

# **QMS® SmartWriter® User's Guide**

**Version 2.2**

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P.O. Box 81250  
Mobile, AL 36689**

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## Warning

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the Instruction Manual may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

## 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.

**WARNING: THIS PRODUCT IS NOT FOR USE  
IN RESIDENTIAL AREAS!**

# Contents

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## Introduction

Overview .....	1-1
Objectives of This Manual .....	1-1
Intended Audience .....	1-1
Prerequisite Skills and Knowledge .....	1-2
Section Format .....	1-2
Manual Organization .....	1-2
Conventions Used in This Manual .....	1-5

## The Basics

Overview .....	2-1
Objectives .....	2-1
Key Terms .....	2-1
Unpacking .....	2-1
Inspection .....	2-2
Printer .....	2-2
Returning Merchandise .....	2-3
Printer Familiarization .....	2-4
Printer Set-Up .....	2-7
Some Preliminaries .....	2-7
Print Cartridge Installation .....	2-10
Fixing Assembly Cleaner Installation .....	2-13
Paper Tray Installation .....	2-14

## Installation

Overview .....	3-1
Objectives .....	3-1
Key Terms .....	3-1
Finding a Good Location .....	3-2
Installing the Printer .....	3-5
The Printer Interface Cable .....	3-5
Loading Paper .....	3-7
Test Your Printer Operation .....	3-11
Status Summary Sheet .....	3-12

## General Operation

Overview .....	4-1
Objectives .....	4-1
Prerequisites .....	4-1
Key Terms .....	4-2
The Keypad .....	4-2
Function Keys .....	4-3
Configuration Keys .....	4-5
The Display Window .....	4-7
Status Codes and Error Messages .....	4-8
Feeding Paper .....	4-10
Automatic Paper Feed .....	4-10
Manual Feed .....	4-11
Printing .....	4-13
Double-Sided Printing .....	4-14
Print Density .....	4-15
Fonts – Resident, Download and Cartridge .....	4-16
Resident and Download .....	4-16
Optional Font Cartridge .....	4-17
Selecting a Font .....	4-18
Printing a Status Summary Sheet .....	4-19

Software Commands .....	4-19
-------------------------	------

## Choosing an Emulation Mode

Overview .....	5-1
Objectives .....	5-1
Prerequisites .....	5-2
Key Terms .....	5-2
Printer Emulation .....	5-2
Replacing an Existing Printer .....	5-3
Adding a Printer to an Existing System .....	5-3
Word Processors and Other Software .....	5-4
The Printer in a New System .....	5-4
Where to Look Next .....	5-5
After Configuration .....	5-5

## Configuration Options

Overview .....	6-1
Prerequisites .....	6-1
Key Terms .....	6-1
GROUP A — ANSI Mode Options .....	6-3
GROUP C — Selecting Current Font .....	6-6
GROUP D — Diablo Emulation Options .....	6-9
GROUP E — Epson Emulation Options .....	6-11
GROUP L — Select Default Landscape Font ...	6-13
GROUP P — Select Default Portrait Font .....	6-15
GROUP Q — Qume Emulation Options .....	6-16
GROUP 0 — System Function Options .....	6-20
GROUP 1 — Selecting Emulation Mode .....	6-24
GROUP 1 — Selecting Page Size/Orientation ...	6-24
GROUP 2 — Copy Count (1 to 9 copies) .....	6-26
GROUP 3 — Copy Count (multiples of 10) .....	6-26
GROUP 4 — Page Margin Settings .....	6-27

GROUP 5 — Common Interface Options .....	6-31
GROUP 6 — Serial Interface Options .....	6-33
GROUP 7 — Parallel Interface Options .....	6-37
GROUP 8 — Printer Alignment .....	6-39
GROUP 9 — Factory Settings .....	6-41

## Seven Special Commands

Overview .....	7-1
Prerequisites .....	7-1
Key Terms .....	7-1
Transmitting Control Characters .....	7-3
Command Format Defined .....	7-4
Numeric Parameters Defined .....	7-7
Summary of Commands .....	7-7
QMSSFO .....	7-8
QMSPGO .....	7-9
QMSFCTL .....	7-10
QMSSCNT .....	7-11
QMSMOD .....	7-12
QMSCTL .....	7-13
QMSRED .....	7-14
Changing the Command Translation Table .....	7-15
Important Considerations .....	7-15
Changing the Font Translation Table .....	7-16
Important Considerations .....	7-16
Command Parameters .....	7-17

## Useful Hints

Overview .....	8-1
Objectives .....	8-1
Cancel Option .....	8-1
Form Feed Key .....	8-2

Suppress Blank Pages .....	8-2
Don't Print Status Summary Sheet .....	8-2
Data Light .....	8-3
Addressable v.s. Printable Areas .....	8-3
Lost Data Upon Power-Up .....	8-3
Epson Graphics – Page Orientation .....	8-3
Diablo – Using Proportional Spacing .....	8-4
Qume – Using Proportional Spacing .....	8-4
Current Font in Epson Emulation Mode .....	8-4

## **Diablo 630 Emulation Mode**

Overview .....	9-1
Objectives .....	9-2
Prerequisites .....	9-2
Key Terms .....	9-2
Summary of Supported Diablo Commands .....	9-4
Unsupported Diablo Commands .....	9-6
Supported Diablo Commands .....	9-8
Single Character Commands .....	9-8
Formatting Commands .....	9-13
Print Position Commands .....	9-19
Special Printer Features .....	9-21
Word Processing Command Sequences .....	9-24
Extended Character Set .....	9-31

## **Epson FX-80 Emulation Mode**

Overview .....	10-1
Objectives .....	10-2
Prerequisites .....	10-2
Key Terms .....	10-2
Summary of Supported Epson Commands .....	10-4
Unsupported Epson Commands .....	10-6

Supported Epson Commands .....	10-7
Print Width Commands .....	10-8
Print Quality Commands .....	10-11
Selecting Print Modes .....	10-19
Paper Feed Commands .....	10-21
Forms Control Commands .....	10-24
Formatting Commands .....	10-25
Special Printer Features .....	10-30
Graphics Mode .....	10-34
Graphics Pin Combination Patterns .....	10-38
Plotter Graphics .....	10-39
User-Defined Characters .....	10-39
Graphics Using 7-Bit Systems .....	10-41
Control Codes Redefined .....	10-42
Double High, Double Wide Letters .....	10-43
Core Characters .....	10-44

## Qume Emulation Mode

Overview .....	11-1
Objectives .....	11-2
Prerequisites .....	11-2
Key Terms .....	11-2
Summary of Supported Qume Commands .....	11-4
Unsupported Qume Commands .....	11-6
Supported Qume Commands .....	11-7
Single Character Commands .....	11-7
Formatting Commands .....	11-10
Print Position Commands .....	11-18
Print Quality Commands .....	11-26
Special Printer Features .....	11-30

## Maintenance and Troubleshooting

Overview .....	12-1
Objectives .....	12-1
Prerequisite Knowledge .....	12-1
Key Terms .....	12-2
User Maintenance .....	12-2
Print Cartridge .....	12-2
When to Replace a Print Cartridge .....	12-3
How to Replace the Print Cartridge .....	12-4
Fixing Assembly Cleaner .....	12-4
Replacing the Fixing Assembly Cleaner .....	12-5
Cleaning the Fixing Roller .....	12-5
Corona Wires .....	12-5
Cleaning the Primary Corona Wire .....	12-6
Cleaning the Transfer Corona Wire .....	12-7
Cleaning the Transfer Guide .....	12-8
The Separation Belt .....	12-9
Cleaning the Separation Belt .....	12-9
Replacing the Separation Belt .....	12-10
Clearing a Paper Jam .....	12-12
Troubleshooting .....	12-16
Error Codes .....	12-16
The Diagnostic Page .....	12-18
Print Quality Problems .....	12-19
Placing a Service Call .....	12-23

## Printer Specifications

Printer Specifications .....	13-1
Addressable Areas .....	13-3
Printable Areas .....	13-3
Parallel Interface Cable Specification .....	13-4
Serial Interface Cable Specifications .....	13-7

**Appendix A - Font Information**

**Appendix B - ASCII Conversion Table**

**Appendix C - Configuration Summary**

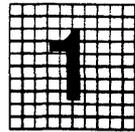
**Glossary**

**Index**

# Introduction

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## Overview

The QMS SmartWriter represents the latest technology in laser printing, quiet operation and flexibility. You can customize your QMS SmartWriter to work with many word processing packages or you can write programs using the commands supported by the SmartWriter.

The QMS printer features Diablo, Qume and Epson emulation modes, graphics capabilities, the ability to access an international character set and a variety of font sizes and styles.

The QMS SmartWriter also supports ANSI X3.64 mode, downloadable fonts, font cartridges, and the ability to use these features in either portrait or landscape orientation on a page.

## Objectives of This Manual

The objectives of this manual are (1) to familiarize you with the physical features of the QMS SmartWriter; (2) to teach you how to install the SmartWriter; (3) to show you how to operate the keypad and use the features that you will need daily; (4) to make the QMS SmartWriter be the printer you want it to be; (5) to help make your QMS SmartWriter work with a word processor; (6) to explain the maintenance tasks which will keep your QMS printer operating well; and (7) to make you aware of possible error messages or problems and what to do about them.

## Intended Audience

The *QMS SmartWriter User's Guide* is written for be-

## Prerequisite Skills and Knowledge

No prerequisite skills or knowledge is needed for installing or operating the QMS SmartWriter. Some knowledge of your computer and word processor or other software package may be required. Refer to your computer or software manuals if needed.

## Section Format

The format for the remaining sections of this manual will be as follows:

### Section Overview

Chapter Objectives

Key Terms defined

Detailed descriptions or Step-by-Step Instructions

Errors and Consequences

This section format is designed to present all necessary information simply and logically. To ensure efficiency and ease of learning, the same basic format is followed in each section of the manual.

## Manual Organization

The *QMS SmartWriter User's Guide* is designed to help you learn about and use the QMS SmartWriter. The information in the manual is explained in the order you will need it. Related material is cross-referenced by section number and subject.

Here is an overview of each section:

### ● Section 1 - Introduction

This section gives you the objectives of the manual. Standard format and manual conventions used in the rest of the manual are also explained. Use Section 1 as an overview and blueprint to the *QMS SmartWriter User's Guide*. The information in Section 1 is intended for all users.

- **Section 2 - The Basics**  
The first part of this section advises you about unpacking your QMS SmartWriter. It includes the items which should be included in the shipment and what to do if anything is damaged or missing. The next part of this section familiarizes you with the physical features of the QMS printer. The final pages of this section, called Printer Set-up, cover pre-installation steps. The information in Section 2 is intended for all users.
- **Section 3 - Installation**  
Installation instructions tell you how to connect your QMS SmartWriter to your computer, load the paper cassette and print a Status Summary Sheet. The information in Section 3 is intended for all users.
- **Section 4 - General Operation**  
This section is divided into two parts. The first portion covers operating the front panel keypad. You need this skill to configure your QMS printer.  
  
The second part of Section 4 covers operating features that you will use on a daily basis. These include double-sided printing, selecting manual or cassette-feed paper and adjusting the print density. Printer Operation also includes the printer error and status messages which may appear in the display window. The information in this section is intended for all users.
- **Section 5 - Choosing an Emulation Mode**  
This section helps you decide how you want to use the QMS SmartWriter with your word processor or other software packages.
- **Section 6 - Configuration Options**  
This section includes all configuration options.
- **Section 7 - Seven Special QMS/ANSI Commands**  
This is an important section for all users. Seven software commands explained in this section allow you to change fonts, change emulation modes,

change page orientation, change paper source, change the copy count, access the Extended Printer Controls, and redefine command/control characters and font tables. These commands may be used from any emulation mode.

- **Section 8 - Useful Hints**

This section provides information about printer features that have very useful applications. Explanations and special notes that you should be aware of are also included.

- **Section 9 - Diablo Emulation Mode**

This section explains the supported software commands of Diablo Emulation Mode. Unsupported commands are also listed.

- **Section 10 - Epson Emulation Mode**

This section explains the supported software commands of Epson Emulation Mode. Unsupported commands are also listed.

- **Section 11 - Qume Emulation Mode**

This section explains the supported software commands of Qume Emulation Mode. Unsupported commands are also listed.

