page.

**Landscape** Places the image from left to right across the wider dimension of the page.

**NOTE:** When printing a landscape image, let the application determine the orientation. If you change the printer’s orientation setting, your image may not print correctly.

## Inputbin

Maintains the default tray or paper cassette from which paper is taken. To change the default input bin, select the appropriate input bin through the printer control panel, then turn the printer off and back on again.

**Inputbin** (default lower (inputbin 2); range multipurpose (inputbin 1), lower (inputbin 2), optional (inputbin 3)) Specifies the default input bin. Displays an “\*” next to the default input bin.

## Chain Inputbins

Maintains the chain input bin value.

**Chain Inputbins** (default on; range on, off)

**On** Switches to the next input bin with the same size paper when the default input bin is empty.

**Off** Does not switch input bins. Uses only the default input bin.

## Multipurpose Sz

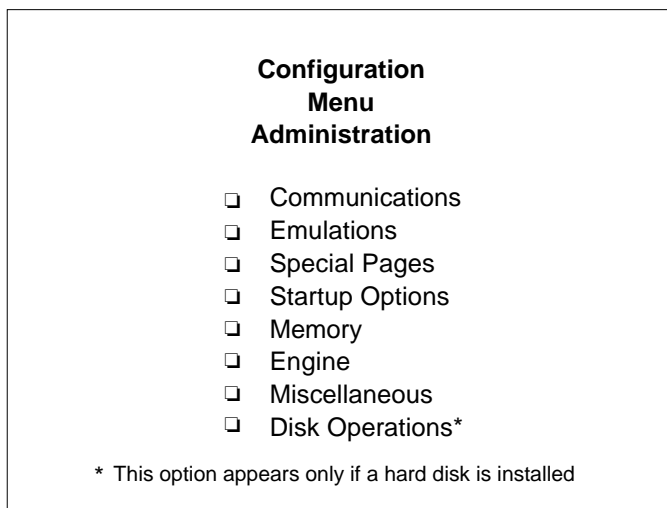
Maintains the paper size for the multipurpose tray (input bin 1).

**Multipurpose Sz** (default letter; range letter, B5, B6, A6, A5, universal, A3, 11 x 17, B4, legal, executive, A4)

## Administration Menu

Use the Administration menu (fig. 4.6) to maintain host communication values, such as selecting and configuring specific printer languages, configuring special pages, printing engine calibration, and configuring external hard disks (when installed).

The printer must restart itself for some of the Administration menu values to take effect. The options within this menu are seldom changed after the initial system installation.



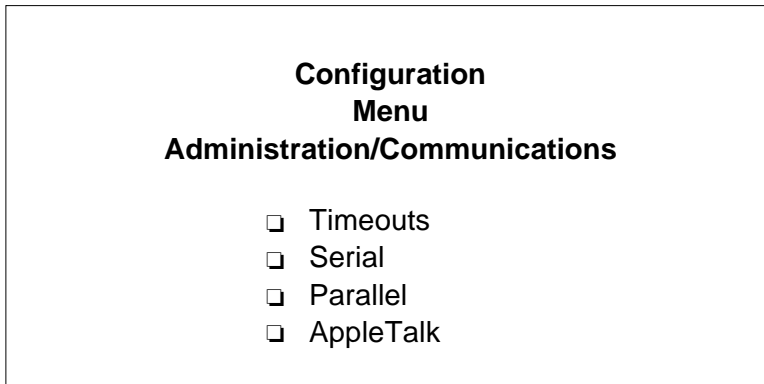
**Fig. 4.6** Administration Menu

<b>Prerequisite</b>	(To password-protect the menu) Install optional security card Set Use Operator Pwd to On Specify Operator Passwr
<b>Access</b>	Restricted to users with a valid password when the menu is password protected.



## Administration / Communications

Use the Administration/Communications menu (fig. 4.7) to maintain the printer's interface values for printer-host communications. Optional interface program selections appear only when installed.



**Fig. 4.7** Administration/Communications

**Administration / Communications / Timeouts** Sets the amount of time the printer waits on transmission from the host for various types of data.

**PS Wait Timeout** (5 digits; default 00030; range 00000-99999)  
Maximum number of seconds that the PostScript emulation waits for incoming data. If the printer goes idle after 30 seconds and does not print, increase this timeout. Large print jobs, such those generated by graphics or computer-aided design applications, require this number to be increased to 00300.

**Emul Timeout** (5 digits; default 00005; range 00000-99999)  
Maximum number of seconds that emulations other than PostScript (such as HP PCL4 or HPGL) wait for incoming data.

**Job Timeout** (5 digits; default 00000; range 00000-99999)  
Maximum number of seconds the printer processes a print job before it ends the job.

**ESP Timeout** (5 digits; default 00003; range 00000-99999)  
Maximum number of seconds the printer uses to match an emulation before printing the job in the default emulation.

**Administration / Communications / Serial Sets** the serial interface communications values used for printer-host communications.

**Mode** (default interactive; range interactive, noninteractive, disabled)  
Sets the PostScript emulation host mode. You must turn the printer off and then on again before these changes take effect.

Interactive Establishes two-way communication between the host and the printer.

Noninteractive Establishes one-way communication from the host to the printer.

Disabled Turns off serial interface communication with the printer. The printer stops accepting serial interface print jobs.

**Emulation** (default ESP; range ESP, Hexdump, PCL4, HPGL, PostScript)  
Selects the serial interface emulation. Optional emulations appear, if installed.

**Min K Spool** (5 digits; default 00015; range 00000-99999)  
Sets the minimum number of kilobytes of system memory allocated to the serial interface. A 00000 value does not turn off the serial interface's spooling buffer. If the value is 00000, the printer calculates the Min K Spool value at initialization.

**Prerequisite:** Value must be less than K Mem for Spool.

<b>Spool Timeout</b>	(5 digits; default 00030; range 00000-99999) Maximum number of seconds the interface waits for data from the host system before terminating a spooled print job.
<b>End Job Mode</b>	(default none; range none, QMS EOD, HP EOD) Sequences that allow host computers to enforce print job sequencing without considerations for interacting timeouts. Enables or disables data stream sensing for the end-of-document (EOD) command. See appendix F, “Additional Technical Information,” for details on how to implement this feature on your QMS 860 Print System.
	None                      PostScript ^D (CTRL D) command
	QMS EOD                %%EndOfDocument
	HP EOD                 <ESC>%-12345X
<b>Baud Rate</b>	(default 9600; range 300, 600, 1200, 2400, 4800, 9600, 19200, 38400) Rate that data is transmitted (bits per second) over the serial interface.
<b>Parity</b>	(default none; range none, mark, space, odd, even) Check bit used to identify data transmission errors. The printer’s parity setting must match the host computer’s or application’s parity setting.
<b>Ignore Parity</b>	(default off; range on, off)
	On                        ignores parity
	Off                        does not ignore parity
<b>Rcv Sw Flow Ctl</b>	(default XON/XOFF; range XON/XOFF, ETX/ACK, none) Software communication protocol used by the printer to control communication from the host computer.
<b>Xmit Sw Flow Ctl</b>	(default none; range none, XON/XOFF, ETX/ACK) Software communication protocol used by the printer to control communication with the host computer.
<b>Data Bits</b>	(default 8 bits; range 8 bits, 7 bits) Number of data bits transmitted per character.

<b>Stop Bits</b>	(default 1 bit; range 1 bit, 2 Bits) Number of stop bits transmitted per character.
<b>Hdwe Flow Ctl</b>	Controls the flow of data. All values must be set the same as those of the host computer.  DSR POL (default lo; range hi, lo) DSR (default off; range on, off) DTR POL (default lo; range hi, lo) DTR (default on; range on, off) RTS (default off; range on, off) CTS (default off; range on, off)
<b>PS Protocol</b>	(default normal; range normal, normal fixed, binary, binary fixed) Sets the binary communications protocol (BCP) for communicating over a serial interface to a PostScript printer. See appendix F, “Additional Technical Information,” for more information.  Normal Enables standard, ASCII hex protocol. Data is sent and received in ASCII format. This mode is recommended if you do not print binary data. It was designed for data in the printable ASCII range. Print jobs can alter the PS protocol value through PostScript operators.  Normal Fixed Enables standard, ASCII hex protocol. Print jobs can not alter this value through PostScript operators.  Binary Enables binary communications protocol. Print jobs can alter this value through PostScript operators. Data in the printable ASCII range also prints.  Binary Fixed Enables binary communications protocol. Print jobs can not alter this value through PostScript operators. Data in the printable ASCII range also prints.

**Administration / Communications / Parallel** Sets the parallel interface value used for printer-host communications.

<b>Mode</b>	(default enabled; range enabled, disabled) Sets the host mode. You must turn the printer off and then on again before changes take effect.				
	<table> <tr> <td>Enabled</td> <td>Establishes one-way parallel communication from the host to the printer.</td> </tr> <tr> <td>Disabled</td> <td>Turns off parallel interface communication with the printer. The printer stops accepting parallel interface print jobs.</td> </tr> </table>	Enabled	Establishes one-way parallel communication from the host to the printer.	Disabled	Turns off parallel interface communication with the printer. The printer stops accepting parallel interface print jobs.
Enabled	Establishes one-way parallel communication from the host to the printer.				
Disabled	Turns off parallel interface communication with the printer. The printer stops accepting parallel interface print jobs.				
<b>Emulation</b>	(default ESP; range ESP, Hexdump, PCL4, HPGL, PostScript) Sets the parallel interface emulation. Optional emulations appear, only if installed.				
<b>Min K Spool</b>	(5 digits; default 00015; range 00000-99999) Sets the minimum number of kilobytes of system memory allocated to the parallel interface. A 00000 value does not turn off the spooling buffer for the parallel interface. If the value is set to 00000, the printer calculates the Min K Spool at initialization. <b>Prerequisite:</b> Value must be less than K Mem For Spool.				
<b>Spool Timeout</b>	(5 digits; default 00030; range 00000-99999) Number of seconds the interface waits for data from the host before terminating a spooled print job.				
<b>Data Bits</b>	(default 8 bits; range 7 bits, 8 bits) Number of data bits transmitted per character.				
<b>End Job Mode</b>	(default none; range none, QMS EOD, HP EOD) Sequences that allow host computers to enforce print job sequencing without considerations for interacting timeouts. Enables or disables data stream sensing for the end-of-document (EOD) command. See appendix F, “Additional Technical Information,” for details on how to implement this feature on your QMS 860 Print System.				

	None	PostScript ^D (CTRL D) command
	QMS EOD	%%EndOfDocument
	HP EOD	<ESC>%-12345X
<b>PS Protocol</b>	(default normal; range normal, normal fixed, binary, binary fixed) Sets the binary communications protocol (BCP) for communicating over a parallel interface to a PostScript printer. See appendix F, “Additional Technical Information,” for more information.	
	Normal	Enables standard, ASCII hex protocol. Data is sent and received in ASCII format. This mode is recommended if you do not print binary data. It was designed for data in the printable ASCII range. Print jobs can alter the PS protocol value through PostScript operators.
	Normal Fixed	Enables standard, ASCII hex protocol. Print jobs can not alter this value through PostScript operators.
	Binary	Enables binary communications protocol. Print jobs can alter this value through PostScript operators. Data in the printable ASCII range also prints.
	Binary Fixed	Enables binary communications protocol. Print jobs can not alter this value through PostScript operators. Data in the printable ASCII range also prints.

**Administration / Communications / AppleTalk** Sets the AppleTalk interface values used for printer-host communication.

**Mode** (default enabled; range enabled, disabled) Enables or disables the communication interface. You must turn the printer off and back on again before changes take effect.

Enabled	Establishes one-way AppleTalk communication from the host to the printer.
Disabled	Turns off the AppleTalk interface, and the printer stops accepting AppleTalk interface print jobs.

**Connection**

(default conventional; range conventional, spool)  
Connection allows you to enable or disable print spooling.

**Conventional** Allows one AppleTalk connection and accepts only one print job at a time. If two users send print jobs to the printer, the workstation belonging to the first user is unavailable until the first job has been printed, and the workstation belonging to the second user is unavailable until both jobs have been printed.

**Spool** Allows multiple AppleTalk connections and accepts (spools) more than one print job at a time. Workstations are available while jobs are printing.

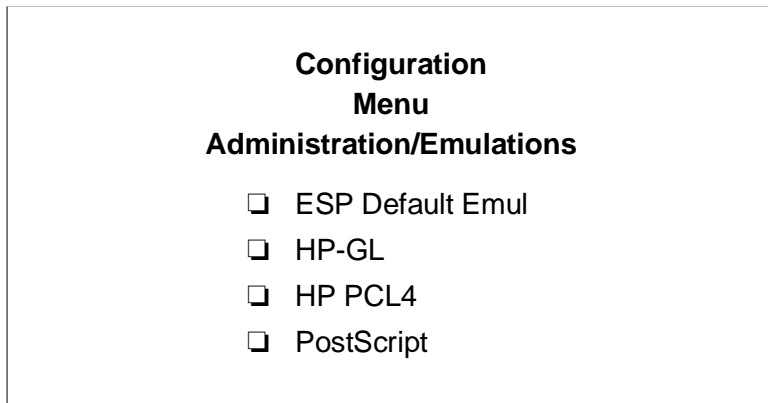
**Min K Spool**

(default 00015; range 00000-99999)  
Sets the minimum number of kilobytes of system memory allocated to the AppleTalk interface.

**Prerequisite:** value must be less than K Mem For Spool.

## Administration / Emulations

Use the Administration / Emulations menu (fig. 4.8) to set the parameters for the available printer emulations. Optional printing emulations appear only if installed.



**Fig. 4.8** Administration/Emulations

**Administration / Emulations / ESP Default Emul** Sets the ESP default emulation used when ESP is unable to identify the language of a print job. This default allows the system administrator to select alternate default emulations. You must turn the printer off and back on again for the changes to take effect.

**ESP Default Emul** (default PCL4; range PCL4, HPGL, PostScript)  
Optional emulations appear, only if installed.

**Administration / Emulations / HP-GL** Maintains HP-GL emulation values. The *QMS Crown Technical Reference Manual*, which is an optional purchase available from your QMS vendor, contains more detailed information on this emulation.



<b>Plotter</b>	(default 7550A; range 7550A, 7475A, 7470A, ColorPro) HP-GL plotter type.
<b>Scaling Percent</b>	(default 100; range 001-150) Percentage to reduce or enlarge an image.
<b>Origin</b>	Image offset from the plotter's origin in 0.01" increments.  X direction (default 0000; range 0-8500 [8.5"]) Y direction (default 00000; range 0-11000 [11.00"])
<b>Reverse Image</b>	(default off; range off, on) Inverse of an image.  Off Prints black image on white background. On Prints white image on black background.
<b>Enhanced Mode</b>	(default off; range off, on) Indicator that sets the resolution of a downloaded character set.  Off Uses standard resolution. On Turns on enhanced resolution.
<b>Expand Mode</b>	(default off; range off, on) Indicator that expands default scaling points P1 and P2, hard-clip plotting range, and maximum plotting area.  Off Uses default scaling points, plotting range, and plotting area. On Turns on expand mode.
<b>Paper Type</b>	(default A; range A, A4, B, A3) Original image's paper size.  A Letter (8.5" x 11") B 11" x 17"

	A4	210 x 297 mm (closest metric value for letter)
	A3	297 x 420 mm (closest metric value for 11" x 17")
<b>Pen 1</b>	Width and color for pen 1 of the plotter.	
	pen width	(default 7 [.7 mm]; range 1-60)
	pen color	(default 1; range 1-8)
<b>Pen 2</b>	Width and color for pen 2 of the plotter.	
	pen width	(default 3 [.3 mm]; range 1-60)
	pen color	(default 2; range 1-8)
<b>Pen 3</b>	Width and color for pen 3 of the plotter.	
	pen width	(default 3 [.3 mm]; range 1-60)
	pen color	(default 3; range 1-8)
<b>Pen 4</b>	Width and color for pen 4 of the plotter.	
	pen width	(default 3 [.3 mm]; range 1-60)
	pen color	(default 4; range 1-8)
<b>Pen 5</b>	Width and color for pen 5 of the plotter.	
	pen width	(default 3 [.3 mm]; range 1-60)
	pen color	(default 5; range 1-8)
<b>Pen 6</b>	Width and color for pen 6 of the plotter.	
	pen width	(default 3 [.3 mm]; range 1-60)
	pen color	(default 6; range 1-8)
<b>Pen 7</b>	Width and color for pen 7 of the plotter.	
	pen width	(default 3 [.3 mm]; range 1-60)
	pen color	(default 7; range 1-8)
<b>Pen 8</b>	Width and color for pen 8 of the plotter.	
	pen width	(default 3 [.3 mm]; range 1-60)

pen color (default 8; range 1-8)

**Administration / Emulations / HP PCL 4** Maintains default font, point size, and attribute used in PCL emulation mode. The *QMS Crown Technical Reference Manual*, which is an optional purchase available from your QMS vendor, contains more detailed information on this emulation.

**Default Font** (default Courier 12; range Courier 12, Courier 12 Bld, Courier 12 Itl, Courier 10, Courier 10 Bld, Courier 10 Itl, Lineprinter)  
Sets the printer's default font.

**Symbol Set** (default Roman 8; range Roman 8, PC-850, PC8-US, PC8-DN, ECMA-94, HP German, HP Spanish, ISO 2, ISO 4, ISO 6, ISO 10, ISO 11, ISO 14, ISO 15, ISO 16, ISO 17, ISO 21, ISO 25, ISO 57, ISO 60, ISO 61, ISO 69, ISO 84, ISO 85)  
Lists the symbol sets available with the HP PCL4 emulation.

**Lines Per Page** (default 60; range 5-128)  
Number of lines on the printed page.

**Retain Temporary** (default off; range off, on)  
Indicator that resets PCL to its default state at the end of each PCL print job.

Off Does not reset PCL to its default state at the end of each PCL print job.

On Resets PCL to its default state at the end of each PCL print job.

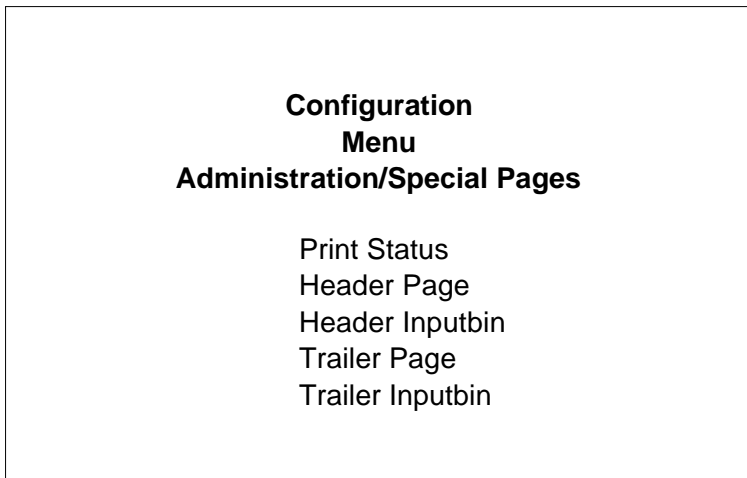
**Line Termination** (default CR=CR LF=LF; range CR=CR LF=LF, CR=CR+LF LF=LF, CR=CR LF=CR+LF, CR or LF = CR+LF)  
Indicator that defines the print position after a carriage return or line feed.

**Administration / Emulations / PostScript** Allows you to select a PostScript emulation level.

<b>Emulation Level</b>	(default Level 2; range Level 2, Level 1 color, Level 1 B/W)
Level 2	For PostScript Level 2 files and most Level 1 files.
Level 1 B/W	For files that contain only black and white PostScript Level 1 operators. This mode does not support the PostScript color operators and use of color operators could even cause the print file to fail.
Level 1 Color	For files that contain color PostScript Level 1 operators. This mode accepts color PostScript Level 1 operators and translates these commands to the appropriate grayscale. This is the recommended setting for Level 1 compatibility since it contains all of the commands in Level 1 B/W and the color commands.

## Administration / Special Pages

Use the Administration/Special Pages menu (fig. 4.9) to print special pages such as a status page, header page, or trailer page. This menu also sets the inputbin for header and trailer pages. See the *QMS Crown Document Option Commands* manual, which is an optional purchase available from your QMS vendor, for detailed information on the contents of special pages.



**Fig. 4.9** Administration/Special Pages

<b>Print Status</b>	(default no; range no, yes) Status page lists printer identification information, current memory configuration, timeouts, communication settings, input buffer sizes, and available fonts.
	No                      Does not print a status page.
	Yes                      Prints a status page.
<b>Header Page</b>	(default off; range off, on) Indicator for a header banner page.

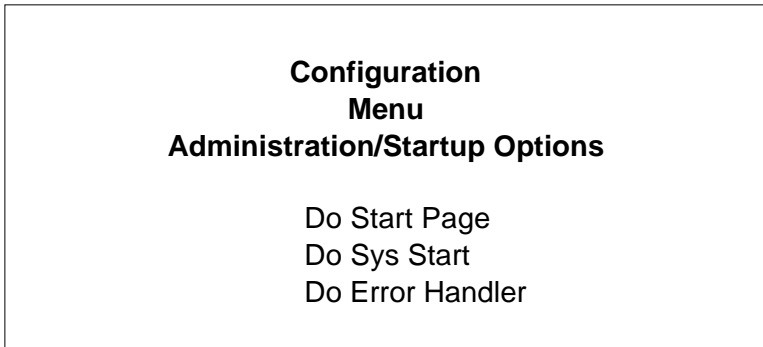
	Off	Does not print a header banner page.
	On	Prints a header banner page before each print job.
<b>Header Inputbin</b>		(default inputbin 1 name; range inputbin 1 name, inputbin 2 name, inputbin 3 name) Input bin to select paper from when printing the header page. The actual inputbin names appear in the message window. The default inputbin names are inputbin 1 (multipurpose), inputbin 2 (lower), and inputbin 3 (optional). See Administration / Engine, later in this chapter, for information on how to assign inputbin names.
	Inputbin 1 name	Selects paper from the multipurpose tray.
	Inputbin 2 name	Selects paper from the lower tray.
	Inputbin 3 name	Selects paper form the optional tray.
<b>Trailer Page</b>		(default off; range off, on, on error, errors only) Indicator for trailer/error page.
	Off	Does not print a trailer/error page for each print job.
	On	Prints a trailer/error page for each print job.
	On Error	Prints a trailer page that includes print job errors, if errors exist.
	Errors Only	Prints a list of errors when print job errors exist, and omits other trailer page information.
<b>Trailer Inputbin</b>		(default inputbin 1 name; range inputbin 1 name, inputbin 2 name, inputbin 3 name) Inputbin to select paper from when printing the trailer/error page. The actual inputbin names appear in the message window. The default inputbin names are inputbin 1 (multipurpose), inputbin 2 (lower), and

inputbin 3 (optional). See Administration / Engine, later in this chapter, for information on how to assign inputbin names.

Inputbin 1 name	Selects paper from the multipurpose tray.
Inputbin 2 name	Selects paper from the lower tray.
Inputbin 3 name	Selects paper from the optional tray.

## Administration / Startup Options

Use the Administration /Startup Options menu (fig. 4.10) to configure your printer to run certain options automatically when the printer is turned on.



**Fig. 4.10** Administration/Startup Options

<b>Do Start Page</b>	(default yes; range yes, no) Indicator that enables and disables the start-up page.
Yes	Enables the start-up page to print when the printer is turned on.

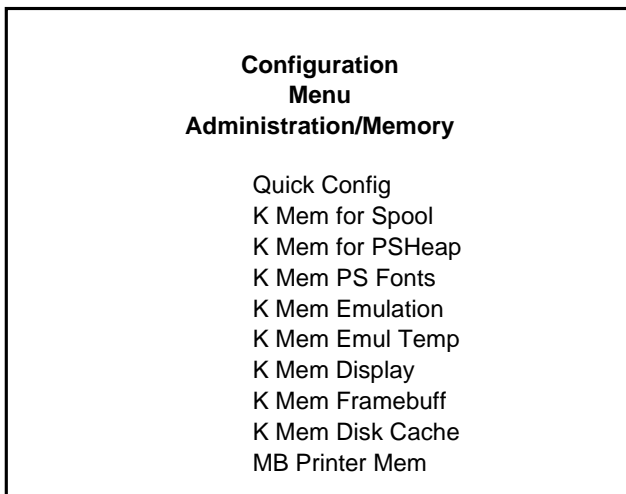
	No	Disables the start-up page.
<b>Do Sys/Start</b>	(default yes; range yes, no)	Indicator that opens a PostScript file named SYS/START, if a hard disk is attached, that is used to custom configure and initialize PostScript-selectable capabilities when the printer is turned on. The Do Sys/Start file does not print.
	Yes	Opens the SYS/START file.
	No	Does not open the SYS/START file.
<b>Do Error Handler</b>	(default no; range no, yes)	Indicator that activates a diagnostic tool that allows you to trap PostScript errors encountered during a print job.
	No	Does not activate the error handler.
	Yes	Activates the error handler.



## Administration /Memory

Use the Administration /Memory Menu (fig. 4.11) to allocate system memory (RAM) among the various memory “clients.” The printer is shipped with 12 MB of memory but can be upgraded to 32 MB. The size of most memory clients can be configured by experienced users (systems engineers and technical support staff) to best meet specific printing, computing, and network needs. However, misallocated memory may hinder the performance level of the printer.

On your QMS 860 Print System you can maintain memory in one of two ways: allocate each client’s memory individually through the Administration / Memory menu or use Quick Config to easily configure your frame buffer. **See appendix F, “Memory Management,” for more detailed information on memory.**



**Fig. 4.11** Administration/Memory

## Quick Config

**Paper Size** (default letter; range letter, A4, 11 x 17, A3, legal, B4, A5, B5, A6, B6, executive, universal)

**Resolution** (default 600; range 300, 600)

Quick Config uses the resolution and the paper size to configure the printer's frame buffer memory for the most complicated conditions in a particular environment. The printer sets values that are guaranteed to work with the amount of RAM currently installed in the printer.

When using Quick Config, you should select the most demanding requirements of the printer. For example, if jobs are printed primarily on 11" x 17" paper, but occasionally jobs are printed on 8.5" x 11" paper, then select 11" x 17" paper size.

**K Mem for Spool** (5 digits; default 00192; range 00192-06144)

**Prerequisite** value must be greater than the sum of the Min K Spool for all installed and enabled communications interfaces.

Number of kilobytes of RAM allocated to the spooling buffers. This memory client stores incoming data from the various interfaces until it is ready to print. This memory client is listed as Host Input on the status page. When the sum of the Min K Spool for all communications interfaces is less than K Mem For Spool, memory is allocated as follows:

1. Interfaces with Min K Spool (in the Administration / Communications menu) value greater than zero to receive their specified allocation.
2. Half of the remaining memory is equally distributed among any interfaces with a Min K Spool value of zero.

3. The other half of the remaining memory is called float memory and it may be used by any interface that needs to spool additional data, but has exceeded its allocation. Interfaces have access to float memory on a first-in-first-out basis, only when it is available and not being used.

See the “Administration / Disk Operations / Spool Overflow” section, later in this chapter for information on spool overflow to a hard disk.

**K Mem for PS Heap** (5 digits, default 01536, range 01024-08192)

Number of kilobytes of RAM dedicated to the dynamic requirements of the PostScript emulation interpreter. This client holds downloaded PostScript emulation fonts and operators.

**K Mem PS Fonts** (5 digits, default 00256; range 00128-08192)

Number of kilobytes of RAM dedicated to caching bitmap representations of PostScript fonts which have been scaled previously to reduce the number of times the fonts must be converted from outline to bitmap form. This client is listed as Font Cache on the status page.

**K Mem Emulation** (5 digits, default 00448; range 00448-08192)

Number of kilobytes of RAM to be used by non-PostScript emulations for temporary storage and for loading optional emulations. If you receive an emulation error, you may need to increase the amount of memory for this client.

**K Mem Emul Temp** (5 digits; default 00224; range 00224-08192)

Number of kilobytes of RAM to be used by non-PostScript emulations for storing downloaded (“soft”) fonts, forms, or macros. Data in this client disappears when the printer is turned off. This client is listed as Temporary on the status page. Increasing this client’s memory increases the amount of PCL downloaded fonts which can be accepted.

**K Mem Display** (5 digits; default 00192; range 00192-12288)

Number of kilobytes of RAM dedicated to the display lists. The display list holds the intermediate representation of pages to be printed.

**K Mem Framebuff** (5 digits; default 04080; range 02160-65536)

Number of kilobytes of RAM dedicated to the frame buffers. The amount of frame buffer storage affects the maximum complexity of any single page.

**K Disk Cache** (5 digits; default 00128; range 00032-02048)

Number of kilobytes of RAM dedicated to the disk cache. This memory client speeds file system throughput on the optional hard disks.

The amount of memory needed for this memory client depends on the size of the disks, the number of disks, the number of subdirectories on each disk, and the desired number of available disk cache blocks. If sufficient memory is available, all disks are accessible. If there is insufficient memory available, some disks may be accessible and others may not and/or an insufficient number of disk cache blocks may be available.

Determine the recommended disk cache client size as follows:

- 20 KB internal usage
- 0.5 KB per megabyte of disk storage total across all drives
- 100 KB cache blocks

For example, the recommended disk cache client size for a single 120 MB drive is 180 KB, and for two 120 MB drives it is 240 KB.

**NOTE:** The disk cache client size can be set to 32 KB. This is reasonable if hard disks are not being used because the printer reallocates this memory to other clients that need additional memory. However, the hard disks remain unavailable until this client's size is increased.

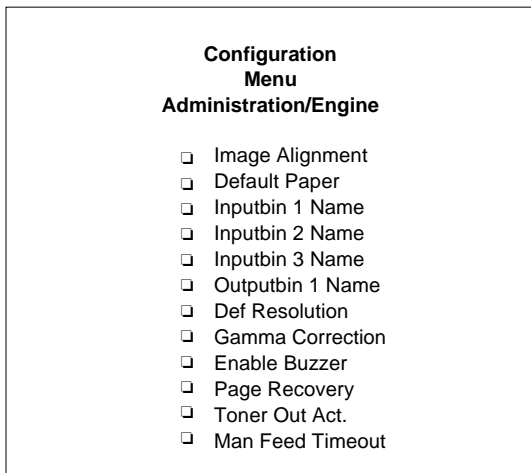
**MB Printer Mem** (default 12; range 12-32)

Number of megabytes of RAM which are available to be split among the various memory clients. The size of this client's memory limits the number of jobs which may be queued simultaneously. When this client's memory is exhausted, the printer slows down and the hosts are forced to wait. This client is listed as System Use on the status page.

**NOTE:** This system client is not user-configurable.

## Administration / Engine

Use the Administration /Engine menu (fig. 4.12) to set print engine defaults.



**Fig. 4.12** Administration/Engine

**Image Alignment** Adjusts the horizontal and vertical offset for placing a printed image on the page.

**Horiz Offset** (3 digits; default 100; range 000-300)

**Vertical Offset** (3 digits; default 100; range 000-300)

Use the calibration tickmarks on the last page of the status page to adjust these pixel (dot) values. See chapter 5, the "Printing a Status Page" section, for information on how to print the status page. Then measure the distance from where the tickmarks meet to the left and bottom edge of the paper. Both measurements should be 0.5." If not, use Image Alignment to move the image in pixel increments ( $\frac{1}{300}$ ").

**Default Paper** (default letter; range letter, A4)

Specifies a paper size for the printer to use if it does not recognize the paper size specified for a job.

**Inputbin 1 Name** (16 characters; default multipurpose)

Name for Inputbin 1 (multipurpose tray) to display at the control panel and to be used with DOC commands. See the *QMS Crown Document Option Commands* manual, which is an optional purchase available from your QMS vendor, for more information on DOC commands.

**Inputbin 2 Name** (16 characters; default lower)

Name for Inputbin 2 (lower paper cassette) to display at the control panel and to be used with DOC commands. See the *QMS Crown Document Option Commands* manual, which is an optional purchase available from your QMS vendor, for more information on DOC commands.

**Inputbin 3 Name** (16 characters; default optional)

Name for Inputbin 3 (optional paper cassette) to display at the control panel and to be used with DOC commands. See the *QMS Crown Document Option Commands* manual, which is an optional purchase available from your QMS vendor, for more information on DOC commands.

**Outputbin 1 Name** (16 characters; default upper)

Name for Outputbin 1 to display at the control panel and to be used with DOC commands. See the *QMS Crown Document Option Commands* manual, which is an optional purchase available from your QMS vendor, for more information on DOC commands.

**Def Resolution** (default 600 dpi; range 300 dpi, 600 dpi)

Sets the print engine's default resolution.

**Gamma Correction** (default 0; range 0-3)

Sets the print engine's gamma correction. See chapter 6, "Print Quality," for more information on gamma correction.

**Enable Buzzer** (default off; range off, on)

- |     |  |
|-----|--|
| On  | Enables the print engine warning buzzer to sound when an error is encountered. |
| Off | Disables the print engine's warning buzzer.                                    |

**Page Recovery** (default on; range off, on)

- |     |  |
|-----|--|
| On  | Reprints a print job from the page that an error or paper jam occurs on. |
| Off | Does not reprint a print job when an error or jam occurs.                |

**Toner Out Act.** (default continue; range continue, stop)

- |          |  |
|----------|--|
| Continue | Continues to print after the toner out error message is displayed. |
| Stop     | Stops printing when the toner out error message is displayed.      |

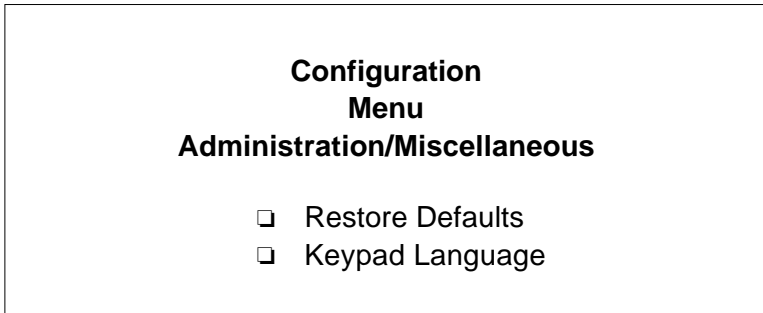
**Man Feed Timeout** (default 060; range 000-300)

Determines how long, in seconds, to wait for the next sheet of paper to be placed into the manual feed tray. If the timeout occurs, the manual feed job is canceled. The multipurpose tray, when accessed by a PostScript emulation operator as bin 0, is the manual feed tray.



## Administration / Miscellaneous

Use the Administration / Miscellaneous menu (fig. 4.13) to restore defaults or to change the printer's keypad (control panel) language.



**Fig. 4.13** *Administration/Miscellaneous*

### **Restore Defaults** (default no; range yes, no)

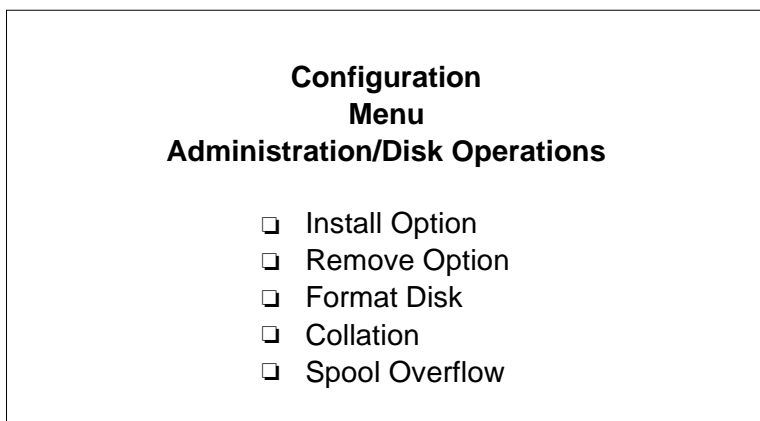
Yes	Resets all configuration values to their original defaults. This takes effect immediately.
No	Does not reset configuration values.

### **Keypad Language** (default English; range English, French, German, Spanish)

Sets the control panel display language.

## Administration /Disk Operations

Use the Administration/Disk Operations menu (fig. 4.14) to perform disk operation processes that appear only when the optional external SCSI hard disk is attached.



**Fig. 4.14** Administration/Disk Operations

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**CAUTION:** If you connect to this printer an external hard disk you previously used with an earlier QMS Crown printer (QMS 860 release 1, QMS-PS 1700, QMS-PS 2000, QMS-PS 3200, or QMS ColorScript 210/230 release 1), this QMS 860 software release will automatically reorganize the files on the hard disk when the printer is turned back on again. (The printer release number is listed on both the start-up and the status page.) Once this reorganization is done, the files on the hard disk can no longer be accessed if the hard disk is attached to an earlier QMS Crown printer again.

This reorganization process takes time. If, when you first turn the printer on after attaching a previously used hard disk, it does not come on line immediately, be patient. Interrupting the reorganization process could cause all files on the hard disk to be lost.

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**NOTE:** Errors may occur during these operations. An error message displays until the Menu key is pressed. The operations must be restarted from the beginning.

### **Install Option**

Use this selection to add options, such as fonts and emulations, to the hard disk via font and emulation cards. This selection copies data from the card to the hard disk. See chapter 8, the “Installing an Optional Font or Emulation” section, for information on how to install an option.

### **Remove Option**

Use this selection to remove a previously installed option and all of its files. See chapter 8, the “Removing an Optional Font or Emulation” section, for information on how to remove an option.

### **Format Disk**

Use this selection to format a hard disk. See chapter 8, the “How to Format a Disk” section, for information on how to format a disk.

### **Collation**

Use this selection to specify which disk and how much of that disk should be used to store collated print jobs when the jobs can not be accommodated by RAM space. Collation is turned on in the Operator Control / Collation menu (described earlier in this chapter). The printer advances through the list of available hard disk locations. (The # symbol represents the disk number). Turn the printer off and back on again for the value to take effect.

**Location**                    (default DSK#; range DSK0-DSK6)  
List of installed hard disks.

**Size (Meg)** (2 digits; default variable; range 00-50)  
Number of megabytes of disk space to be allocated for storing collated print jobs. Ten megabytes of collation disk space is probably sufficient for most printing applications.

### **Spool Overflow**

Use this selection to specify which disk and how much disk space is to be used to send print jobs when the job cannot be accommodated by RAM space. The Administration / Memory / K Mem for Spool selection explained earlier in this chapter is where the memory for spool buffers is defined. Spool overflow allows the user to allocate hard disk space to be used for spooling data the same as RAM. The printer attempts to realize as much of this value as it can. Turn the printer off and back on again for this value to take effect. (The # symbol represents any hard disk).

**Location** (default DSK#; range DSK0-DSK6)  
List of installed hard disks.

**Size (Meg)** (3 digits; default variable; range 000 - 255)  
Number of megabytes of disk space to be allocated to spool print job data in addition to RAM.

## **Configuring Optional Features**

Several of the printer options available (for example, an external hard disk) affect printer configuration and the Configuration menu. When an option is installed, its configuration information merges into the Configuration menu. New menu entries may appear, and the range options for existing configuration values may be extended. See the documentation accompanying the option to learn exactly how it affects the Configuration menu.

# Chapter 5

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## Daily Operations

### Chapter highlights:

- Using print media
  - Loading paper
  - Chaining input bins
  - Clearing paper jams
  - Replacing the toner cartridge
  - Cancelling and ending print jobs
  - Caring for the printer
-



## Introduction

This chapter covers basic printer operations, including using print media, loading paper, chaining input bins, clearing paper jams, and replacing the toner cartridge. It also explains how to disable the start-up page, print a status page, cancel print jobs, and care for your printer.

## Using Print Media

### Page Sizes and Imageable Regions

Your printer supports paper, transparencies, and labels in various sizes. Each size has a certain imageable region (table 5.1), the maximum area a printer can access. It is subject to both hardware limits (physical page size and margins required by the printer) and software constraints (amount of memory available for the full-page frame buffer).

Page Type	Page Size		Imageable Region	
	Inches	Millimeters	Inches	Millimeters
11 x 17	11.0 x 17.0	279 x 432	10.6 x 16.9	269 x 429
A3	11.7 x 16.6	297 x 422	10.6 x 16.2	269 x 411
Ledger*	17.0 x 11.0	432 x 279	16.9 x 10.6	429 x 269
Legal	8.5 x 14.0	216 x 356	8.2 x 13.7	208 x 348
B4	10.1 x 14.3	257 x 364	10.0 x 14.2	254 x 360
Letter	11.0 x 8.5	279 x 216	10.7 x 8.2	272 x 208
A4	11.7 x 8.2	297 x 208	11.3 x 8.0	287 x 203
A5	8.2 x 5.8	208 x 147	8.0 x 5.5	203 x 140
B5	10.1 x 7.2	257 x 183	9.8 x 6.9	249 x 175
A6	4.1 x 5.9	104 x 150	3.7 x 5.6	94 x 142
B6	5.1 x 7.2	130 x 183	4.7 x 6.9	119 x 175
Executive	10.5 x 7.3	267 x 185	10.2 x 7.0	259 x 178
Universal	11.7 x 17.0	297 x 432	11.3 x 16.9	287 x 429

\*The printer uses 11 x 17" print media in landscape orientation to support ledger.

**Table 5.1** *Page Sizes and Imageable Regions*

**NOTE:** The printer senses the page size from the paper cassette that is installed in the printer. Be sure to match the page size to the appropriate paper cassette size. You may purchase additional paper cassettes from your QMS vendor.

**Working Within Imageable Regions** The imageable regions for print media on your QMS 860 Print System are not centered vertically on their respective pages and may vary  $\frac{1}{16}$ " (1.6 mm). You can align the image in several different ways:

1. Adjust margins or page size through your application.
2. Use the printer's control panel.
3. Use the PS Executive Series Utilities.
4. You can also use the PostScript **translate** and **scale** operators to reduce image size and change its placement on the page. The *QMS Crown Technical Reference Manual*, which is an optional purchase available from your QMS vendor, contains information on PostScript operators.

## Page Margins

Margins are set through your application. Some applications allow you to set page size and margins while others have only standard page sizes and margins from which to choose. If you choose a standard format, you may lose part of your image (due to imageable region constraints). If you can custom-size your page, use exactly those sizes given for the imageable region.



## Paper

Use only paper recommended for laser printers. See appendix B, the “Print Media” section, for more information.

### Storing Paper

How you store paper can make a big difference in print quality and printer operation. Improperly stored paper increases the chance of paper jams during printing and can drastically affect the appearance of the printed page. Keep paper in good condition by storing it

- In its wrapper
- On a flat surface
- In a closed cabinet
- In a cool, dry area

**NOTE:** Do not leave paper unwrapped or in a place where heat and humidity can damage it.

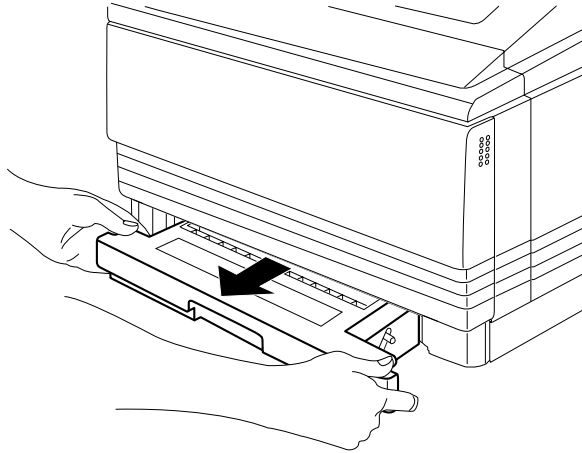
### Loading the 250-Sheet Paper Cassette

The QMS 860 Print System comes standard with two 250-sheet paper cassettes (letter/A4 and 11" x 17"/A3). The printer automatically pulls paper from the paper cassette. You may purchase optional paper cassettes from your QMS vendor.

**NOTE:** Use the paper size that matches the paper cassette size. The paper cassette sends a paper size signal to the controller when the cassette is inserted into the printer.

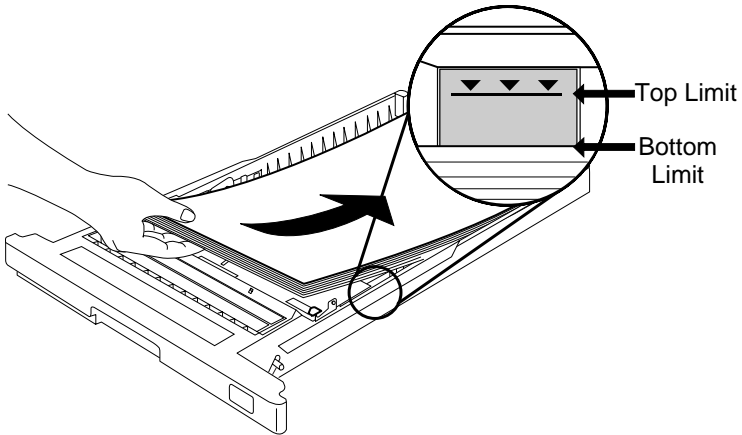
Load paper in either 250-sheet paper cassette as follows:

1. Remove the paper cassette from the printer (fig. 5.1).



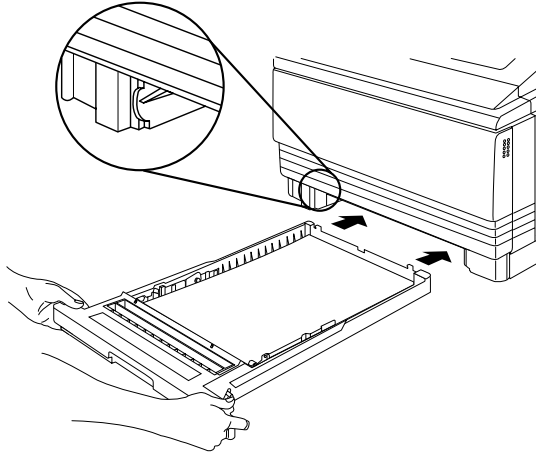
**Fig. 5.1** *Remove the Paper Cassette*

2. Align the paper stack on a flat surface.
3. Insert the paper stack into the paper cassette so that it lies flat, does not exceed the top limit mark (fig. 5.2), and rests under the retaining clips. The cassette holds about 250 sheets of 20 lb (75 g/m<sup>2</sup>) paper,



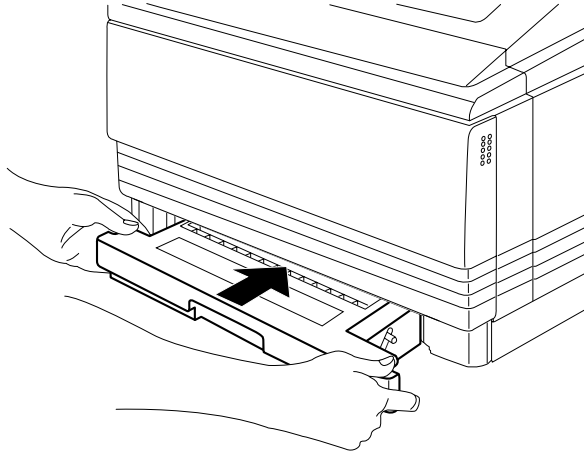
**Fig. 5.2** *Load the Paper*

4. Insert the paper cassette into the paper cassette installation slot (fig. 5.3).



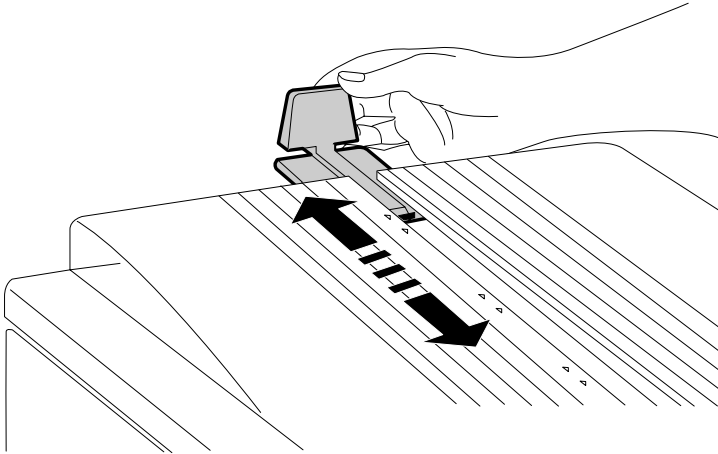
**Fig. 5.3** *Insert the Paper Cassette*

5. Push the filled paper cassette straight into the installation slot until it is firmly seated (fig. 5.4).



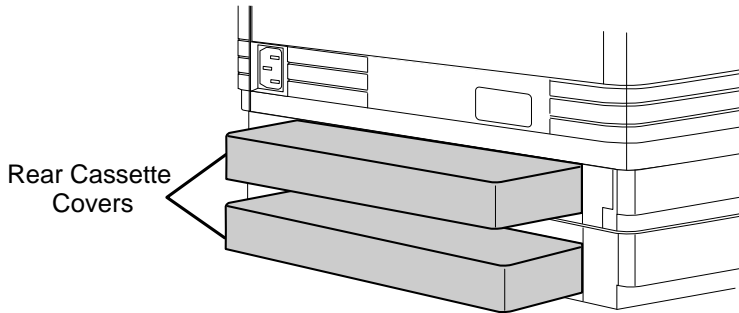
**Fig. 5.4** *Seat the Paper Cassette*

6. Adjust the paper stop to fit the paper size (fig. 5.5). The printer delivers your output print-side down, to the output tray at the top of the printer. The paper stop keeps the paper positioned in the output tray.



**Fig. 5.5** *Adjust the Paper Stop*

7. Install the rear cassette covers (fig. 5.6) for both paper cassettes (only when using 11" x 17"/A3 or legal/B4 paper cassettes). Attach one to the rear of the printer and attach the other to the rear of the optional paper feeder.



**Fig. 5.6** *Install Rear Cassette Covers*

## Loading Print Media in the Multipurpose Tray

This section explains how to load any type print media in the multipurpose tray. For tips on how to get the best possible printing results from print media other than paper, see the “Transparencies” and “Labels” sections later in this chapter.

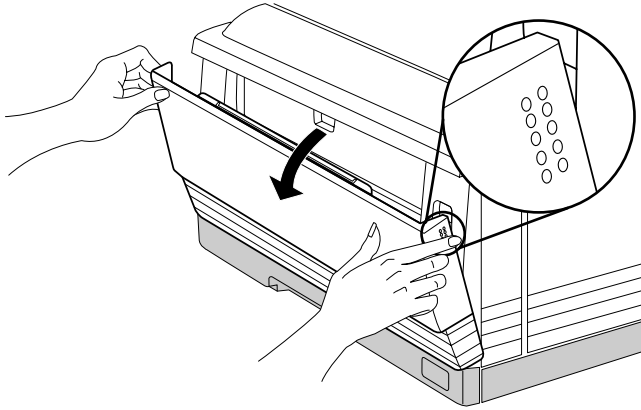
The multipurpose tray is especially useful if you want to print on a single transparency or a sheet of letterhead without changing the paper in the paper cassette. Use the multipurpose tray to print on labels and odd-sized paper as well as transparencies.

This printer is not specifically designed to support envelope printing. But if you want to test print a standard envelope to see if the print quality is suitable for your needs, then use landscape orientation to create the envelope text in your application short-edge first, set the multipurpose tray to universal paper size, and feed the envelope in the multipurpose tray short-edge first. See chapter 4, the “Operator Control / Multipurpose Sz” section, for more information on multipurpose tray size.

**NOTE:** A PAPER SIZE MISMATCH error can be caused if the paper in the multipurpose tray is not the paper size selected for the multipurpose tray (input bin 1). If the printer supports the paper size you want, insert the correct paper size in the multipurpose tray. If the printer does not support the paper size you want, select the universal paper size to clear the error. See chapter 4, the “Operator Control / Multipurpose Sz” section, for more information on multipurpose size.

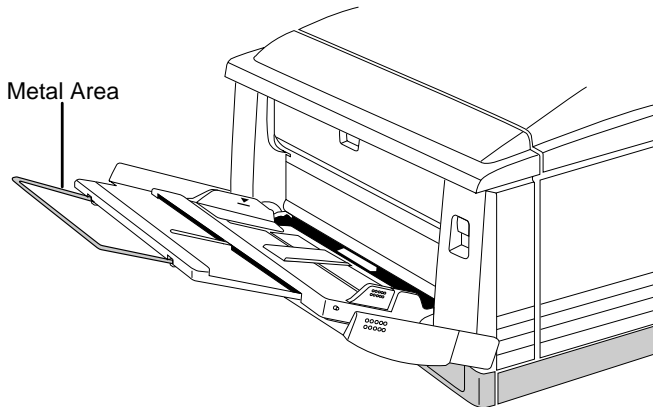


1. Open the multipurpose tray using both hands (fig. 5.7). The tray opens to about a 65° angle.



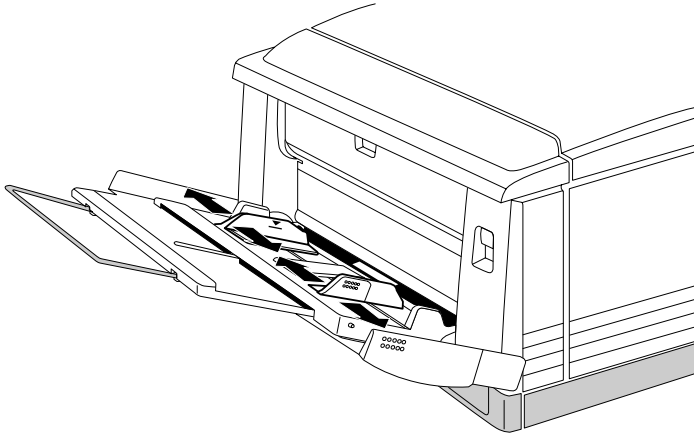
**Fig. 5.7** *Open the Multipurpose Tray*

2. Adjust the multipurpose tray extension to fit the paper size. Pull out the tray extension by the metal area of the tray edge (fig. 5.8).



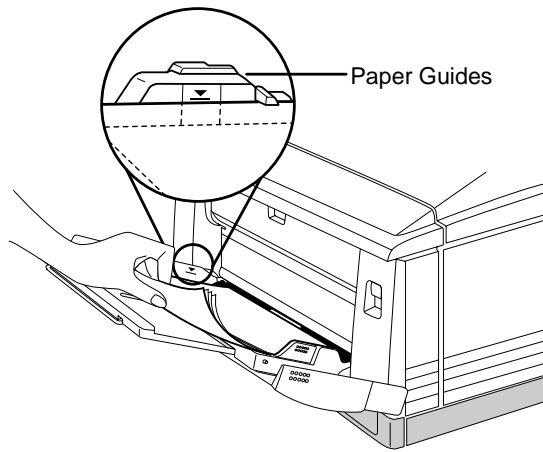
**Fig. 5.8** *Adjust the Multipurpose Tray Extension*

3. Adjust the paper guides to the size of the paper (fig. 5.9).



**Fig. 5.9** *Adjust the Paper Guides*

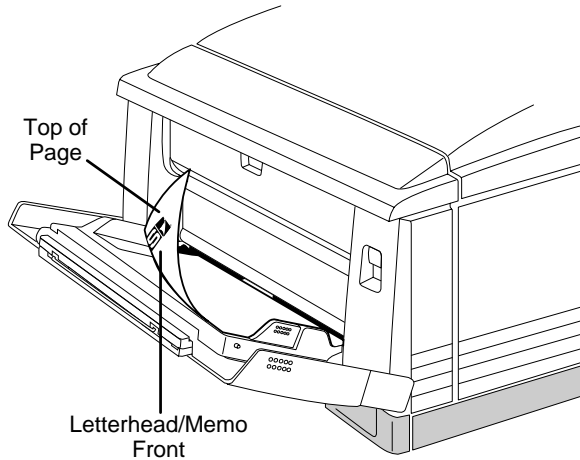
- Align the paper before loading it into the tray. The multipurpose tray holds about 100 sheets of 20 lb ( $75\text{g/m}^2$ ) paper. If you are loading 8.5" x 11" paper in the multipurpose tray, load it lengthwise (long edge first). Insert the print media straight in between the paper guides (fig. 5.10) as far as possible. The paper is automatically fed into the printer and the printed paper is forwarded to the output tray.



**Fig. 5.10** *Insert Paper Between the Paper Guides*

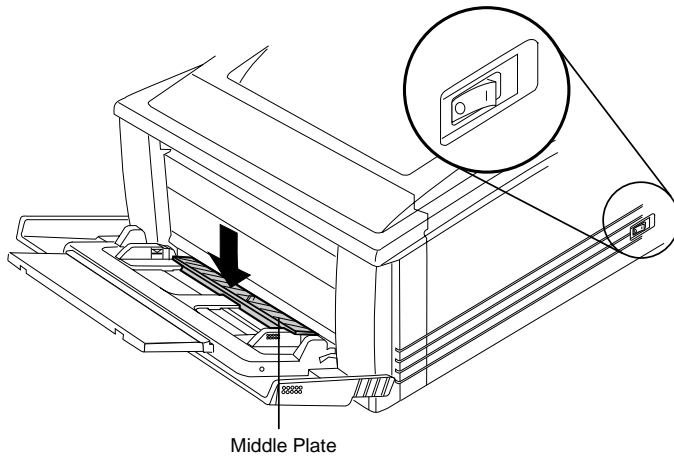


If you are loading letterhead or memo paper in the multipurpose tray, load it face down, lengthwise (long edge first) with the top of the page on the left side of the tray (fig. 5.11).



**Fig. 5.11** *Insert Letterhead/Memo Paper*

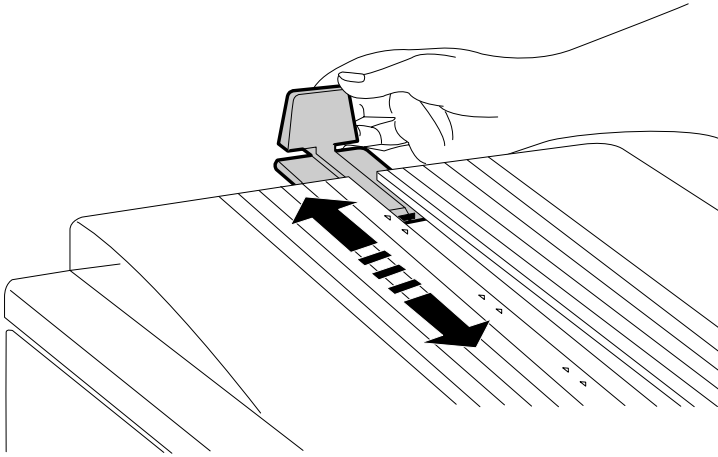
**NOTE:** Make sure that the print media does not exceed the limit mark on the paper guide and that the middle plate at the multipurpose tray's paper entrance (fig. 5.12) is lowered before inserting the paper. If the middle plate is raised, turn the power off and then back on again before inserting the print media.



**Fig. 5.12** Lower Paper Guide Middle Plate

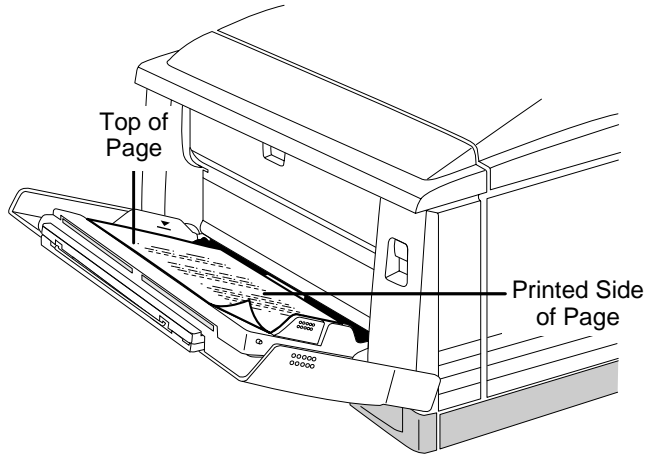
5. Adjust the paper guides so that they touch the sides of the print media.

6. Adjust the paper stop to the correct paper size (fig. 5.13).



**Fig. 5.13** *Adjust the Paper Stop*

**Printing on Both Sides** You can print on both sides of the paper using the multipurpose tray. After printing one side, insert the paper in the tray with the side you want to print next facing down (fig. 5.14). Straighten the front of the paper if it is curled, because curling can cause print media jams and wrinkles on the printed page.



**Fig. 5.14** *Paper Alignment for Two-Sided Printing*



## Transparencies

Use only transparencies recommended for laser printers. See appendix B, the “Consumable Supplies” section, for transparency specifications and vendors.

### Storing Transparencies

Storing transparencies improperly increases the chance of jams during printing and can affect the print quality of your transparencies. Keep transparencies in good condition by storing them

- In their wrapper
- On a flat surface
- In a closed cabinet
- Out of high temperature and humidity areas

Do not leave transparencies unwrapped or in a place where heat and humidity can damage them.

### Loading Transparencies in the Paper Tray

Transparencies are to be printed in the multipurpose tray. Follow the instructions in “Loading Paper in the Multipurpose Tray” given earlier in this chapter to load transparencies. Keep in mind the following considerations:

- Slightly fan the transparency stack before printing to prevent a jam.
- Load transparencies print side down. The correct print side is usually marked on the transparency package.

- Load up to 50 transparencies at a time in the multipurpose tray to avoid static buildup.
- Keep the paper path clean. Transparencies are especially sensitive to a dirty paper path; if there are shadows either on the top or the bottom of the sheets, see the “Caring for the Printer” section of this chapter for instructions on how to clean the paper path.
- Remove each transparency from the output tray before the next sheet is printed to prevent jams or misfeeds.

## Labels

Use only labels recommended for laser printers. (See appendix B, the “Print Media” section, for label specifications.) Adhesive label stock has pressure-sensitive (peel and stick) adhesive backing. Always use the multipurpose tray to print labels.

### Storing Labels

Storing labels improperly increases the chance of jams during printing and can affect the print quality of your labels. Keep labels in good condition by storing them

- In their wrapper
- On a flat surface
- In a closed cabinet
- Out of high temperature and humidity areas

Do not leave labels unwrapped or in a place where heat and humidity can damage them.

## Loading Labels in the Multipurpose Tray

Follow the instructions in “Loading Paper in the Multipurpose Tray” given earlier in this chapter to load labels. Keep in mind the following consideration:

- Load up to 40 labels at a time in the multipurpose tray.

## Paper Cassette Chaining

The QMS 860 Print System comes standard with two 250-sheet paper cassettes: letter/A4 and 11" x 17"/A3. You can insert only one of these paper cassettes at a time in the printer unless you purchase the optional paper feeder. The optional paper feeder allows you to install another 250-sheet paper cassette, increasing paper feed capacity to 500 sheets, or 600 sheets including the 100 sheet multipurpose tray. Attaching an optional cassette supporter to the paper feeder allows you to install an optional 500 sheet paper cassette, increasing paper feed capacity from 250 to 750 sheets, or 850 sheets counting the multipurpose tray. You may choose to have the printer automatically draw from the optional cassette when the lower cassette is empty. There are three ways to do this:

- Use your application if it includes a procedure for using a dual-cassette printer. Check your documentation.
- Use the PS Executive Series Utilities to configure the printer’s paper source.
- Configure your printer for paper cassette chaining through the printer’s control panel as follows:

## How To Chain Paper Cassettes

Press the control panel keys in the order shown in the following instructions. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>ONLINE/ OFFLINE</b>	IDLE	Turns off the LED indicator.
<b>MENU</b>	CONFIGURATION OPERATOR CON- TROL	Accesses the Configuration menu.
<b>SELECT and NEXT</b>	OPERATOR CON- TROL CHAIN INPUTBINS	Accesses the Operator Control menu and advances to the Chain Input Bins option.
<b>SELECT</b>	CHAIN INPUTBINS ON	Accesses the Chain Input Bins selection and displays On option.
<b>SELECT</b>	ON IS SELECTED	Confirms that Chain Input Bins is set to On.
	OPERATOR CON- TROL CHAIN INPUTBINS	Returns to Operator Control / Chain Inputbins.
<b>MENU</b>	SAVE CHANGES? NO	Prompts you to save changes.
<b>NEXT</b>	SAVE CHANGES? YES	Advances to the next Save Changes option.
<b>SELECT</b>	IDLE	Finishes the print jobs in process, saves changes, and idles or reinitializes the printer.

<b>OFFLINE/ ONLINE</b>	IDLE	Turns on the indicator and puts the printer in a ready state.
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**NOTE:** Make sure that the two paper cassettes installed in your printer use the same size paper. Also, remember that the printer must be off line to change printer configuration.

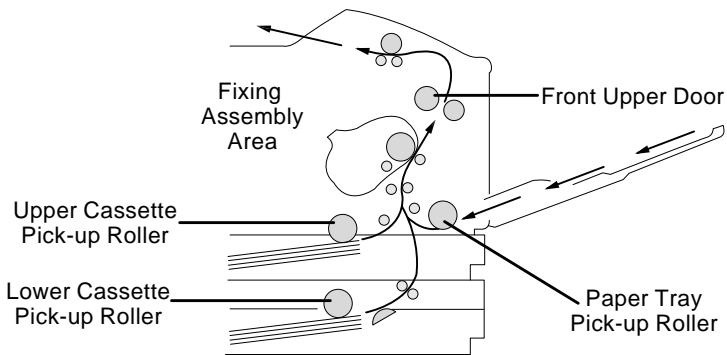
## Clearing Media Jams

With most printers, if a jam occurs, you must remove the jammed media and then reprint the job. However, the QMS 860 Print System provides automatic jam recovery. If a media jam occurs, remove the jammed media, and the printing automatically resumes from the page the printer stopped at when the jam occurred.

**NOTE:** For automatic jam recovery to work, it is necessary to leave the printer turned on when you remove the jammed media. After the jam is cleared, open and close the front cover once before printing. Printing will not begin until you do this.

## Locating Print Media Jams

When print media jams occur, a PAPER JAM message displays in the message window. Frequent jams in any area indicate that area should be checked, repaired, or cleaned. Repeated jams may also happen if you are using the wrong weight print media. (See appendix B, the “Print Media” section, for print media specifications.) Print media jams can occur in any of the areas shown in figure 5.15.



**Fig. 5.15** *Print Media Jam Locations*

Check each of the indicated locations, and remove any jammed print media. Jams can occur in more than one location at a time, so be sure to check all the indicated locations. After clearing the jam, always open and close the front cover once before printing.

**When printing from a paper cassette**, check the area of the print media jam in the following order:

- Check the front inside area
- Check the paper cassette area

- Check the front upper door area

**When printing from the multipurpose tray**, check the area of the print media jam in the following order:

- Check the multipurpose tray area
- Check the front inside area
- Check the front upper door area

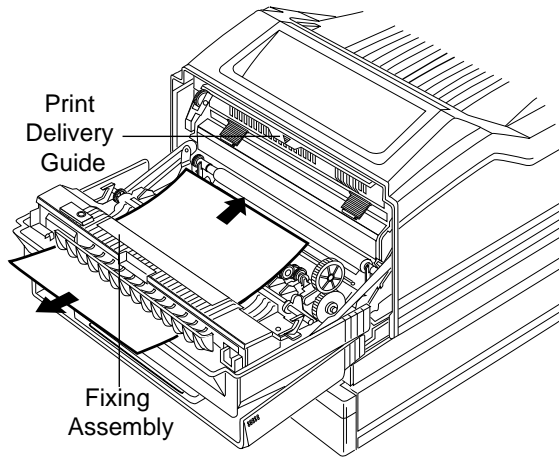
## Clearing Front Inside Area Jams

**WARNING:** The fixing assembly and print delivery guide become extremely hot when the printer is used. Personal injury could result if you touch those areas.

**ACHTUNG:** Die Fixiereinheit und die Papierführung werden sehr heiß, wenn der Drucker in Betrieb ist; bei Berührung dieser Partien besteht Verletzungsgefahr!

1. Open the multipurpose tray, using both hands.
2. Push up on the printer's release button and open the front cover.

3. Remove jams from the fixing assembly area by pulling in the direction of the arrow pointing away from the printer (fig. 5.16). Pull the print media in the opposite direction of that arrow (toward the printer) only if the end of the paper has passed completely through the fixing assembly.