- **Section 12 - Maintenance**

This section covers both maintenance and troubleshooting. Occasional maintenance is necessary to keep your printer printing smoothly. If you run into difficulties, check the information under "Troubleshooting" in the second half of this section. "Troubleshooting" also covers error messages which may appear in the QMS SmartWriter display window. The information in this section is intended for all users.

- **Section 13 - Printer Specifications**

QMS SmartWriter specifications are given here for quick reference. Printer specifications includes the cable specifications for parallel and serial interface cables.

- **Appendix A - Font Information**  
This section begins with an explanation of fonts. Width tables for each of the resident fonts are also included. This provides a quick reference for the letters, symbols, size and style of each resident SmartWriter font.
- **Appendix B - ASCII Conversion Table**  
ASCII values are shown with the equivalent Hex, Decimal, Octal and Binary values in this conversion table.
- **Appendix C - Configuration Summary**  
Appendix C summarizes the configuration Groups and Options that are explained in detail in Section 6.
- **Glossary**  
The *QMS SmartWriter User's Guide* has a Glossary in addition to defining key terms in each section.
- **Index**

## Conventions Used in This Manual

**bold type** indicates section or subsection headings, key terms or important considerations.

*italicized type* is used for manual titles.

boxes are used to indicate a key from the front panel keypad, a display in the keypad display window or a particular command format.

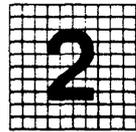
bullets (●) are used to itemize or list.

CAPITAL LETTERS indicate a special comment or note.

< > Angle brackets indicate an ASCII non-printable control character (<ESC>) or a decimal value. In a command syntax such as <ESC><RS><n> the <RS> represents the ASCII RS control character (Hex 1E) and the <n> repre-

sents a variable "decimal value" (taken from the "Decimal" column of the ASCII CONVERSION TABLE in Appendix B) as defined in the explanation of the command.

# The Basics



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## Overview

This chapter includes 1) unpacking and inspection instructions, 2) illustrations to help familiarize you with the QMS SmartWriter, and 3) pre-installation tasks.

## Objectives

The purpose of this section is (1) to identify the contents of the SmartWriter shipping container and what to do if anything is damaged or missing; (2) to explain, with illustrations, the inside and outside features of the SmartWriter; (3) to indicate which parts need occasional maintenance for smooth operation; and (4) to guide you through pre-installation tasks such as removing the shipping spacers and inserting the print cartridge.

## Key Terms

**Print Cartridge** – A disposable cartridge containing dry toner and a print drum.

**Font Cartridge** – An optional means of having more fonts available for use.

## Unpacking

The following items should be enclosed in the QMS SmartWriter shipping container:

1. *QMS SmartWriter User's Guide*
2. Output Stacker Tray (see Figure 2.1)
3. Manual Feed Tray (see Figure 2.2)

4. Paper Cassette (see Figure 3.4)

5. QMS SmartWriter

**NOTE:** You will have to make or purchase an interface cable. See Section 3 for cable information.

Keep the shipping carton and packing materials until you have inspected the contents. Check the contents against the packing list. If there is any evidence of external damage, do not try to use the printer. Contact the carrier immediately and begin a damage claim procedure. Inform your distributor/dealer of the problem.

## Inspection

Take the time now to inspect the contents of the printer container. Be sure that you have all the parts and that nothing is damaged.

## Printer

Remove the foam packing and locate the handles on the front and rear of the printer (see Figure 3.2 in Section 3). Lift the printer out of the shipping container. Always use the **HANDLES** when **LIFTING** the SmartWriter.

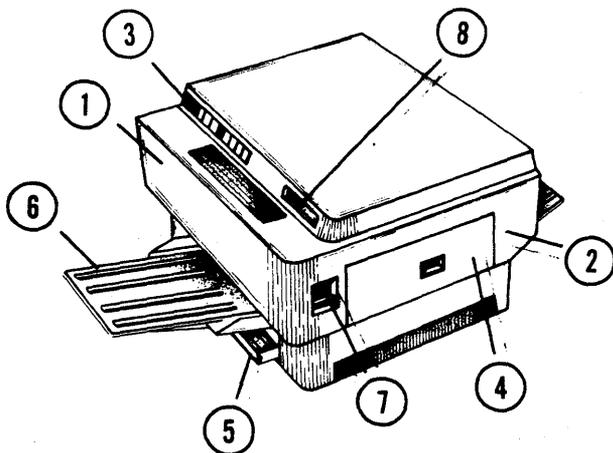
Remove the plastic bag enclosing the printer and check for exterior damage. Locate the **GREEN** release lever (see Figure 2.4). Carefully lift the lever and raise the top half of the QMS SmartWriter (springloaded). Check the inside of the printer for damage. If dirty, clean the inside with a damp cloth.

## **Returning Merchandise**

If you ever have to return the QMS SmartWriter, repack the equipment carefully in order to prevent further damage. Return the printer to the dealer or distributor from whom you purchased the printer.

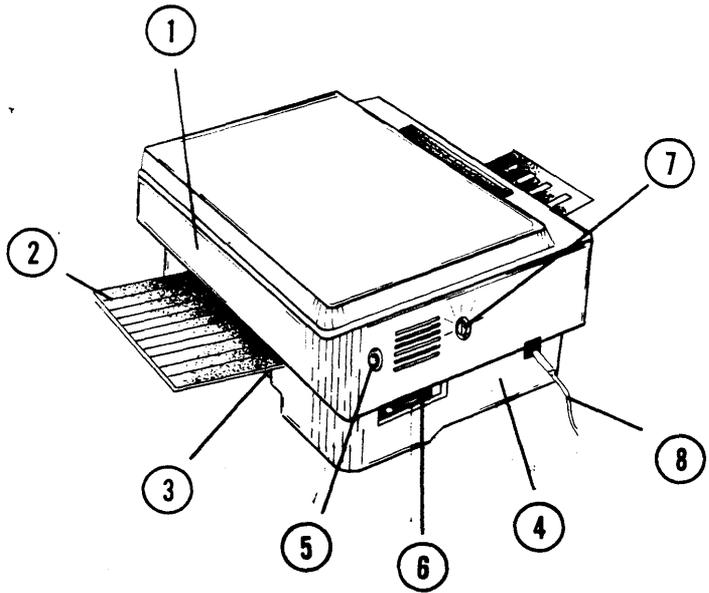
## Printer Familiarization

You need to become “visually” familiar with the physical features of the SmartWriter before you try to install it. Use the Figures in this section as a guide. Spending time now to review the Figures will pay off when you start to install and use the printer.



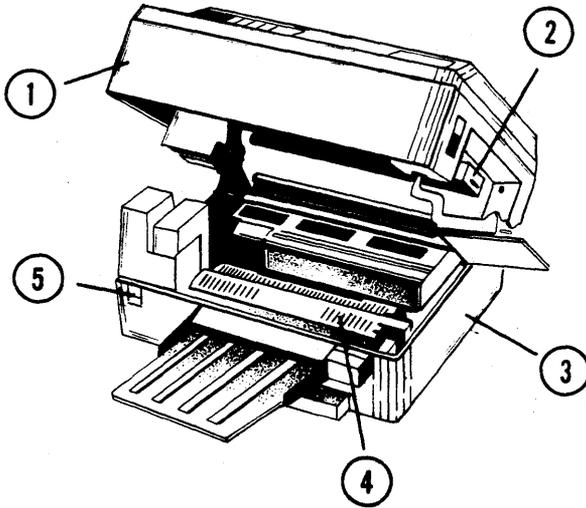
**Figure 2.1 Front/Right-Side View**

1. **Front of the Printer.**
2. **Right Side of the Printer.**
3. **Keypad** - used to control the operation of the printer.
4. **Right Door** - provides access to the Print Cartridge.
5. **Paper Cassette** - holds a variety of paper sizes and weights. This cassette is the source of paper when the printer is set for automatic paper feed.
6. **Output Stacker Tray** - collects the printed pages as they come out of the printer.
7. **Release Lever** - releases the upper half of the printer when the lever is raised.
8. **Font Cartridge Slot** - insert optional Font Cartridge here.



**Figure 2.2 Rear/Left-Side View**

1. **Rear Panel of Printer.**
2. **Manual Feed Tray** - allows you to manually feed pages/ envelopes into the printer, one at a time.
3. **Rear Door** - opens to provide access to the Cassette Feed Area in case of a paper jam.
4. **Left Side.**
5. **Test Print Button** - press to print the SmartWriter's engine self-test page.
6. **Interface Connection Area** - connector for plugging the interface cable from your host computer into the SmartWriter.
7. **Print Density Adjustment Dial** - adjusts the darkness of the print.
8. **Power Cord** - provides AC power to the QMS SmartWriter when plugged into a standard 120V/60HZ outlet.



**Figure 2.3 Raised View**

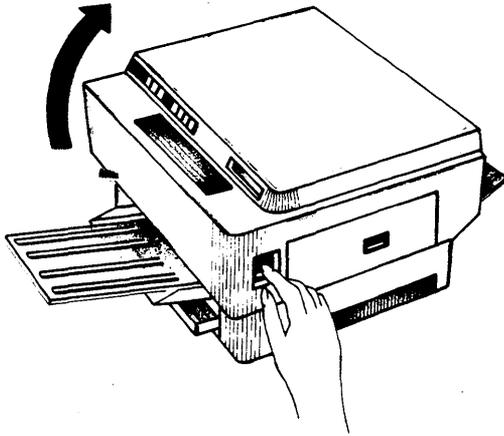
- 1. Upper Half of the Printer.**
- 2. Print Cartridge** - contains toner, photosensitive drum, and the Primary Corona wire.
- 3. Lower Half of the Printer.**
- 4. Fixing Assembly Cover** - lift to remove jammed paper, clean the fixing rollers, and replace the Fixing Assembly Cleaner.
- 5. Power Switch** - turns the printer ON/OFF (1 and 0, respectively).

## Printer Set-up

Printer set-up is an important pre-installation step. Set-up involves removing spring spacers and installing the Print Cartridge, Fixing Assembly Cleaner, Paper Trays, and the Paper Cassette.

### Some Preliminaries

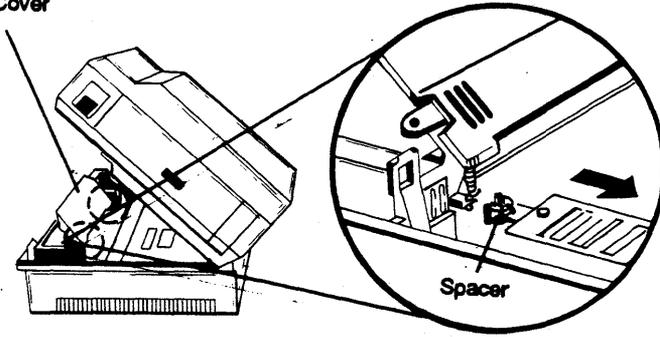
1. Raise the upper half of the printer by lifting the green Release Lever (Figure 2.4).



**Figure 2.4 Opening The Printer**

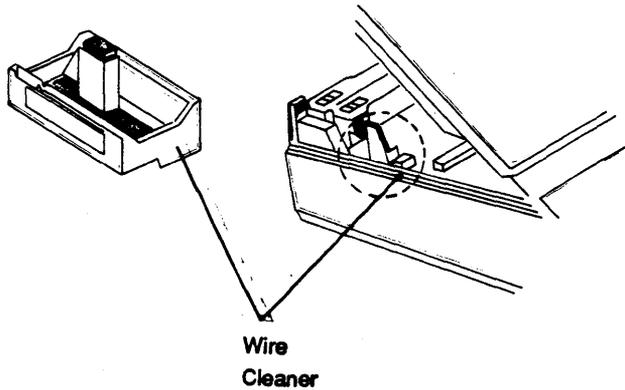
2. Lift the Fixing Assembly Cover (green insulating cover) and remove the two plastic spacers marked with red flags (Figure 2.5). These spacers have simply maintained the spring tension of the cover during shipment.

Fixing Assembly  
Cover



**Figure 2.5 Removing The Spacers**

3. Locate the Wire Cleaner (Figure 2.6). Remove the tape that holds the Wire Cleaner so it will be ready for use when needed. This Cleaner is used to periodically clean the Primary Corona Wire in the Print Cartridge (see Section 12, "Maintenance and Troubleshooting").