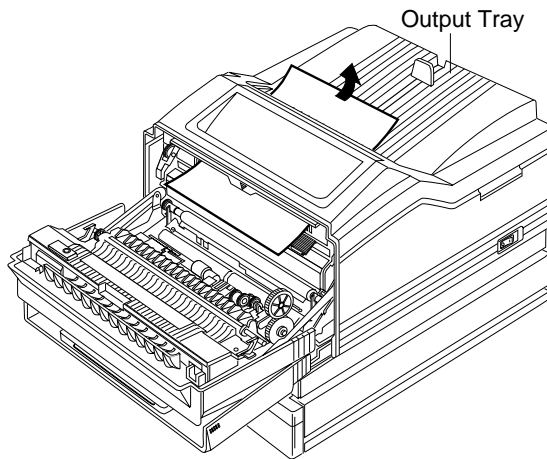
**Fig. 5.16** Clear Assembly Area Jam

**NOTE:** If the end of the print media has not passed completely through the fixing assembly area, and the print media is pulled toward the inside of the printer, infused toner may adhere to the inside of the printer and stain the backs of the next pages being printed.



4. Check the output tray. If the print media has passed through to the output tray, pull the print media in the direction of the arrow (fig. 5.17).

After checking all print media paths in the fixing assembly area, close the front cover and the multipurpose tray. If the jam has been cleared, printing will restart. If the jam remains, check the paper cassette area described in the next section of this chapter.

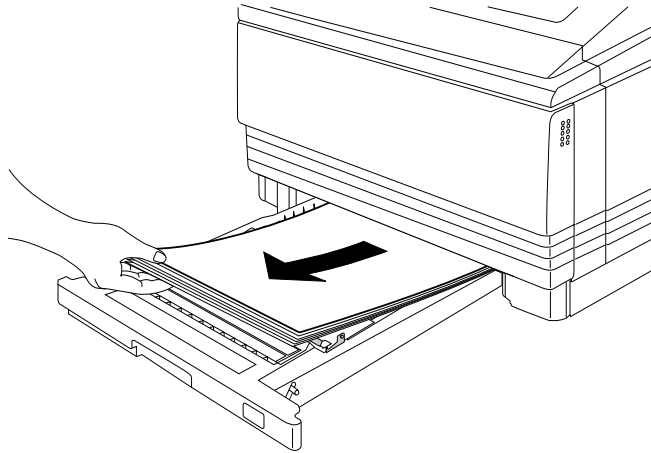


**Fig. 5.17** *Clear Output Tray Jam*

## Clearing Paper Cassette Area Jams

1. Determine which paper cassette is currently being used and remove it.
2. Check the paper cassette pick-up roller area and remove any jammed print media by pulling in the direction of the arrow (fig. 5.18).

After replacing the paper cassette, open and close the front cover. If the jam has been cleared, printing will restart. If the jam remains, check the front upper door area described in the next section of this chapter.



**Fig. 5.18** *Clear Paper Cassette Area Jam*

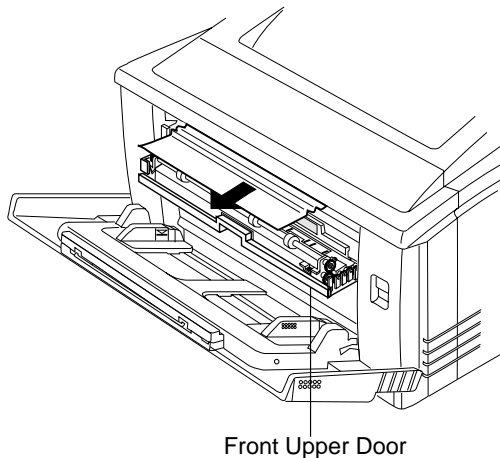
## Clearing Front Upper Door Area Jams

**WARNING:** The inside of the front upper door becomes extremely hot when the printer is used. Personal injury could result if you touch that area.

**ACHTUNG:** Die Innenseite der oberen Abdeckklappe wird im Betrieb sehr heiß; bei Berührung dieser Partie besteht Verletzungsgefahr!

1. Open the front upper door and remove the jam by pulling in the direction of the arrow (fig. 5.19).

After removing the jammed print media, close the front upper door. If the jam has been cleared, printing will restart. If you cannot easily remove the print media from the front upper door area, remove the jam from the front inside area as described in the “Clearing Front Inside Area Jams” section of this chapter.



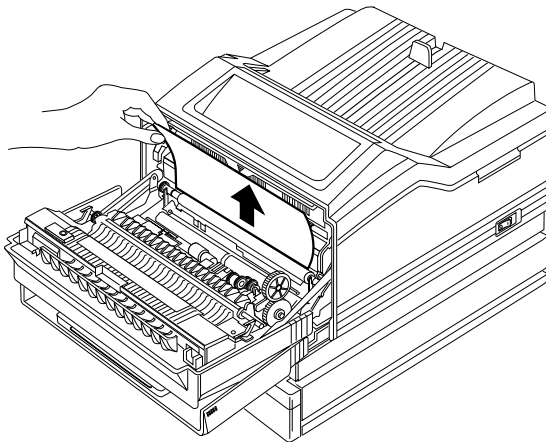
**Fig. 5.19** Clear Front Upper Door Area Jam

## Clearing Multipurpose Tray Area Jams

**NOTE:** Leaving print media in the multipurpose tray can cause the print media position to shift during removal of the jam. This may result in a paper feed failure and another jam when printing is restarted.

1. Open the multipurpose tray, using both hands. Remove all print media remaining in the multipurpose tray and close the tray extension.
2. Push on the release button, and open the front cover.
3. Remove the print media from the paper pick-up area by pulling in the direction of the arrow (fig. 5.20).

If the jam has been cleared, close the front door and printing will restart. If you are unable to locate the jam in the multipurpose tray area, check the areas for locating jams when using a paper cassette described earlier in this chapter.



**Fig. 5.20** Clear Paper Pick-up Area Jam

## Replacing the Toner Cartridge

The toner cartridge lasts for approximately 6,000 prints at 4% coverage. When the toner supply is low, the printer's message window displays `TONER OUT`, and usually parts of the page print lighter than normal.

Sometimes you may increase the life of the cartridge by taking it out of the printer and redistributing the toner in the cartridge as described in the “Installing the Toner Cartridge” section of this chapter. If the `TONER OUT` message remains in the message window, the toner cartridge must be replaced.

**NOTE:** Keep the toner cartridge away from your CRTs, disk drives, and floppy disks. The magnets in the cartridge can damage stored data. Also, we recommend that you do not use refilled toner cartridges. Due to variations in toner quality and reliability, your print quality may be reduced. In addition, toner leaks affect your warranty.

The toner cartridge contains the toner and photosensitive drum needed to operate the laser printer. You may purchase additional cartridges from your QMS vendor. See appendix B, the “Print Engine” section, for toner specifications.

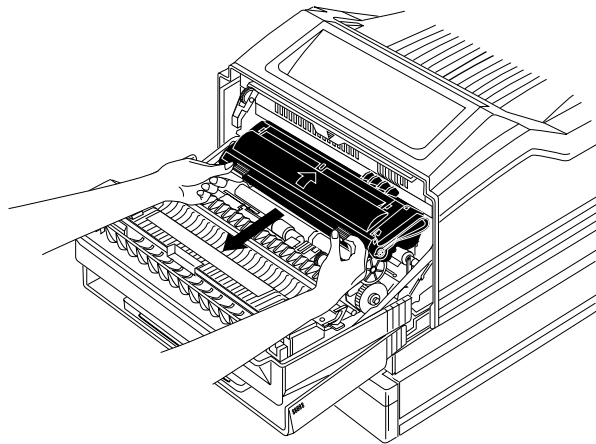
**WARNING:** The fixing assembly and print delivery guide areas become extremely hot when the printer is used. Personal injury could result if you touch those areas when opening the front cover or removing the toner cartridge.

**ACHTUNG:** Die Fixiereinheit und die Papierführung werden sehr heiß, wenn der Drucker in Betrieb ist. Es besteht daher Verletzungsgefahr, wenn Sie die Abdeckklappe öffnen oder die Tonerkartusche auswechseln wollen!

**NOTE:** We recommend that you do not use refilled toner cartridges. Due to variations in toner quality and reliability, your print quality may be reduced. In addition, toner leaks affect your warranty.

Replace the toner cartridge as follows:

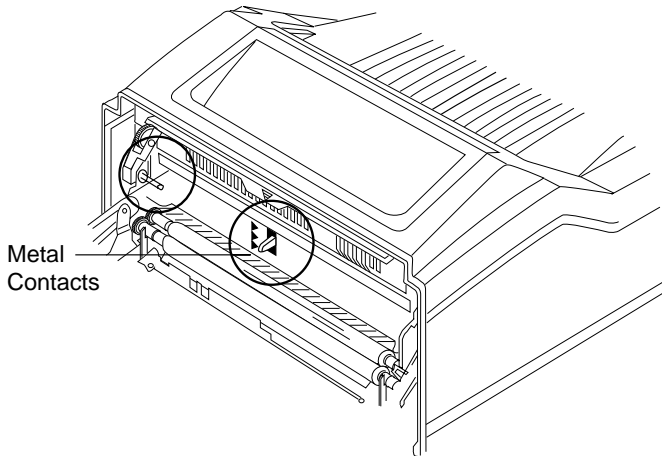
1. Open the multipurpose tray, using both hands.
2. Push up on the release button and open the front cover.
3. Grasp the green tabs of the empty toner cartridge with both hands, and remove the cartridge by pulling in the direction of the arrow (fig. 5.21)



**Fig. 5.21** *Remove the Toner Cartridge*

**CAUTION:** Do not touch or insert anything in the metal contacts or the opening circled in figure 5.22. Corrosion or obstruction in this area could cause the printer to malfunction.

---



**Fig. 5.22** *Toner Cartridge Area*

**CAUTION:** Put the old toner cartridge in the trash receptacle. Do not dispose of the old toner cartridge by placing it in fire.

---

## Installing the Toner Cartridge

The toner cartridge contains the toner and photosensitive drum needed to operate the laser printer. The cartridge

- Is sensitive to bright light. Do not remove the toner cartridge from its protective bag until you are ready for installation.
- Should be kept level for storage. Do not stand or store the cartridge on its end.
- Should be kept away from CRTs, disk drives, and floppy disks. The magnets in the cartridge can damage stored data.

You may purchase additional cartridges from your QMS vendor. See appendix B, the “Print Engine” section, for toner specifications.

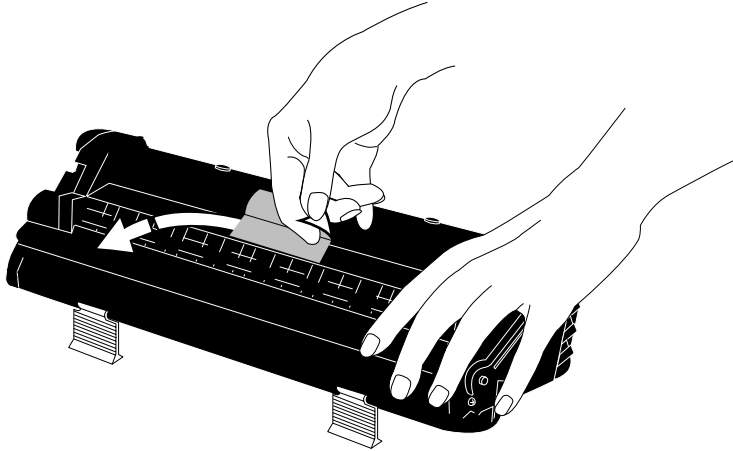
**WARNING:** The fixing assembly and print delivery guide areas become extremely hot when the printer is used. Personal injury could result if you touch those areas when opening the front cover or installing the toner cartridge.

**ACHTUNG:** Sowohl die Fixiereinheit als auch die Papierführung werden im Druckbetrieb extrem heiß. Um Verletzungen zu vermeiden, sollten diese Druckerpartien, z.B. wenn Sie eine neue Tonerkartusche einlegen, nicht berührt werden!

1. Lift the toner cartridge out of its shipping carton, open the aluminum protective bag, and remove the cartridge.

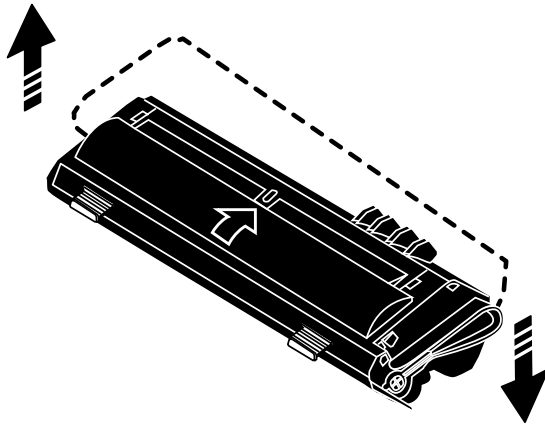


2. Place the cartridge on a flat-stable surface, remove the black protective sheet (fig. 5.23), and discard it.



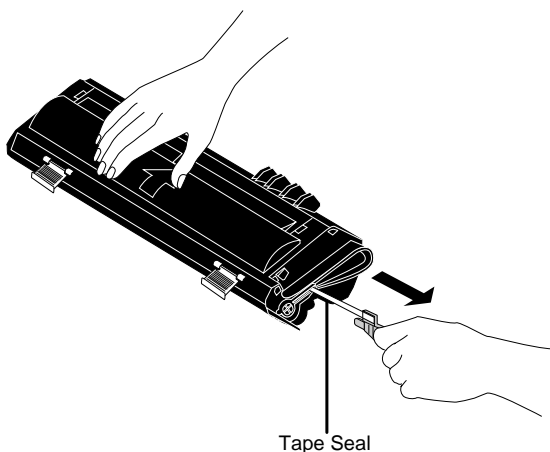
**Fig. 5.23** *Remove the Protective Sheet*

3. Hold the cartridge with both hands, and gently rock it from side-to-side five or six times to distribute the toner (fig. 5.24).



**Fig. 5.24** *Distribute the Toner*

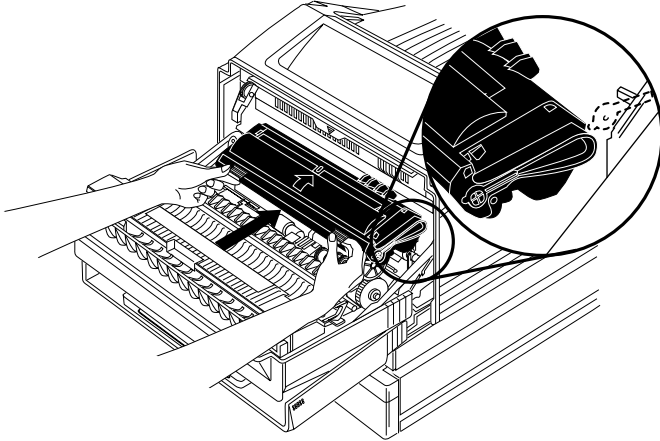
4. Hold the cartridge in place with one hand, and using your other hand grasp the orange tab on the right side of the tape seal (fig. 5.25). Keeping the toner cartridge parallel to the flat surface, pull the orange tab straight out (26.4"/67 cm). Discard the orange tab and tape seal.



**Fig. 5.25** *Remove the Tape Seal*

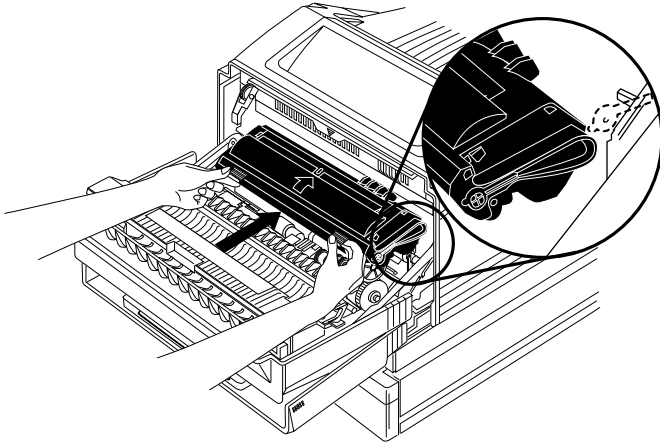
**NOTE:** When the toner cartridge is installed and the front cover is partially opened or partially closed, the drum protective shutters open and the drum surface is exposed to light. This may deteriorate the drum and reduce print quality.

5. Grasp the green tabs on the toner cartridge, and place the cartridge on the rails inside the printer (fig. 5.26).



**Fig. 5.26** *Place Toner Cartridge on Rails*

6. Hold the green tabs slightly lifted and slide the cartridge straight back into the printer until it is firmly seated (fig. 5.27).

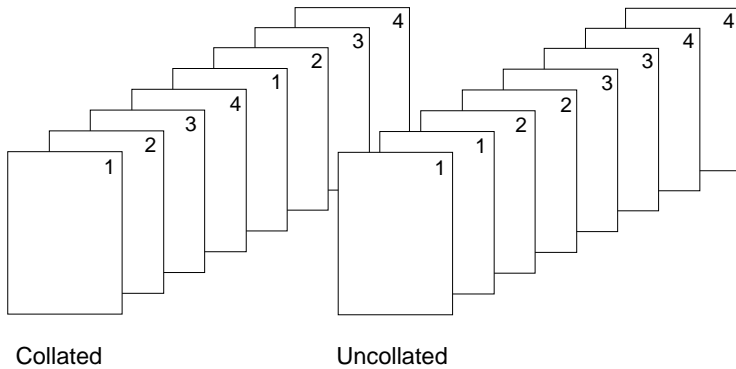


**Fig. 5.27** *Install the Toner Cartridge*

7. Close the front cover, and close the multipurpose tray (if it is not being used).

## Collating Output

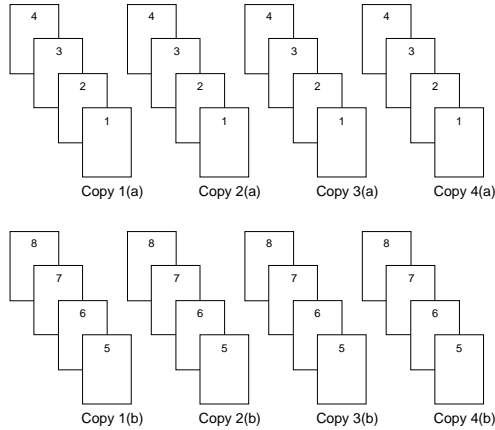
Collation is printing of multiple copies of a print job in numeric order. The QMS 860 Print System can deliver multiple copies of your files in collated order to the output tray. Figure 5.28 shows the collated and uncollated stacking for two copies of a four-page file.



**Fig. 5.28** *Collated and Uncollated Output*

When a hard disk drive is installed, the use of additional disk space for collation greatly improves collation performance. Increasing the disk space to be used for collation allows increasingly more complex and longer collation sequences. However, there is a limit to how much can be collated at one time. When 100 sheets are received for a print job or when a complex print job consumes all the collation disk space, chunk collation occurs.

Chunk collation breaks a print job into several smaller, more manageable collation sequences. For example in figure 5.29, copies “a” and “b” of each collation sequence must be manually combined to create one collated print job.



**Fig. 5.29** *Chunk Collation*

If print jobs begin chunk collating well before 100 sheets, you may want to increase the amount of collation disk space. See chapter 4, “Administration / Disk Operations / Collation,” for more information on configuring your printer for collation.

The main advantage of collation is user convenience and the time savings derived from not having to separate and sort individual copies of a print job. Each copy of the print job exists as a whole unless chunk collation has occurred. There is no offset stacking feature on your QMS 860 Print System, so it may be best to use a header and trailer page for determining the beginning and end of your print job. (See chapter 4, the “Administration / Special Pages” section, for more information on how to print the header and trailer pages.)

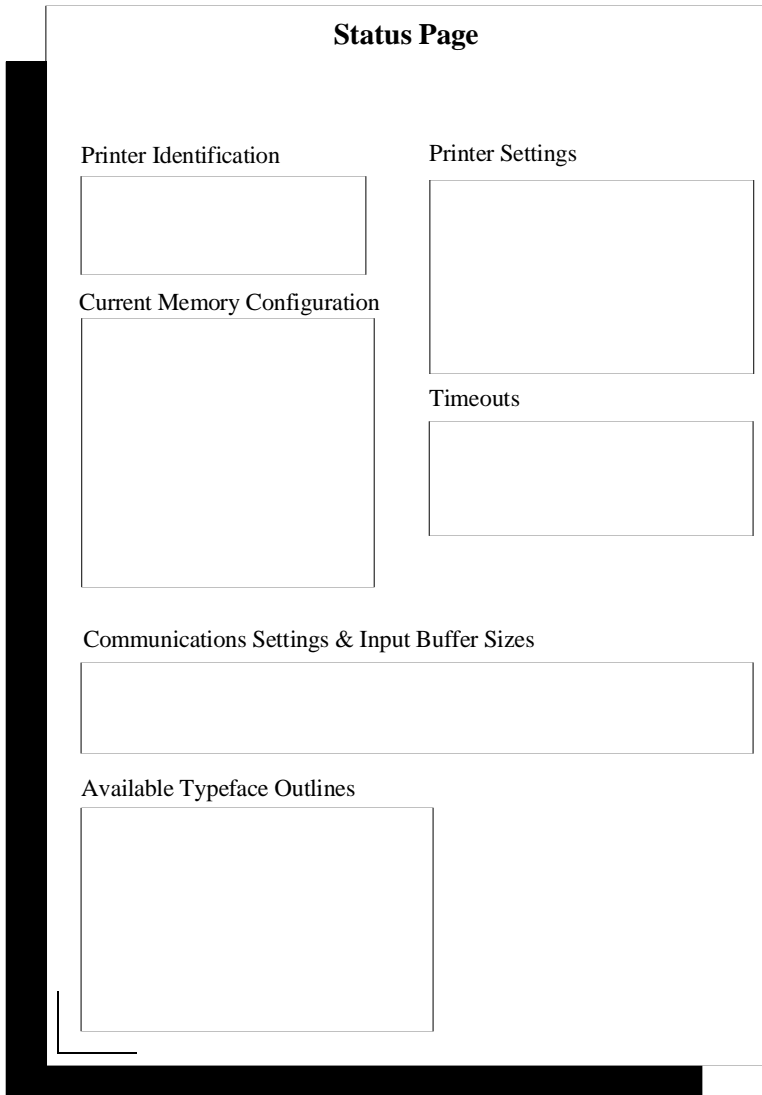
## Printing a Status Page

Use the Status Page key to print a page listing the current printer settings. The status page (fig. 5.30) lists

- Printer identification (the printer's name, firmware information, number of sheets printed)
- Printer settings (printer set-up options for paper handling)
- Current memory configuration (printer memory settings)
- Timeouts (printer timeout settings)
- Communications settings and input buffer sizes (settings for host-printer communication, including spooling memory sizes)
- Available typeface outlines (resident PostScript fonts)

Also, tickmarks print in the lower-left corner for image alignment.





**Fig. 5.30** *Printer Status Page*

## How to Print a Status Page

Press the control panel keys in the order shown in the following instructions. The printer responds by displaying a status message in the message window.

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>STATUS PAGE</b>	PRINT STATUS YES	Displays the Print Status Yes option.
<b>SELECT</b>	YES IS SELECTED	Displays Print Status confirmation message.
	PRINTING STATUS	Prints the status page when the job queue is available and clears the Printing Status message.

## Canceling a Print Job

The Cancel key has two functions. It cancels or ends the first job in the queue and allows you to send an end-of-job indicator to a currently compiling print job waiting on incoming data. It not necessary to press the Online/Offline key to take the printer off line before using the Cancel key. There are no equivalent functions in the control panel menu structure.

Press the control panel keys in the order shown in the following instructions to cancel or end a print job. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

### How to Cancel a Print Job

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>CANCEL</b>	CANCELLING JOB? YES	Displays the Cancelling Job confirmation message.
<b>CANCEL or SELECT</b>	YES IS SELECTED	Confirms that jobs which are printing or compiling data are to be deleted from the job queue.
	CANCELLING JOB	Cancels the first job in the job queue and displays the CANCELLING JOB message until the job is completely removed from the printer.

### How to End a Print Job

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
	WAITING FOR INPUT END JOB?	Displays this message and accepts an end-of-job indicator for the currently compiling job if it is the first job in the job queue and is waiting for incoming data.
<b>PREVIOUS or NEXT</b>	CANCELLING JOB? END JOB	Displays the Cancelling Job confirmation message.
<b>CANCEL or SELECT</b>	END JOB IS SELECTED	Confirms that the print jobs waiting for input are ended.

**NOTE:** Use the Menu key to stop the print job cancel or end.

## Caring for the Printer

Blurred or splotchy prints and paper jams can result from dusty printer parts. Regular cleaning takes only a few minutes and helps ensure print quality. Printer parts that require cleaning are the transparent sheet area and the outside surface of the printer.

## Handling the Printer

Handle the printer with care to preserve its life. Abuse may cause damage.

- Do not place anything on the top of the printer.
- Do not place anything on the multipurpose tray except the media being used for printing.
- Do not leave the printer open for any length of time, especially in well-lit places; light may damage the toner cartridge.
- Wait until the printer has cooled down before covering it with a dust cover.
- Lift the printer from the bottom only. Make sure two people are available to lift the printer when moving it.
- Keep the output tray at minimum level. If paper stacks too high, you may experience print media jams and excessive paper curl.
- Do not attempt to lubricate or disassemble the printer.
- Store the printer under the following conditions when it is not going to be used for an extended period:

Unplug the power cord from the power source outlet.

See appendix B, the “Environmental Requirements” section, for storage specifications.

Remove the toner cartridge from inside the printer. After removing the cartridge from the printer, return it to the aluminum bag in which it was originally packaged or wrap it in a thick cloth to protect it from direct sunlight or any other bright light.

## **Cleaning the Printer**

To maintain crisp and clear print quality, the transparent area of the printer must be thoroughly cleaned at the following times:

- Every time the toner cartridge is changed
- Whenever print quality becomes unsatisfactory

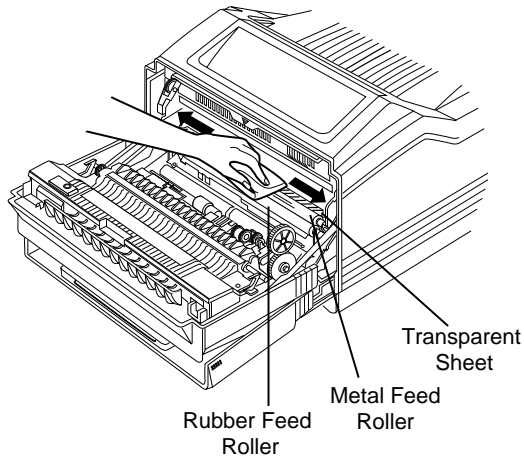
When cleaning the printer, follow these guidelines:

- Use only water. Never use neutral detergents or other cleaning solutions.
- Do not leave moisture inside the printer. After cleaning, allow all parts to dry thoroughly before closing the printer cover.
- Remember to unplug the power cord before cleaning.
- Use a soft, dry cloth to wipe the printer.

### **Cleaning the Transparent Sheet Area**

**NOTE:** Clean the transparent sheet area when replacing the toner cartridge. Make sure the old toner cartridge has been removed and that the printer is unplugged.

1. Remove the old toner cartridge as described in the “Replacing the Toner Cartridge” section of this chapter.
2. Wipe the transparent sheet area clean (fig. 5.31) with a soft cloth soaked in water. Then wipe dry with another soft cloth.



**Fig. 5.31** *Clean Transparent Sheet Area*



# Chapter 6

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## Print Quality

### Chapter highlights:

- Testing the print quality
  - Adjusting the print quality
  - Changing the gamma correction
-





## Introduction

This chapter describes how to improve print quality. Density, gamma correction, screen frequency, and screen angles are some of the factors that affect print quality. Your QMS 860 Print System is a multi-resolution printer. This technology gives you more flexibility to control the print quality factors.

## About Print Density

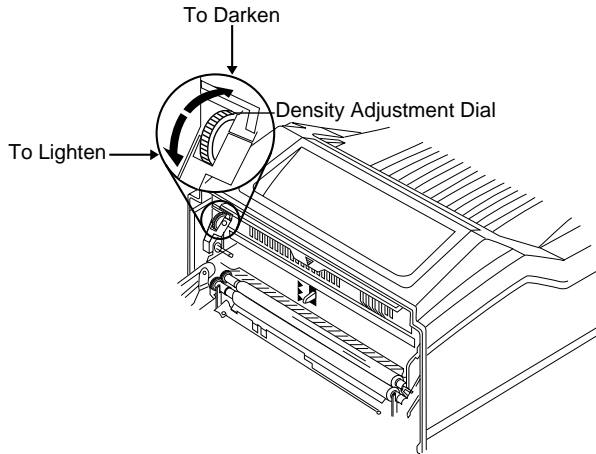
Print density is the amount of toner placed on the page, making the print appear lighter or darker. The higher the density, the darker the print looks and the higher the contrast is on the page. To adjust the print density

1. Open the multipurpose tray, push up on the printer's release button, and open the front cover.

2. Locate the density adjustment dial that is inside the printer on the right side (fig. 6.1). The scale on the density adjustment dial shows the density setting; the dark marking increases density, and the light marking reduces density.

To increase density (darken print on the page) rotate the dial up, using your left thumb. To decrease density (lighten print on the page) rotate the dial down. The dial clicks at the center setting. Adjust the dial to your desired setting.

**NOTE:** You may want to increase density as the toner cartridge depletes.



**Fig. 6.1** *Adjust the Print Density*

## About Gamma Correction

Gamma Correction is the compression or expansion of the ranges of dark or light shades in a printed image to provide the best copy of scanned images.

### Terms

Several terms related to gamma correction are explained in this section to help you better understand the gamma correction concept.

**Gray Levels** are a progressive series of gray tones between black and white. Gray levels are obtained by varying the ratio of black to white dots. The number of gray levels depends on printer resolution and screen frequency.

**Halftone** is a printed copy of a scanned image as a set of tiny, evenly spaced spots of variable diameter that, when printed, visually blur together to appear as shades of gray. Your QMS 860 Print System creates halftone cells by mapping each gray level onto a collection of dots.

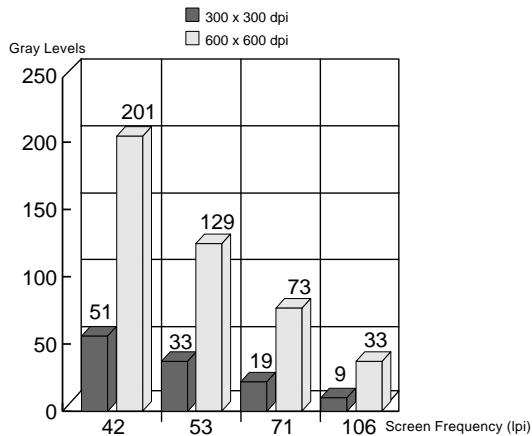
Factors that influence the quality of a halftone are

- Device resolution of the printer
- Screen frequency of the halftone
- Quality of the scan
- Diameter of the laser beam

The higher the resolution of the printer, the smoother the resulting spots, and the greater the number of gray levels possible because each spot is represented by a wider range of dots. The laser beam is part of the print engine, so it is not a factor that the user can adjust.

**Screen Frequency** is the number of lines of dots that compose each inch of a halftone screen. The screen frequency of a halftone determines the number of spots used to represent gray levels in a given area. A 71 lines per inch (lpi) screen frequency has 71 lines of dots for each inch of the halftone screen.

Figure 6.2 shows the relationship between screen frequency, gray levels, and print resolution. As the screen frequency increases, the number of gray levels decreases.



**Fig. 6.2** *Gray Levels*

The number of gray levels that your printer can produce depends on the screen frequency and the print resolution. The default value for screen frequency using 600 dpi is 71 lpi. This typically allows 73 different levels of gray. The default value for screen frequency

using 300 dpi is 53 lpi. This typically allows 33 different levels of gray. You may change screen frequency through your application or by using the PostScript **setscreen** operator. The *QMS Crown Technical Reference Manual*, which is an optional purchase available from your QMS vendor, contains information on **setscreen**.

The extra gray levels available through higher resolution provide a smoother shift from the darkest black to very light grays while higher resolution provides sharper image outlines.

**Screen Angle** is the angle at which a halftone screen prints. The default screen angle for your QMS 860 Print System is 45°. This is the normal angle for a black and white printer. You can change the screen angle through the PostScript **setscreen** operator. The *QMS Crown Technical Reference Manual*, which is an optional purchase available from your QMS vendor, contains information on **setscreen**.

## Gamma Correction Concept

Often in scanned images, gray scaling may be too light or dark to show details clearly. Using gamma correction on a gray-scale image is similar to using a graphic equalizer on a home stereo; the range of gray levels is adjusted for the best possible image. This sharpens overall midrange contrast while blacks (shadows) and whites (highlights) keep their original values. Gamma correction sets gray-scale values specified through the **setgray** PostScript operator to your printer's gray-scale values.

The gamma correction value provided through the printer control panel refers to a constant value applied to the scan. Increasing the gamma value lightens the image and decreasing the value darkens the image.



Gamma 0  
Uncorrected



Gamma 1  
Low Contrast

### Change from Gamma 0 to Gamma 1

Gamma correction 1 provides low contrast. It provides a continuous tone of gray values from all white to all black.



Gamma 0  
Uncorrected



Gamma 2  
Medium Contrast

### Change from Gamma 0 to Gamma 2

Gamma correction 2 provides medium contrast. It is the midpoint between gamma correction 1 and gamma correction 3.



Gamma 0  
Uncorrected



Gamma 3  
High Contrast

### Change from Gamma 0 to Gamma 3

Gamma correction 3 provides a high contrast. It accentuates the near black (charcoal or dark gray) and the near white (very light gray) areas. There is a continuous tone area between the near white and near black areas.

**NOTE:** These gamma correction charts were not generated by the Administration / Special Pages / Gamma Correction selection. They are simulated output.

You can test gamma correction using the **setgray** PostScript operator. The *QMS Crown Technical Reference Manual*, which is an optional purchase available from your QMS vendor, contains information on **setgray**.

**NOTE:** You may want to use the **settransfer** PostScript operator to set gamma correction values not predefined in the printer. (See the *QMS Crown Technical Reference Manual*, which is an optional purchase available from you QMS vendor, for more information on **settransfer**.)