**Figure 2.6 Wire Cleaner**

## Print Cartridge Installation

1. Open the Right Door (Figure 2.1) to install the Print Cartridge. The Right Door will not open unless the Upper Half of the printer has been raised (Figure 2.4). To open the Right Door, place your thumb on the ribbed surface of the window in the center of the Door and let your fingers curve down under the Door. Pull out and down with your thumb. The Door should pop open.
2. Lay the bag containing the Print Cartridge on a flat surface. Open the bag and slide the Print Cartridge out. (Do not hold the bag or Print Cartridge in an upright position. Dry toner goes to one end which may result in poor print quality.) Hold the Cartridge as shown in Figure 2.7. Rotate it slowly 45-degrees in both directions several times in order to distribute the toner inside the Cartridge.

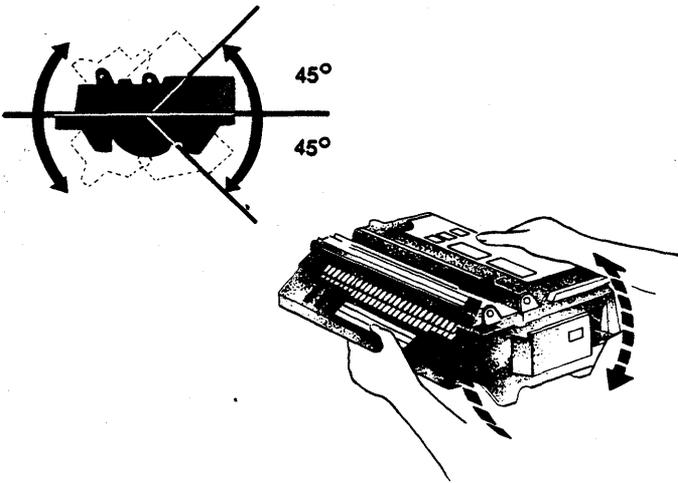
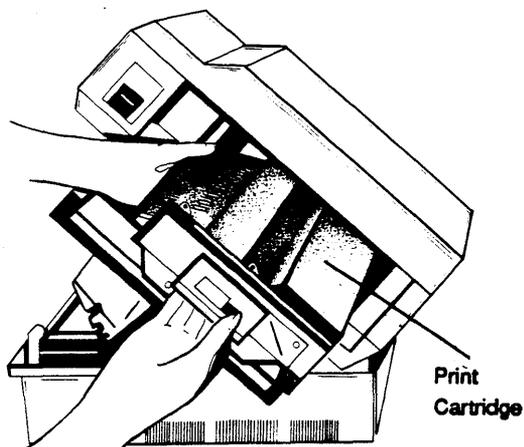


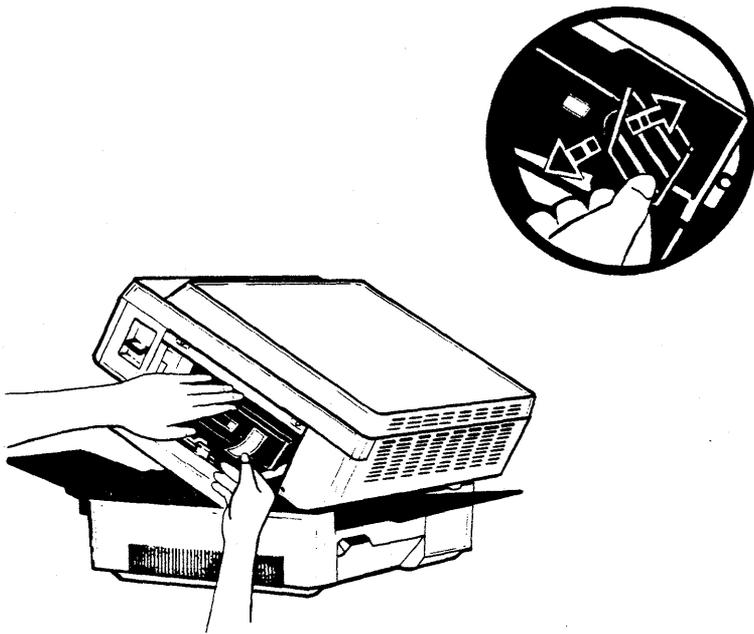
Figure 2.7 Rotating the Print Cartridge

3. Insert the Print Cartridge into the printer through the Right Door (Figure 2.8). The Cartridge handle should be to the left. The instruction label should face upward.



**Figure 2.8 Inserting the Print Cartridge**

4. Hold the Print Cartridge steady. Flex the black tab back and forth until it breaks loose (Figure 2.9). Pull the tab out completely to remove the attached sealing tapes. Once in view, the sealing tapes may be grasped and pulled to aid in their removal. The sealing tapes are about two feet long.
5. Close the Right Door.



**Figure 2.9 Removing the Sealing Tapes**

## Fixing Assembly Cleaner Installation

1. Take the Fixing Assembly Cleaner (a long plastic-and-felt stick) out of the Print Cartridge box. Remove the plastic wrapper.
2. Raise the Upper Half of the printer if it is not already raised (Figure 2.4).
3. Open the Fixing Assembly Cover and insert the Cleaner into the groove in the underside of the Cover (Figure 2.10).
4. Close the Fixing Assembly Cover and the Upper Half of the printer.

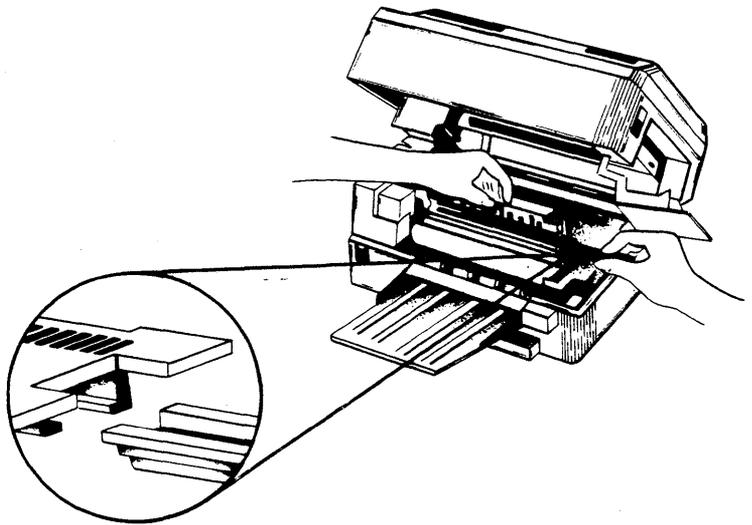


Figure 2.10 Fixing Assembly Cleaner

## Paper Tray Installation

The SmartWriter has two paper trays: the Output Stacker Tray (see Figure 2.1), and the smaller Manual-feed Tray (see Figure 2.2). The Output Stacker Tray is used to collect the printed pages as they come through the printer. The Manual-feed Tray is used to guide the paper into the printer for manual feed. Both trays are installed by fitting plastic pegs into the appropriate holes as described below.

1. Locate the Output Stacker Tray. Move to the front of the printer. Hold the tray so that the wide end is toward the front of the printer. The sliding extension attached to the Output Stacker Tray should be on the underside. There is an installation nub on each side of the tray. Insert the pegs, one side at a time, into the slots directly above the front handle of the printer.

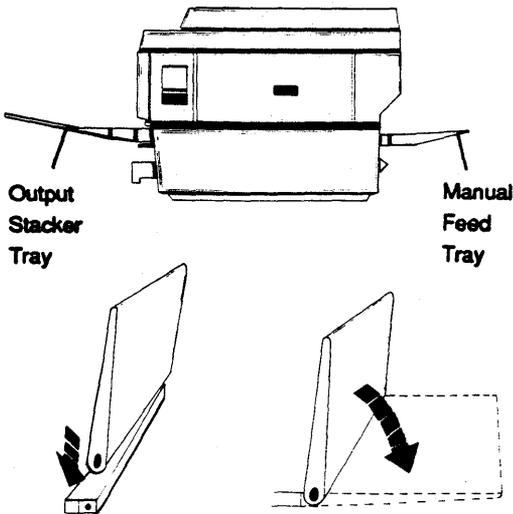
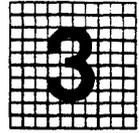


Figure 2.11 Paper Trays

2. Locate the Manual-feed Tray. Move to the rear of the printer. Hold the tray so that the installation brackets are toward the rear of the printer. The top of the tray has raised lines along the surface. Install the tray by inserting the installation pegs on the outside edges of the rear handle into the holes in the installation brackets of the tray.



# Installation



## Overview

The installation instructions begin with guidelines for finding a good work station for your printer. Next, you must determine whether you have a parallel or serial interface so that you may buy or make the right type of interface cable.

The actual installation involves connecting the interface cable to your computer and SmartWriter and plugging in the power cord.

The next step is to fill the paper cassette and perform a Printer Operation Check. This operation check will determine if all the connections have been properly completed.

This section is concluded with an explanation of the Status Summary Sheet that will be printed if the SmartWriter is correctly installed.

## Objectives

This section is intended to (1) guide you in choosing a good work location for your printer; (2) guide you in obtaining the correct interface cable; (3) tell you how to connect your printer to your terminal or computer; (4) enable you to check your printer for proper operation; and (5) to show you a sample Status Summary Sheet and explain what it means.

## Key Terms

**Parallel** – Refers to the means of transferring data along parallel lines or wires.

**Printer Interface Cable** – Used to connect your computer to your printer so that they can communicate with each other.

**Serial** – Refers to the means of transferring data sequentially along a single wire or line.

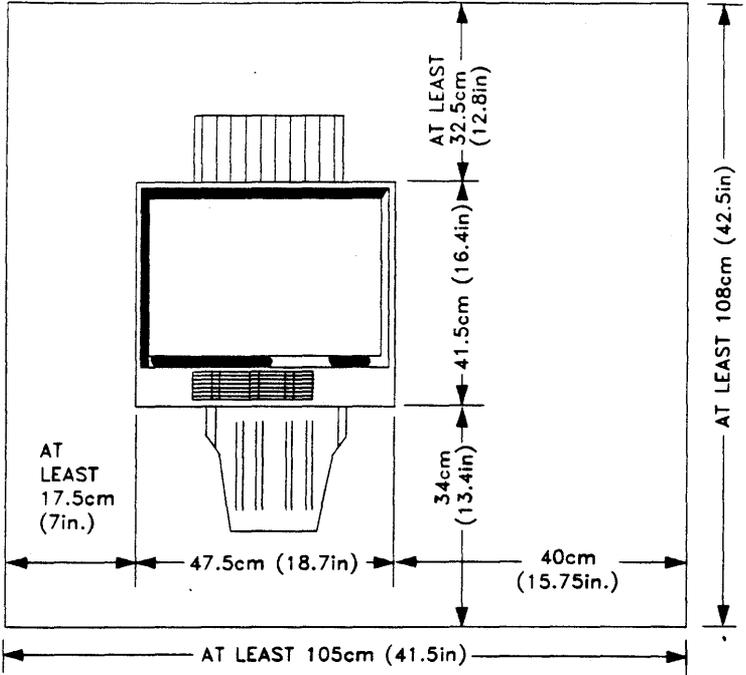
**Status Summary Sheet** – Shows the current fonts and selected printer options. This page is automatically printed each time you power up your SmartWriter printer.

## **Finding a Good Location**

The location you pick for the QMS SmartWriter should meet the following requirements:

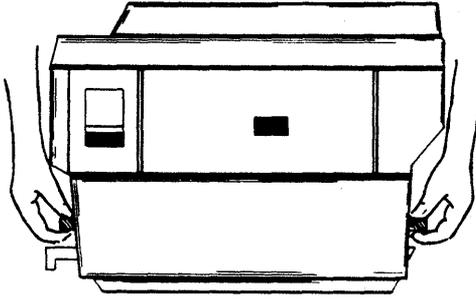
- The line voltage should not vary more than 10 percent from the voltage marked on the Print Engine nameplate (inside), and a ground connection should be available.
- The room temperature should be 50 to 90 degrees Fahrenheit, and the relative humidity 20 to 80 percent.
- The printer should not be installed where it might be exposed to water damage or variations in temperature/humidity, e.g., near water faucets, boilers, humidifiers, refrigerators, air conditioners, etc.
- The printer should not be exposed to open flames, dust, ammonia fumes, or direct sunlight.
- The location should be well ventilated.
- The printer should be installed on a sturdy, level surface.
- The printer should be located where there is plenty of space to work. Refer to Figure 3.1 for some recommended space requirements for the printer.

(Refer to the Printer Specifications in Section 13 for more details.)



**Figure 3.1 Space Requirements**

Once a suitable location is found, remove the paper trays and carry the printer using the **HANDLES** as shown in Figure 3.2. Remove the paper trays before lifting the printer by the handles. Always use the **HANDLES** when **LIFTING** the printer.



**Figure 3.2 Printer Handles**

## **Installing the Printer**

The installation of the SmartWriter involves (1) connecting an interface cable between your computer and printer and (2) plugging in the power cord.

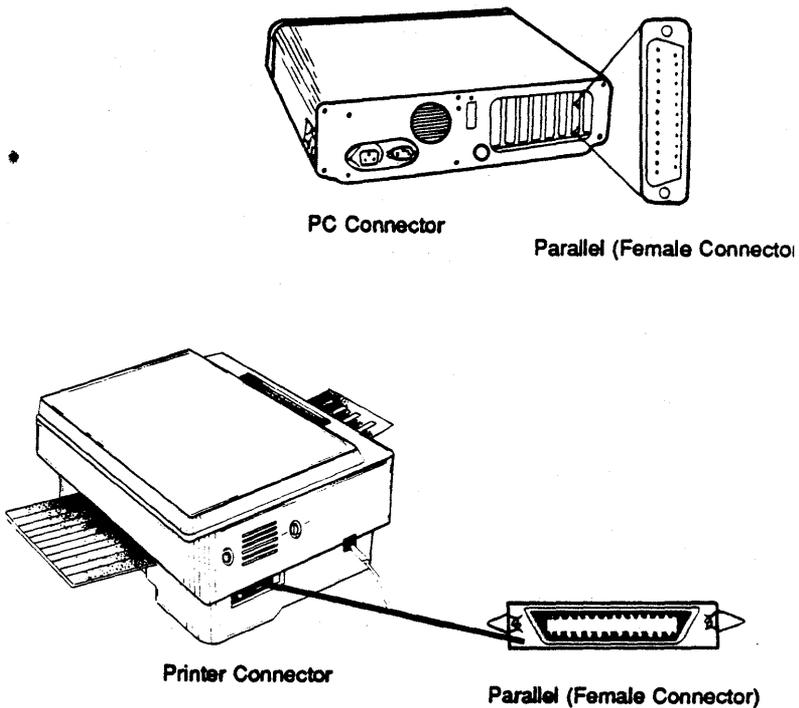
### **The Printer Interface Cable**

The SmartWriter is available with two types of interfaces: Centronics parallel or RS-232C serial.

You will need to purchase or make the cable to connect your computer to the SmartWriter. Section 13, "Printer Specifications," lists the specifications for both parallel and serial interface cables.

Follow each of the steps below in order to properly connect your computer system and the SmartWriter. The IBM PC is used as the example computer in the directions. Consult your particular computer manual or distributor for additional information on connecting your computer to a printer.

1. Buy a Centronics parallel or RS-232 serial interface cable from your local computer dealer or make an interface cable if you know how. See the cable specifications given in Section 13, "Printer Specifications." If you ordered your SmartWriter with a parallel interface, you need a parallel interface cable. If you ordered a serial interface, you need a serial interface cable.
2. Locate and examine the interface connectors (ports) on both the computer and the printer. Figure 3.3 shows the interface connectors for an IBM PC and a QMS SmartWriter.
3. Connect the DB 25 parallel male end or the serial female end of the cable to your IBM PC. It will only fit in one direction. (A different computer may require a different cable connector. Your distributor can help you.)



**Figure 3.3 Interface Connectors**

4. Connect the other end of the interface cable to your SmartWriter. Be sure the cable is not twisted.
5. Make sure that both ends of the interface cable are securely connected.
6. Now, plug the printer power cord into an appropriate wall outlet and your printer connections are completed.
7. Read the instructions that follow for filling the Paper Cassette. Your printer will then be ready to test.

## Loading Paper

The procedure for loading paper into the Paper Cassette is as follows:

1. Locate the Paper Cassette that corresponds to the desired paper size being used (the size of the cassette is given on the foil label on its right side). Make sure the position of the adjustment bar (Figure 3.4) corresponds with the paper length specified for the cassette.

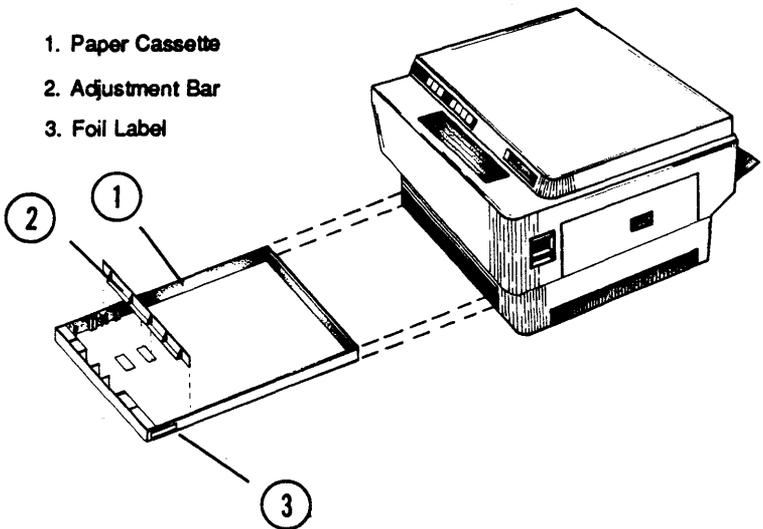
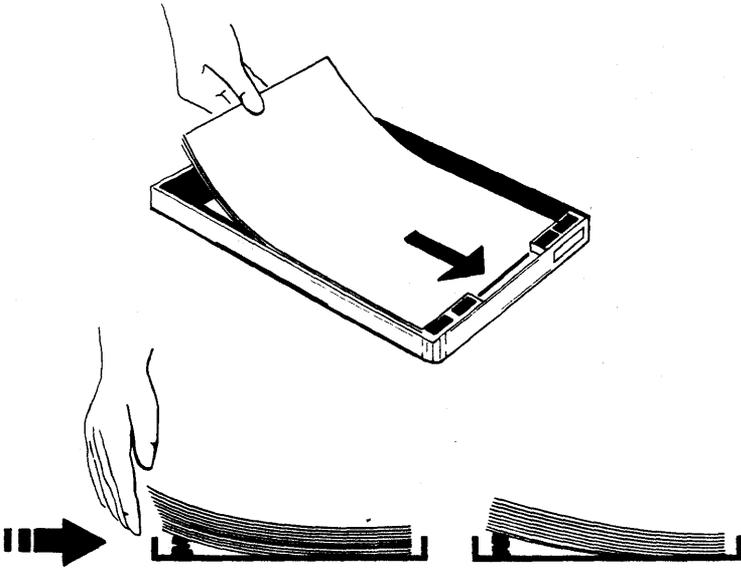


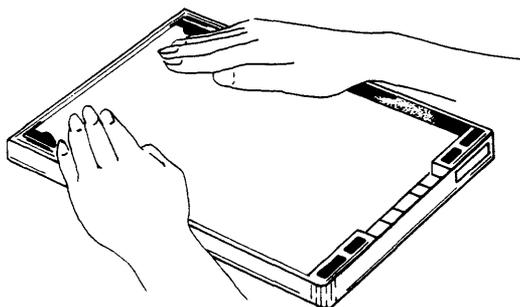
Figure 3.4 Paper Cassette

2. Place the paper in the paper cassette (Figure 3.5). The side of the paper on which printing will occur should be face down in the paper cassette with the top edge of the paper pointing in the direction of the arrow in Figure 3.5. Special instructions for printing two-sided copies are given in Section 4, "General Operation."



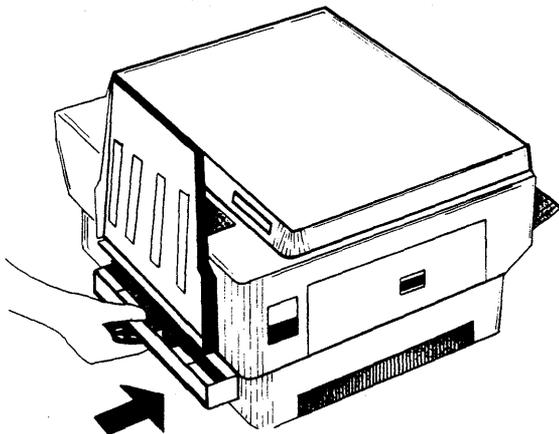
**Figure 3.5 Loading Paper Cassette**

3. Push the paper under the paper-control clips (Figure 3.6). Do not overfill the paper cassette. About 100 sheets of 20 pound paper is best.



**Figure 3.6 Paper-Control Clips**

4. Insert the Paper Cassette in the slot under the front paper tray and handle (Figure 3.7). The end with the paper control clips is inserted first.



**Figure 3.7 Inserting Paper Cassette**

## Test Your Printer Operation

Now that your printer is loaded with paper, you can do some simple tests to confirm that your SmartWriter is working correctly. Follow the instructions below.

1. Locate the Power Switch on the front of the printer. Turn the printer ON by pressing the half of the switch marked with a "1". This will start a two minute printer warm-up cycle beginning with about 15 seconds of self tests.

The Display Window on the printer's keypad (on the front panel) will first display **8.8.** and then

**PU** (Power Up). The printer displays **8.8.** during the self tests and **PU** during the rest of the warm-up period.

When the warm-up period is over the printer will automatically print a Status Summary Sheet. A

**PA.** (Printer Active) will appear in the Display Window when the Status Summary Sheet is printing.

The contents of the Status Summary Sheet are explained later in this section.

2. Check the Status Summary Sheet to see that all the characters are clear and well-formed. There should be no noticeable blotches, streaks, or fade spots. NOTE: After inserting a new Print Cartridge, several pages may need to be printed before good print quality is achieved.
3. If the Status Summary Sheet printed, go to the next Step. Your SmartWriter is ready to print when the keypad's **ONLINE** key lights up and the Display Window contains **PI** (Printer Idle).

If a Status Summary Sheet did not print, turn the printer off, go back to Step 1 and repeat the Steps. If you don't get a Status Summary Sheet after re-

peating these steps, check the Display Window. A list of all the Display Window messages is given in Section 4, "General Operation." Also, see the Troubleshooting portion of Section 12 for help.

4. Press the Test Print Button located on the left side and toward the back of the printer.

The printer will print a page with a striped pattern. This is the printer's self-test page of the print engine.

5. Check the page for smears or any faded areas.

Notice the size of the white margins on this page. The print engine cannot print in these margin areas. (However, the scan alignment may be positioned differently. See Group 8, Options 1-4 in Section 6.)

## Status Summary Sheet

Each time the printer is powered on, a Status Summary Sheet is printed. The firmware Version of your printer and current selected options such as emulation mode, paper size, margins and page orientation are printed on the Status Summary Sheet. The number, orientation and name of each of the 7 resident SmartWriter fonts are also printed on the upper half of this page.

A sample Status Summary Sheet is shown in Figure 3.8.