## Gamma Correction Application

You can use gamma correction to correct gray-scale problems for scanned images or to accentuate detail. An increase in the gamma value lightens the image. This change does not affect black or white text, but may affect gray text. Here are some examples:

- For a photo with a wide range of gray areas from white to black, you might want to use gamma correction 1.
- For a photo with very dark or very light areas and few intermediate gray areas, you might want to use gamma correction 3.

The main benefit of gamma correction is that it improves the copy quality of a scanned image.





# Chapter 7

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## Professional Printing

### Chapter highlights:

- Introduction to typefaces and fonts
  - Introduction to page design
-



## Introduction

Now you are ready to explore the potential of your QMS 860 Print System. This chapter displays the printer's resident typefaces, offers suggestions for using them, and includes page design tips. A bibliography for graphic design, desktop publishing, and PostScript printing can be found at the end of this chapter.

## About Typefaces and Fonts

Many of the terms and phrases used in desktop publishing are derived from the language of professional printers and typesetters. This section explains common words and phrases used when printing typefaces. The more you know about the typeface and printing capabilities of your printer, the more you can improve the appearance of your documents.

You need to know the following four terms since they are often confused.

**Typeface**            A named design of a set of printed characters, such as Times, that has a specified obliqueness (degree of slant) and stroke weight (thickness of stroke). It does not define a particular size.

**Typeface Family**    A typeface family is a group of similar typefaces. For example, the Times typeface family consists of four typefaces: Times Roman, **Times Bold**, *Times Italic*, and ***Times Bold Italic***.

**Font**                 A font is a set of characters of the same typeface (such as Times), style (such as *italic*), stroke weight (such as **bold**), and point size (such as 10). Although you hear the term "font" used more generally, as if referring to a typeface, it is really a subset of a typeface.

**Character Set**

A character set is a collection of symbols designed for various printing applications. Many character sets are composed of the letters (uppercase and lowercase A-Z), digits (0-9), and any symbol (such as blank space, dollar sign, and ampersand). Other character sets are composed entirely of symbols.

## Typeface Classification

One way of classifying the different typefaces is to group them into the following categories:

- Serif
- Sans serif
- Script
- Pi or symbol

**Serif**—A serif is a decorative line or tail on the ends of the strokes of a letter. Serifs, usually on the lower half of a letter, have also been referred to as feet or curlicues. Courier, ITC Bookman, New Century Schoolbook, Palatino, and Times are serif typefaces.

In the following example, all the letters except “e” and “o” have serifs:

# Times Roman

**Sans serif**—Sans serif (“sans” is French for “without”) indicates a typeface without any of these small tails. A sans serif typeface is decorative by the shape and styling of its letters but has less detail than a serif typeface. Helvetica, Helvetica Condensed, Helvetica Narrow, and ITC Avant Garde Gothic, are all sans serif typefaces.

In the following example, the slight curving at the bottom of the letters “t” and “a” is not a serif. It is part of the line forming the letter rather than a decorative line added on:

## Helvetica

**Script**—Script typefaces simulate handwriting or brush lettering. Each letter is connected visually, if not physically. ITC Zapf Chancery is a script typeface.

**Pi or symbol**—Pi or symbol typefaces are collections of assorted special-purpose characters (for example, decorative, graphic, math, or monetary characters). The phrase pi typeface comes from the days of handset type. A pi was a letter of one font that accidentally fell into a drawer of another font. When discovered, it was thrown into a box with other pies, known as a hell box, to be sorted out later. They are especially useful for highlighting items in lists, providing graphics, and displaying symbols that might otherwise have to be drawn in by hand. Many typefaces today include a complement of the more commonly used pi characters. Symbol and ITC Zapf Dingbats are pi typefaces.

### Resident PostScript Fonts

The following 39 PostScript fonts come resident in your printer. See your QMS vendor if you are interested in expanding your printer’s typeface families.

<b>Serif</b>	<b>ITC Bookman Light</b>
	<i>ITC Bookman Light Italic</i>
	<b>ITC Bookman Demibold</b>
	<i>ITC Bookman Demibold Italic</i>

Courier  
*Courier Oblique*  
**Courier Bold**  
***Courier Bold Oblique***

New Century Schoolbook Roman  
*New Century Schoolbook Italic*  
**New Century Schoolbook Bold**  
***New Century Schoolbook Bold Italic***

Palatino Roman  
*Palatino Italic*  
**Palatino Bold**  
***Palatino Bold Italic***

Times Roman  
*Times Italic*  
**Times Bold**  
***Times Bold Italic***

**Sans**  
**Serif**

ITC Avant Garde Gothic Book  
*ITC Avant Garde Gothic Book Oblique*  
**ITC Avant Garde Gothic Demibold**  
***ITC Avant Garde Gothic Demibold Oblique***

Helvetica  
*Helvetica Oblique*  
**Helvetica Bold**  
***Helvetica Bold Oblique***

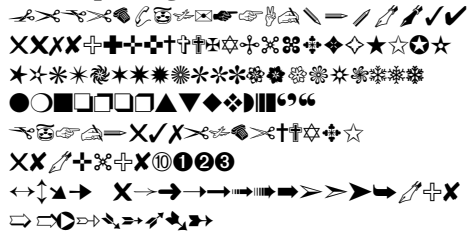
**Helvetica Condensed**  
***Helvetica Condensed Oblique***  
**Helvetica Condensed Bold**  
***Helvetica Condensed Bold Oblique***

Helvetica Narrow  
Helvetica Narrow Oblique  
Helvetica Narrow Bold  
Helvetica Narrow Bold Oblique

**Script** *ITC Zapf Chancery Medium Italic*

**Pi or Symbol** **Symbol**  
!∇#∃%&∞()\*+,-./01234P56789:;<=?≡ABXΔE-  
ΦΓΗΙθK  
ΘΡΣΤΥςΩΨΖ[.:.]⊥ ¯αβχδεφ  
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| }| | | | | }

**ITC Zapf Dingbats**



All of these typeface families are authentic: they are licensed, they carry the true name, and they have multilingual character sets.



## HP PCL Fonts

Your printer has the following resident HP PCL fonts:

Typeface	Pitch	Point	Style	Orientation
Courier	12	10	Regular	Portrait
Courier	12	10	Bold	Portrait
Courier	12	10	Italic	Portrait
Courier	10	12	Regular	Portrait
Courier	10	12	Bold	Portrait
Courier	10	12	Italic	Portrait
Line Printer	16.66	8.5	Regular	Portrait

\*Fonts can be automatically rotated to Landscape

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## PostScript Typeface Sampler

Following are some tips on using your printer's resident PostScript typefaces appropriately and effectively.

**Helvetica**—Helvetica is a popular typeface, a modification of a kind of sans serif typeface called Grotesque. It is used widely in publishing and is admired for its clean lines, although it can be repetitive to the eye, **ESPECIALLY WHEN IN ALL CAPS**. **Helvetica has a strong bold and *bold oblique* form**. There is no italic form. *Helvetica oblique is the slanted form*. This typeface is proportionally spaced.

**Helvetica Condensed**—**You have a problem! Your space is limited, your copy is too long, and you need a typeface that is bold and attention-getting. Try Helvetica Condensed. This typeface conserves space, gets attention, and is readable. There is a bold form, *an oblique form, and a bold oblique form*.**

**Helvetica Narrow**—You have a problem! Your space is limited, your copy is too long, and you need a typeface that is bold and attention-getting. Try Helvetica Narrow. This typeface conserves space, gets attention, and is readable. **There is a bold form, *an oblique form, and a bold oblique form*.**

**ITC Avant Garde Gothic**—ITC Avant Garde Gothic is a sans serif typeface that originated in 1970. It has a highly stylized look, particularly in some of the symbol characters like % and @. **The bold form is called "demibold"; the oblique form simulates an italic**. In addition, **there is a bold, oblique form**. ITC Avant Garde Gothic is useful for headlines and documents that need a strong, contemporary look.

**Courier**—Courier is a relatively new typeface designed for electric typewriters by IBM. **Courier has a bold form that is thick and stylish.** *The oblique form has its merits and uses, too, as does the bold oblique form.* The Courier family may be used for counterpoint with Times and Helvetica. Courier is a monospaced, serif typeface.

**Times**—Times is a popular typeface adapted from older forms. Once used by the London *TIMES*, it is considered an elegant, bookish typeface and has been used in the United States for decades. This typeface is excellent for a wide variety of applications except for small, condensed formats, where Helvetica proves superior. *Times italic is particularly graceful while the bold italic form is thicker.* Times is a proportionally spaced typeface.

**Palatino**—Palatino is a graceful typeface designed by Hermann Zapf. It is highly legible and often used for headlines. It has a **bold form** and a *true, crafted italic form*. **The bold italic form is also elegant.** Palatino is a popular and useful typeface, always in good taste.

**New Century Schoolbook**—Like Palatino, New Century Schoolbook is a highly legible typeface that is popular for many general purposes. It was designed in this century, based on scientific research into typographic legibility. New Century Schoolbook has a **bold**, an *italic*, and a **bold italic** form. It is a practical, sturdy typeface.

**ITC Bookman**—ITC Bookman is a strongly styled, updated typeface. Although modified to improve legibility, it dates back to the hand-set print era. ITC Bookman is used for headlines and displays since they

need a strong style. ITC Bookman has a **bold form that is somewhat playful** while the *light italic* and **bold italic** forms are more elegant.

*ITC Zapf Chancery Medium Italic—Dating from 1979, ITC Zapf Chancery Medium Italic is a graceful typeface that has the look of calligraphy. Designed by Hermann Zapf, it is useful for invitations, announcements, and text that needs elaborate flourishes. This typeface has only one form, the medium italic used here.*

**Symbol**—The Symbol typeface is used for technical and mathematical notation. It also contains Greek letters.

1 2 3 4 5 6 7 8 9 0 - = . : ~ ! ≅ # ∃ % † & \* ( ) \_ + | { } [ ] : ∇ ;  
 ∞ ? , . / Θ Ω Ε Ρ Τ Ψ Υ Ι Ο Π Α Σ Δ Φ Γ Η Θ Κ Λ Ζ Ξ Χ ζ Β Ν Μ  
 θ ω ε ρ τ ψ υ ι ο π α σ δ φ γ η φ κ λ ζ ξ χ ω β ν μ

**ITC Zapf Dingbats**—ITC Zapf Dingbats, also designed by Hermann Zapf, is a typeface of whimsical characters with a wide variety of uses.



## Page Design

One rule to remember when designing documents is keep it simple. Avoid cluttering your documents with unnecessary font changes. It takes experience and talent to blend a wide range of typefaces skillfully, and using too many typefaces detracts from a document's effectiveness.

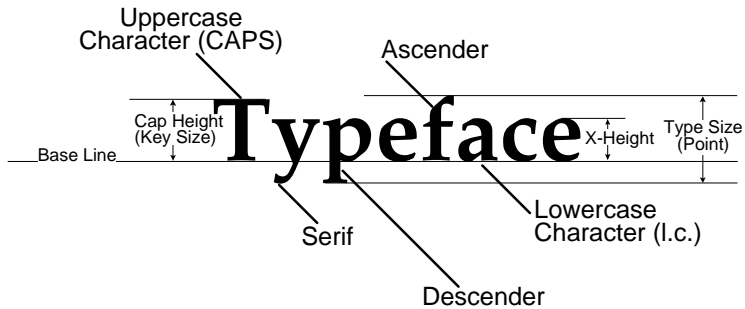
Always consider your reader first. Select the typeface that is best for your particular document by considering the meaning of your words. What are you trying to communicate? A strong, no-nonsense typeface, like Helvetica, proclaims its message loud and clear. This is why sans serif type is often used for signs, as in **NO PARKING**. Helvetica is considered so strong it does not even have a true italic form, since italic forms convey grace.

The skillful use of typeface in page design can also increase readability. Good newspapers are an example of the use of text placement for maximum readability. The typeface chosen for text and headlines varies in size, and text is contained in columns two to three inches wide. Thus, the eye does not have to travel far, and readers do not lose their place.

Other aspects of design such as word spacing (justified or unjustified), line spacing, the spacing of letters within words, and uppercase and lowercase letters all affect the legibility of your page.

While page design has no set rules, there are many books available on page layout and design as well as on typography to guide you in making effective choices. But the main guideline, again, is keep it simple.

There are many words with meanings that apply only to typography (fig. 7.1). The following sections explain point, pitch, monospacing, proportional spacing, character set, family, orientation, stroke weight, italic, and oblique.



**Fig. 7.1** *Typography Terms*

## Point Size

Point size refers to the vertical height of a typeface. A point is a unit of measure (equal to  $\frac{1}{72}$  of an inch) originally used by typesetters to show the height of a piece of metal type. Computer typefaces are harder to measure since they are not physical objects. In proportional fonts, size is usually described in points, which measure height rather than width. In points, a higher number means larger characters. One vertical inch height is 72 points. The following example shows text in 8, 10, 12, 24, and 36 point sizes:

ABCABCABCABCABC

## Pitch

Pitch is the number of characters in a horizontal inch. Ten-pitch Courier prints ten characters per inch. Therefore, ten-pitch type is wider than twelve-pitch type since only ten characters fill a horizontal inch rather than twelve. Another name for this measurement is cpi (characters per inch).

In fixed spaced fonts, sizes are usually described by pitch. In pitch measurements, a higher number means smaller characters. The following example shows ten-pitch and twelve-pitch Courier:

10-Pitch Courier  
12-Pitch Courier

## Monospacing

The term monospaced refers to a typeface whose characters all have uniform and equal spacing. Another term for this style of type spacing is fixed pitch. A monospaced or fixed-pitch typeface is useful for spreadsheets and other documents with columnar data. Monospacing is the opposite of proportional spacing.

## Proportional Spacing

The term proportionally spaced refers to a typeface that varies the size of each character. For example, the letter “i” is thinner than the letter “m” and should take up less space. Proportional spacing saves page space and is easier on the eye. This manual uses Times, a proportionally spaced typeface.

Because proportionally spaced typefaces place each character according to its individual size, they increase legibility and

readability. The following example shows the difference between a fixed-pitch (monospaced) font and a proportionally spaced font:

# Alphabet Alphabet

## Character Set

A character set is a collection of symbols designed for various printing applications. Many character sets are composed of the alphabet, the numbers zero through nine, and an assortment of other symbols, such as the dollar sign and the ampersand. Other character sets are composed entirely of symbols.

## Orientation

Orientation (portrait/landscape) is the direction of the print on a page. Portrait orientation reads from left to right, across the narrower dimension of the page. This manual is in portrait orientation. Landscape orientation also reads from left to right but places the print across the wider dimension of the page. Spreadsheet and table applications commonly use this type of printing. Both terms derive from painting; a portrait is usually a vertical view while a landscape is usually a horizontal view.

## Stroke Weight

Stroke weight (light/medium/bold) is the width, or thickness, of the lines (strokes) that make up a character. The following example shows the medium and bold weights of Courier:



Courier  
**Courier**

## **Italic and Oblique Forms**

Italic typeface derives from the early sixteenth century and was the printed form of cursive writing. Italic forms are individually crafted typefaces. Oblique (or slanted) type forms, however, are not designed and crafted individually but are mechanically slanted versions of the upright (or Roman) form from which they derive. Oblique forms can be very attractive in their own right. The term refers to the method of design. The following example shows the Roman and italic forms of Times and the Roman and oblique forms of ITC Avant Garde Gothic:

Times Roman  
*Times Italic*

ITC Avant Garde Gothic  
*ITC Avant Garde Gothic Oblique*

## Bibliography

For more information on PostScript printing, graphic design, and desktop publishing, refer to the following publications:

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Adobe Systems, Inc. *PostScript Language Program Design*. Reading, MA: Addison-Wesley, 1988. ISBN 0-201-14396-8.

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Adobe Systems, Inc. *PostScript Language Tutorial and Cookbook*. Reading, MA: Addison-Wesley, 1985. ISBN 0-201-10179-3.

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*PostScript Language Journal*, the PostScript industry newsletter, West Orange, NJ: Pipeline Associates. ISBN 0891-5873.

PostScript Language Reference Manual. *Supplement for Version 2011* Adobe Systems, Inc., January 24, 1992.

Smith, Ross. *Learning PostScript: A Visual Approach*. Berkeley: Peachpit Press, 1990. ISBN 0-938151-12-6.

# *Chapter 8*

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## **Printer Options**

### **Chapter highlights**

- Additional printer options
- Installation procedures for printer options



## Introduction

QMS offers many options that expand the QMS 860 Print System's capabilities. The following are available for purchase from your QMS vendor:

- Paper cassettes in the sizes shown in appendix B, the “Consumable Supplies” section
- Paper feeder
- Paper cassette supporter
- Font and emulation cards
- Security card
- SIMM upgrades
- Network interfaces
- Centronics to Dataproducts parallel port conversion
- External hard disk drive
- *QMS Crown Technical Reference Manual*
- *QMS Crown Document Option Commands* manual

If your vendor cannot offer these options for your printer, see appendix D, “QMS Customer Support.”

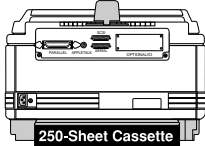
## Additional Paper Cassettes

The benefits of having additional paper cassettes available are

- Increased paper feed capacity. Install a second paper cassette and chain paper cassettes. (See chapter 5, the “Paper Cassette Chaining” section, for more information.)
- Expanded flexibility to switch paper size, color, and type without having to unload and load paper. Keep replacement cassettes close by, and you can easily change paper by slipping one cassette out and another in.

The QMS 860 Print System has three user-installable paper input configurations.

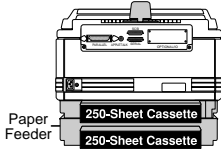
Standard Configuration  
(250 x 1)



### Standard

Uses the lower paper cassette and multipurpose tray for paper feed capacity of 350 sheets.

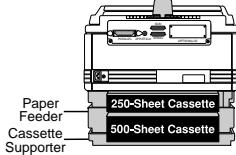
Configuration I  
(250 x 2)



### Dual cassette with paper feeder

Allows you to install two cassettes at once, increasing paper feed capacity to 600 sheets (including the multipurpose tray). For this configuration you must purchase the paper feeder and the desired paper cassette.

Configuration II  
(250 x 1, 500 x 1)



### Dual cassette with paper feeder and cassette supporter

Allows you to install a 500-sheet paper cassette (letter/A4 only), increasing paper feed capacity to 850 sheets (including the multipurpose tray). For this configuration you must purchase the paper feeder, the cassette supporter, and the desired paper cassette.

## About the Paper Feeder

With the paper feeder you can install dual paper cassettes. The paper feeder

- Increases paper feed capacity to 600 sheets with the additional paper cassette.
- Allows you to load two different sizes of paper. Paper size can easily be changed by switching paper cassettes.
- Is easy to install. The paper feeder attaches to the bottom of the printer so no extra space is necessary.

## Unpacking the Paper Feeder

Remove the packing materials that protect the paper feeder during shipment as follows:

1. Take the paper feeder and rear cassette cover from the shipping carton.
2. Remove any tape and packing material from the paper feeder and rear cassette cover.
3. Save the packing material in case you ever have to move or ship the printer to a new location.

## Installing the Paper Feeder

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**CAUTION:** Turn off the printer before installing the optional paper feeder.

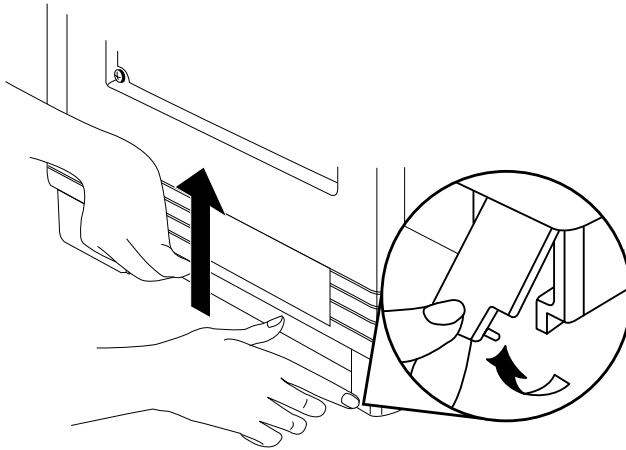
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Install the paper feeder as follows:

1. Disconnect the power cord and all printer interface cables.
2. Remove any installed paper cassettes from the printer.



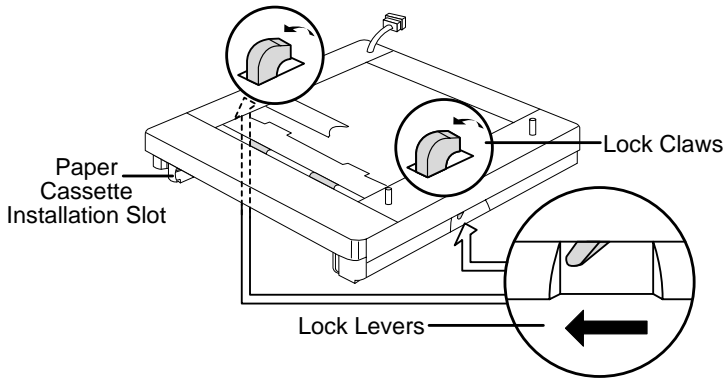
3. Lift the back side of the printer with your left hand and remove the connector cover on the lower-right side (fig. 8.1) by pulling the connector cover away from the printer.



**Fig. 8.1** Remove the Connector Cover

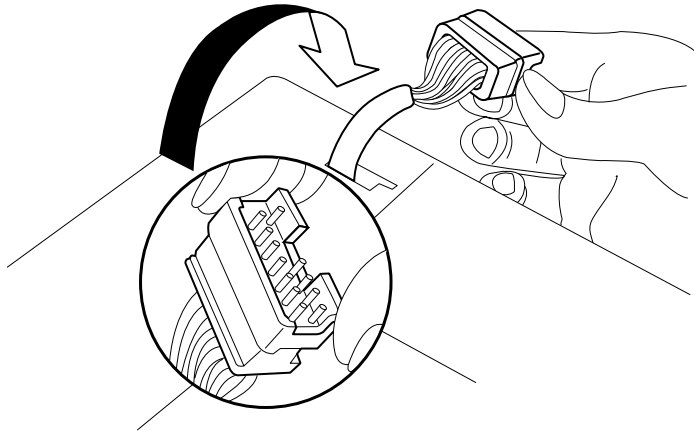
4. Place the paper feeder on a stable, flat surface, and turn the paper cassette installation slot toward you.

5. Pull the green lock levers, located on the right and left of the paper feeder bottom (fig. 8.2), toward you (lock released condition).



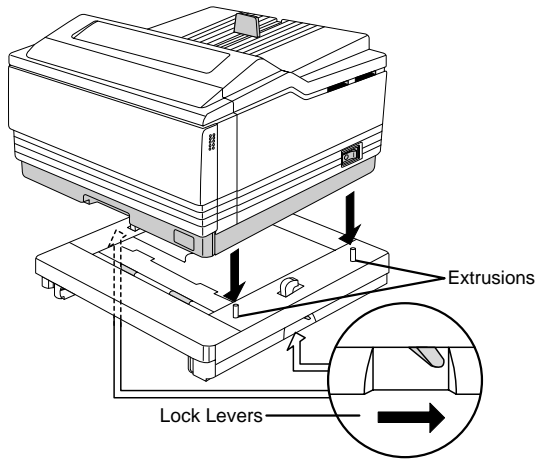
**Fig. 8.2** Release the Lock Levers

6. Move the connector cable located at the inner left of the paper feeder to the outside of the paper feeder (fig. 8.3).



**Fig. 8.3** *Move the Connector Cable*

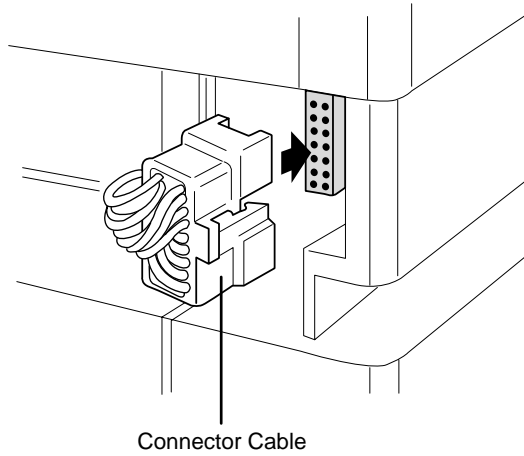
7. Place the printer so that the extrusions on the paper feeder are inserted into the holes on the bottom of the printer (fig. 8.4). Be careful that the connector cable is not caught between the printer and the paper feeder.



**Fig. 8.4** Place the Printer on the Paper Feeder

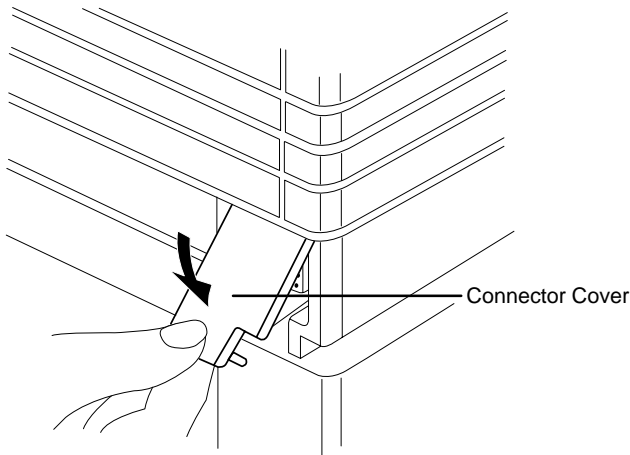
8. Push the green lock levers, located at the right and left of the paper feeder bottom, to the rear (locked condition).

9. Plug the connector cable located at the inner left of the paper feeder into the printer's connector at the back of the printer (fig. 8.5).



**Fig. 8.5** *Plug in the Connector Cable*

10. Replace the connector cover on the printer (fig. 8.6).



**Fig. 8.6** *Replace the Connector Cover*

11. Reconnect the printer power cord and interface cables. Turn on the printer. Replace the paper cassette you removed earlier and install the second cassette as described in the “Dual Paper Cassettes” section later in this chapter.

**NOTE:** When using the legal/B4 or 11" x 17"/A3 size paper cassette with the optional paper feeder, remember to place the rear cassette covers on both cassettes, one at the rear of the printer and the other at the rear of the paper feeder.

## Removing the Paper Feeder

If you installed the paper feeder before the cassette supporter, you must first remove the paper feeder to install the cassette supporter.

Remove the paper feeder from the printer as follows:

1. Turn off the printer. Disconnect the power cord and all interface cables.
2. Remove any installed paper cassettes from the printer.
3. Remove the paper feeder from the printer by following, in reverse order, the steps in the “Installing the Paper Feeder” section of this chapter. The following is a quick reference guideline to removing the paper feeder:
  - a. Remove the connector cover.
  - b. Unplug the paper feeder’s connector cable.
  - c. Unlock the green lock levers on the paper feeder (pull them toward you).
  - d. Lift the printer off of the paper feeder.
  - e. Replace the connector cover.
  - f. Reconnect the power cord and interface cables. Then turn on the printer and reinstall the paper cassette.

## About the Cassette Supporter

With the paper cassette supporter you can install a 500-sheet paper cassette. The cassette supporter

- Increases paper feed capacity to 850 sheets with the additional 500-sheet paper cassette.

- Is easy to install. It attaches to the paper feeder, and then the paper feeder is attached to the printer's bottom.

## **Unpacking the Cassette Supporter**

Remove the packing materials that protect the cassette supporter during shipment as follows:

1. Take the cassette supporter from the shipping carton.
2. Remove the cassette supporter from its vinyl bag.
3. Save the packing material in case you ever have to move or ship the printer to a new location.

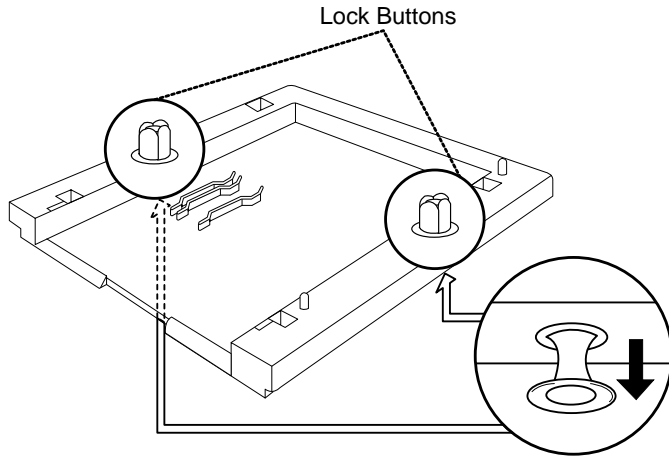
## **Installing the Cassette Supporter**

The cassette supporter is installed on the paper feeder, and then the paper feeder is installed on the printer. If the paper feeder is already attached to the printer, first remove the paper feeder as described in the “Removing the Paper Feeder” section earlier in this chapter. Then install the cassette supporter as follows:

1. Turn off the printer. Disconnect the power cord and all printer interface cables.
2. Remove any installed paper cassettes from the printer.

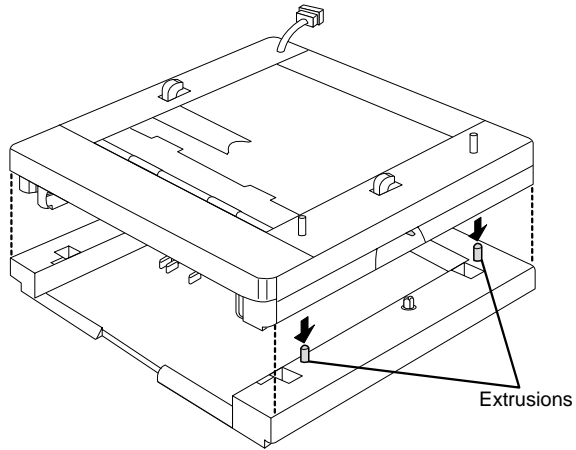


3. Locate the lock buttons on the bottom left and right of the cassette supporter (fig. 8.7). Pull the lock buttons out until you hear them click. Then place the cassette supporter on a flat, stable surface.



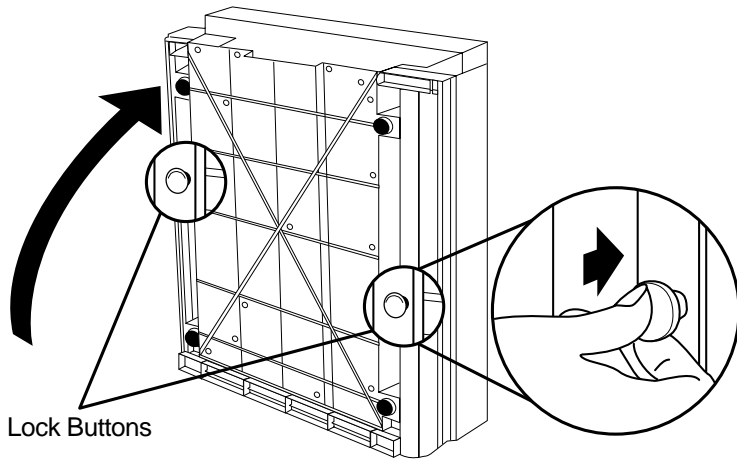
**Fig. 8.7** *Pull Out the Lock Buttons*

4. Fit the holes on the bottom of the paper feeder onto the extrusions on the cassette supporter (fig. 8.8).



**Fig. 8.8** *Place Paper Feeder on Cassette Supporter*

5. Stand both the paper feeder and the cassette supporter on their ends to attach them together (fig. 8.9). Using your thumb, push the lock buttons on the bottom left and right sides of the cassette supporter until you hear a click.



**Fig. 8.9** Lock Paper Feeder to Cassette Supporter

6. Attach the paper feeder to the printer. See the “Installing the Paper Feeder” section earlier in this chapter for instructions.

## Removing the Cassette Supporter

If you find it necessary to remove the cassette supporter from the printer, use the following procedure:

1. Turn off the printer. Disconnect the power cord and all interface cables.
2. Remove any installed paper cassettes from the printer.
3. Remove the paper feeder from the printer by following the steps in the “Removing the Paper Feeder” section earlier in this chapter.
4. Remove the cassette supporter by following the steps in the “Installing the Cassette Supporter” section earlier in this chapter in reverse order. The following is a quick reference guideline to removing the cassette supporter:
  - a. Remove the paper feeder from the cassette supporter.
  - b. Pull the lock buttons out on the cassette supporter to remove the paper feeder.
  - c. Take the paper feeder off the cassette supporter.
  - d. Push the lock buttons in on the cassette supporter.
  - e. Reconnect the interface cables and power cord.
  - f. Turn on the printer.

## Dual Paper Cassettes

Dual paper cassettes increase your printer's paper feed capacity and give you expanded flexibility to change paper size and color. When using two paper cassettes that are attached with the paper feeder, both cassettes must be inserted in order to print. There are two possible paper input configurations when using dual paper cassettes:

- Two 250-sheet cassettes

See the steps in the “Loading the 250-Sheet Paper Cassette” section in chapter 5.

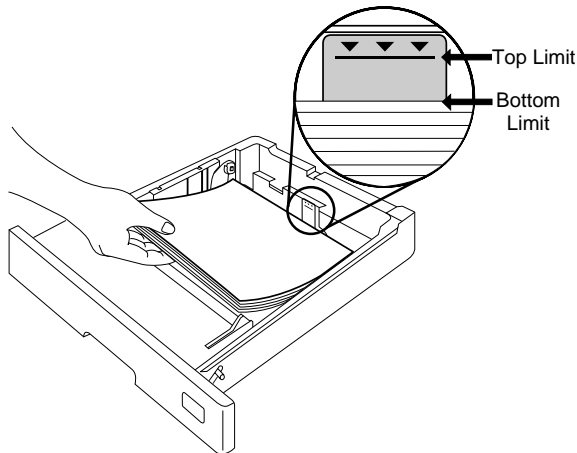
- One 250-sheet cassette and one 500-sheet cassette

See the steps in the “Loading the 500-Sheet Paper Cassette” section in this chapter.

## Loading the 500-Sheet Paper Cassette

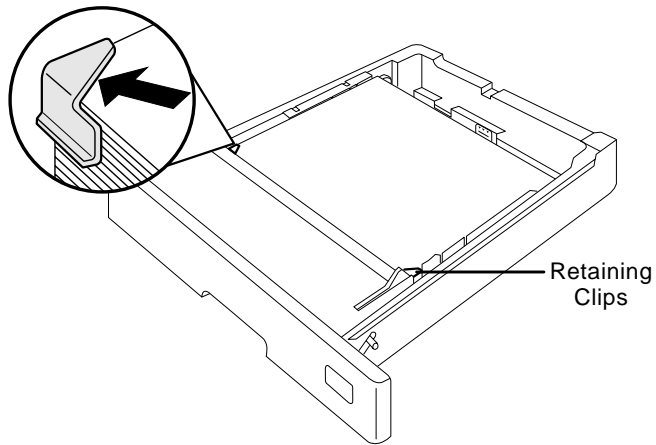
Load paper in the 500-sheet letter/A4 sheet paper cassette in increments so that all 500 sheets fit in the cassette and the paper stack is properly leveled out. Use the procedure that follows to load the paper cassette:

1. Fan the paper stack and align the paper on a flat surface.
2. Load the paper in three steps as follows (fig. 8.10):
  - a. Up to the bottom limit mark
  - b. Halfway to the top limit mark
  - c. Up to the top limit mark



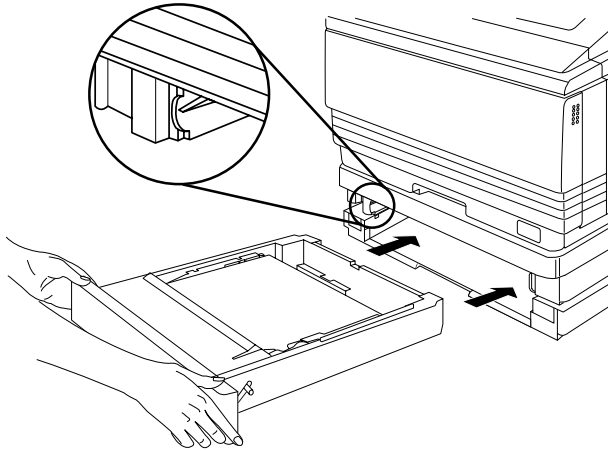
**Fig. 8.10** Load Paper in 500-Sheet Paper Cassette

3. Ensure that the paper stack lies flat, does not exceed the top limit mark, and is positioned under the retaining clips (fig. 8.11).



**Fig. 8.11** *Position Paper in 500-Sheet Paper Cassette*

4. Insert the paper cassette in the paper installation slot (fig. 8.12).



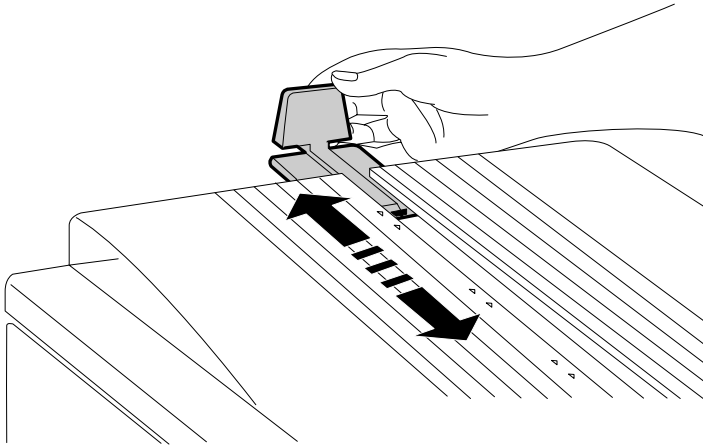
**Fig. 8.12** *Insert the 500-Sheet Paper Cassette*

5. Push the filled paper cassette straight into the installation slot until it is firmly seated.



6. Adjust the paper stop to fit the paper size (fig. 8.13).

The printer delivers your output, print-side down, to the output tray at the top of the printer. The paper stop keeps the paper positioned in the output tray.



**Fig. 8.13** *Adjust the Paper Stop*

## Font and Emulation Cards

Typefaces (fonts), such as the ProCollection for the HP emulations on your printer, and printer emulations are contained on small printer circuit boards called cards. These cards can be plugged into your printer to provide additional functionality. For a more complete list of available font and emulation cards, contact your QMS vendor. Some cards may require a RAM expansion to operate properly.

The font and emulation card slots are located on the right side of the printer above the power switch. The printer supports up to two cards at once. You may insert either type of card in either slot.

---

**CAUTION:** The printer must be off line (the Online/Offline indicator is off) before you insert or remove cards. Press the Online/Offline key once to take the printer off line. If you insert a font or emulation card in one of the card slots without taking the printer off line, you cannot use the printer's resident fonts and data stored in the printer's memory. You can use only the fonts and emulations contained on the font and emulation cards. To regain access to the resident fonts and the data stored in memory, turn the printer off and back on again.

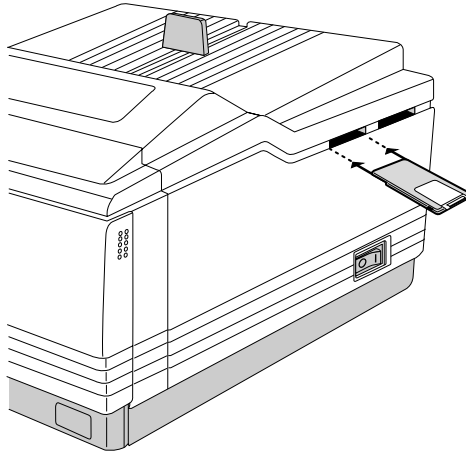
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### Using Font and Emulation Cards

Use the following procedure to install a font or emulation card on your printer. If your printer has a hard disk, you can install the font or emulation information from the card onto your hard disk. See "Installing an Optional Font or Emulation" later in this chapter, for information on how to install an option on your hard disk.

1. Make sure the printer is off line (the Online/Offline indicator should be off).

2. Insert the font or emulation card into either slot with the QMS label side facing up (fig. 8.14).



**Fig. 8.14** *Insert the Font or Emulation Card*

3. Press the Online/Offline key to put the printer back on line.

**NOTE:** If you are using a font card, you should also make sure that the printer driver you have installed for each application supports the fonts on the card. If it does not, contact your application manufacturer for support.

## **Removing Font and Emulation Cards**

Use the following procedure to remove a font or emulation card:

1. Take the printer off line.
2. Pull out the card gently.
3. Put the printer back on line.

## Security Cards

The security card allows the Operator Control and Administration menus to be password protected, so that only users who know the password can change printer configuration values. When a security card is installed, the Installation menu appears in the printer's menu structure. See chapter 4, "Printer Configuration," for complete menu information.

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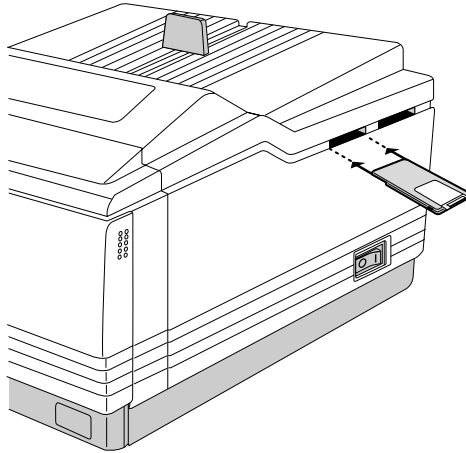
**CAUTION:** The printer must be off line (the Online/Offline indicator should be off) before you insert or remove a security card. Press the Online/Offline key once to take the printer off line. If you forget to take the printer off line before you insert or remove a security card, turn the printer off and back on again to regain access to the data stored in the printer's memory.

---

A security card uses the same slots as font and emulation cards. The card slots are located on the right side of the printer above the power switch. Use a security card as follows:

1. Take the printer off line. The Online/Offline indicator should be off.

2. Insert the security card with the label facing up into either slot (fig. 8.15). You should feel the card snap into place.



**Fig. 8.15** *Insert the Security Card*

3. Use the instructions in “How to Restrict Access to the Operator Control Menu” and “How to Restrict Access to the Administration Menu” to set passwords for the Administration and Operator Control menus.

Press the control panel keys in the order shown in the following instructions. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options. After you have password-protected the menus, remove the security card from the slot, and press the Online/Offline key to put the printer back on line.

## How to Restrict Access to the Operator Control Menu

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>MENU and NEXT</b>	CONFIGURATION INSTALLATION	Accesses the Configuration menu and advances to the Configuration/Installation menu.
<b>SELECT and NEXT</b>	INSTALLATION OPERATOR PASSWRD	Accesses the Configuration/Installation menu and advances to Operator Passwr.
<b>SELECT</b>	OPERATOR PASSWRD PASSWORD	Accesses Operator Passwr and allows you to enter the password (PASSWORD is the entered password). See chapter 4, the “Entering Character Information,” section for details on how to enter character information.
<b>SELECT</b>	PASSWORD IS SELECTED	Confirms and saves the selected password.
	INSTALLATION OPERATOR PASSWRD	Returns to Installation / Operator Passwr.
<b>NEXT and SELECT</b>	INSTALLATION USE OPERATOR PWD	Advances to and selects Installation / Use Operator Pwd.
<b>NEXT and SELECT</b>	USE OPERATOR PWD YES	Advances to and selects the next Use Operator Pwd option.
<b>SELECT</b>	YES IS SELECTED	Confirms that the Operator Control menu password is set to “On.”

	INSTALLATION USE OPERATOR PWD	Returns to the Installation / Use Operator Pwd menu.
<b>MENU</b>	SAVE CHANGES? NO	Prompts you to save changes.
<b>NEXT</b>	SAVE CHANGES? YES	Advances to the next Save Changes option.
<b>SELECT</b>	IDLE	Finishes printing any print jobs in process, saves changes, and idles or reini- tializes the printer.
<b>ONLINE/ OFFLINE</b>	IDLE	Turns on the indicator and puts the printer in a ready state.

### **How to Restrict Access to the Administration Menu**

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>MENU and NEXT</b>	CONFIGURATION INSTALLATION	Accesses the Configura- tion menu and advances to the Configuration/Installa- tion menu.
<b>SELECT and NEXT</b>	INSTALLATION ADMIN PASSWORD	Accesses the Configura- tion / Installation menu and advances to Installa- tion/Admin Password.
<b>SELECT</b>	ADMIN PASSWORD PASSWORD	Accesses Admin Password and allows you to enter the password (PASSWORD is the entered password). See chapter 4, the “Entering Character Information,” section for details on how to enter character informa- tion.

<b>SELECT</b>	PASSWORD IS SELECTED	Confirms and saves the selected password.
	INSTALLATION ADMIN PASSWORD	Returns to Installation / Admin Password.
<b>NEXT and SELECT</b>	USE ADMIN PWD YES	Advances to and selects the next Use Admin Pwd option.
<b>SELECT</b>	YES IS SELECTED	Confirms that the Administration menu password is set to "On."
	INSTALLATION USE ADMIN PWD	Returns to the Installation / Use Admin Pwd menu.
<b>MENU</b>	SAVE CHANGES? NO	Prompts you to save changes.
<b>NEXT</b>	SAVE CHANGES? YES	Advances to the next Save Changes option.
<b>SELECT</b>	IDLE	Finishes printing any print jobs in process, saves changes, and idles or reinitializes the printer.
<b>ONLINE/ OFFLINE</b>	IDLE	Turns on the indicator and puts the printer in a ready state.

Once a menu is password-protected, you cannot enter it or make changes in it until you enter a valid password. You know a menu is password protected if

ENTER PASSWORD

appears on the message window when you try to enter the menu structure. If you enter an invalid password, the message window flashes

INVALID PASSWORD



for three seconds, and then returns to the parent menu. If you forget the password, the system administrator can easily recover it by repeating the “Security Cards” procedure.

If you enter the correct password, you are allowed to enter the menu. The passwords for these two menus may be the same or different. See chapter 4, “Printer Configuration,” for more complete menu information.

## Removing the Printer and Controller Board Covers

**WARNING!** The following options which require access to the controller board—SIMM upgrades, optional network interfaces, and Centronics-to-Dataproducs parallel port conversion—should be performed only by a qualified QMS service technician.

**ACHTUNG!** Da beim Einbau der nachfolgend aufgeführten Optionen—Speichererweiterungen, Einbau optionaler Interfaces und Umrüstung von Centronics zu Dataproducts Shortline—Zugriff auf das Controller Board genommen werden muß, sollten diese Umrüstungen nur durch einen qualifizierten QMS Servicetechniker durchgeführt werden.

The printer and controller board covers must be removed when a SIMM or an optional network interface is installed.

CAUTION: Eliminate static by putting on the anti-static wristband provided with your printer option accessory kit and grounding it to any base metal surface (such as the bottom of your telephone). Avoid walking around after grounding yourself because your body

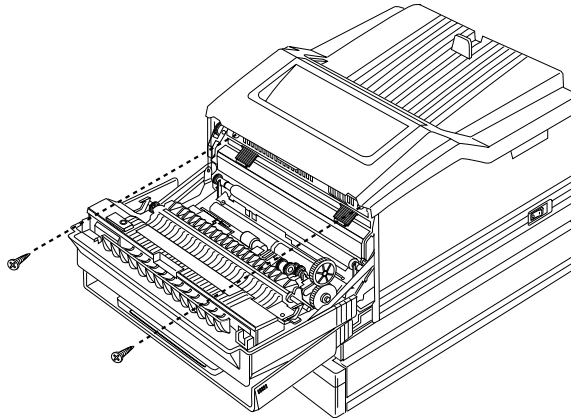
may build up static and you will have to repeat the grounding process.

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**WARNING:** Turn off the printer and unplug the power cord before taking the cover off the printer.

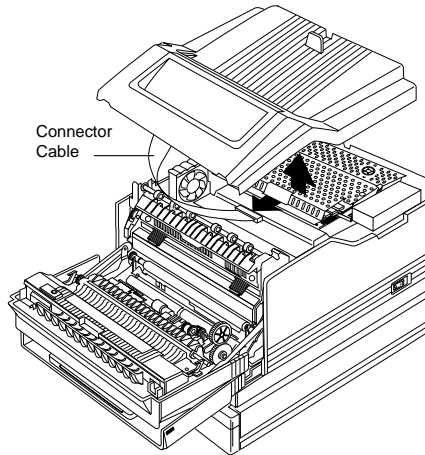
**ACHTUNG:** Bitte schalten Sie den Drucker aus und ziehen Sie den Netzstecker heraus bevor Sie die Druckerabdeckung öffnen.

1. Turn off the printer. Disconnect the power cord and all interface cables (parallel, serial, AppleTalk, and the optional interface) from the printer.
2. Open the multipurpose tray, using both hands.
3. Push up on the release button and open the printer's front cover.
4. Remove and set aside the two screws on each end of the front inside of the printer (fig. 8.16).



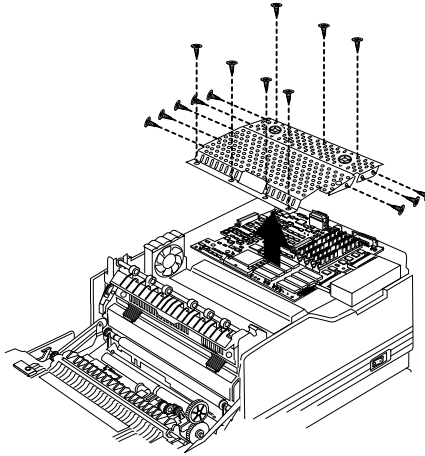
**Fig. 8.16** Remove the Front Inside Screws

5. Lift the printer's cover, using both hands. Then hold the cover with your right hand while you unplug the connector cable from the printer (Fig. 8.17). This allows access to the printer's controller board.



**Fig. 8.17** *Remove the Printer's Cover*

6. Remove and set aside the 15 screws on the metal controller board cover (fig. 8.18). Then remove the metal cover to access the controller board.



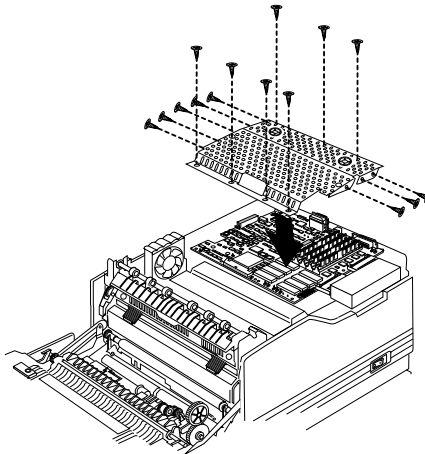
**Fig. 8.18** *Remove the Controller Board Cover*

## Replacing the Printer and Controller Board Covers

The printer and controller board covers must be reinstalled after a SIMM or an optional network interface is installed.

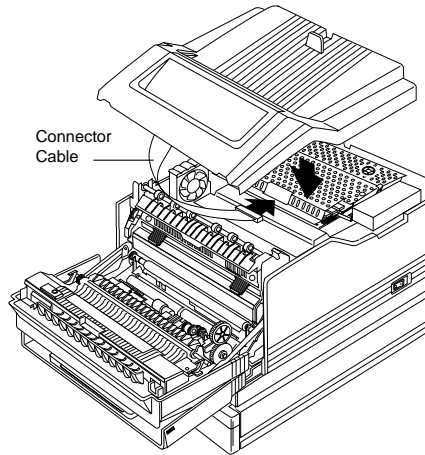
**CAUTION:** Eliminate static by putting on the anti-static wristband provided with your printer option accessory kit and grounding it to any base metal surface (such as the bottom of your telephone). Avoid walking around after grounding yourself because your body may build up static and you will have to repeat the grounding process.

1. Place the metal cover on the controller board, and replace the 15 screws you removed earlier (fig. 8.19).



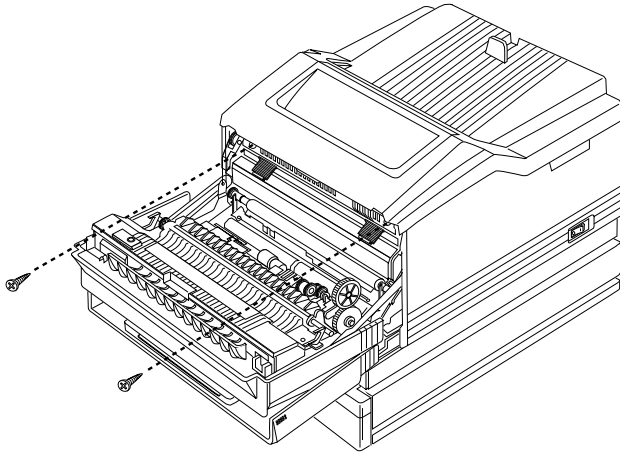
**Fig. 8.19** Replace Controller Board Cover

2. Hold the printer's plastic cover over the top of the printer and slide the connector cable back into the printer's connector (fig. 8.20).



**Fig. 8.20** *Plug Connector Cable into the Printer*

3. Lower the printer cover and position it firmly on the printer. Secure the cover to the printer by replacing the two screws you removed earlier (fig. 8.21).



**Fig. 8.21** *Replace Front Inside Screws*

4. Reconnect all interface cables and the power cord, and then turn on the printer.





## SIMMs

Additional printer memory allows you to download more fonts and increase the printer's buffer (area where data sent from the computer is stored while it is waiting to be printed). Your printer comes with 12 MB RAM and is upgradable to 32 MB through user-installable 4 MB or 8 MB SIMMs (Single In-Line Memory Modules).

### Installing a SIMM

SIMMs are installed as follows:

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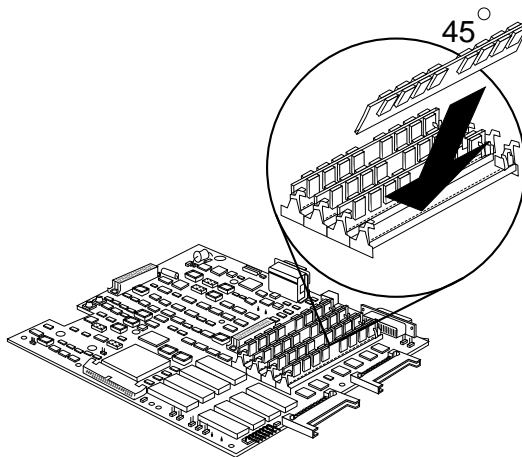
**CAUTION:** Eliminate static by putting on the anti-static wristband provided with your printer option accessory kit and grounding it to any base metal surface (such as the bottom of your telephone). Avoid walking around after grounding yourself because your body may build up static and you will have to repeat the grounding process. If you obtained the SIMM from someone other than a QMS vendor and do not have an anti-static wristband, before removing the SIMM from the anti-static bag ground yourself by touching the bag and any base metal surface (such as the bottom of your telephone). Handle the SIMM carefully and preferably by the edges only.

---

**WARNING:** Turn off the printer and unplug the power cord before taking the cover off the printer.

**ACHTUNG:** Bitte schalten Sie den Drucker aus und ziehen Sie den Netzstecker heraus bevor Sie die Druckerabdeckung öffnen.

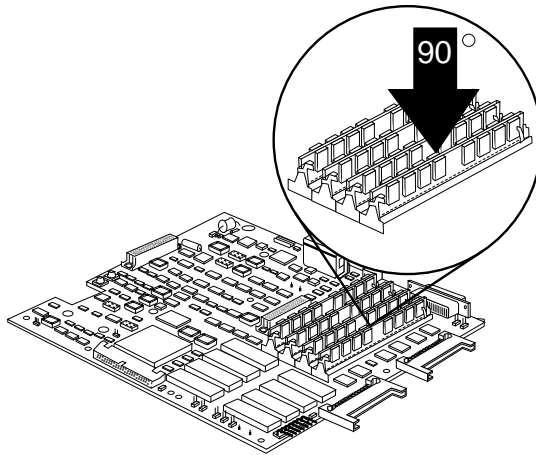
1. Follow the steps in the “Removing Printer and Controller Board Covers” section of this chapter to access the controller board.
2. Remove the SIMM from the anti-static bag.
3. Hold the SIMM at a 45° angle to the controller board, with the notch on the left side. Slide the SIMM into any open SIMM connector on the controller board (fig. 8.22). Push gently to make sure the board is properly seated onto the connector.



**Fig. 8.22** *Insert SIMM into SIMM Connector*

**NOTE:** You can install a SIMM in any SIMM connector as long as either a 4 MB or an 8 MB SIMM occupies RAM0, the SIMM connector farthest from you.

4. Tilt the SIMM up to a 90° angle until you feel it snap into place (fig. 8.23). When seated, the SIMM stands upright, firmly in place. If you cannot snap the SIMM into place, do not force it. Reposition it, making sure that the bottom of the SIMM is seated completely in the connector.



**Fig. 8.23** *Snap the SIMM into Place*

5. Repeat steps 2-4 for each additional SIMM you are installing.
6. Replace the printer and controller board covers by following the steps in the “Replacing the Printer and Controller Board Covers” section found earlier in this chapter.

## Removing a SIMM

If all four of the SIMM connectors are filled and you want to install more memory (for example, if you want to replace a 4 MB SIMM with an 8 MB SIMM), a SIMM must be removed. The following section explains this procedure. The previous section, “Installing a SIMM,” explains the installation instructions. You can remove a SIMM from and install a SIMM in any SIMM connector as long as either a 4 MB or an 8 MB SIMM occupies RAM0, the SIMM connector farthest from you. Also, you must make sure that there is a total of at least 12 MB of RAM installed.

---

**CAUTION:** Eliminate static by putting on the anti-static wristband provided with your printer option accessory kit and grounding it to any base metal surface (such as the bottom of your telephone). Avoid walking around after grounding yourself because your body may build up static and you will have to repeat the grounding process. If you obtained the SIMM from someone other than a QMS vendor and do not have an anti-static wristband, before removing the SIMM from the anti-static bag ground yourself by touching the bag and any base metal surface (such as the bottom of your telephone). Handle the SIMM carefully and preferably by the edges only.

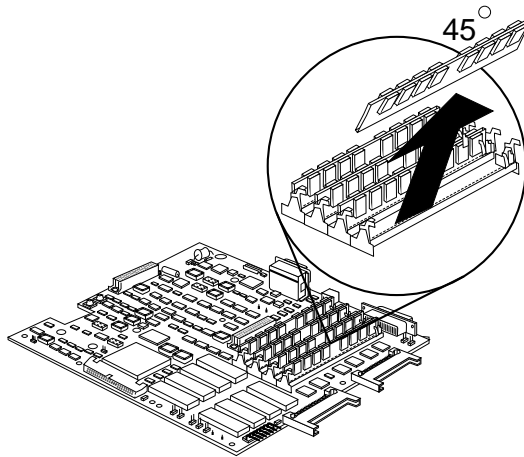
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**WARNING:** Turn off the printer and unplug the power cord before taking the cover off the printer.

**ACHTUNG:** Bitte schalten Sie den Drucker aus und ziehen Sie den Netzstecker heraus bevor Sie die Druckerabdeckung öffnen.

1. Follow the steps in the “Removing the Printer and Controller Board Covers” section of this chapter to access the controller board.

2. Pull the latches on each side of the SIMM connector outward using both thumbs. The SIMM is released. Tilt the SIMM forward to a 45° angle away from the SIMM connector (fig. 8.24).



**Fig. 8.24** *Remove the SIMM*

3. Follow the steps in the “Replacing the Printer and Controller Board Covers” section of this chapter to replace the covers.

## Optional Network Interface Assembly Kit

The optional network interface assembly kit includes the following:

- An anti-static wristband
- A daughterboard and two plastic support posts
- A network interface board
- Four screws

### Installing an Optional Network Interface

An optional network interface is installed as follows.

---

**CAUTION:** Eliminate static by putting on the anti-static wristband provided with your printer option accessory kit and grounding it to any base metal surface (such as the bottom of your telephone). Avoid walking around after grounding yourself because your body may build up static and you will have to repeat the grounding process.

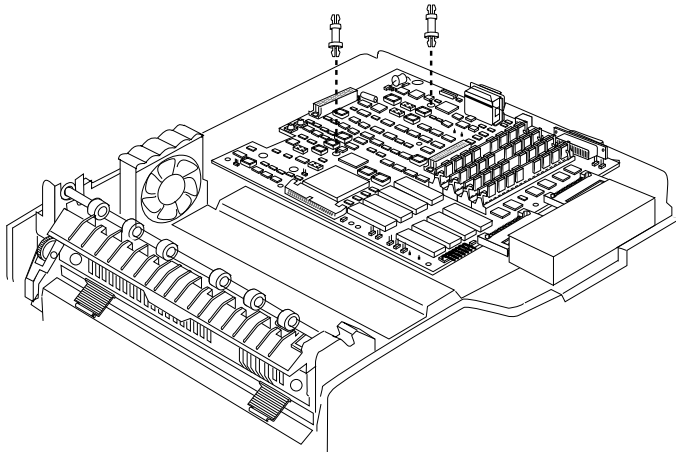
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**WARNING:** Turn off the printer and unplug the power cord before taking the cover off the printer.

**ACHTUNG:** Bitte schalten Sie den Drucker aus und ziehen Sie den Netzstecker heraus bevor Sie die Druckerabdeckung öffnen.

1. Turn off the printer. Disconnect the power cord and all interface cables (parallel, serial, and AppleTalk) from the printer.

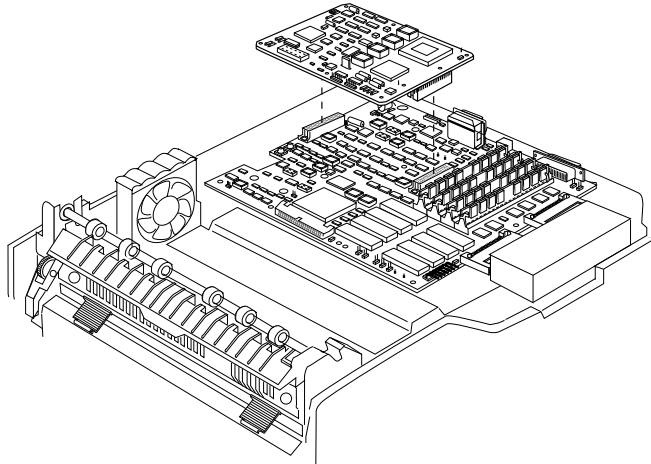
2. Follow the steps in the “Removing the Printer and Controller Board Covers” section of this chapter to access the controller board.
3. Install the two support posts that came with the daughterboard into the two holes on the controller board. The support posts have a larger diameter at one end and are tapered at the other end. Snap the ends with the larger diameter in the controller board (fig. 8.25). You may need a tool to hold the posts together enough to get them into the controller board holes.



**Fig. 8.25** *Install Support Posts on Controller Board*



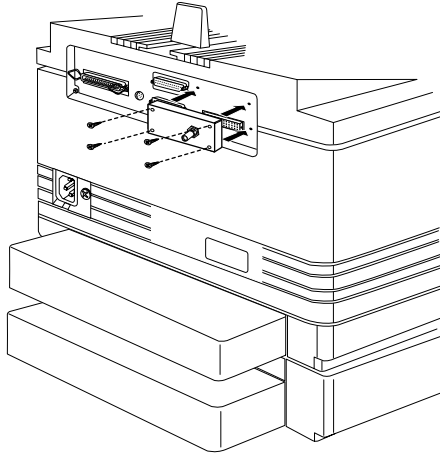
4. Snap the daughterboard on the two support posts and the two 48-pin connectors (fig. 8.26). The daughterboard is notched (keyed) so that it fits only one way.



**Fig. 8.26** *Install the Daughterboard*

5. Replace the controller board and printer covers by following the steps in the “Replacing the Controller Board and Printer Covers” section found earlier in this chapter.
6. Remove the screws from the optional interface plate on the back of the printer and save for reuse later or discard.

7. Place the optional interface board on the optional interface connector at the back of the printer and push gently to seat it properly. Secure the optional interface board to the printer with the four screws provided in the kit (fig. 8.27).



**Fig. 8.27** *Secure Optional Interface Card to Printer*

8. Reconnect all interface cables and the power cord, and then turn on the printer.

## **Using an Optional Network Interface**

Once an optional network interface is installed, refer to the interface's user's guide for complete information on connecting the printer to the network.

For information on using the interface to print, see the *QMS Crown Network Notes* and your network documentation.

After your optional network interface is correctly installed, PS Protocol appears on the optional network interface menu.

<b>PS Protocol</b>	(default normal; range normal, normal fixed, binary, binary fixed) Sets the binary communications protocol (BCP) for communicating over an optional network interface to a PostScript printer. See appendix F, “Additional Technical Information,” for more information.
Normal	Enables standard, ASCII hex protocol. Data is sent and received in ASCII format. This mode is recommended if you do not print binary data. It was designed for data in the printable ASCII range. Print jobs can alter the PS protocol value through PostScript operators.
Normal Fixed	Enables standard, ASCII hex protocol. Print jobs can not alter this value through PostScript operators.
Binary	Enables binary communications protocol. Print jobs can alter this value through PostScript operators. Data in the printable ASCII range also prints.
Binary Fixed	Enables binary communications protocol. Print jobs can not alter this value through PostScript operators. Data in the printable ASCII range also prints.

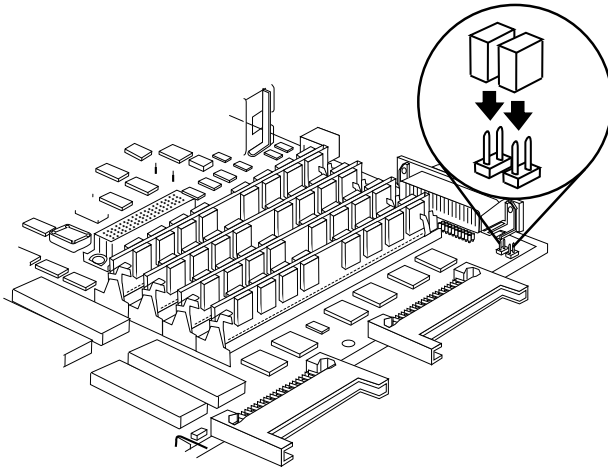
## Centronics to Dataproducts Conversion

Your printer is shipped with a Centronics parallel port, but a kit for converting it to Dataproducts is available from your vendor.

Make sure you have all the parts necessary for the conversion. The Dataproducts conversion kit includes the following:

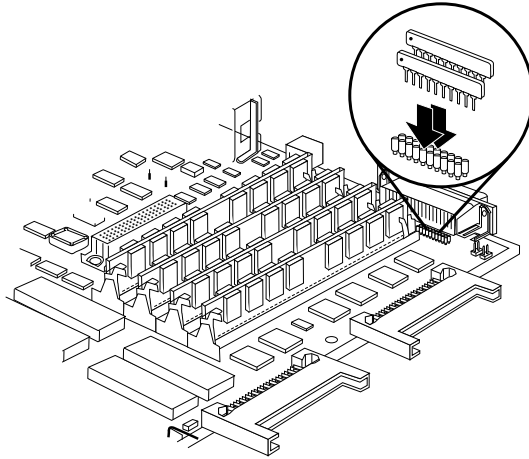
- An anti-static wristband
  - Two 2-pin shunts (small plastic pieces lined with metal)
  - Two SIP (single in-line package) resistors (a 220 ohm and a 330 ohm)
  - Two DIP (dual in-line package) resistors (not necessary for this procedure)
  - A 50-pin to 36-pin cable
1. Follow the instructions in the “Removing the Controller Board and Printer Covers” section earlier in this chapter, being careful to follow the directions for eliminating static before you begin.
  2. Face the controller board so that the side where the SIMMs are is closest to you and the parallel port is located on your right side.

3. Place the two shunts on the two jumpers (JP1 and JP2) nearest the parallel port (fig. 8.28). (Orientation of the shunts is not important.)



**Fig. 8.28** *Place the Shunts on the Jumpers*

4. With pin 1 (indicated by a dot in fig. 8.29) away from you, insert the 220-ohm SIP resistor pack prongs in the RN5 socket; then insert the 330-ohm SIP resistor pack prongs in the RN4 socket (fig. 8.29).

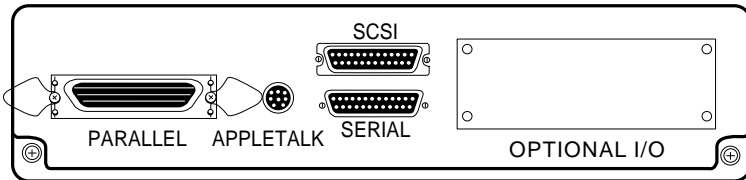


**Fig. 8.29** *Insert the SIP Resistors*

5. Follow the instructions in the “Replacing the Printer and Controller Board” section earlier in this chapter, being careful to follow the directions for eliminating static.
6. Use the 50-pin to 36-pin cable included in your kit to connect the Dataproducts cable to the parallel port.