SmartWriter (TM)  
Version: 2.2 Date: 04/28/86

DEFINED FONTS AND OVERLAYS

<u>Number</u>	<u>Orientation</u>	<u>Name</u>	<u>Version</u>	<u>Type*</u>	<u>Bytes</u>
10	Landscape	EDP	1	RF	19508
380	Portrait	EPSON COMPRESSED	1	RF	22026
381	Portrait	EPSON ELITE	1	RF	32382
382	Portrait	EPSON PICA	1	RF	32580
404	Portrait	Q-TYPEWRITER MEDIUM	1	RF	27386
444	Portrait	Q-TYPEWRITER ITALIC	1	RF	27876
7224	Portrait	CLAIBORNE LIGHT	1	RF	28862

\* C = Cartridge, D = Download, R = Resident, F = Font, O = Overlay  
Number of bytes available for download fonts and overlays = 78992

CURRENT CONFIGURATION

EMULATION: Epson FX80            ORIENTATION: Portrait

POWER-UP DEFAULT FONTS: Portrait = 382            Landscape = 10

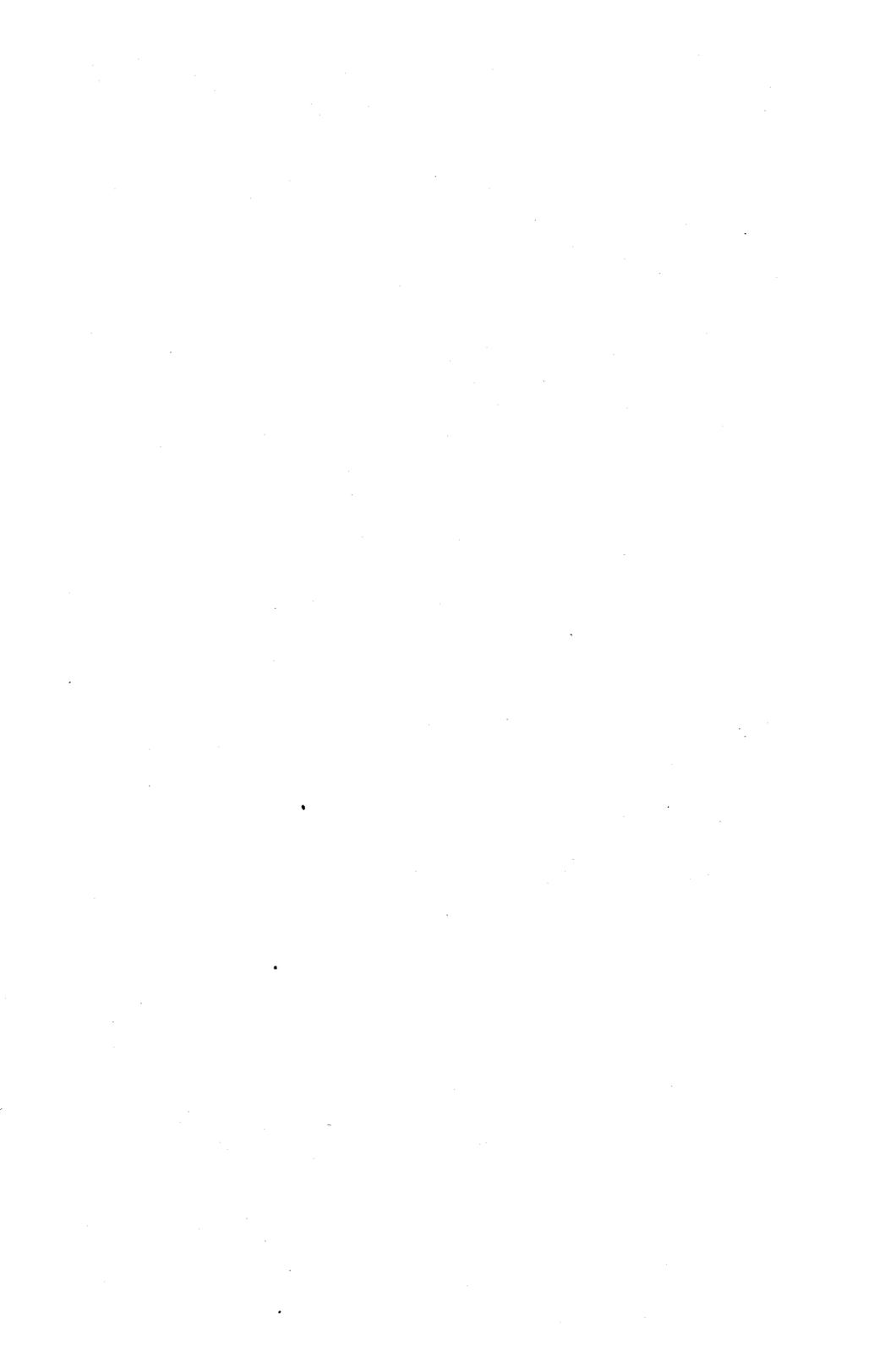
PAGE PARAMETERS: Units of length are in inches.  
Top Margin = 0.00 Characters/Unit = 10.00  
Bottom Margin = 11.00 Lines/Unit = 6.00  
Left Margin = 0.25 Page Size = Letter  
Right Margin = 8.25 Copy Count = 1

INTERFACE: RS232C Serial  
9600 Baud, 8 Data Bits, No Parity, 1 Stop Bit  
Input buffer size = 8192 bytes

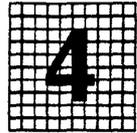
ENABLED OPTIONS:  
A1 A2 A3 A5 D1 E3 E4 E5 Q1 O7 12 14 15 21 41 45 51 52 53 64  
65 67 68 69 6A 6C 75 76 83 85 87 88 95 96 99

Number of pages printed by this engine to date = 1388

Figure 3.8 Status Summary Sheet



# General Operation



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## Overview

Operating the QMS SmartWriter involves learning to use the keypad, learning how to use the supported software commands, learning how to do one and two-sided printing, selecting manual or automatic paper feed, and adjusting the print density.

## Objectives

The objectives of this section are to (1) explain the function of each keypad key; (2) to teach you how to operate the SmartWriter keypad; (3) to make you aware of the messages which may appear in the display window and explain what each message means; (4) to explain how to use both manual and automatic paper feed; (5) to teach you how to adjust print density; (6) to explain how to correctly insert and remove the optional font cartridge; (7) to explain how to select a font for printing; and (8) to make you aware of the software commands available on the SmartWriter.

## Prerequisites

Be sure that you have completed the Printer Set-up instructions in Section 2 before you try operating the SmartWriter.

## Key Terms

**Keypad** – Used to select the desired printer features. The keypad is located on the front panel of the SmartWriter.

**Display Window** – The LED display on the keypad that shows the status of the printer or displays error messages. 

**Group** – The main category used to select printer features. Each Group is subdivided into Options.

**Options** – The printer features (choices) within a Group that may be selected using the keypad.

**Emulate** – Refers to the ability of the SmartWriter to imitate or “appear to be like” another printer. The SmartWriter is able to respond to most of the same commands as Diablo, Qume and Epson printers.

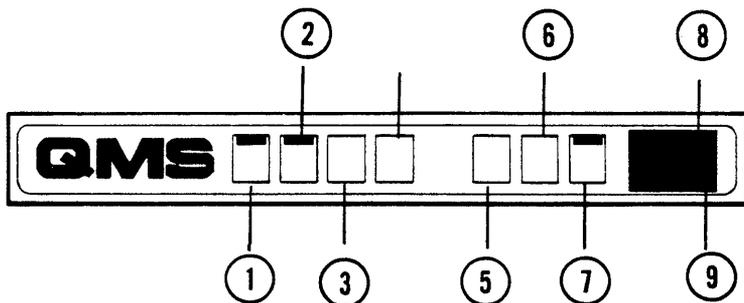
**Option Mode** – The printer state or status that allows you to select features through the front panel keypad.

**Warm Restart** – When the printer reinitializes to the new keypad options selected.

## The Keypad

The keypad on the front panel of the printer (shown in Figure 4.1) is used to select different printer operations. Rub your finger lightly over the keypad. Find the slight “bubble” in the center of each key. To select a particular printer operation, you press this bubble until you feel it click.

The keypad also has a Display Window which displays printer status codes and error message codes. These codes are listed and explained in Table 4.1 of this section.



**Figure 4.1 The Keypad**

- |                    |                       |
|--------------------|-----------------------|
| 1. Online Key      | 6. Option Key         |
| 2. Manual Feed Key | 7. Toggle Key         |
| 3. Form Feed Key   | 8. LED Display Window |
| 4. Test Key        | 9. Data Light         |
| 5. Group Key       |                       |

Three keys, **ONLINE**, **MANUAL FEED** and **TOGGLE**, have light indicators which let you know when they are “enabled” or on.

There are two types of keys on the printer’s keypad, (1) Function Keys and (2) Configuration Keys.

### Function Keys

There are four function keys. These four keys are grouped together on the left-hand side of the keypad. Each key is used to perform the particular function that is printed on the key itself. The status of a key is either “enabled” (on) or “disabled” (off).

An explanation of the four function keys follows:

### **ONLINE** Key

This key allows you to change the status of the printer: either on-line or off-line with your computer. When this key's green indicator light is lit, the printer is under computer control (on-line with the computer). When this key is pressed again, the light will go out which means that the printer is off-line.

When you want to print something other than a Status Summary Sheet or Test Pages, the green indicator light must be lit (meaning the printer is on-line).

**NOTE:** In order to use the rest of the keys on the keypad, the printer must be off-line.

### **MANUAL FEED** Key

This key is used to switch from automatic (cassette) paper feed to manual paper feed. The printer must be taken off-line before you can select manual paper feed.

When manual paper feed is selected, the green indicator on this key will light up. If the indicator light is off, the paper source is from the cassette paper tray. When the printer is first turned on, the paper feed method is set for automatic (cassette) feed (the default).

If you use this **MANUAL FEED** key while pages are printing, the QMS SmartWriter will change the paper feed method for all pages in the print buffer that have not yet begun to print.

**NOTE:** There is also a software command available that allows you to select manual feed without using the keypad. See "Software Commands" later in this section.

### **FORM FEED** Key

Pressing this key causes a form feed to be inserted at the end of the data that is currently contained in the printer buffer. The QMS SmartWriter must be taken off-line before selecting this function. A page will be ejected

after all pages of data in the buffer have printed. If there is a partial page of data remaining in the print buffer, it will be printed on the ejected page.

NOTE: Pressing this key will not cause a blank page to eject if you chose to suppress blank pages using Group 0, Option 7 (See Section 6),

### **TEST** Key

This key is used to print test pages. Take the printer off-line first. Any data that is in the printer buffer when this key is pressed will print before the test pages. The test pages consist of examples of the Standard Fonts in your printer.

## Configuration Keys

The remaining three keys on the printer keypad are called Configuration Keys. You will use all three keys to select (or configure) the printer capabilities (known as Configuration Options). When you use these keys to select particular Configuration Options, you are in "Option Mode."

The Configuration Options are separated into main categories called "Groups." Each Group has from 1-15 sub-categories called "Options."

An Option of a particular Group is selected (enabled or disabled) by pressing the **GROUP** and **OPTION** keys until the correct Group and Option are displayed in the Display Window, and then pressing the **TOGGLE** Key.

Remember, in order to use these Configuration Keys, the **ONLINE** Key light must be off.

### **GROUP** Key

This key is used to enter Option Mode at Group A, Option 0. It is also used to progress through the different Group letters (A, C, d, E, L, P, q) and numbers (0-9)

until you reach the desired Group. The Group letter or number appears in the left digit of the keypad's two-digit Display Window.

When you go from one Group to the next, the Option number (right digit in the Display Window) is reset to zero.

#### **OPTION** Key

This key is used to enter Option Mode at the Group and Option that was most recently accessed. It is also used to progress through the Option numbers until you reach the desired Option. The Option numbers are displayed in the right digit of the keypad's two-digit Display Window.

#### **TOGGLE** Key

Press this key when you want to enable or disable the particular Group and Option that is displayed in the keypad's Display Window.

As you progress through the Options of a particular Group, the green indicator light on the **TOGGLE** Key indicates whether the displayed Option is enabled (lit) or disabled (not lit). You can check the status of a particular Option by progressing through the Option letters/numbers to see which are enabled or disabled. Some Groups may have only one Option enabled at a time. Other Groups require that more than one Option be enabled to perform a particular function.

If a particular Option is currently disabled, pressing the **TOGGLE** Key will enable it. The green indicator lights up to visually confirm that the change was made. The same is true if the Option is enabled and you want to disable it.

Once you have selected (enabled or disabled) all the Options you intend to change, you must press the **GROUP** Key to display any Group letter or number and press the **TOGGLE** Key in order to save the changes you have

just made. This will cause a warm restart which means that the printer will read the changes that you made.

**NOTE:** The one exception to toggling a zero Option in order to save your changes is when you change current font numbers. The change is immediate once you have entered the font number.

Anytime you toggle a zero Option, you will erase the current font number that you just entered. This information is repeated in Section 6, under Group C where the procedure for changing current font numbers is explained.

Pressing the **TOGGLE** Key has no effect at all if you are not in Option Mode.

## The Display Window

The keypad also has a Display Window which displays printer status codes and error message codes. Table 4.1 lists the status codes and error messages. The error messages are explained in Section 12, "Maintenance and Troubleshooting."

The second function of the Display Window is to show the Groups and Options when configuring the printer in "Option Mode." The Configuration Options used to emulate (imitate) a Qume, Diablo or Epson printer are explained in Section 6.

Note that due to the nature of the Display Window, Groups D and Q are lowercase d and q instead of uppercase. To avoid confusing Group q and Group 9, remember that Group q follows Group P and Group 9 follows Group 8.

The Data Light  in the bottom right-hand corner of the Display Window indicates that data is currently being received by the printer.

Display	Meaning
CE	Controller Error
CO	Cartridge Out (No print cartridge installed)
dA	Download Active (a font has been downloaded, printer is active)
dF	Download Font being received
di	Download Idle (download font, printer idle)
FE	Font Error (no font in system)
IE	Interface Error
PA	Printer Active (data has been received; printer has data that has not been printed)
PE	Printer Error
PI	Printer Idle (ready to receive data)
PJ	Paper Jam
PO	Paper Out (empty paper cassette or no paper on Manual Feed Tray when Manual Feed selected)
PU	Power-Up self-tests in progress
UP	User Pause
8.8.	Display Window test (at power-up) Engine test in progress

NOTE: “D”s, “I”s and “Q”s are displayed in lowercase. Error codes are discussed in Section 12, “Maintenance and Troubleshooting.”

**Table 4.1 Status Codes and Error Messages**

## Example: Using the Configuration Keys

ACTION	DISPLAY
SmartWriter has been powered-on and is on-line; green light in <b>ONLINE</b> key is lit.	<b>PI</b>
Pressing the <b>ONLINE</b> key once takes the printer off-line; the green light in the key will go out. The display does not change.	<b>PI</b>
Pressing the <b>GROUP</b> key once prepares the printer to accept a change to its configuration. This is Group A Option 0.	<b>A 0</b>
Pressing the <b>GROUP</b> key again will display the next of the configuration groups.	<b>C 0</b>
Each press of the <b>GROUP</b> key will display the next group in this sequence: A, C, d, E, L, P, q, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.	<b>d 0</b> <b>E 0</b>
Pressing the <b>OPTION</b> key increments the Option number in the display.	<b>E 1</b>
If an Option is "enabled" when its number is displayed, the green light in the <b>TOGGLE</b> key will be lit. If not, that Option's status is "disabled."	

(continued on next page)

## ACTION

## DISPLAY

To change the status of an Option once its number is displayed, press the **TOGGLE** key.

To store the changes that you have made, first press the **GROUP** key once. This displays the zero Option (warm restart) of the next Group in sequence.

**L 0**

And then, press the **TOGGLE** key. The printer will automatically perform a warm restart, go back on-line and print a Status Summary Sheet (depending on the status of Group 0 Option 8.)

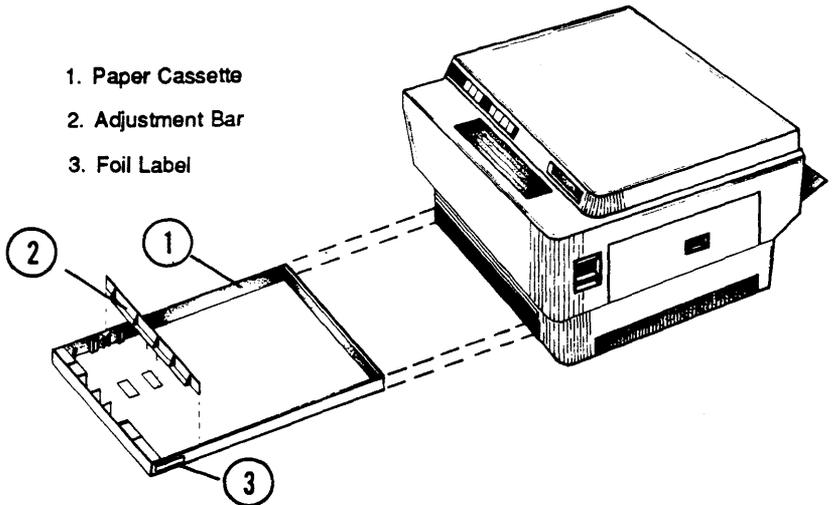
**P i**

## Feeding Paper

There are two methods of feeding paper through the printer: (1) automatic (cassette) feed, which you used when you printed a Status Summary Sheet in Section 3, and (2) manual feed. These two methods have very different operating procedures.

### Automatic Paper Feed

The automatic paper feed method feeds paper to the printer from the Paper Cassette at the front of the printer (Figure 4.2). The Paper Cassette operates with paper as light as 16 pound or as heavy as 21 pound. The maximum loading depth of the cassette is .4 inches. Ideally, 100 sheets of 20 pound paper should be used.



**Figure 4.2 Paper Cassette**

Nominal print speed is 8.1 sheets per minute (6.9 for legal size). Of course, as with all printers, actual print speed depends on the amount of printing being done on the page. Before attempting to print using cassette-feed, make sure the green light is out on the **MANUAL FEED** Key.

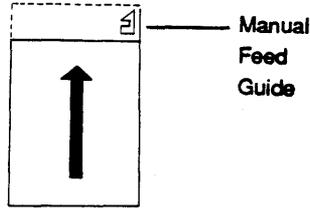
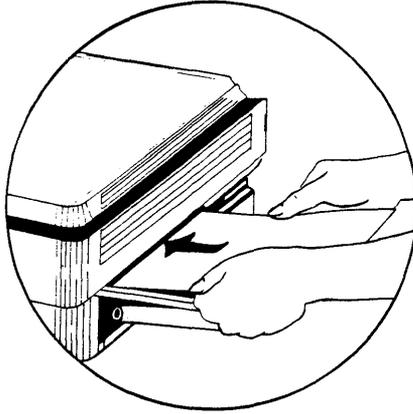
### **Manual Feed**

The manual-feed method gives you complete control of the paper-feed operation. Manual feed is very useful for envelopes and double-sided printing. The paper weight can range from 11 to 33 pound for single-sided printing, and from 16 pound to 33 pound for double-sided printing. The procedure for using manual feed on the printer is as follows:

1. Check the indicator light on the **MANUAL FEED** Key. The green light on this key must be on to use manual feed.
2. If the light is already on, go to Step 4. If the green light is not on, take the SmartWriter off-line by

pressing the **ONLINE** Key. The **ONLINE** indicator light will go out. The printer must be taken off-line before any other keys on the keypad can be enabled.

3. Press the **MANUAL FEED** Key until this indicator light goes on. This indicates that manual feed is now enabled.
4. Put the printer back on-line by pressing the **ONLINE** Key until the indicator light goes on. The printer must be on-line before it can perform any function other than keypad selection.
5. Align one sheet of paper lengthwise with the arrow on the Manual-Feed tray, and insert the sheet into the printer until the paper stops (Figure 4.3). The side of the paper to be printed should be facing up. NOTE: The printer will expect manually-fed paper that is the same size as the paper cassette in use. You can change this by selecting a different paper size through the keypad (Group 1, Options 4-6.) These keypad options are explained in Section 6. (Paper size may also be selected using a software command. See "Software Commands" later in this section.)
6. The next sheet of paper can be inserted approximately two seconds after the previous sheet has completely disappeared into the printer.



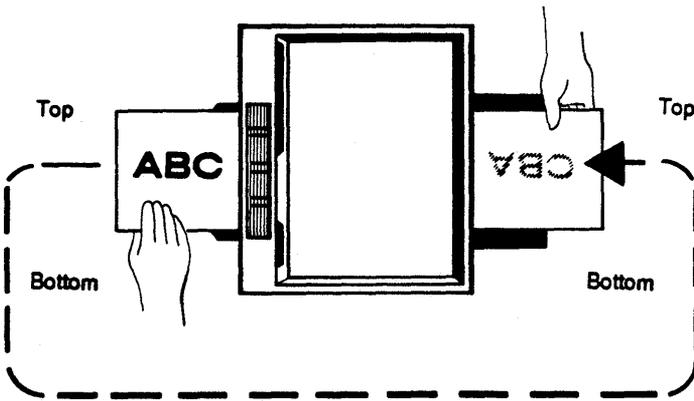
**Figure 4.3 Manual Feed**

## **Printing**

Printing can be done on regular copier-type paper or on pre-printed forms using either manual or cassette feed. Material is normally printed on one side of the paper only. However, double-sided and overlay printing are also possible. **NOTE:** The print engine will not print any closer than approximately 5 millimeters to the top, left and bottom edges of the paper, and approximately 8 millimeters to the right edge of the paper.

## Double-Sided Printing

Double-sided printing is possible using manual feed. The procedure for the first side is the same as normal manual-feed printing. To print on the back, simply turn the sheet over and insert it back into the printer (Figure 4.4). If the paper curls after the first pass, uncurl it before inserting it into the printer again. Special care must be taken to ensure the print on the second side is oriented as desired.

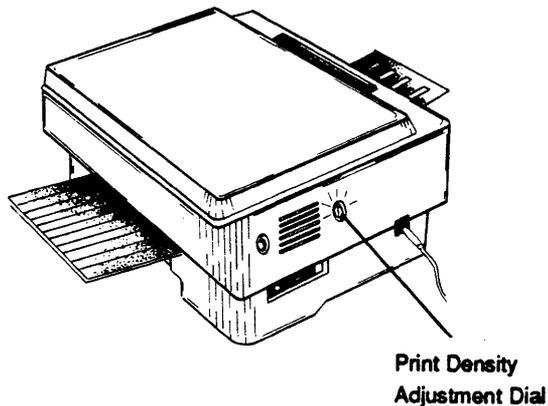


**Figure 4.4 Double-Sided Printing**

## Print Density

The Print Density Adjustment Dial (Figure 4.5) is used to adjust the darkness of the print. Turning the dial to your left darkens the print; turning it to your right lightens the print.

**NOTE:** When the dial is set for darker printing, more toner than normal is applied to the paper. This affects the number of copies you can expect to get from a single toner cartridge. The cartridge life indicator may give you an erroneous reading. The voltage required by the printer will also be affected when the dial is set for darker printing. More voltage is required to properly adhere the toner to the paper.



**Figure 4.5 Adjusting Print Density**

## Fonts — Resident, Download and Cartridge

On the SmartWriter, there are three sources of fonts for you to choose from: resident fonts (which came in the printer when you bought it), download fonts (available on various media) or optional QMS Font Cartridges.

### Resident and Download Fonts

The QMS SmartWriter has seven “resident” fonts – fonts (or “typefaces”) that are installed in the printer and that are available whenever the printer is powered-on. The names and numbers of these fonts are printed on the Status Summary Sheet.

Download fonts are fonts that are stored in some form outside the printer and then “downloaded” (copied) into the SmartWriter’s memory when the correct command is issued. (This command is the QMSDLF Download Font command and is explained in the *QMS/ANSI X3.64 Programming Manual*.) Download fonts remain in the SmartWriter’s memory until they are deleted by a special software command (see “Software Commands”) or until the printer is powered-off. Fonts may also be downloaded from the optional Font Cartridges into the SmartWriter’s memory. Depending on the available capacity of the memory, all fonts in a cartridge can be copied into memory (using the Epson command <ESC>: or the QMS/ANSI QMSCFO command) and the cartridge can be removed from the cartridge slot. Another Font Cartridge can then be inserted in the slot. This process may continue until the capacity of the memory is reached.

There is a limit on the number of fonts which the SmartWriter’s memory will accommodate. The maximum number of fonts (resident and download) that can exist at any one time in its memory is 64. The memory is also limited by the number of “bytes” of data that it can hold. The number of bytes available for download fonts or overlays is shown on the Status Summary Sheet.

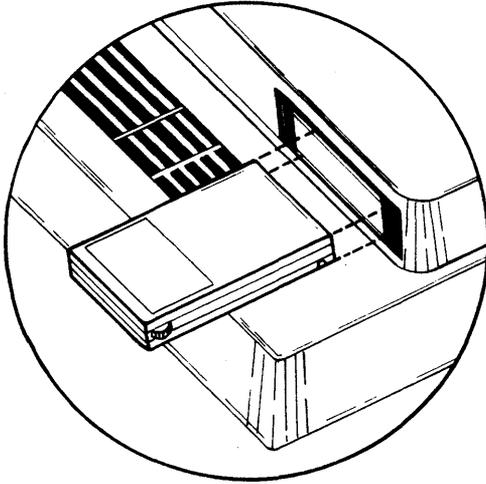
Therefore, if either the maximum number of fonts or the maximum number of bytes is exceeded, no more fonts or overlays will be accepted into memory.