## External Hard Disks

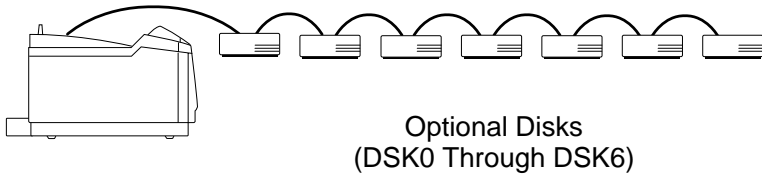
Your QMS 860 Print System supports up to seven optional external hard disks through the SCSI port on the rear of the printer (fig. 8.30). These hard disks provide storage space for optional emulations and permanent downloading of fonts.



**Fig. 8.30** *SCSI Port*

## Identifying Hard Disks

External hard disks are identified by their device numbers (fig. 8.31). These seven numbers range from DSK0 to DSK6 and can be configured by the installer. Before turning on the printer, make sure the hard disk is turned on. Disk Online prints on the status page. See chapter 5, the “Printing a Status Page” section, for information on how to print the status page.



**Fig. 8.31** *Optional Hard Disks*

Error messages that occur during the install, format, or remove disk operations display until the Menu key is pressed. You must restart the operation from the beginning when an error occurs.

### **Error Message**    **Meaning**

READ FAILURE	A floppy disk is not inserted (at the host), or the drive encountered a read error.
WRITE ERROR	The hard disk encountered a write error, or there is no room for data on the hard disk or in RAM.

**NOTE:** The install, remove, and format disk operations do not include support for a Font Folio disk. You must download the fonts to your hard disk from host applications.



## How to Format a Disk

After you have accessed the Administration/Disk Operations menu, press the control panel keys in the order shown in the following instructions to format a hard disk. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options. (The “#” symbol represents the disk number).

**NOTE:** If the `FORMAT FAILED` message displays in the message window during the Format Disk operation, the disk cannot be used. Press the Menu key to remove the message and contact your QMS vendor.

Control Panel Keys	Message Window	Printer Response
<b>SELECT</b>	DISK OPERATIONS FORMAT DISK	Accesses Disk Operations / Format Disk.
<b>SELECT</b>	FORMAT DISK DSK# :	Advances through the list of installed hard disks to select the one to be formatted.
<b>SELECT</b>	FORMAT DISK ARE YOU SURE	Accesses the selected disk and displays a confirmation message.
<b>SELECT</b>	FORMAT DISK FORMATTING . . .	Displays formatting message. While the system reboots, the hard disk is being formatted.
	FORMAT DISK FORMAT COMPLETE	Displays message when format is complete. The machine powers up and a start-up page prints.

**NOTE:** After an unformatted disk is formatted and the **FORMAT COMPLETE** message displays, you must turn the printer off and back on again before the printer can recognize the disk.

## **Installing an Optional Font or Emulation**

**CAUTION:** If you connect to this printer an external hard disk you previously used with an earlier QMS Crown printer (QMS 860 release 1, QMS-PS 1700, QMS-PS 2000, QMS-PS 3200, or QMS ColorScript 210/230 release 1), this QMS 860 software release will automatically reorganize the files on the hard disk when the printer is turned back on again. (The printer release number is listed on both the start-up and the status page.) Once this reorganization is done, the files on the hard disk can no longer be accessed if the hard disk is attached to an earlier QMS Crown printer again.

This reorganization process takes time. If, when you first turn the printer on after attaching a previously used hard disk, it does not come on line immediately, be patient. Interrupting the reorganization process could cause all files on the hard disk to be lost.

---

Optional fonts and emulations can be installed in two ways:

- You may use optional fonts or emulations by inserting the font or emulation card in one of the card slots below the printer's paper cassette. However, when you remove the font or emulation card from the card slot, you can no longer use those fonts or emulations. This procedure is covered in the "Using Font and Emulation Cards" section found earlier in this chapter.
- You can copy the contents of a font or emulation card to an external hard disk if one is available. The procedure that

follows describes how to install the font or emulation card on your hard disk. Once the font or emulation is stored on disk, they can be downloaded to the printer's memory when needed for printing.

### How to Install an Option

After you have accessed the Administration/Disk Operations menu, press the control panel keys in the order shown in the following instructions to install an option. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options. The following symbols are used in this procedure: the disk or card number is designated with the “#” symbol and the card number is CAR0 or CAR1.

Control Panel Keys	Message Window	Printer Response
<b>SELECT</b>	DISK OPERATIONS INSTALL OPTION	Accesses Disk Operations/Install Option.
<b>NEXT or SELECT</b>	INSTALL OPTION DSK# :	Advances through the list of hard disks or accesses the selected hard disk and installs the option.
<b>SELECT</b>	INSTALL SOURCE CAR# :	Accesses the card address that the option is being installed from.
<b>SELECT</b>	INSTALL OPTION INSERT MEDIA	Starts the option install when the card is inserted.
	INSTALL OPTION READING DATA . . .	Displays a reading message while reading data on the card and installing the option and files to the disk. This usually takes several minutes.

	INSTALL OPTION INSTALL COM- PLETE	Displays after the option is installed.
<b>MENU</b>	DISK OPERATIONS INSTALL OPTION	Exits from Install Option and returns to the Disk Operations menu.

After the option is installed, remove the card from the slot and place the printer back on line.

## Removing an Optional Font or Emulation

Use the Disk Operations/Remove Option to remove optional fonts or emulations from your hard disk. You need the original font or emulation card containing the files. The Remove Option compares the contents of the card against the contents of the hard disk and then deletes the matching files from the hard disk.

### How to Remove an Option

After you have accessed the Administration/Disk Operations menu, press the control panel keys in the order shown in the following instructions to remove an option. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options. The following symbols are used in this procedure: the disk or card number is designated with the “#” symbol and the card number is CAR0 or CAR1.

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>SELECT</b>	DISK OPERATIONS REMOVE OPTION	Accesses Disk Operations/Remove Option.
<b>NEXT or SELECT</b>	REMOVE OPTION DSK# :	Advances through the list of hard disks or accesses

		the selected hard disk and removes the option.
<b>SELECT</b>	REMOVE SOURCE CAR# :	Accesses the card address that option is being removed from.
<b>SELECT</b>	REMOVE OPTION INSERT MEDIA	Starts the option remove when the card is inserted.
	REMOVE OPTION READING DATA . . .	Displays a reading message while reading the data on the card and removing the option and files from the hard disk.
	REMOVE OPTION REMOVE COMPLETE	Displays after the option is removed.
<b>MENU</b>	DISK OPERATIONS REMOVE OPTION	Exits from Remove Option and returns to the Disk Operations menu.

After the option is removed, remove the card from the slot and place the printer back on line.



# Chapter 9

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## Troubleshooting

### Chapter highlights:

- Preventing jams
  - Responding to status messages
  - Problem checklist
  - Print quality problems
  - Placing a service call
-





## Introduction

This chapter offers jam prevention tips, lists and explains many control panel messages, outlines possible printer and print-quality problems and solutions, and explains how to place a service call.

## Preventing Print Media Jams

Many printer problems are caused by improper handling of paper. The following sections provide information about using consumables properly.

There are several things you can do to reduce print media jamming in your printer:

- Use paper, transparency film, and labels that meet the guidelines set for the printer. (See appendix B, the “Consumable Supplies” section, for more information.)
- Make sure paper, transparency film, and labels are not folded or wrinkled.
- Do not overfill the paper cassette or the multipurpose tray. The 11" x 17"/A3, legal/B4, letter/A4, A5, B5, A6, B6, executive, and universal paper cassettes hold about 250 sheets of paper; the optional 500-sheet paper cassette holds about 500 sheets of paper; the multipurpose tray holds about 100 sheets of paper, 50 transparencies, or 40 labels.
- If you have problems with multiple sheets of paper feeding through the printer, remove the paper from the paper tray and fan the edges. The sheets may be sticking together.
- Store print media away from moisture and humidity. They may cause media to turn up at the edges or wrinkles to

occur. The recommended relative humidity during operation is 20%-80%.

- Load media printing side down. The printing side of paper is indicated on the paper wrapping.

## Status Messages

Status messages in the message window provide information about your printer and help you locate many problems. They are displayed in order of importance. If a message is only one line long, it can be displayed along with another message (with the highest priority message on the top line). However, if either message is two lines long, only the highest priority message is displayed.

When the condition associated with a displayed message has changed, the message is cleared from the window and the next highest priority message is then displayed. Status messages are not displayed while the printer is off line.

**NOTE:** A service message sometimes occurs as a result of an unusual combination of events, not because of an actual problem. When the printer stops and a service message displays in the message window, turn the printer off and then back on. This often clears the service message indicator and printer operation resumes. Always try this before making a service call. Service calls should be placed to the vendor from whom you purchased the printer. If you cannot get service from your vendor, see appendix D, “QMS Customer Support,” for more information.

The following status messages may appear in the message window:

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<b>x ACTIVE JOBS</b>	Indicates that the printer is on line and the number of jobs displayed ( <i>x</i> equals number of jobs in the queue) are in process.
<b>ADJUST INPUTBIN BIN</b>	Indicates that the displayed paper cassette or tray is not inserted correctly.
<b>CALL FOR SERVICE ENGINE ERROR 1</b>	Indicates a fixing assembly malfunction. Contact your QMS vendor.
<b>CALL FOR SERVICE ENGINE ERROR 2</b>	Indicates a beam detect malfunction. Contact your QMS vendor.
<b>CALL FOR SERVICE ENGINE ERROR 3</b>	Indicates a main motor malfunction. Contact your QMS vendor.
<b>CALL FOR SERVICE ENGINE ERROR 4</b>	Indicates a no VSYNC error. Contact your QMS vendor.
<b>CALL FOR SERVICE ENGINE ERROR 5</b>	Indicates a scanner motor malfunction. Contact your QMS vendor.
<b>CALL FOR SERVICE ENGINE ERROR 6</b>	Indicates a beam detect error. Contact your QMS vendor.
<b>CALL FOR SERVICE ENGINE ERROR 7</b>	Indicates a fan motor 1 malfunction. Contact your QMS vendor.
<b>CALL FOR SERVICE ENGINE ERROR 8</b>	Indicates a fan motor 2 malfunction. Contact your QMS vendor.
<b>CALL FOR SERVICE ENGINE ERROR 9</b>	Indicates that the inner plate is not pressing or releasing properly. Contact your QMS vendor.
<b>CANCELLING JOB</b>	Indicates the Cancel key has been pressed, and the oldest job in the print queue is being canceled. Displays until the canceled print job has been removed from the queue.
<b>CLOSE ENGINE DOOR(S)</b>	Indicates that the engine front cover is open and needs to be closed.
<b>IDLE</b>	Indicates that the printer is on line, but no jobs are in process.

<b>IDLE INPUT PRINTING</b>	Indicates that the printer is on line and printing jobs that are already in the queue; no new jobs are arriving at the communication interfaces.
<b>INITIALIZING</b>	Indicates that system is getting ready to go on line.
<b>PAPER JAM</b>	Indicates that media has jammed either while being pulled from the input bin, passing through the printer, or exiting from the printer into the output bin.
<b>PAPER SIZE MISMATCH</b>	Indicates that the size paper selected for input bin 1 (multipurpose tray) is not the size paper currently being fed in the tray. If the printer supports the paper size you want, insert the correct paper size in the multipurpose tray. If the printer does not support the paper size you want, select the universal paper size to clear the error. See chapter 4, the “Operator Control / Multipurpose Sz” section, for more information on multipurpose size.
<b>PRINTING STATUS</b>	Indicates that the Status Page key has been pressed. The message clears after the status page prints.
<b>PUT SIZE PAPER IN INPUTBIN BIN</b>	Indicates that the displayed paper cassette or tray is empty. Refill the paper cassette or tray with the specified paper size.
<b>TEST PRINT</b>	Indicates that a test print page is being printed.
<b>TONER ABSENT</b>	Indicates that the toner cartridge is not installed.
<b>TONER OUT</b>	Indicates that the printer’s toner cartridge is empty.
<b>WAITING FOR IDLE</b>	Indicates that an active print job is in process, so access to the menu is not allowed

until the print job is finished. Wait until the print job is finished and the printer goes idle.

**WAITING ON  
INPUT END JOB?**

Indicates that the compiler is waiting on incoming data for the first job in the queue. The job may not have an end-of-job indicator and therefore cannot end. You may want either to cancel or to end the print job. The message clears if more input arrives from the port or if you press the Cancel key. No other jobs can be printed until this job has ended.

**WARMING UP**

Indicates that the printer is warming up. Wait until the IDLE message displays before printing.

**PostScript Error with Error Handler Enabled**

- If you receive a PostScript error when printing a file that previously printed correctly on another PostScript printer, check the “Other Common Printer Problems” section that appears later in this chapter for a solution. If no solution is found, then call your QMS vendor for additional error information.
- If you receive a PostScript error when printing a new file from a new application, check the “Other Common Printer Problems” section that appears later in this chapter for a solution. If no solution is found, see the *PostScript Language Reference Manual* (Adobe Systems, Inc., Reading, MA: Addison-Wesley, 1990, ISBN 0-201-18127-4), or call your QMS vendor for additional error information.

## Printer Problem Checklist

This section contains a list of possible printer problems and solutions. If you have just installed your printer and are having problems, be sure you have correctly followed the steps outlined in chapter 2, “Printer Installation,” and chapter 3, “Printer-Host Interface.”

If there is no status message in the message window, use the following steps to identify the source of your problem and to learn possible solutions:

1. Do all indicators come on when the printer power is turned on?

**YES** - Go to question 2.

**NO** - Check the following:

- Is the power cord plugged into both the power outlet and the printer?
- Is the printer power switch in the On “1” position?
- Is the power outlet working?
- Does the line voltage from the power outlet match the printer’s power requirements? See appendix B, “Technical Specifications.”

2. Can you print a status page? (This option is located in the Administration/Special Pages menu.)

**YES** - Go to question 3.

**NO** - Check the following:

- Is the printer off line before you try to enter the menu? It should be.
  - Does the paper cassette or tray have paper? If it is out of paper, the message `PUT SIZE PAPER IN INPUTBIN` is displayed in the control panel message window and the Error indicator is lit.
  - Is the printer top closed securely?
  - Is there a paper jam? If a paper jam message displays and the error indicator lights, go to the following section, “Clearing a Paper Jam.”
3. Is the printer receiving data from the computer? If the Data indicator blinks after sending the file, the printer is receiving data. If not, check the following:
- Is the printer on line? The message window displays `IDLE`.
  - Has the communication mode been changed from ESP (the factory default) to a dedicated mode that does not match the file you are sending? The *QMS Crown Technical Reference Manual*, which is an optional purchase available from your QMS vendor, contains more information on how to troubleshoot this problem.
  - Print a status page from the control panel. If you are using the serial interface, is the baud rate (speed of data transmission) of the printer, the computer, and your software application program the same? The *QMS Crown Technical Reference Manual*, which is an optional purchase available from your QMS vendor, contains more information on how to troubleshoot this problem.

- If you still cannot identify the problem, contact your QMS vendor.
4. Is the printer printing codes or not printing at all when in ESP mode?
- Reconfigure the port to the specific printer language of the file you are trying to print. See chapter 3, “Printer-Host Interface,” or chapter 4, “Printer Configuration,” for instructions or use the PS Executive Series Utilities to change modes.
  - If a PostScript document prints PostScript statements while in ESP mode, increase the ESP timeout. See chapter 4, “Printer Configuration,” to learn how to make the change at the printer control panel, or increase the timeout with the PS Executive Series Utilities.
  - If you continue to have problems with the ESP mode selecting printer language, contact your QMS vendor.

## **IBM PC and Compatible Computer Checklist**

If you are experiencing problems with printing (not related to print quality), check the following:

- Does your application setup match the printer interface settings?
- Have you set up your printer port at the system level (DOS) and installed a PostScript driver within your application? (Refer to your DOS and application documentation.)
- If you are using a serial interface, are you experiencing a protocol problem? Set the printer to DTR/DSR protocol. If that does not work, check your serial interface cable. (See appendix A, “Cable Pinouts,” for information on



cable pinouts. You may also want to try setting the printer to XON/XOFF protocol.)

- Is your application software PostScript compatible? (Check the application manual.)

## **Apple Macintosh Checklist**

If you are experiencing problems with printing (not related to print quality), check the following:

- Are the LaserWriter and Laser Prep files (version 6.0 or higher) installed in your System Folder or Extensions Folder?
- Have you used the Chooser to select “LaserWriter,” “QMS 860 Print System,” or another PostScript driver?
- Is AppleTalk active in the Chooser dialog box?
- Are the screen fonts installed? (See chapter 3, “Printer-Host Interface.”)

## **Other Common Printer Problems**

### **Data Indicator Stays Lit**

If the Data indicator stays on, one of two problems may exist.

1. If you are downloading additional typefaces, too many can overload the printer’s memory causing the printer to reset and lose information previously downloaded to RAM. Make sure you have enough printer memory for the additional typefaces. Additional memory (RAM) is available and easily installed.

Contact your QMS vendor for information on RAM upgrades. See chapter 8, “Printer Options.”

2. On an AppleTalk network, Macintosh computers sometimes interfere with each other. If this happens often, reinstall the LaserWriter and Laser Prep files to reset the printer. If neither of these files is the problem, contact your QMS vendor.

## **No Start-up Page**

If no start-up page prints, check the following:

1. Is the printer on line?
2. Has the start-up page been disabled? Use the printer control panel or the PS Executive Series Utilities to make sure the start-up page is on. If the start-up page is turned on, go to step 3.
3. Turn the printer off. From a cold start, it takes a minute for the printer to warm up. Be sure you wait long enough for a start-up page before suspecting a problem.
4. Check to be sure the paper cassette is in place and secure.
5. Open the front cover of the printer and check for a paper jam.
6. Make sure a toner cartridge is installed.

If you have not solved the problem, open the front cover of the printer. Hold your hand just close enough to the fixing assembly to tell whether the rollers are hot; then, with this information ready, call your QMS vendor for help.

## **Printer Resets**

1. Occasionally, Macintosh applications interfere with each other. Applications send a printer prep file to the printer at the beginning of each document. Other prep files cannot be sent without resetting the printer. Monitor your activities to see if there is a correlation between your use of a certain driver version and the printer resetting. If so, contact the developer.
2. Downloading too many typefaces can overload the printer's memory and cause the printer to reset to default. Additional memory (RAM) is available. Contact your QMS vendor for information on SIMM upgrades. See chapter 8, "Printer Options."
3. If the printer resets in other circumstances, call your QMS vendor for service.

## **Blank Pages**

1. If a blank start-up page ejects or blank pages come out during a printing job, check the toner cartridge. Images do not print if the toner cartridge is empty.
2. Make sure you have broken the tab on the side of the toner cartridge and removed the sealing tape.
3. Check to ensure that you are not using perforated paper (including 3 hole punched). This type paper is not recommended for your printer.

## **Not All Pages Print**

1. Check your cable connection. You could have the wrong kind of cable, or your printer may not be configured for the correct cable and port.
2. Make sure no one pressed the Cancel key while your job was printing.
3. Check the control panel message window to see if the paper cassette or tray is out of paper.

## **Paper Jam Message Stays On**

1. If a PAPER JAM message displays in the control panel message window, open the printer and clear the jam. If the message is still there, try opening and closing the top of the printer again.
2. As a last resort, try turning the printer off and on (this causes jobs to be lost).

## **PostScript Emulation Job Does Not Print**

If the print job is set for PostScript or ESP emulation, increase the PS Heap value to at least 1536 KB and reprint the job. See the chapter 4, the “Administration / Memory” section, for more information on PS Heap.

## **Trouble Printing PostScript Files**

If you are using a Level 1 driver in your application and you have trouble printing PostScript files, try printing the files with the

PostScript level set to Level 2. See chapter 4, the “Administration / Emulations / PostScript” section, for more information.

## **Multiple Pages Problem**

If you are experiencing unexpected results when printing multiple pages, try turning the collation feature off so that the memory used for compressed pages can be released after it has been used. See chapter 4, the “Operator Control / Collation” section, for more information on collation.

## **Limit Check Error on a Macintosh**

If a limit check error appears in the status box window when you are printing a Macintosh file, then increase the PS Heap memory client. See chapter 4, the “Administration / Memory” section, for more information on PS Heap.

## **Emulation Error**

If you receive an emulation error, you may need to increase the amount of memory for the K Mem For Emulation memory client. See chapter 4, the “Administration / Memory” section, for more information on the Emulation memory client.

## **Binary Data Printing Problem**

If binary data is not being interpreted correctly or if your binary print job does not print, check that PS Protocol in the Administration / Communications serial and parallel menus and also in the Optional Network Interface menu (if installed) is set to the Binary or Binary Fixed mode.

## Printer Does Not Print 600 dpi

If you have configured the printer from the control panel to print at 600 dpi resolution but the printer continues printing 300 dpi, you may need additional memory allocated to the frame buffer.

The menu selection “Memory/Quick Config” should be set to the correct paper size and 600 dpi resolution. See chapter 2, “Printer Installation,” for memory configuration information.

## Paper Size Mismatch

If you are printing via the multipurpose tray, and the printer does any of the following, then check that you are not using perforated paper (including 3 hole punched). Perforated and 3-hole punched paper are not recommended for your QMS 860 Print System.

- Generates a PAPER SIZE MISMATCH error.
- Partially prints the page (approximately ¼" and leaves the other part of the page blank).
- Ejects the page.
- Aborts the print job.

## Image Orientation Problem

If you have manually set the orientation and your image (landscape or portrait) does not print correctly, you may be experiencing an orientation problem. The preferred method to set orientation is through your application.

## Ledger Versus 11 x 17" Problem

If your ledger image (17 x 11") prints as an 11 x 17" image, check that the paper size is set to 11 x 17". Ledger is imaged in landscape orientation and 11 x 17" is imaged in portrait orientation. The preferred method is to let your application set the orientation, but if this is not possible, set the orientation to landscape using the printer control panel. See chapter 4, the "Operator Control Menu" section, for more information on orientation.

## End-of-Document (EOD) Command Problems

The information in this section is intended to assist you in recognizing and fixing EOD problems.

- If you add an EOD command to your file and the EOD command prints on your job, you may need to set the end job mode on the printer's control panel. See appendix F, the "Setting the End Job Mode for the Serial and Parallel Protocols" section, for more information.
- If your QMS Crown printer is not interpreting the selected EOD command correctly for you print job, then do the following:
  1. Check the syntax and spelling of the EOD command in your file or network job separator, depending on your environment.
  2. Check that the end job mode on the printer's control panel and the EOD command in your file or network job separator, depending on your environment match.
  3. Check with your system administrator or applications development department to ensure that you are using the standard EOD command for your organization.
- If the End Job Mode option is set to None, and if an EOD command is inserted between each print job, the EOD

commands may cause the printer to select the incorrect emulation or to print the EOD command on your print job.

## General Print Quality Problems

Print quality problems are those related to the appearance of the pages you print. Print quality problems include white lines on the page, uneven blacks, and other print distortions.

If you have problems with the quality of your printed pages, try this quick check procedure:

1. Check the print density adjustment dial on the inside of the printer. Change the setting and try printing another page.
2. If the TONER OUT message is on, replace the toner cartridge.
3. Remove the toner cartridge and rotate it several times. The toner can settle, and this procedure redistributes the toner. Reinsert the cartridge and try printing again.
4. Place a service call to your QMS vendor.

## Specific Print Quality Problems

Listed below are several print quality problems with possible solutions. Try the solutions in the sequence given. If the solutions listed do not solve the problem, place a service call to your QMS vendor.



## **White or Light Lines**

1. Remove the toner cartridge and rock it as you do before installing a new cartridge. This redistributes toner inside the cartridge. Reinstall the cartridge.
2. If step 1 does not solve the problem, install a new toner cartridge.

## **Light Image (Entire Page)**

1. Increase the print density by adjusting the print density control lever inside the printer to the thick end of the wedge-shaped scale.
2. Remove the toner cartridge and rotate it as you would when installing a new cartridge. This redistributes toner inside the cartridge. Then, reinstall the cartridge.
3. Install a new toner cartridge.

## **Dark Image (Entire Page)**

1. Decrease print density by adjusting the print density control lever inside the printer to the thin end of the wedge-shaped scale.
2. If step 1 does not solve the problem, install a new toner cartridge.

## **Black Image (Entire Page)**

1. Install a new toner cartridge.

2. Contact your QMS vendor.

### **Stain along the Edge of the Page**

Install a new toner cartridge.

### **Stains on the Back of the Page**

The paper path may be dirty. Clean the paper path area. See chapter 5, “Daily Operations,” for more information.

### **Image Smears when Rubbed**

Place a service call.

## **Placing a Service Call**

If you have a problem you cannot resolve, contact your QMS vendor. Your QMS vendor is best equipped to handle most problems you may encounter. If you cannot get service from your vendor, see appendix D, “QMS Customer Support.”

Certain error messages in the control panel message window also require that you contact your QMS vendor:

CALL FOR SERVICE ENGINE ERROR 1

CALL FOR SERVICE ENGINE ERROR 2

CALL FOR SERVICE ENGINE ERROR 3

CALL FOR SERVICE ENGINE ERROR 4

CALL FOR SERVICE ENGINE ERROR 5

CALL FOR SERVICE ENGINE ERROR 6

CALL FOR SERVICE ENGINE ERROR 7

CALL FOR SERVICE ENGINE ERROR 8

CALL FOR SERVICE ENGINE ERROR 9

If you have technical questions your QMS vendor is unable to answer, you may call QMS Customer Technical Service. See appendix D, “QMS Customer Support,” for information.





# *Appendix A*

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## **Cable Pinouts**



## AppleTalk

The table below gives the correct pinouts for the printer end of the 8-pin LocalTalk cable used to connect a computer and printer:

<b>Pinout: AppleTalk</b>	<b>Pin No.</b>	<b>Name</b>
	3	Transmit Data -
	4	Signal Ground
	5	Receive Data -
	6	Transmit Data +
	8	Receive Data +

## Centronics Parallel

This table gives the correct pinouts for the Centronics parallel interface cable that can be used with your printer. (See “Notes to the Centronics Parallel Cable Pinouts Table” on the next page for more information.)

<b>Pinout: Centronics Parallel</b>	<b>Signal Pin No.</b>	<b>Return Pin No.</b>	<b>Signal Description</b>	<b>Direction</b>
	1	19	STROBE-	In
	2	20	DATA 1	In
	3	21	DATA 2	In
	4	22	DATA 3	In
	5	23	DATA 4	In
	6	24	DATA 5	In
	7	25	DATA 6	In
	8	26	DATA 7	In
	9	27	DATA 8	In
	10	28	ACNLG-	Out
	11	29	BUSY+	Out
	12	30	PE+	Out
	13	-	SELECT	Out
	16	-	GND	-
	18	-	VCC TEST	-
	19-30	-	GND	-
	31	-	IPRIME	-
	32	-	FAULT-	-
	33	-	GND	-
	34	-	RESERVED	-
	35	-	RESERVED	-



## Notes to the Centronics Parallel Cable Pinouts Table

**Direction** refers to the direction of signal flow as viewed from the printer.

**Return** denotes “twisted-pair return” and is to be connected at signal-ground level. When wiring the interface, be sure to use a twisted-pair cable for each signal and never fail to complete connection on the return side. To prevent noise effectively, these cables should be shielded and connected to the chassis of the system unit and printer, respectively.

All interface conditions are based on Transistor-Transistor Logic (TTL) level. Both the rise and fall times of each signal must be less than 0.2 microseconds.

Data transfer must be carried out by recognizing the ACKNLG or BUSY signal.

The cable must have an overall braided shield, Belden 8345 or equivalent.

Connectors must have shielded housings. The overall shield must be bonded to the shielded housings at both ends of the cable.

## Dataproducts Parallel

This table gives the correct pinouts for the Dataproducts parallel interface cable that can be used with your printer.

<b>Pinout: Dataproducts Parallel</b>	<b>Signal Pin No.</b>	<b>Return Pin No.</b>	<b>Signal Description</b>	<b>Direction</b>
	1	2	Data Bit 3	In
	11	-	Parity Error (grounded)	
	12	-	+5V (limited by 1K ohm resistor)	Out
	19	3	Data Bit 1	In
	20	4	Data Bit 2	In
	21	5	Online	Out
	22	6	Ready	Out
	23	7	Demand	Out
	28	44	Data Bit 8	In
	30	14	Paper Instruction	In
	34	18	Data Bit 5	In
	36	35	Data Bit 7	In
	38	37	Strobe	In
	39	-	Logic Ground	
	41	40	Data Bit 4	In
	43	42	Data Bit 6	In
	45, 46	-	Interface Verify	

## Serial

This table gives the correct pinouts for the printer end of the 25-pin serial cable used to connect a computer and printer:

<b>Pinout: Serial</b>	<b>Pin No.</b>	<b>Name</b>
	2	Transmit Data
	3	Receive Data
	4	Request to Send (optional)
	5	Clear to Send
	6	Data Set Ready (optional)
	7	Signal Ground
	8	Receive Line Signal Data
	20	Data Terminal Ready (optional)
	24	Reserved
	25	Reserved

## IBM PC/XT, PC/AT, and Compatible Computers

The following tables show the suggested pinouts for IBM PC/XT, PC/AT, and compatible computers.

<b>Pinout: IBM PC/XT</b>	<b>Printer DB-25S</b>	<b>IBM PC/XT DB-25P</b>
	1	1
	2	3
	3	2
	4	5
	5	4
	20	6+8
	6+8	20
	7	7

<b>Pinout: IBM PC/AT</b>	<b>Printer DB-25S</b>	<b>IBM PC/AT DB-9P</b>
	1	1 (No Connection)
	2	2
	3	3
	4	8
	5	7
	6+8	4
	7	5
	20	1+6

# *Appendix B*

---

## **Technical Specifications**



## Print Engine

<b>Maximum Duty Cycle</b>	10,000 pages per month
<b>Print Method</b>	Laser beam scanning and dry electrophotographic printing
<b>Print Speed</b>	Up to 8 pages per minute using letter or A4 paper loaded long edge; up to 4.6 pages per minute using ledger or A3 paper loaded long edge; actual speed depends on application
<b>Resolution</b>	600 x 600 or 300 x 300 print resolution
<b>Toner</b>	Microfine toner designed especially for high-resolution printers (EP-B cartridge); dry, single component in user-replaceable cartridge
<b>Toner Cartridge Life</b>	6,000 pages at normal (4%) page coverage, letter or A4 paper
<b>Warm-Up Time</b>	90 seconds at 115V/240V, 68° F (20° C) 120 seconds at 220V, 68° F (20° C)

## Physical Characteristics

<b>Dimensions</b>	W	D	H
	18.07" 459 mm	20.55" 590 mm	11.81" 300 mm
	Height increases by 3.15"/80 mm with optional paper feeder; height increases by 4.76"/121 mm with optional paper feeder and cassette supporter		
<b>Type</b>	Highest quality and performance 8 ppm 600 dpi desktop printer with 11" x 17" print capability		
<b>Weight</b>	About 50 lbs (22.68 kg)		

## Controller

<b>Emulations</b>	PostScript - Levels 2 and Level 1 compatibility mode HP PCL 4 HP-GL 7475A/7550A Optional emulations
<b>Fonts</b>	39 resident PostScript emulation fonts that can be scaled from 4 points upward and rotated to any angle in 1° increments; all typefaces have multilingual character sets Host-resident downloadable fonts are also supported
<b>Memory</b>	12 MB RAM standard, upgradable to 32 MB; 4 MB ROM and 2 KB EEPROM
<b>Type</b>	Intel 80960CA RISC microprocessor operating at 25 MHz



## SIMMs

<b>Approved Vendors</b>	Micron Technology - MT8D132M-8 (4 MB) Samsung Semiconductor - KMM5321000AV-8 (4 MB) Micron Technology - MT16D232M-8 (8 MB) Samsung Semiconductor - KMM5322000AV-8 (8 MB) Other vendors' SIMMs meeting the above mechanical and electrical specifications may work				
<b>QMS Order Number</b>	4 MB — 2600202-902 8 MB — 2600202-903				
<b>Electrical</b>	5V $\pm$ 10% Fast page mode  <table> <tr> <td><math>t_{ras} = 80</math> ns.</td> <td><math>t_{cas} = 20</math> ns.</td> </tr> <tr> <td><math>t_{rac} = 80</math> ns.</td> <td><math>t_{cac} = 20</math> ns</td> </tr> </table>	$t_{ras} = 80$ ns.	$t_{cas} = 20$ ns.	$t_{rac} = 80$ ns.	$t_{cac} = 20$ ns
$t_{ras} = 80$ ns.	$t_{cas} = 20$ ns.				
$t_{rac} = 80$ ns.	$t_{cac} = 20$ ns				
<b>Mechanical</b>	72-pin industry standard package; 1" high; tin plated contacts				
<b>Size</b>	4 MB (1M x 32) 8 MB (2M x 32)				

**NOTE:** Additional memory installed in your QMS 860 Print System will not be allocated until you allocate memory through Quick Config or through the memory clients. See chapter 4 the, "Administration / Memory" section, and appendix F, the "Memory Management" section for more information on memory.