### Optional Font Cartridges

The optional Font Cartridges enhance the flexibility of the QMS SmartWriter by providing you with additional fonts in an easily accessible form. Whenever a Font Cartridge is in the cartridge slot, its fonts are considered resident fonts by the printer. Copying the contents of one (or more) cartridges into the SmartWriter's memory (using the Epson <ESC>: command or the QMS/ANSI QMSCFO command) will still allow you to insert another cartridge into the slot. This Epson copy command gives you the capability of using two or more Font Cartridges simultaneously. (NOTE: The same limitations on the font capacity of the printer apply to Font Cartridge fonts.)

The SmartWriter must be off-line before you install the font cartridge. The indicator light on the **ONLINE** key on the front panel keypad will be off when the printer is off-line. Insert the cartridge into the slot in the front right corner of the SmartWriter as shown in Figure 4.6 below. Then, press the **ONLINE** key to put the printer back online.

The SmartWriter must be off-line before you remove the font cartridge. Then, slowly pull the cartridge out of the slot and put the printer back online.



**Figure 4.6 Installing the Font Cartridge**

## **Selecting a Font**

A font may be selected by using either the SmartWriter keypad or by using a software command.

Selecting a font via the keypad involves taking the printer off-line and using the Group C Options. These Options are explained in Section 6. When a font is selected in this manner, it will remain in effect until a new font is chosen, a warm restart (Option 0 of any Group) is performed, or the printer is powered-off.

A font may be selected by entering the proper software command from your terminal's keyboard. The QMSSFO software command (one of the Seven Special Commands explained in Section 7) allows you to select any font that

is available in the printer's memory. The Epson commands for selecting Elite, Compressed or Pica (default) Print Widths select from the three Epson fonts (font 380, 381 or 382). When a font is selected using either of these font selection methods, it will remain in effect until you change it.

## Printing a Status Summary Sheet

A Status Summary Sheet is printed every time the printer is powered-on. You may also print one by performing a warm restart of the printer (refer to Option 0 of any Configuration Group in Section 6). (NOTE: Group 0 Option 8 can be set to suppress the printing of a Status Summary Sheet at warm restart.)

## Software Commands

Software commands are commands sent to the SmartWriter that are issued directly from your terminal's keyboard. The software commands that the SmartWriter responds to are explained in detail in Sections 7, 9, 10, and 11. In particular, the commands in Section 7 are very useful. These commands, the Seven Special QMS/ANSI Commands, are:

- **QMSSFO** – Select Fonts or Overlays. This command can be used in place of the Group C Options that select a current font. Parameters included in this command also allow you to delete fonts or overlays from the printer memory.
- **QMSPGO** – Select Page Orientation. This command allows you to select between portrait and landscape orientation for printing. Use this instead of Group 1 Option 3.

- **QMSFCTL** – Paper Feed Control. Using this command you can select manual or cassette paper feed without taking the printer off-line. Use this instead of the **MANUAL FEED** key and Group 1 Options 4, 5, and 6.
- **QMSSCNT** – Copy Count. This command allows you to specify the number of copies to print from 1 to 5000. This command can take the place of all Options in Groups 2 and 3.
- **QMSMOD** – Select Emulation Mode. With this command, more than one emulation mode may be used in a document thereby allowing you to mix printing capabilities of different modes. This takes the place of Group 1 Options 1 and 2.
- **QMSCTL** – Extended Printer Control. This command allows you to pause the printer, enter Hex Dump Mode, print a Status Summary Sheet, or print the Font Test Pages.
- **QMSRED** – Redefine Translation Tables. This command may be the most useful for users with word processors that do not have the capability to embed ASCII control characters. The QMSRED command can be used to redefine any printable character to represent any unprintable control character (see the program below). Any fonts having characters in the upper-ASCII range (Hex 80 to Hex FF) can also have those characters redefined through this command so that they can be accessed by users who could not do so before.

If your word processor will not allow you to embed ASCII control characters, you may wish to use the following BASIC program to redefine the <ESC> character to the “^” character. This file can be sent to the printer once during a power-on cycle and will remain in effect until the Command Translation Table is reset or until the printer is powered-off. (NOTE: The “tilde,” is CHR\$(126). Be sure to include the space before the tilde.)

```
LPRINT CHR$(27); "[0;0;94;27 ~"
```

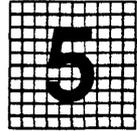
After this program is sent to the printer, any “^” that the printer receives will be translated into an ^ character. Now whenever you see <ESC> in this manual, you will only need to type ^. For example, sending the following command to the printer would cause a Status Summary Sheet to print (this is an example of the QMSCTL command):

```
^[2 r
```

The ^ in the command would be understood by the printer to be an <ESC>. Redefining the <ESC> character gives you easy access to all the supported software commands of the SmartWriter 150 listed in Section 7 of this manual and in the *QMS/ANSI X3.64 Programming Manual*.



# Choosing an Emulation Mode



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## Overview

This section explains what an emulation mode is and what factors must be considered when selecting an emulation mode. The QMS SmartWriter may be used in place of the following printers:

- Diablo 630 and Xerox 1730 Printers
- Qume Sprint 9/45, 9/55 and 11 Plus Printers
- Epson FX-80 Printer

The discussions in this section will help you determine whether you want the QMS SmartWriter to emulate (imitate) a Diablo, Qume or Epson printer. The SmartWriter is by no means limited to emulating only one of these printers. Each Emulation Mode, like each printer, has certain features or capabilities that may prove more useful for your particular needs. You may, if you wish, use all three modes – there are software commands (QMSMOD) and keypad configuration options (Group 1 Options 1 and 2) that allow you to easily switch between the three Emulation Modes and the ANSI X3.64 Mode.

## Objectives

In this section, we (1) explain why the QMS SmartWriter can replace other printers; (2) describe how and why your word processor and/or other software packages affect which printers your SmartWriter may replace; (3) explain what factors need to be considered if the SmartWriter is replacing an existing printer or being added to an ex-

isting system; and (4) explain what factors need to be considered when installing a whole new system.

## **Prerequisites**

No prerequisite knowledge or skills are needed for this section. However, a general understanding of word processors and other software packages is helpful.

## **Key Terms**

**Emulate** – Refers to the ability of the SmartWriter to imitate or “appear to be like” another printer.

**Configure** – To select particular options that cause your printer to respond in a specific manner.

**Software** – Programs and routines which enable computers to function in a desired manner.

**Compatible** – The ability of a device, such as a printer, to work with another device, such as a particular computer model or software package.

**Word Processor** – A type of software package which simplifies writing, editing and formatting letters, memos, articles and reports. Some word processors are very simple to use but have many limitations (can only handle paragraphs or pages of text). Others are more complex but allow you to perform a variety of functions such as rejustify paragraphs, search for an item of data and check spelling.

## **Printer Emulation**

A printer can only print your data if it receives commands from the computer (and/or software package) that it recognizes. Qume, Diablo, and Epson each have a

unique set of commands which enable them to perform the same functions.

The QMS SmartWriter emulates most of the commands of the Diablo, Qume, and Epson printers. This allows you to substitute the SmartWriter for any of the above printers and get the superior print quality of a laser printer.

In addition to the three "emulation" modes, there is a fourth mode of operation referred to as ANSI Mode. Although this is not truly an emulation mode, ANSI Mode commands provide you with extensive spacing, positioning, and graphics controls as well as the ability to define and download fonts and overlays. Refer to the accompanying *QMS/ANSI X3.64 Programming Manual* for details of the ANSI commands.

## **Replacing an Existing Printer**

If your QMS SmartWriter is replacing a Qume, Diablo or Epson printer, or any printer that is compatible with these three printers, you will probably want to customize your SmartWriter to be like the printer being replaced. For example, if you are replacing an Epson printer, you will most likely want the QMS SmartWriter to emulate an Epson printer so that you can continue to use the same word processing package and print your old files.

## **Adding a Printer to an Existing System**

If the QMS SmartWriter is to be an additional printer in a system that also uses Diablo, Qume or Epson printer, you will probably want the SmartWriter to emulate the printer you already have. For example, if you already have a Diablo printer and you want to add the QMS SmartWriter and keep the Diablo, you will most likely want the SmartWriter to emulate a Diablo printer. That way, you can print your files from either printer and continue to use the same word processing package.

## Word Processors and Other Software

Word Processors are software packages used for text processing. They make writing and formatting letters, memos, articles, and reports easy. Some of the more familiar word processing packages are: Wordstar, Multimate, DisplayWrite, XYWrite, Symphony, Volkswriter and MicroSoft Word.

Other software packages may be used to prepare charts, graphs, tables and spreadsheets.

Word Processors and other software packages are made to work with either a specific computer/printer system or a type of computer and printer. Since the SmartWriter is capable of emulating the Diablo 630, Qume Sprint or Epson FX-80 printers, most word processing packages can be configured to work with the SmartWriter. However, the SmartWriter is not an impact printer and therefore will not act on the Diablo, Qume or Epson commands in the same manner as would an impact printer.

If you have (or buy) a word processor or other software package, it must be able to work with a Diablo, Qume or Epson printer in order to be used with the QMS SmartWriter. This factor must be considered when determining which printer emulation mode to select.

If your word processor will allow you to embed ASCII control characters (those unprintable characters associated with Hex 00 to Hex 20), you will easily be able to use the commands that are referenced in Sections 7, 8, 9, and 10 to write your own programs. If you cannot embed control characters, please refer to "Software Commands" in Section 4 for a BASIC program that can redefine a printable character to be recognized by the SmartWriter as an <ESC> character.

## The Printer in a New System

If you are buying a new computer, a new word processor and a QMS SmartWriter, be sure that the computer and

work processing package (or any other software) will work with a Diablo, Qume or Epson printer.

## Where to Look Next

At this point, we hope that you have a fairly good idea of what you want your printer to do for you. Your next step will be configuring the printer to perform the way you want it to. Through the Configuration Options described in Section 6, you will be able to instruct the SmartWriter what type of printer to emulate at power-up, how to respond to certain commands sent to it from your computer, what font and spacing to use whenever none is specified, and you will be able to establish margins and other conditions of the printer that will help decrease the amount of keystrokes that will have to be made when you start sending your files to the printer.

Before you begin configuring the printer, take time first to study Section 6. Each Group of options contains important information. All the Groups have "factory default" settings which were established before the printer was shipped. These defaults are labelled in Section 6 by a "†." As you read through Section 6, note those Groups and Options whose defaults coincide with how you wish the printer to operate. You will then be able to skip over these when you perform printer configuration.

Groups A, D, E, and Q refer to ANSI Mode, Diablo Emulation Mode, Epson Emulation Mode, and Qume Emulation Mode respectively. Each of these Groups contains settings that are accessed whenever the printer is in the respective emulation mode. If you know that you will only use certain emulation modes then you can ignore the Groups that concern those other emulation modes that will not be used. For instance, if you will only be using Diablo Emulation Mode, you do not need to set configuration for Groups A, E, and Q.

### After Configuration...

Once you have completed any configuration that you wish to make, you are ready to begin sending files to

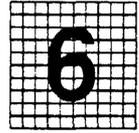
the printer. Sections 7, 9, 10, and 11 are only for reference and for use when you wish to start writing your own programs. If you are using a word processor, you need to refer to its documentation for instructions on installing it to work with an emulation mode that matches the emulation mode you have chosen for SmartWriter. Once you have done this, you may use the **word processor's commands** when writing, editing and sending your files to the printer. The word processor will translate its commands into "escape sequences" that the printer will understand (as long as the emulation modes for the word processor and the printer match).

If you wish to program, you will need to be able to embed control characters using your word processor. If your word processor will not allow you to embed control characters (such as <ESC>), please refer to "Software Commands" in Section 4 for a BASIC program that can redefine a printable character to be recognized by the printer as the <ESC> character.

# Configuration Options

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## Overview

This section explains the different Configuration Options available for the QMS SmartWriter.

## Prerequisites

Before continuing with this section you should be familiar with the operation of the QMS SmartWriter keypad.

## Key Terms

**Configuration** – The process of setting certain characteristics of the printer that determine how it will handle data.

**Emulation** – Imitating another printer or device so that most of the same commands may be sent to either printer with the same or similar results.