## Interfaces

Your printer's industry standard ports are

AppleTalk  
Parallel  
Serial  
SCSI

Your printer interfaces with

Apple Macintosh computers and LocalTalk networks  
IBM PCs and compatible computers  
Optional networks  
Many minicomputers and mainframes

## SCSI Hard Disk Drives

### **Approved Vendors**

There are subtle differences in the command sets of SCSI hard disks from different vendors; therefore, not all SCSI hard disks are compatible with this printer. The following 40 MB disk drives have been successfully tested:

Seagate ST157N  
Connor CP-3040  
Quantum LP52S

The following 120 MB hard disk drives have been successfully tested:

Connor CP-30100  
Maxtor 7120SR

## Electrical

<b>Frequency</b>	50/60 Hz ( $\pm 2$ Hz)
<b>Power Consumption</b>	1 KW 68° F (20° C)
<b>Power Requirements</b>	110/120v 60 Hz (about 90-130 VAC) or 220/240v 50 Hz (about 200-260 VAC)

## Environmental Requirements

<b>Noise Level</b>	Idle; maximum 37 dB (A) Printing; maximum 49 dB (A)
<b>Ozone Density</b>	The printer emits less than 0.1 ppm maximum with a 100% duty cycle under 8 hours of continuous operation
<b>Relative Humidity</b>	Printing: 20-80% (with no condensation) Storage: 20-80% (with no condensation)
<b>Temperature Range</b>	Printing: 50-90° F (10-32.5° C) Storage: 32-95° F (0-35° C)

## Print Media

<b>Delivery</b>	Face down
<b>Feed</b>	<p><b>Paper cassette</b>            About 250 sheets of 20 lb (75 g/m<sup>2</sup>) paper            About 750 sheets of 20 lb (75 g/m<sup>2</sup>) paper with the optional paper feeder</p> <p><b>Multipurpose tray</b>            About 100 sheets of 20 lb (75 g/m<sup>2</sup>) paper            About 50 sheets of transparencies film            About 40 sheets of labels</p>
<b>Loading</b>	Automatic from multipurpose tray or paper cassette
<b>Paper</b>	Cut-sheet
<b>Sizes</b>	

Size	Inches	Millimeters	Feed Edge	Input
11 x 17	11.00 x 17.00	279.4 x 431.8	Short Edge	Cassette
Ledger**	17.00 x 11.00	431.8 x 279.4	Short Edge	Cassette
A3	11.70 x 16.55	297.2 x 420.4	Short Edge	Cassette
Legal	8.50 x 14.00	215.9 x 355.6	Short Edge	Cassette
B4	10.12 x 14.3	257.1 x 363.7	Short Edge	Cassette
Letter	11.00 x 8.50	279.4 x 215.9	Long Edge	Cassette
A4	11.69 x 8.27	296.9 x 210.1	Long Edge	Cassette
A5	8.27 x 5.83	210.1 x 148.1	Long Edge	Tray
B5	10.11 x 7.16	256.8 x 181.9	Long Edge	Cassette
A6	4.13 x 5.85	104.9 x 148.6	Short Edge	Tray
B6	5.06 x 7.17	128.5 x 182.1	Short Edge	Tray
Executive	10.50 x 7.25	266.7 x 184.2	Short Edge	Tray
Universal*	11.70 x 17.00	297.2 x 431.8	Short Edge	Tray

\*Maximum paper size

\*\*The printer uses 11 x 17" print media in landscape orientation to support ledger.

**Table B.1** Paper Sizes

<b>Types</b>	Your printer can handle special paper, including labels and transparencies. We do not recommend printing on envelopes or perforated paper (including 3 hole punched). But if envelopes are used, they must be fed through the multipurpose tray.
<b>Weight</b>	Paper; paper feed (cassette); 17-24 lb (64-90 g/m <sup>2</sup> ) Paper; paper feed (tray); 17-24 lb (64-90 g/m <sup>2</sup> ) Transparency; paper feed (tray); 17-34 lb (64-128 g/m <sup>2</sup> ) Labels; paper feed (tray); 17-34 lb (64-128 g/m <sup>2</sup> )

## Printer Manuals

Your QMS vendor provides the following optional manuals for purchase:

*QMS Crown Technical Reference Manual*

*QMS Crown Document Option Commands*

## Consumable Supplies

Your QMS vendor provides the following options and consumables for the QMS 860 Print System:

<b>Options</b>	Paper Cassette Supporter
	Paper Feeder
	Toner Cartridge (EP-B)
<b>Paper</b>	11" x 17" 250 sheet
<b>Cassettes</b>	A3 250 sheet
	Legal 250 sheet
	B4 250 sheet
	Letter 250 sheet
	Letter 500 sheet
	A4 250 sheet

	A4	500 sheet	
	B5	250 sheet	
<b>Paper and Transparencies</b>	<b>Size</b>	<b>Inches</b>	<b>Millimeters</b>
	11 x 17	11.00 x 17.0	279.4 x 431.8
	A3	11.70 x 16.55	297.2 x 420.4
	Ledger	14.00 x 8.50	355.6 x 215.9
	Legal	8.50 x 14.00	215.9 x 355.6
	B4	10.12 x 14.32	251.1 x 363.7
	Letter	11.00 x 8.5	279.4 x 215.9
	A4	11.69 x 8.27	296.9 x 210.1
	A5	8.27 x 5.83	210.1 x 148.1
	B5	10.11 x 7.16	256.8 x 181.9
	A6	4.13 x 5.85	104.9 x 148.6
	B6	5.06 x 7.17	128.5 x 182.1
	Executive	10.50 x 7.25	266.7 x 184.2
	Universal	11.70 x 17.00	297.2 x 431.8

**Approved Vendors** The following transparencies have been successfully tested:

Canon brand type D  
3-M type PP2500

## How Consumables Affect Your Warranty

The use of non-QMS consumables and/or accessories alone does not affect either your warranty or any maintenance contract you may have purchased. However, if QMS printer failure or damage is found to be directly attributable to the use of non-QMS consumables and/or accessories, QMS will not repair the printer free of charge. In this case, standard time and material charges will be applied to service your printer for that particular failure or damage. QMS recommends that you use only QMS consumables and accessories to support your printer. To order QMS consumables and accessories in the US, call (800) 777-7782.

# *Appendix C*

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## **Character Encoding Tables**





## Character Encoding Tables

The tables on the following pages are examples of the character encoding used by the fonts available on your printer. The first table (titled “Standard Encoding”) is the standard encoding for all but two (Symbol and ITC Zapf Dingbats) fonts. The numbers at the far left of the table are the first two digits of the octal code values. Each number across the top of the table corresponds to the third digit of an octal value. To find the octal value of any character, read the first two digits for the row and the last digit for the column that corresponds to the character you want. For example, “A” is in the row headed by “10x” and the column headed by “1.” Therefore, “A” has an octal value of 101. The second and third tables are the only two fonts that are not encoded the same as the first table. The characters in the Symbol set and ITC Zapf Dingbats have different characters assigned to the octal values.

In addition to the characters in the tables, the fonts have certain “unencoded” characters. Refer to the *PostScript Language Reference Manual* (available from Addison-Wesley Publishing Company and many bookstores) for more information about unencoded characters.

Standard Encoding

octal	0	1	2	3	4	5	6	7
\00x								
\01x								
\02x								
\03x								
\04x		!	"	#	\$	%	&	'
\05x	(	)	*	+	,	-	.	/
\06x	0	1	2	3	4	5	6	7
\07x	8	9	:	;	<	=	>	?
\10x	@	A	B	C	D	E	F	G
\11x	H	I	J	K	L	M	N	O
\12x	P	Q	R	S	T	U	V	W
\13x	X	Y	Z	[	\	]	^	_
\14x	'	a	b	c	d	e	f	g
\15x	h	i	j	k	l	m	n	o
\16x	p	q	r	s	t	u	v	w
\17x	x	y	z	{		}	~	
\20x								
\21x								
\22x								
\23x								
\24x		ı	ç	£	/	¥	f	§
\25x	ı	'	"	«	<	>	fi	fl
\26x		-	†	‡	.		¶	•
\27x	,	"	"	»	...	&		¿
\30x		`	'	^	~	-	˘	˙
\31x	˚		•	,		˝	ˆ	˘
\32x	-							
\33x								
\34x		Æ		ª				
\35x	£	Ø	ƒ	º				
\36x		æ				ı		
\37x	‡	ø	œ	ß				

Symbol

octal	0	1	2	3	4	5	6	7
\00x								
\01x								
\02x								
\03x								
\04x		!	∇	#	∃	%	&	ə
\05x	(	)	*	+	,	-	.	/
\06x	0	1	2	3	4	5	6	7
\07x	8	9	:	;	<	=	>	?
\10x	≡	A	B	X	Δ	E	Φ	Γ
\11x	H	I	ϑ	K	Λ	M	N	O
\12x	Π	Θ	P	Σ	T	Υ	ζ	Ω
\13x	Ξ	Ψ	Z	[	∴	]	⊥	
\14x	¯	α	β	χ	δ	ε	φ	γ
\15x	η	ι	φ	κ	λ	μ	ν	ο
\16x	π	θ	ρ	σ	τ	υ	ϖ	ω
\17x	ξ	ψ	ζ	{		}	~	
\20x								
\21x								
\22x								
\23x								
\24x		Υ	'	≤	/	∞	f	♣
\25x	♦	♥	♠	↔	←	↑	→	↓
\26x	°	±	"	≥	x	∞	∂	•
\27x	+	≠	≡	≈	...		—	┘
\30x	ℵ	ℑ	℔	∅	⊗	⊕	∅	∩
\31x	∪	⊃	⊇	⊂	⊆	⊆	∈	∉
\32x	∠	∇	®	©	™	Π	√	·
\33x	¬	^	v	↔	←	↑	⇒	↓
\34x	◊	<	®	©	™	Σ	∫	
\35x	(	Γ		L	f	{		
\36x		)	J	f		J	)	
\37x	J			J		}	J	

### ITC Zapf Dingbats

octal	0	1	2	3	4	5	6	7
\00x								
\01x								
\02x								
\03x								
\04x		✂	✂	✂	✂	✂	✂	✂
\05x	✂	✂	✂	✂	✂	✂	✂	✂
\06x	✂	✂	✂	✂	✂	✂	✂	✂
\07x	✂	✂	✂	✂	✂	✂	✂	✂
\10x	✂	✂	✂	✂	✂	✂	✂	✂
\11x	★	☆	☉	☆	★	★	★	★
\12x	☆	*	*	*	*	*	*	*
\13x	*	*	*	*	*	*	*	*
\14x	*	*	○	*	*	*	*	*
\15x	*	*	*	*	●	○	■	□
\16x	□	□	□	▲	▼	◆	◇	▷
\17x			▮	‘	’	“	”	
\20x								
\21x								
\22x								
\23x								
\24x		♩	♪	♪	♥	♣	♠	♠
\25x	♣	♦	♥	♠	①	②	③	④
\26x	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
\27x	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳
\30x	①	②	③	④	⑤	⑥	⑦	⑧
\31x	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯
\32x	↻	↻	↻	↻	→	→	↕	↕
\33x	↻	→	↻	→	→	→	→	→
\34x	→	→	↘	↘	↘	↘	↘	↘
\35x	→	↻	↻	↻	↻	↻	↻	↻
\36x		↻	↻	↻	↻	↻	↻	↻
\37x	↻	↻	↻	↻	↻	↻	↻	

# *Appendix D*

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## **QMS Customer Support**



## QMS Customer Support

Several sources of help and information are available, depending on the type of help you need:

1. Your QMS printer vendor

Your local vendor (the one from whom you bought the printer) may be best equipped to help you. Your vendor has specially trained service technicians available to answer questions, and the equipment to analyze your printer problems.

2. Your application vendor

Often, “printing” problems have more to do with the application being used than with the printer. In this case, the application manufacturer is the best source of help.

3. Q-FAX

Q-FAX, a QMS information retrieval service, provides application notes, technical support notes on common printing problems, and information about printer specifications, options, accessories, consumables, and prices.

In the United States and Canada, call (800) 633-7213 to reach Q-FAX. In all other countries, call (205) 633-3850. Have your fax number handy when you call (or place the call from your fax machine’s handset).

You can choose to have either a directory (a list of currently available documents on a particular topic) or a specific document sent to you. The first time you call, request the directory (press 2 on your phone or fax keypad when prompted). Then call back to request specific documents. You can order up to three documents per call.

4. The QMS Corporate Bulletin Board System (BBS)

The bulletin board contains technical support notes, application notes, drivers, patches, and utilities, and you may leave technical questions not requiring an immediate response on electronic mail for the Sysop (System Operator). The bulletin board [(205) 633-3632] operates at 1200, 2400, 9600, and 14400 baud, 8 data bits, no parity, 1 stop bit, with XMODEM and YMODEM capabilities. Contact QMS Customer Technical Support for more information about the bulletin board.

5. CompuServe

Through CompuServe, you ask general (non-technical) questions, share information with other users, and access printing information and programs. When you use CompuServe, type one of the following commands:

- `go.dtpven` takes you to the DTP Vendor forum; QMS is section 3 of that forum
- `go.qmsprint` takes you directly to the QMS library section

The QMS library section contains application notes, printer drivers, utilities, technical information, and announcements.

6. Internet

The QMS server provides access to technical reports, new product announcements, a trade show schedule, and other general information about QMS.

You can access the QMS server via any one of the many web viewers available to Internet users. If you don't have access to a web viewer, we recommend the NCSA Mosaic web viewer (Mosaic is at <ftp.ncsa.uiuc.edu>). The QMS home page is at <http://www.qms.com/>. The QMS ftp resource is <ftp.qms.com>.



## 7. QMS Customer Technical Support

QMS Customer Technical Support is available from 8 a.m. to 5 p.m., Central Standard Time, at (205) 633-4500 (US). You can also fax questions to CTS at (205) 633-3716 (US). Please indicate whether you would like a faxed or a phoned reply.

If you call for assistance, have the following information ready so our technicians can help you more quickly:

- Your phone number, fax number, and shipping address
- A description of the problem
- The printer model
- The type of host computer you are using
- The type and version of operating system you are using
- The interface you are using, and, if serial, the protocol
- The application and version you are using
- The emulation you are using
- Your printer firmware version (listed on the status and start-up pages)

## **QMS World-wide Offices**

**United States**

QMS, Inc.  
One Magnum Pass  
Mobile, AL 36618  
(205) 633-4300

Product Information: (800) 631-2692 or 2696  
OEM Information: (800) 631-2692  
Consumables: (800) 777-7782  
Fax: (205) 633-4866  
E-mail: info@qms.com

**Asia-Pacific**

QMS Asia-Pacific  
Auckland 64 (9) 630 7912  
Hong Kong (852) 511 5300  
Melbourne 61 (3) 899 5777  
Sydney 61 (2) 901 3235  
Tokyo (81) 3-3457-4030

**Canada**

QMS Canada, Inc.  
9630 Rte. Trans-Canadienne  
Saint Laurent, Québec H4S 1V9  
Telephones: (514) 333-5940, (800) 361-3392  
Fax: (514) 333-5949  
National Service: (800) 268-4969  
National Service Fax: (416) 673-7676

Offices in Calgary, Edmonton, Ottawa, Québec City, Toronto, Vancouver, and Winnipeg

**Europe**

Düsseldorf (49) 211/596 1333  
London (44)784 430900  
Maarssen (31) 3465 51 333  
Paris (33) 1 4 107 9393  
Winterthur (41) 52-213 60 60

# *Appendix E*

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## **Document Option Commands**



## Document Option Commands (DOC)

This appendix lists the supported Document Option Commands for your QMS 860 Print System. The commands are grouped in sections by feature type. Within each section the commands are alphabetized by the task being accomplished. Each command is preceded by a statement. There are two statement types: Doc (%%) and IncludeFeature (%%IncludeFeature). (See the *QMS Crown Document Option Commands* manual, which is an optional purchase available from your QMS vendor, for information on how to execute each command.)

### Header/Trailer

Print document creator	%%Creator:
Print creation date and time	%%CreationDate:
Print copyright statement	%%CopyRight:
Print current date	%%Date:
Print header page	%%IncludeFeature: header
Print document host	%%Host:
Print document owner	%%For:
Print document title	%%Title:
Print trailer page	%%IncludeFeature: trailer
Print routing information	%%Routing:
Print version and revision	%%Version:

### Printer

Collate print jobs	%%IncludeFeature: collate
Select emulation	%%IncludeFeature: emulation
Select paper	%%IncludeFeature: input
Select number of copies	%%IncludeFeature: numcopies
Select orientation	%%IncludeFeature: orientation
Select output bins	%%IncludeFeature: output
Set printer resolution	%%IncludeFeature: resolution

## HP-GL Emulation

Expand plot	%%IncludeFeature: expand
Scale the image	%%IncludeFeature: scaling
Select enhanced resolution	%%IncludeFeature: enhanced
Select original paper size	%%IncludeFeature: size
Select pen width and color	%%IncludeFeature: pen
Select plotter	%%IncludeFeature: plotter
Shift the origin	%%IncludeFeature: origin
Reverse image	%%IncludeFeature: reverse

## HP PCL Emulation

Reset to PCL defaults	%%IncludeFeature: reset
Select font	%%IncludeFeature: font
Select symbol set	%%IncludeFeature: symbolset
Set carriage return	%%IncludeFeature: crisrlf
Set linefeed	%%IncludeFeature: lfisrlf
Set lines per page	%%IncludeFeature: linesperpage
Store fonts to disk	%%IncludeFeature: resource

## PostScript Emulation

Select PostScript level	%%IncludeFeature: languagelevel
-------------------------	---------------------------------



# *Appendix F*

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## **Additional Technical Information**





## Introduction

This appendix provides additional technical information on memory management, end job mode, PS protocol, and the equation for converting color to grayscale.

## Memory

Memory allows your printer to store and retrieve information that is required to perform many of its tasks. The memory requirements of each printer are dictated by the applications that are to be run. Each printer comes standard with a certain amount of memory, but you may add more memory as necessary.

The memory is divided among blocks or “memory clients,” each of which is dedicated to a specific printing and application purpose. Your QMS 860 Print System allows you to distribute the printer’s memory among the various memory clients where it can best serve your specific printing needs. The following sections provide information on memory management so you can get the most from your printer.

Generally, there are two main reasons for wanting to reconfigure your printer’s memory:

- To achieve maximum performance
- To enable additional features

The ability to configure your printer’s memory does not necessarily mean that you must change your current configuration. If you are presently using all the features you need, and the printer is performing efficiently, you should not feel compelled to reconfigure your printer’s memory. Just remember that if your

printing needs change, not only do you have the ability to increase the amount of printer memory, but you also can redistribute it where you feel it would best meet your printing requirements.

## **QMS Memory Management**

Managing the memory on your printer is much the same as managing your personal income. In money management, you have a certain amount of income and many ways of spending that income. You decide where that money goes according to what is important to you. There is no single correct way to manage money, but there is one best way for you according to your financial obligations. Just as long as your method works for you.

The same is true for managing the memory on your printer. There is no single correct way for everyone to allocate available printer memory. There is, however, a best way to configure your printer's memory for maximum efficiency in your specific printing environment. For example, if you use a large number of PostScript fonts of various point sizes, you may want to increase the amount of memory allocated to the area specified for PostScript fonts. Or you may want to increase memory to the area that minimizes slowdowns when collating large print jobs.

Memory configuration affects these things as well as the number of jobs that can be accepted by the printer, the number of options available simultaneously, the number of downloadable fonts and emulations that can be stored, and overall printer performance.

## Memory Terms

Before you can configure your printer's memory efficiently, you must first understand the different types of memory and how they work together. This user's guide uses the following memory terms:

### Memory

Memory allows your printer to store and retrieve information. It is the space within your printer where information is stored while being actively worked on.

### Memory Clients

A memory client is a block of memory dedicated to a specific function. Each memory client controls certain features. When insufficient memory is allocated to a specific client, the features it controls may not be accessible.

### Excess Memory Client

The memory remaining after providing all the other memory clients with their specified amounts of memory is automatically added to the excess memory client. The frame buffer is the excess memory client on your QMS 860 Print System.

### Storage

Storage is a device in or on which information can be kept. There are three main types of storage, ROM, RAM and hard disk drives. ROM stores read-only data, RAM represents temporary storage, and hard disk drives hold information on a more permanent basis (see the following definitions).

## **ROM (Read Only Memory)**

This type of memory contains data and/or machine-executable instructions that can be read but not modified. On your QMS 860 Print System, the operating system code, resident fonts, and resident emulations are stored in ROM. This information is not lost when the printer's power is turned off.

## **RAM (Random Access Memory)**

RAM is the memory your printer uses to perform each task. It can be written to and read from. Once a task is complete, the memory is free again to be used for another file. This memory is volatile, so if your printer loses power while a file is being sent, you must resend the file. The number and type of features you can run on your printer simultaneously depend on the amount of RAM you have and how that RAM is distributed. Your printer comes with 12 MB of RAM, upgradable to 32 MB by adding Single In-line Memory Modules (SIMMs).

## **RAM Disk**

Also called a virtual disk, the RAM disk is an area of RAM that is used to simulate an additional hard disk. Data can be written and read more quickly than on a hard disk, but a RAM disk loses any information stored on it when the printer's power is turned off. The frame buffer and spooling buffer are RAM disk clients.

## **SCSI (Small Computer System Interface)**

Pronounced "scuzzy," the printer's SCSI port allows you to connect up to seven hard disks, providing storage for fonts, emulations, and other files. Hard disks are also used to increase the

amount of collation that can be accepted and provide a secondary storage area for spooled data, while providing virtual memory capabilities.

## **Non-volatile Memory**

The options you select in your printer's Configuration menu—such as emulations, memory settings, and input bins—are saved to non-volatile memory. This means that when you turn off your printer's power, you do not lose this information.

## **Volatile Memory**

This type of memory can be lost when the printer loses power. For example, most RAM is volatile.

## **Physical Memory**

The physical memory on your printer is equal to the amount of RAM installed.

## **Virtual Memory**

Virtual memory extends the effective size of the printer's memory by using a disk file or swap file to simulate additional memory space. It enables the hard disk to accept data swapped from RAM to free temporarily the RAM for other tasks.

Your printer supports virtual memory for the spooling buffer and the display list only.

## **Spool (Simultaneous Print Operations On Line)**

Spooling is temporary storage to hold print jobs until the printer is available to process them.

## **Evaluation of Your Printing Environment**

The first step in allocating your printer's memory is to define your printing needs. Each of your printer's features requires a minimum amount of memory. If you use a feature, you must allocate enough memory to the client which controls it. On the other hand, if there are features you do not use, you can move excess memory in the clients which control the unused features to other clients that need additional memory.

### **Evaluation Questions**

To get a better idea of what your printing requirements and your printer's capabilities are, answer the following questions:

1. How much RAM does your printer have (standard and additional memory)?
2. Do you have the option of installing additional memory if it is needed?
3. Does your printer have an internal hard disk? If so, what size?
4. Does your printer have any external hard disks connected? If so, how many and what size?
5. Which resident emulations will you be running?
6. Will you be loading any non-resident emulations to memory? If so, how many and which ones?

7. How many printer ports will be connected?
8. Do you have an optional network interface connected?
9. How many people will be using this printer simultaneously?
10. How many downloadable fonts will you be using? What sizes? From which emulation?
11. Will you use many different sizes of fonts/typefaces?
12. How large will the files be that you are printing? How large is the largest file you will be printing?
13. Are most of your files text, or are any graphics intensive?
14. Will you want to download fonts, forms, or operators to memory?
15. Will you be collating documents? If so, how large and complex will these documents be?
16. What paper sizes will you be using?
17. Will you be printing at 600 dots per inch (dpi)? (if applicable)

After you have answered all of these questions, read the following sections to see how to use Quick Config, or if you plan to manually configuring your memory, which memory clients control the features you plan to use and which memory clients control features you do not need.

## Quick Configuration

This option is also known as Quick Config on the control panel. If you are uncertain about how to configure your printer's memory, use only the quick configuration option. Or use quick config as a starting point before trying to manually configure your printer's memory.

Quick config provides a simple method of defining how much memory should go to each of the clients for the most complicated conditions in your environment. This option asks you to specify the largest paper size used, and the highest resolution used. It then transfers memory to the clients that require it to perform these functions. Any extra memory is allocated to the printer's excess memory client.

**NOTE:** The printer does not allow you to choose features that do not work with the amount of memory currently installed on your printer.

Use quick config any time your printing needs change or when additional memory is installed. Keep in mind that using quick config does not change the paper size or resolution you are using. These settings just ensure you have enough memory allocated to the appropriate clients to perform these functions when requested.

## Memory Clients

Memory clients are blocks of printer memory that are dedicated to a specific purpose. Each of the memory clients is located in the Configuration / Administration / Memory menu. When you allocate memory to a specific client through the control panel, it is allocated in kilobytes (KB). Each time you make changes in the Administration / Memory menu, print out a status page to confirm the memory reallocation. The sizes listed on the status page are in bytes, so you must divide the numbers on the status page by 1024 to get the equivalent number of kilobytes entered through the control panel.

**NOTE:** The value for each memory client must be divisible by 4 KB. Therefore, if a value is entered that is not evenly



divisible by 4 KB, it is automatically converted to the next lower value that is divisible by 4 KB. For example, if you enter 102 KB, the actual value is lowered to 100 KB, assuming there is enough memory available to allocate to this client. See chapter 4, the “Administration / Memory” section, for the minimum and default settings for each memory client. The amount shown on the status page will then be 102,400 (100 x 1024).

## **Frame Buffer**

Also known as K Mem Framebuff, the frame buffer memory client holds rasterized or bitmapped images of page faces which are ready to be sent to the physical print engine. Any task that affects the page faces—such as increasing paper size or printing at a higher resolution—may require increasing the amount of memory allocated to this client to boost print speed and overall system throughput. If not enough memory is allocated to this client, memory is taken from the display list to complete a print job.

A frame holds the contents of a single page image. Because the frame buffer memory is so critical to the actual printing of a page, its allocation takes precedence over that of other memory clients. Therefore, you cannot set the frame buffer to an amount smaller than that required to image a page of the selected size.

The number of frames needed to print at engine speed is engine specific and depends on what paper size you are using, and at what resolution. For example, printing at 600 dpi requires four times the amount of memory in the frame buffer than does 300 dpi.

## Calculating the Frame Buffer Size

The following formulas should help you determine the minimum number of kilobytes required in the frame buffer for any printing situation. Your printer requires additional memory in the frame buffer to print at rated speed.

paper feed width (inches) x horiz. resolution (dpi) ÷ 8 = scanline width (bytes)  
paper feed length (inches)x vert. resolution(dpi) = number of scanlines  
scanline width (bytes) x number of scanlines = total frame buffer memory (bytes)  
Bytes ÷ 1024 = KB

For example, if you are printing a 8½" x 11" page at 600 x 600 dpi, with the short edge of the page fed into the printer first, your equations would look like this:

8.5 x 600 ÷ 8 = 638 bytes (scanline width)  
11 x 600 = 6,600 (number of scanlines)  
638 x 6,600 = 4,210,800 bytes or 4,113 kilobytes  
(4,210,800 ÷ 1024 = 4113 KB)

**NOTE:** If you do an equation for printing at 300 x 300 dpi and want to change it to 600 x 600 dpi, you can just quadruple the frame memory size (double the resolution for both the vertical and horizontal edge of the page).

## Special Considerations

The frame buffer memory client is considered the excess memory client for your printer. You can manipulate this client by taking memory from other clients since any extra memory that is not allocated elsewhere is allocated to the frame buffer. For example, you can add memory to the frame buffer by reducing the amount of memory dedicated to other memory clients, such as the

emulation client. After changing the memory configuration, print a status page to ensure the frame buffer has enough memory.

## **Display List**

Also known as K Mem Display, this client shares its memory with the excess memory client. The display list stores compressed representations, or blocks, of the pages to be printed. It takes approximately 1 compressed block for a normal 8 $\frac{1}{2}$ " x 11" text page, 4 compressed blocks for an 8 $\frac{1}{2}$ " x 11" page that includes some graphics, and as many as 500 compressed blocks for an extremely complex page.

Many pages of compressed blocks belonging to multiple print jobs can be stored at the same time in the display list. If enough memory is allocated to this memory client, a page can always be ready to print as soon as another page has been imaged to the print engine.

Your printer takes approximately 64 KB of memory from the display list for each compressed block.

Increasing the amount of memory in this client may improve printing throughput and minimize slowdowns due to collating or printing complex pages. If not enough memory is allocated to this client, memory is taken from the excess memory client to complete a print job.

## **PostScript Font Cache**

Also known as K Mem PS Fonts and Font Cache, this memory client stores bitmapped representations of previously scaled PostScript fonts. This process reduces the number of times a font must be converted from outline form to bitmap form. Printing pages

that have characters already stored in the font cache is immensely faster than printing characters not yet in the font cache.

As the font cache memory fills, the printer erases bitmapped characters that have been in the cache longer than the others without being used to make room for new characters. By increasing the memory allocated to this client, the printer can store more characters and spend less time erasing and replacing characters in the cache.

Normally, you do not need to change this memory client unless you use a large number of fonts at various point sizes. If you do, you may allocate additional memory to this client to improve printer performance. There is no specific formula to use in figuring the amount of memory required by the font cache, but after a certain point, large font caches cause the printer to take longer to print than smaller font caches because of the search time through the cache. The recommended font cache size is in the following ranges:

- 128 KB to 256 KB for 300 dpi printing
- 256 KB to 512 KB for 600 dpi printing

You should experiment to see what font cache size works best for you.

## **PS Heap**

Also known as K Mem PS Heap, PostScript VM, and Virtual Memory, this client holds downloaded fonts, PostScript operators, and forms.

Inefficiently coded PostScript jobs can consume an infinite amount of virtual memory or leave objects in the PostScript heap after the

print jobs are completed, leading to virtual memory errors. If not enough memory is allocated to the PS heap, the job cannot print.

Increasing the memory allocated to this client allows more complex jobs to print and increases the number of fonts that can be downloaded to virtual memory. However, this client should be increased only if you receive a virtual memory error when attempting to print a job or download a font and only in small increments until the error message goes away. Excess memory in the PS heap is not being used.

## **Emulation**

Also known as K Mem Emulation, this client is used to store any optional emulations, such as CCITT or LN03 Plus. Increasing this client's memory allows more complicated non-PostScript jobs to print and allows larger, optional emulations or multiple emulations to be loaded and ready to process jobs.

If an emulation is loaded to process a print job and there is not enough memory in the emulation client, another emulation already loaded may be unloaded automatically to obtain enough memory. If you notice a delay in printing between jobs that have different non-resident emulations, it is possible that the emulations are having to reload each time they are run. Adding to the emulation client may eliminate the unloading and reloading of these emulations and, consequently, increase throughput.

Also, increase the emulation client if you are printing complex non-PostScript jobs that may require more memory to process correctly.

## Temporary Emulation

Also known as K Mem Emul Tmp and Emulation Temporary, this client sets the amount of system memory to be used by non-PostScript emulations for storing downloaded fonts, forms, and macros. By dedicating a portion of memory to this client, your printer can perform “context switching,” which is the ability to retain downloaded fonts and forms even after the printer changes from one emulation to another. Context switching prevents unnecessary repetitive downloading and traffic congestion on networks.

Normally, this memory client does not need to be changed unless you plan to download many different non-PostScript fonts.

## Spool Buffers

Also known as Host Input and K Mem for Spool, this memory client stores incoming data from all the interfaces until the physical print engine can print the job. When enough memory is allocated to this client, the host becomes free more quickly, and the number of jobs that the printer can accept simultaneously is increased. You should consider the amount of data being sent simultaneously when allocating memory to the spool buffer. If available, a hard drive can supplement this client with additional memory needed for spooling. See the “Hard Disk Management” section later in this appendix.

**NOTE:** While increasing this client is beneficial in reducing network traffic, throughput speed is not necessarily increased.

## **Disk Cache**

This memory client stores frequently used data in system memory instead of continually storing and retrieving it from a hard disk. If a hard disk is used and a lot of disk access is required, adding memory to the disk cache may increase the printer's performance. For example, if many fonts are stored on disk, faster access to these fonts is achieved by increasing the disk cache size. Conversely, if no hard disk is used, the disk cache should be set to zero until a hard disk is installed.

## **MB Printer Mem**

On your printer, this field shows the number of megabytes of RAM that is available to be split among the various memory clients when disk swapping is turned off.

## **System Memory**

Also known as System Use, this non-configurable client is the amount of RAM that is used to run the printer's operating system. It is never increased or decreased. The system memory subtracted from the total amount of RAM identifies the amount of RAM available for all the other memory clients.

## **Hard Disk Management**

You can add up to seven external hard disks to your printer. These hard disks serve as secondary storage places for such items as downloaded fonts, emulations, and spooled data. External hard disks also increase the number of pages that can be collated before chunk collation begins.

## **Virtual Memory Support**

Your printer supports virtual memory capabilities for the spooling buffer and the display list clients when a hard disk is installed and disk swapping is enabled.

Once you have a hard disk installed on your printer, it has virtual memory capabilities for specific memory clients, extending the amount of memory available for certain supported features. Your printer supports spooling overflow, which is an extension of the K Mem for Spool memory client, collation, and it has a hard disk. You can dedicate part of that disk for collation overflow or as an extension of the display list memory client.

### **Spooling Overflow**

The spool overflow option is located in the Administration / Disk Operations menu. This option specifies the maximum space reserved for spooling overflow on the hard disk.

When a print job is sent to your printer, a portion of that job is stored in the spooling buffer (K Mem for Spool) while the rest of the job is being printed. If all the memory in the spooling buffer is being used and the Spool Overflow option is enabled, the printer stores the “overflow” from the spooling buffer in a reserved area of the hard disk. Even if you have a hard disk, you should allocate as much RAM to the spool buffer as possible for increased throughput.

Reserving a 10-20 MB portion of the hard disk for spooling overflow works well for most printing environments. If too much of the disk is dedicated to spooling, the printer’s performance may actually be hindered because the printer tries to fill the overflow space before passing the job to the processor.



## **Collation**

Your printer supports collation, the collation overflow option is located in the Administration / Disk Operations menu. This option specifies how much of a hard disk is dedicated to collation overflow.

This feature works in the same manner as the Spool Overflow option. If, when the printer is collating a print job, all the display list memory is being used and the Collation option is enabled, the printer shifts some of the display list storage to the hard disk.

If both the display list and the collation overflow memory are completely exhausted during a single print job, the printer automatically begins “chunk collating.” For chunk collation, the printer prints and collates portions of the job instead of the entire job at once. For example, if all the collation memory is consumed by 50 pages of a 90-page job, the printer may print and collate pages 1 through 50 before continuing with pages 51 through 90.

**NOTE:** Chunk collation begins automatically after 100 pages regardless of the size of collation memory.

## **Specific Printing Environments Examples**

Since configuring memory is not an exact science, it may be helpful to see how others in various printing environments have allocated their printer memory to meet their printing needs best. The following examples are to be used only as a guideline for configuring your own printer’s memory.

## Example

A QMS 860 Print System with 12 MB of RAM and no hard disk. As many as 35 people use this printer, sending text and graphics PostScript files to be printed on 8½" x 11" and 11" x 17" paper. They have configured their printer to print at 600 dpi.

This is what their Current Memory Configuration box on their status page looks like:

<b>Location</b>	<b>Size</b>
Host Input:	196608
Display List:	262144
Font Cache:	241664
Framebuffer:	8355840
Emulation:	524288
Emulation Temporary:	262144
Virtual Memory:	1223737
System Use:	1516487
Total Memory:	12582912
VM allocated:	112496
VM remaining:	1111241
Paper Size:	11" x 17"
Resolution:	600

## **End Job Mode on Your QMS 860 Printer**

When sending print jobs through the serial and parallel protocols, some applications and their printer drivers append an end-of-document command (EOD) to each print job to ensure that each file prints correctly. The reason for this is that some protocols and print queuing systems send print jobs to the printer as one continuous data stream (one print job immediately following another).

But the problem with this system is that some applications are limited by the printer language and are unable to produce an EOD command. This becomes even more problematic when you are printing to a QMS 860 Print System an emulation sensing processor (ESP) where print jobs of any supported emulation can be intermixed. ESP technology examines the first part of each print job to determine its emulation. Once the emulation is identified, the print job processes without further checking. This minimizes any slowdown resulting from the sensing process. To help ESP technology determine the proper emulation of successive print jobs, the printer must be able to identify the end of job for each job.

Therefore, unless a wait timeout (the amount of time the printer is waiting on data from the host) occurs and ends each print job, or unless you add an EOD command between each file being printed through these protocols, some print jobs may be interpreted by the printer as one job and may “run” together. See chapter 4, the “Administration/Communications Menu” section, for more information on emulation timeout.

When printing multiple jobs with little or no time delay and with no EOD command between each job, the serial and parallel protocols may be unable to detect an end of job automatically. So the End Job Mode feature on QMS Crown printers was designed

to allow you to set the end of document for print jobs being sent through these protocols.

## **Common Reasons to Use End Job Mode**

If you are printing via the serial and parallel protocols, and one of the following conditions exists, you may need to set the end job mode:

- Multiple print jobs with little or no time delay and with no EOD commands have been sent to the printer and the message window displays only one active job.
- Multiple print jobs of the same printer language have been sent to the printer and they print on the same page. (For example, you send the AUTOEXEC.BAT file with no EOD command followed with little or no time delay by the CONFIG.SYS file, and they both print on the same page.)
- Multiple print jobs of different printer languages “run” together as if they are a single print job. (For example, you send a PCL print job followed by a PostScript print job, and the PCL job prints and is followed by what appears to be program code instead of your PostScript print job.)
- You want to print multiple jobs with header pages.
- You want to print multiple jobs where job separation is important.

When your printer is in ESP mode, printing multiple jobs through the serial and parallel protocols and end job mode is not set, ESP technology interprets the emulation for only the first job. The print jobs that follow are interpreted as being the same emulation as the first job. For example, if there are two print jobs, the first a PCL file with no EOD command, and the second a PostScript file with

a Ctrl-D (a PostScript end-of-file character)—ESP technology interprets the emulation of the first job correctly. But since the first print job has no EOD command, it “runs” into the second job, and even though the second job is PostScript, it prints in PCL.

## **Using the EOD Commands**

Since the serial and parallel protocols may not be able to detect an EOD automatically, due to a lack of an EOD command in some printer languages, you can insert an EOD command at the end of your file to tell the printer where your print job ends. QMS Crown printers recognize two end-of-document commands: QMS EOD and HP EOD. These commands are functionally the same. They enable data stream sensing for the EOD command, allowing your host computer to control print job separation. The QMS EOD and the HP EOD commands perform an end of document for all of the printer emulations supported on your QMS Crown printer (such as PostScript, HP-GL, HP PCL, CCITT, and LN03+). See your system administrator or applications development department to have them identify the standard EOD command for your organization, or to have them select a standard EOD command.

## **Setting the End Job Mode for the Serial and Parallel Protocols**

Your printer can be connected through the serial or parallel interface to a stand-alone PC, to a PC print server, or to some other type of print queuing system. This section provides a quick guide to the steps needed to set the end job mode for each environment. The following sections provide more detailed information for each step.

### **Stand-Alone PC**

1. Set the end job mode from the printer's control panel.
2. Add the EOD command to your file.

**NOTE:** If using steps 1 and 2 are not feasible in your stand-alone PC environment, you can alternatively use a program that either causes an emulation timeout or that inserts an EOD command between each print job. See your QMS vendor for more information on this type of program.

### **PC Print Server**

1. Set the end job mode from the printer's control panel.
2. Create a job separator to append an EOD command and send it between each print job.

### **Other Print Queuing Systems**

If you use a print queuing system other than a PC print server and you experience what appears to be an EOD command problem, you may need to use another procedure, such as a print utility, an initialization sequence, or a header page to add an EOD command. See your print queuing system documentation, your network administrator, or your QMS vendor for more information.

## **How to Set the End Job Mode via the Control Panel**

Use the following procedure to set the end job mode from the printer's control panel for printers connected via the serial or parallel interface to a stand-alone PC, a PC print server, or some other type of print queuing system:

**NOTE:** If you print both serial and parallel protocol jobs, then you must set the end job mode for each protocol.

Wait for the printer to go idle, and then press the control panel keys in the order shown in the following instructions to access the End Job Mode option. The printer responds by displaying a status message in the message window. You may need to press the Next key one or more times to advance through the list of selections or options.

<b>Control Panel Keys</b>	<b>Message Window</b>	<b>Printer Response</b>
<b>ONLINE OFFLINE</b>	IDLE	Takes the printer off line. The Online/Offline indicator goes off.
<b>MENU</b>	CONFIGURATION OPERATOR CON- TROL	Accesses the Configura- tion menu.
<b>NEXT</b>	CONFIGURATION ADMINISTRATION	Advances through the Configuration menu selec- tions.
<b>SELECT</b>	ADMINISTRATION COMMUNICATIONS	Accesses the Administra- tion / Communications menu.
<b>NEXT</b>	COMMUNICATIONS PARALLEL or SE- RIAL	Advances through the Communications menu selec- tions until the protocol you want displays.
<b>SELECT then NEXT</b>	PARALLEL (or SERIAL) END JOB MODE	Accesses the Communica- tions / Parallel or the Com- munications / Serial menu and displays the End Job Mode option.

<b>SELECT then NEXT</b>	END JOB MODE OPTION	Access End Job Mode and advances to the selected End Job Mode option. <i>OPTION</i> is the End Job Mode option you want (QMS EOD, HP EOD, or NONE).
<b>SELECT</b>	PARALLEL (or SERIAL) END JOB MODE	Returns to Parallel or Serial / End Job Mode.
<b>ONLINE/ OFFLINE</b>	SAVE CHANGES? NO	Exits from the End Job Mode menu and prompts you to save changes.
<b>NEXT</b>	SAVE CHANGES? YES	Advances to the next save changes option.
<b>SELECT</b>	IDLE	Saves the changes and returns the printer to idle.
<b>ONLINE/ OFFLINE</b>	IDLE	Turns on the indicator and puts the printer back on line.

## Adding an EOD Command to Your File

When adding an EOD command to your file use the syntax for the selected EOD command exactly as written (the command's syntax is case sensitive).

**NOTE:** represents the escape character. (The decimal value for the escape character is 027, and the hexadecimal value is 1B.) How you enter the escape character depends on your application. Some applications allow you to press and hold the ALT key and then type 027 to enter the escape character, while others allow you to type certain character sequences to represent the escape character.



See your computer or application documentation to find out how to enter the escape character on your system.

<b>For EOD Command</b>	<b>Use Syntax</b>
QMS EOD	%%EndOfDocument
HP EOD	<ESC>%-12345X

When the QMS EOD or the HP EOD is set, the printer does not recognize the Ctrl-D EOD command. Add your organization's standard EOD command to the end of your print file, or add it to a separate file as follows:

■ **Add an EOD Command to the End of your Print File**

Create an output file (for example, ASCII, PCL, or PostScript file to disk) and add your organization's standard EOD command (QMS EOD or HP EOD) to the end of that file.

Sample output file:

```
Text
Text
Text
Text
%%EndOfDocument
```

■ **Add an EOD Command to a Separate File**

Create an ASCII text file that contains only the EOD command. For example, create a DOS batch file listing each print filename followed by the EOD command filename for each file being printed. Then "run" the batch file to print your list of files.

Sample DOS batch file:

```
Print mktg.doc(print job filename)
Print end.txt(EOD command filename)
```

```
Print acct.doc(print job filename)  
Print end.txt(EOD command filename)
```

## Creating a Network Job Separator

If your printer is connected to a network through a PC and the PC is acting as a print server managing the printing of shared network files, then your system administrator must create a job separator and associate it with a print job queue. Different network environments have different procedures for creating the job separator, such as initialization sequences, custom banner pages, print job headers, or print job trailers. The print server does not necessarily send multiple print jobs to the printer in the order that you queued them to the printer. The network job separator is accessed with each print job, so this ensures that network job separation is enforced. See *QMS Crown Network Notes*, an optional manual available from your QMS vendor, for more information on how to create a network job separator for several commonly used networks.

## PS Protocol

Your QMS 860 Print System supports a new protocol for communication between the printer and a host computer over a serial, parallel, or optional interface connection. This new protocol is called PS protocol. This binary communications protocol allows any 8-bit binary value (0-255) to be treated as data, while allowing a few of the values to function as special control characters. When communicating 8-bit binary data in binary or binary fixed mode, the printer uses the quoting mechanism of the binary communications protocol (BCP) to distinguish between the special control characters and print job binary data.

To differentiate data from the special control characters, any data that is the same as one of the following special control characters must be quoted.

<b>ASCII Keyboard</b>	<b>ASCII Name</b>	<b>ASCII Hex</b>	<b>Control Function</b>
^A	SOH	0x01	Quote data character
^C	ETX	0x03	Abort job and flush to end of file
^D	EOT	0x04	End-of-file marker
^E	ENQ	0x05	(Reserved for future use)
^Q	DC1	0x11	XON in XON/XOFF flow control
^S	DC3	0x13	XOFF in XON/XOFF flow control
^T	DC4	0x14	Job status request
^\ ^	FS	0x1C	(Reserved for future use)

A data byte is quoted by replacing it with a two-character sequence. The first character is a ^A (ASCII hex 0x01), and the second character is the character itself XORed with the ASCII value 0x40. For example, to send the value 0x14(^T) as data, send the two-character sequence 0x01 0x54 (^a T) instead. (ASCII “T” is the result of XORing ^T with 0x40).

This method of quoting guarantees that whenever the printer receives any of the eight control characters, the control function is intended regardless of whether the preceding character is a ^A. Any data byte not equal to one of the eight special control characters is transmitted by sending the data byte. For more information on BCP and quoting, see the *PostScript Language Reference Manual* (Adobe Systems, Inc., Reading, MA: Addison-Wesley, 1990, ISBN 0-201-18127-4), the “Adobe Serial and Parallel Communications Protocols Specification” (in *Adobe Developer Support*. Adobe Systems, Inc., February 14, 1992), and the “PostScript Language Reference Manual” (in *Supplement for Version 2011*, Adobe Systems, Inc., January 24, 1992).

## Advantages

The main advantage of using the Binary and Fixed Binary PS protocol modes when sending binary data is that these modes compress the data stream allowing your documents to be smaller so you can send smaller jobs to the printer. For example, some device drivers can format bit map images as binary data instead of as ASCII hex data.

## Implementation

To implement PS protocol for sending binary data on your system you need a device driver available with some applications or operating systems, or you can alternatively use a program to read the data and write out the quoted characters. See your QMS vendor for any available information on device drivers or binary filter programs.

## HP-GL Emulation Color Encoding Equation

The term “pen” in the HP-GL emulation refers to a logical pen (i.e., the current pen position) rather than a physical pen on a plotter. A pen and a pen color are selected to draw images. This emulation supports 8 pens and pen colors. Since your QMS 860 Print System is a monochrome (black and white) printer, the pen colors are converted to shades of gray. The color mappings for the 8 pens are as follows:

<b>Pen</b>	<b>Pen Color</b>	<b>Level of Gray</b>
1	Black	100%
2	Black	100%
3	Red	70%
4	Green	41%
5	Blue	89%

6	Violet	59%
7	Orange	25.8%
8	Brown	50%

**NOTE:** The color for both pen 1 and pen 2 is black. However, the pen width (thickness in tenths of millimeters) for these two pens is different. Pen 1 is 7 mm and pen 2 is 3 mm.

The printer maps each pen to its assigned color, then converts the color to a grayscale using the National Television System Committee (NTSC) standard equation for encoding color. This equation converts a given set of CMYK values to grayscale. For the 8 pen colors assigned to pens 1 - 8, the printer uses the designated grayscale; for any other pen color, the printer uses the following equation:

$$[(C*0.3) + (M*0.59) + (Y*0.11) + K] \div 255$$

**NOTE:** This equation assumes that each grayscale is a byte value that ranges from 0 to 255 (100%). If the sum of the left-side (calculation in brackets) of the NTSC equation is greater than 255, then the sum is set equal to 255.

**Example:**

Any color can be reproduced by using some combination of CMYK. If you have defined the following CMYK values for the color brown in your application, the NTSC equation that follows shows you how the percentage of grayscale for the color is derived.

**CMYK Value**

C (96)  
M (128)  
Y (224)  
K (0)

$$[(96*0.3) + (128*0.59) + (224*0.11) + 0] \div 255 =$$

$$[(28.80) + (75.52) + (24.64) + 0] \div 255 = 50\%$$



# *Appendix G*

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## **Manual Notices**





## Manual Notice

QMS, Inc. reserves the right to make changes to this manual and to the equipment described herein without notice. Considerable effort has been made to ensure that this manual is free of inaccuracies and omissions. **However, QMS, Inc. makes no warranty of any kind including, but not limited to, any implied warranties of merchantability and fitness for a particular purpose with regard to this manual.** QMS, Inc. assumes no responsibility for, or liability for, errors contained in this manual or for incidental, special, or consequential damages arising out of the furnishing of this manual, or the use of this manual in operating the equipment, or in connection with the performance of the equipment when so operated.

## Laser Safety

This printer is certified as a Class 1 laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

Since radiation emitted inside the printer is completely confined within protective housings and external covers, the laser beam cannot escape from the machine during any phase of user operation.

## FCC Compliance

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

installed and used in accordance with the user documentation, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

**WARNING!** To prevent electrical shock, do not remove any covers from your printer unless you are a qualified QMS service technician.

**ACHTUNG!** Zur Vermeidung von Verletzungen durch Stromschläge dürfen die Abdeckungen im Drucker nicht entfernt werden. Dies sollte nur bei Bedarf durch einen QMS Servicetechniker erfolgen.

---

CAUTION: Any modifications or changes to this product not expressly approved in writing by the manufacturer responsible for compliance to Federal Regulations could void the user's authority to operate this product within the Laws and Regulations of the Federal Communications Commission.

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**NOTE:** A shielded cable is required to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules.

## **Canadian Users**

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques (de la classe B) prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

## **Vfg 1046/1984 Conformity Statement**

Hierdurch bescheinigen wir, daß dieses Produkt in Übereinstimmung mit Postordnung 1046/1984 ist und RFI unterdrückt ist. Die Geschäftslage und der Verkauf diese Geräte auszuprobieren, mit der Übereinstimmung und der Regierung zu bestätigen, wurde der Deutschen Bundespost gegeben.

## **Bescheinigung des Herstellers/Importeurs**

Hiermit wird bescheinigt, daß QMS 860 Print System in Übereinstimmung mit den Bestimmungen der Vfg 1046/1984 funkentstört ist. Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

QMS Inc., Mobile, AL

## **Declaration of Manufacturer/Importer**

We hereby certify that the QMS 860 Print System is in compliance with Vfg 1046/1984 and is RFI suppressed.

The marketing and sale of this equipment was reported to the German Postal Service.

The right to retest this equipment to verify compliance with the regulation was given to the German Postal Service.

QMS Inc., Mobile, AL

## **Electronics Emissions**

Your printer complies with the Electronics Emissions Requirements of the German Federal Minister for Postal and Telecommunication Technology regulation:

Vfg 1046/1984

Your printer complies with the Electronics Emissions Requirements of the European Economic Council directive:

82/499/EEC

## **Colophon**

This manual was written using WordPerfect, illustrated using Adobe Illustrator and Micrografx Designer, and formatted using Ventura Publisher. Typefaces chosen are Times, Helvetica, and Courier. The manual was printed in camera-ready form on a QMS printer.



# Glossary

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**AppleTalk** A network communication system (and any software supporting it) used by Macintosh systems, by printers, and often used by print networks.

**Application** Any word processing or special program that can be installed in your computer's memory. WordPerfect, Lotus 1-2-3, and Microsoft Word are examples of applications.

**ASCII** An acronym for American Standard Code for Information Interchange. This coding scheme assigns numeric values to character data (letters, digits, or symbols).

**AUTOEXEC File** A special-purpose batch file (set of commands) that is automatically executed when an operating system is started up. The DOS version of this file is called AUTOEXEC.BAT.

**Baud Rate or Baud** The data transfer rate between the computer and the printer. The computer and the printer must be configured at the same baud rate. It can be set from 300 to 38,400 baud, depending upon the type of computer used.

**Binary** A base 2 number system written with the digits 0 or 1.

**Bit** An acronym for binary digit. The bit is the most fundamental unit of information that a computer can accept. It has two states called 1 (one) and 0 (zero), or on and off, and can be used to represent a yes/no type of statement.

**Bitmap** A grid composed of small dots used to define an image, line drawing, or character. See also *raster graphics*.

**Boolean** A method of expressing the logical relationships between entities such as propositions or on-off computer circuits. This method was invented by the nineteenth century English mathematician George Boole.

**Buffer** Storage space used to compensate for a difference in rate or sequence of data flow when transmitting data from one device to another.

---

**Cancel Key** The Cancel key cancels a print job or sends an end-of-job indicator to a print job waiting for incoming data. It is not necessary to take the printer off line first.

**Cards (Font or Emulation)** Cards the size of a credit card containing fonts or emulations which supplement the printer's internal, resident fonts or emulations. For a complete list, contact your QMS vendor.

**Character** Any letter, digit, or symbol.

**Character Set** A collection of characters.

**Command** An instruction that tells the printer to perform a certain function. Commands are sent from the host computer to the printer via the interface cable when the printer is on line.

**Controller** The software that controls the engine of a printer. The controller is the intelligence of the printer.

**Concurrent Interfaces** Interface ports that are all active simultaneously. This gives you the ability to print all three ports concurrently rather than be restricted to one. See *Simultaneous Interface Operation*.

**Configuration** The process of specifying certain settings to allow your computer and printer to communicate properly. For example, interface selection (serial or parallel) is part of printer configuration. The computer is configured through MODE commands in the AUTOEXEC.BAT file.

**Connector Box** A piece of equipment consisting of a small box with a built-in cable that links the printer to the AppleTalk cable system.

**Crown** A multitasking operating system architecture developed by QMS and used in the QMS 860 Print System.

**Daughterboard** A printed circuit board that attaches to another circuit board (often the main system board, or motherboard) to provide additional functionality or performance.



---

**Default** A printer control panel setting used in the absence of a application selection. See also *factory default*.

**Document** A text or graphics file created by a user with an application program.

**DOS** An acronym for Disk Operating System, which is a program that instructs a disk-based microcomputing system to schedule and supervise work, manage computer resources, and operate and control peripheral devices.

**Download** Transfer information from one device to another. Downloaded fonts are not built into the printer. They are transferred from the computer and stored in the printer's memory temporarily. They disappear from the printer's memory when the printer is turned off.

**dpi** An acronym for dots per inch, which is a measurement unit used to indicate printer resolution. Your QMS 860 Print System has 300 and 600 print resolution.

**DTR/DSR** An acronym for data terminal ready and data signal received, DTR/DSR is a hardware-controlled protocol. It controls the flow of data via signals on the DTR/DSR line, as opposed to XON/XOFF protocol, which is software controlled.

**EEPROM** Electrically Erasable Programmable Read Only Memory, a variation of EPROM that can be erased by applying an electrical signal to one or more pins. See also EPROM.

**Electrophotographic Drum** This is a drum in the EP cartridge that is sensitive to both light and electricity. It is used in the creation and transfer of images to the printed page. See also *EP cartridge*.

**Emulation** The ability of the printer to respond to commands that are intended for a different type of printer. For example, when the printer is set for LaserJet Series II emulation, it responds to the same commands (HP PCL) that a LaserJet Series II printer does.

**Engine** The part of a printer where the paper is physically processed and printed. It is the body and internal components that house the controller.

---

**EPROM** Erasable Programmable Read Only Memory. EPROMs are nonvolatile memory chips that are programmed after they are manufactured.

**EP-B Cartridge** The EP-B (electrophotographic) cartridge contains a photosensitive print drum and a supply of toner. Because the drum is photosensitive, it must be protected from exposure to light. The cartridge, which prints an average of 8,000 text-only pages, is replaceable.

**ESP Technology** Emulation Sensing Processor technology, using a form of artificial intelligence, analyzes incoming file data from any of your printer's interfaces, selects the appropriate printer language from those installed on the printer, and processes the print job. ESP technology works with most popular commercially available applications.

**Escape Character** The escape character, Hex 1B, Decimal 27, is a special character used to identify a printer command. It is usually not a printable character; instead, it is used as a preface for printer command codes.

**Escape Sequence** HP PCL printer commands are also called escape sequences. They begin with an escape character.

**Excess Memory Client** The memory remaining after providing all the other memory clients with their specified amounts of memory is automatically added to the excess memory client. The frame buffer is the excess memory client for your QMS 860 Print System.

**Expansion, RAM** See *memory upgrade*.

**Factory Default** Factory defaults refer to the printer settings that are programmed into the printer at the factory. These settings are used unless they are overridden with printer commands sent through the applications or PS Executive Series Utilities.

**Field** A collection of characters that have meaning.

**Fixed Spacing** Uniform horizontal spacing between characters and symbols in a font composed of characters of uniform width is called fixed spacing. For example, in fixed spacing an "i" has the same space allotment as a "w."

---

Fonts with fixed spacing have a specific number of characters per inch called pitch. See also *pitch* and *proportional spacing*.

**Font** A complete character set in one typeface or style.

**Font Cards** Font cards contain fonts which can supplement the printer's internal, resident fonts to increase the variety of available typefaces. See also *cards (font or emulation)*.

**Font Characteristics** Attributes that determine what a printed font looks like. These attributes include symbol set, spacing, pitch, point size, style, stroke weight, and typeface.

**Fuser Assembly** The fuser assembly contains two heated rollers between which the paper passes after toner has been applied; the heated rollers bond the toner to the paper.

**Gamma Correction** Gamma corrections allow you to sharpen the midrange contrast when scanning black and white images.

**Graphics** Printing, through special software commands, of graphs, diagrams, or other pictorial images.

**Gray Scale** Progressive shades from black to white which provide detail and contrast to printed images.

**Handshake, Handshaking** A procedure, usually part of a communications protocol, to establish a data communications path. Devices must be able to communicate with each other. Your printer uses either XON/XOFF or DTR/DSR protocol to communicate with a computer.

**HDD** An acronym for hard disk drive.

---

**Header Page** A special page printed before a print job that identifies the print job and helps users sort out the print jobs in the printer's output tray. Header pages contain the following information: printer name, selected interface, job identification, title, submitting computer, job owner, routing message, start time, application used, creation time, copyright date, version number, job submission time, job start time, number of sheets printed, and printer product name/logo. The header page also lists any specified DOC commands. See the optional *QMS Crown Document Option Commands* manual, available from your QMS vendor, for complete information.

**HP-GL (Hewlett-Packard-Graphics Language)** HP-GL is the programming language upon which the HP plotters are based. This emulation is a resident emulation on your QMS 860 Print System.

**HP PCL (Hewlett-Packard Printer Control Language)** HP PCL is the printer control language native to the HP Laser Jet Series II and IIP printer. Your QMS 860 Print System has a resident HP PCL emulation.

**Icon** A pictorial symbol indicating a printer function.

**Interface** A shared boundary defined by common physical interconnection characteristics, signal characteristics, and meanings of interchanged signals.

**Interface Cable** A special cable used to connect the printer to the computer so they can communicate.

**Interface Card** Internal hardware used to link a workstation or printer physically to a LAN cable. Ethernet and Token-Ring are typical interface cards.

**Interface Port** The printer comes with three interface ports: serial, parallel, and AppleTalk located on the back panel. The cable that attaches the computer to the printer must be plugged into the proper interface port. See *I/O cable*.

**Internal Fonts** Fonts permanently stored in the printer's memory. Also called resident fonts.

---

**I/O Cable** The term I/O stands for input/output. An I/O cable attaches the printer to the host computer to allow data or control messages to be input to the printer or output to the computer. See *interface port*.

**Landscape Orientation** See *Orientation*.

**LAN** Local area network; a data communications system providing connectivity and shared resources of devices operating in the same general area.

**LocalTalk** One type of cable system used to link computers and peripheral devices in an AppleTalk network.

**Media** Any material (such as paper, labels, and transparencies) used in the printer for printed output.

**Memory** Memory allows your printer to store and retrieve information. It is the space within your printer where information is stored while being actively worked on. The term applies to internal storage space as opposed to external storage, such as disks or tapes. See also *RAM* and *ROM*.

**Memory Clients** A memory client is a block of memory dedicated to a specific function. Each memory client controls certain features. When insufficient memory is allocated to a specific client, the features it controls may not be accessible.

**Memory Upgrade** An available option that is easily attached to the printer's controller board to expand its standard 12 MB of RAM to a maximum of 32 MB in increments of 4 or 8 MB.

**Menu Key** The control panel key that accesses the printer Configuration menu when the printer is off line. Use this key to advance through the menus or to return to a previous position in the menu. When changing printer setup, press this key to cancel a change (before pressing the Select key) or to return to previous menus one level at a time.

**Mode** One of several alternative conditions or methods of operation. For example, working in HP mode means the printer is emulating or using HP PCL or HP-GL commands or features.

---

**Motherboard** The main circuit board containing the primary components of a computer system.

**Network** A group of computers and other devices connected by some type of communications facility.

**Network Administrator** The person in charge of operating a network; also called a system administrator.

**Next Key** The control panel key that advances through a list of selections or options for a menu. When changing character information, use this key to advance to the next choice for the current input (underlined) character.

**Null Modem Cable** A type of cable used for serial communication. This cable arranges the communication between two devices.

**Octal** A number system with the base 8. The octal system uses eight number symbols (0 through 7) as a simple way to represent binary numbers.

**Off line** Not accepting data from the computer. The printer is taken off line by pressing the Online/Offline key. When the Online indicator is off, the printer is off line. The printer must be off line to enter the Configuration menu.

**On line** Accepting data from the computer. The printer is on line when the Online/Offline key is pressed and the Online indicator is on.

**Orientation** The direction of print on the page. Printing across the narrow width of a page is called portrait orientation printing. The word “portrait” comes from portraits of people, which are usually vertical in format. Printing across the length of a page is called landscape orientation printing. The term “landscape” is derived from pictures of the landscape, which are usually horizontal in format.

**Page Memory** A special buffer large enough to hold an entire page of data.

**Paper Path** The path the paper follows in its journey through the printer; it begins at the paper cassette or tray pickup point and ends at the output tray.

---

**Parallel** A data transmission technique that sends each bit simultaneously over separate lines. It is normally used to send a byte (8 bits) at a time between computers and printers.

**Parallel Interface** A connection between the computer and the printer in which character information is transferred simultaneously over a path through multiple lines. Parallel configuration data transfer is generally faster than serial configuration data transfer. See also *serial interface*.

**Parity, Parity Check** The addition of overhead bits to ensure that the total number of 1s in a grouping of bits is either always even (for even parity) or always odd (for odd parity). This permits detection of single errors. It may be applied to characters, transmission blocks, or any convenient bit grouping.

**PCL** See *HP PCL*.

**Permanent Soft Fonts** Permanent soft fonts are soft fonts downloaded into the printer's memory that remain resident there, even if the printer is reset, until the printer is powered off or the fonts are deleted by software printer commands. (See *download*.)

**Persistent** Remaining in the printer's memory after you turn it off. Persistent parameters appear each time you turn on the printer.

**Pitch** The number of characters printer per horizontal inch. For example, 12 pitch means that 12 characters will be printed per horizontal inch. Pitch is applied only to fonts with fixed spacing. See also *fixed spacing*.

**Point Size** The height of a character or symbol in a font. There are 72 points per inch. This text is printed using a 10 point font.

**Portrait Orientation** See *orientation*.

**PostScript** A page description language that describes text, graphics, and page images to the printer.

---

**Previous Key** The control panel key that returns through the list of previous selections or options for the current menu. When changing the character information, use this key to return to the previous choice for the current input (underlined) character.

**Print Density** Print density refers to the relative darkness of print on the page. Very dense print appears totally black. Less dense print looks lighter, with solid-filled areas not totally covered. Print density can be adjusted by a lever inside the printer.

**Print Engine** The non-intelligent portion of the printer, including the laser, print drum, and paper-feeding mechanism.

**Print Quality** A general measure of the appearance and readability of a printed page. Criteria of print quality include the darkness, clearness, and sharpness of the printed page.

**Printer Driver** A printer driver is a program that translates the file you are printing into a language that the printer understands. Usually, the printer driver is installed within an application.

**PROM** An acronym for Programmable Read Only Memory. A storage device that can be programmed by electrical pulses, a PROM does not lose its memory when the printer is powered off.

**Proportional Spacing** Horizontal spacing between characters and symbols in a font varies according to the width of the character. For example, an “i” takes up much less horizontal space than a “w” in proportional spacing. See also *fixed spacing*.

**Protocol** A set of rules or standards designed to enable computers and other devices to connect to one another and to exchange information.

**Queue** A list of documents waiting to be printed.

**RAM** An acronym for Random Access Memory, RAM specifies the memory that is transient. Information or data in RAM is lost when the power is turned off or severely interrupted.



---

**Raster Graphics** The system of forming graphics using a bitmap, or grid of small dots, is called raster graphics. The term “raster” denotes the Cartesian grid system in which the dots are arranged. Bitmaps can define images, shapes, or characters created with a specific number of dots per inch. See also *bitmap*.

**Resident Fonts** Fonts permanently stored in the printer’s memory; also called internal fonts.

**Resolution** A measurement of the dots per inch (dpi) in output material, either printed or visual, as in a high-resolution monitor. Your printer features a 300 and 600 dpi resolution.

**ROM** An acronym for Read Only Memory, ROM is a more stable kind of memory than RAM. Information stored in ROM is retained and can be retrieved each time the machine is activated.

**RTS** An acronym for Request to Send. RTS is a signal sent from the host to the printer indicating it is ready to send data.

**Screen** The pattern in which dots or lines are placed on a page to create colors.

**Screen Angle** The angle at which a screen is printed. See also *screen*.

**Select Key** The control panel key used to access a menu or to choose a displayed selection or option.

**Serial** A data transmission technique that sends each bit sequentially over a single line. It is normally used to send one bit at a time for data communications.

**Serial Interface** This is a connection between computers and printers in which character information is transmitted sequentially as contrasted with parallel transfer.

---

**SIMM** Single In-line Memory Module, a small circuit board designed to accommodate surface-mount memory chips. SIMMs use less board space and are more compact than more conventional memory-mounting hardware.

**SIO** Simultaneous Interface Operation; the capability of printing to all three of the printer's concurrently active ports rather than being restricted to one. See also *concurrent interfaces*.

**Soft Font** Soft fonts are fonts created or stored on disks. They can be transferred to the printer's memory and remain available to be used until the printer is turned off. See also *download*.

**Spacing** All fonts are designed with either fixed or proportional spacing. In fixed spacing, all characters are the same width. In proportional spacing, character width depends on the character size, and the number of characters per line varies.

**Start-up Page** A page generated when you turn on the printer (unless you have disabled it). It gives limited information on the printer, including name, pages printed, current interface settings, and amount of RAM available.

**Status Page** The control panel key that prints a page that gives an overview of the printer status. The status page shows the current operating parameters of the printer for example, interface type, resident fonts, RAM available, and printer name.

**Storage** Storage is a device in or on which information can be kept. There are three main types of storage, ROM, RAM and hard disk drives. ROM stores read-only data, RAM represents temporary storage, and hard disk drives hold information on a more permanent basis. See ROM and spool.

**Stroke Weight** The thickness of the elements of a character or symbol in a font. Light, medium, bold, black, and condensed are names of different weights.

**Symbol Set** A unique subgrouping of all the available characters in a font. Each symbol set is defined with a specific application in mind. For example, the math symbol set includes special characters used in mathematical and scientific applications.

---

**System Administrator** The person in charge of managing a network; also called a network administrator.

**Timeout** The expiration of a predefined interval, which triggers some action such as a disconnection that occurs following 30 seconds without any data activity (in a 30-second, no-activity timeout). Timeout also refers to the length or existence of such an interval.

**Toner** Toner is a dry, powdered substance capable of being attracted to electrically charged areas on a photosensitive revolving drum. The printer's EP (electrophotographic) toner cartridge holds the toner. The toner is first attracted to this charged area, then attracted to the negatively charged paper. The toner is melted (or fused) in place by the fuser assembly. CAUTION: Toner can stain fabric. Handle it carefully.

**Toner Cartridge** A disposable cartridge containing dry toner and a print drum.

**Trailer Page** A special page printed after a print job that identifies the print job and helps users sort out the print jobs in the printer's output tray. Trailer pages contain the following information: printer name, selected interface, job identification, title, submitting computer, job owner, routing message, start time/date, application used, creation time/date, copyright date, version number, job submission time, job start time, job finish time, number of sheets printed, and printer product name/logo. The trailer page also lists any errors generated by the printer while processing or printing your document. See the optional *QMS Crown Document Option Commands* manual, available from your QMS vendor, for complete information.

**Transparency** A type of media, also known as OHP (overhead projection) film, commonly used for presentations.

**Typeface** The basic printed design of characters in a font. For instance, Courier, and Times typefaces each print characters of different designs.

**Typeface Family** A group of related typefaces. For example, the Times typeface family consists of four typefaces: Times Roman, **Times Bold**, *Times Italic*, and **Times Bold Italic**. See also *font and typeface*.

---

**Volatile** Used to reflect printer parameters which remain in the printer's memory only during the current power cycle. They are lost when you turn off the printer.

**XON/XOFF** Control characters used for flow control in data transmission.

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