**Group** – A set of “Options” for configuring a certain characteristic of the printer.

**Option** – One setting (off or on) for a particular characteristic of the printer.

**Keypad** – The controls on the front panel of the QMS SmartWriter.

**Default** – A pre-set condition of the printer. Throughout this manual, default configuration options are labelled with a “†”.

**Font** – A complete alphabet of upper and lower case letters, figures, and punctuation marks in a certain style and weight.

**Decimal Values** – Numeric values associated with ASCII characters. (Base 10).

**Octal Value** – A “Base 8” numbering system for representing the ASCII characters.

**Hex Value** – A system of letters and numerals for representing the ASCII characters. (Base 16).

**Control Characters** – ASCII characters with a Hex value of 20 or lower.

**Orientation** – The direction across the page where printing occurs. Orientation may be either “portrait” (across the narrow dimension) or “landscape” (across the wide dimension).

**Buffer** – A “holding area” where incoming data is stored before being processed.

**Hex Dump** – An operating mode where all incoming data is printed as ASCII hex values (0-9 and A-F) and printable characters in order to determine the characters actually being received by the printer.

**Form Feed** – Movement of the paper out of the printer; the ASCII character <FF> associated with this movement.

**Carriage Return** – Movement of the current print position to the left margin; the ASCII character <CR> associated with this movement.

**Warm Restart** – Toggling Option 0 of any Group in order to initiate changes made to the configuration options. When Option 0 is showing in the LED display on the keypad, pushing the **TOGGLE** key will “save” the status of all Options.

**Status Summary Sheet** – A page that lists available fonts, enabled options, and other printer conditions.

**Copy Count** – The number of copies to be printed at one time.

**Parallel Interface** – A method of data transmission where a complete character is sent to the printer at one time.

**Serial Interface** – “Bit-by-bit” method of data transmission.

**Before you begin, please read “The Keypad” in Section 4 and be sure you understand the operation of the configuration keys. If, during configuration, you become confused or lose your place, go to Group 0 Option 5 and follow the instructions there. This will reset the printer to the factory defaults labelled “†” in this section.**

## **GROUP A — ANSI Mode Options**

These Options (except Options 1 and 2) control the operation of the printer when in ANSI Mode.

### **Group A Option 0 – Warm Restart**

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.” Save changes to other configuration options before selecting current font with the Group C Options.) Refer to Section 4, “Operation,” for keypad instructions.

## Group A Options 1 and 2 – Units of Measurement for Status Summary Sheet

These two Options control how the “Page Parameters” section of the Status Summary Sheet describe the margins and spacing that are configured in the printer. Setting “inches” will cause the page parameters to be shown in terms of inches. Setting “centimeters” will cause the page parameters to be shown in terms of centimeters. A sample of the Status Summary Sheet is shown in Section 3. These Options do not affect the Unit of Measurement used by the ANSI commands.

Option 1	Option 2	Results In
disabled	disabled	Measurements in dots (0.0033”)
enabled	disabled	Measurements in deci-points (0.0014”)
disabled	enabled	Measurements in centimeters (0.394”)
† enabled	enabled	Measurements in inches

## Group A Option 3 – Character Spacing

This Option allows you to select “proportional” or “fixed” character spacing when in ANSI Mode. When a font is described as “proportional,” the horizontal space occupied by each character varies with the actual width of the character. For example, in a proportional font, the character “i” occupies less space than the character “m.” When printing text, proportional fonts give a more “natural” look because of these differences in horizontal space. Although a fixed-space font is not attractive when printing pages of text, it is suited to tabular material since it is easier to align in a column. The characteristics that make a font proportional or fixed-space are not controlled by this Option alone. Therefore, selecting fixed-spacing through this Option will not make a proportional fixed-space.

Option 3	Results In
disabled	Proportional character spacing
† enabled	Fixed character spacing

## Group A Options 4 and 5 – Line Spacing

These Options allow you to specify the Line Spacing when the SmartWriter is in ANSI Mode.

In order to print text that “looks right,” proper line spacing is essential. Line spacing is measured from baseline to baseline. It could, therefore, also be thought of as “line height.” Since the QMS SmartWriter has a resolution of 300 dots per inch, a line spacing of 6 lines per inch yields lines that are 50 dots from baseline to baseline (300 dots per inch divided by 6 lines per inch = 50 dots per line). When selecting 6 lines per inch line spacing, you should be using a font that will fit into this 50 dot line. Fonts that are “10-point” will fit into this line. Appendix A includes Width Tables of the 10 point fonts that are standard on the SmartWriter. Selecting 8 lines per inch spacing will yield 37 dots per line. Fonts classified as 7-point match the 37 dot vertical requirement. Most standard QMS SmartWriter fonts are larger than this. Using these fonts will result in less space between lines than is ideal. You should print a sample before using this spacing with the standard fonts. Selecting “font-fixed” line spacing causes the spacing value embedded in each font definition and automatically ensures optimum line spacing font used.

	Option 4	Option 5	Results In
	disabled	disabled	“Font-fixed” line spacing
	enabled	disabled	4 lines per inch
†	disabled	enabled	6 lines per inch
	enabled	enabled	8 lines per inch

## Group A Option 6 – Print Line Overflows

This Option allows you to specify what the SmartWriter should do with data that extends past the right margin.

	Option 6	Results In
†	disabled	Print data extending past right margin
	enabled	Absorb data extending past right margin

### Group A Option 7 – Carriage Returns

The setting of this Option controls how the SmartWriter responds when it receives a <CR> character (Hex 0D).

#### Option 7 Results In

- † disabled <CR> = <CR> only
- enabled <CR> = <CR><LF> (line feed)

### Group A Option 8 – Line Feeds

The setting of this Option controls how the SmartWriter responds when it receives a <LF> character (Hex 0A). Also refer to Group A Option 9.

#### Option 8 Results In

- † disabled <LF> = <LF> only
- enabled <LF> = <CR><LF>

### Group A Option 9 – Line Feeds

The setting of this Option controls how the SmartWriter responds when it receives a <LF> character (Hex 0A). Also refer to Group A Option 8.

#### Option 9 Results In

- † disabled <LF> = <LF> only
- enabled <LF> = <LF><LF>

## GROUP C — Selecting Current Font

The “current font” is the font that you select for printing. This can be a different font from the “default” fonts (selected by Groups L and P). If your computer system will allow you to embed decimal, octal, or hex values, you may also use a QMS/ANSI command to change fonts (see Chapter 7). Other users will have to interrupt the printer and change fonts through this configuration sequence.

## Group C Option 0 – Warm Restart

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.” Save changes to other configuration options before selecting current font with the Group C Options.) Refer to Section 4, “Operation,” for keypad instructions.

## Group C Options 1 through 5 – Current Font

These Options are used to enter the five-digit font number (00001 to 65535). Each Option controls a different place in the font number as illustrated in Figure 6.1. (NOTE: Whenever a warm boot is performed, the current font will be reset to the default font.)

### Option Results In

- | Option | Results In   |
|--------|--|
| 1      | Allows you to enter the ten-thousands digit of the current font number |
| 2      | Allows you to enter the thousands digit of the current font number     |
| 3      | Allows you to enter the hundreds digit of the current font number      |
| 4      | Allows you to enter the tens digit of the current font number          |
| 5      | Allows you to enter the units digit of the current font number         |

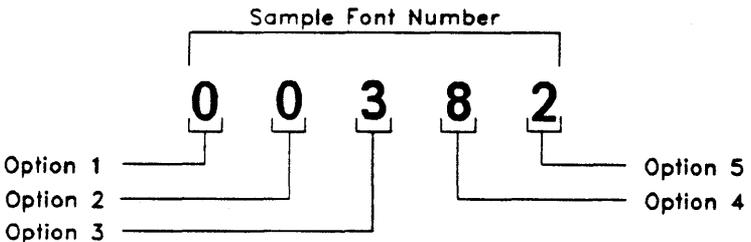


Figure 6.1

Use this procedure to change the current font:

1. Press the **ONLINE** key. When the green light in the key is out, the printer is off-line.
2. Press the **GROUP** key repeatedly until "C 0" is showing in the LED display.
3. Press the **OPTION** key to display "C 1".
4. Press the **TOGGLE** key. The display will show "1 . 0". The decimal point in the display indicates "font number entry mode."
5. Press the **OPTION** key repeatedly to display the number of the ten-thousands digit of the font number after the decimal point. **Remember that all five digits, including any leading zeros, must be set.**
6. Press the **TOGGLE** key to enter the digit. This will display "C 2" indicating Option 2 (entering the thousands digit).
7. Repeat Steps 4, 5, and 6 for Options 2 through 5 until all digits of the font number have been set.

**Do not use Option 0 to save the selection. The new current font will be in effect as soon as the printer is placed back on-line.**

## GROUP D — Diablo Emulation Options

The Group D Options control the QMS SmartWriter during Diablo Emulation Mode.

### Group D Option 0 – Warm Restart

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

### Group D Options 1 and 2 – Proportional or Fixed Spacing

This Option allows you to select “proportional” or “fixed” character spacing when in Diablo Emulation Mode. When a font is described as “proportional,” the horizontal space occupied by each character varies with the actual width of the character. For example, in a proportional font, the character “i” occupies less space than the character “m.” When printing text, proportional fonts give a more “natural” look because of these differences in horizontal space. A “fixed-space” font’s characters all occupy the same amount of horizontal space. Although a fixed-space font is not attractive when printing pages of text, it is more suited to tabular material since it is easier to align in a column. The characteristics that make a font proportional or fixed-space are not controlled by this Option alone.

	Option 1	Option 2	Results In
	disabled	disabled	Proportional character spacing
†	enabled	disabled	Fixed character spacing (10 characters per inch)
	disabled	enabled	Fixed character spacing (12 characters per inch)
	enabled	enabled	Fixed character spacing (15 characters per inch)

### Group D Option 3 – Carriage Returns

This Option controls the interpretation of <CR> characters.

	Option 3	Results In
†	disabled	<CR> = <CR>
	enabled	<CR> = <CR> <LF>

### Group D Option 4 – Line Feeds

This Option controls the interpretation of <LF> characters.

	Option 5	Results In
†	disabled	<LF>= one line feed
	enabled	<LF>= two line feeds

### Group D Option 6 – Font Table Proportional Spacing

This Option controls the proportional spacing used by a word processor package when the printer is in Diablo Emulation Mode. For best results, this Option should be disabled when using a word processing software package. When this Option is disabled, you should only use the 10 cpi font in proportional spacing. The 10 cpi font has a table of character widths designed for it that a word processing package would use to give the most attractive spacing between characters. The table would not provide the same results with any other font.

If the Option is enabled, you will be able to use fonts other than the 10 cpi font with a word processing package. However, using these fonts will cause the page margins to shift.

**Option 6 Results In**

- † disabled Use the font table for character spacing when in proportional spacing.
- enabled Do not use the font table for character spacing.

## **GROUP E — Epson Emulation Options**

The Group E Options control the QMS SmartWriter during Epson Emulation Mode.

### **Group E Option 0 – Warm Restart**

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

### **Group E Option 1 – Epson Print Mode**

This Option allows you to select the default printing mode when the QMS SmartWriter is in Epson Emulation Mode. If this Option is disabled, any printing will take place in Pica format (10 characters per inch). If this Option is enabled, any printing will take place in Compressed format (17 characters per inch).

**Option 1 Results In**

- † disabled Printing is in Pica format during Epson Emulation Mode
- enabled Printing is in Compressed format during Epson Emulation Mode

## Group E Option 2 – Pica Print Quality

This Option allows you to control print quality during Pica format printing in Epson Emulation Mode.

	Option 2	Results In
†	disabled	Print quality is “normal” Pica
	enabled	Print quality is “emphasized” Pica

## Group E Options 3, 4, 5 – International Character Sets

This Option allows you to select international character sets. Unless you are operating your QMS SmartWriter outside of the U.S., these Options should be left in the factory configuration (all enabled).

	Option 3	Option 4	Option 5	Results In
†	enabled	enabled	enabled	U.S.A.
	disabled	enabled	enabled	France
	enabled	disabled	enabled	Germany
	disabled	disabled	enabled	England
	enabled	enabled	disabled	Denmark
	disabled	enabled	disabled	Sweden
	enabled	disabled	disabled	Italy
	disabled	disabled	disabled	Spain

**Note:** All three Options must be set as indicated to select the character sets indicated.

## Group E Option 6 – Carriage Returns

This Option controls the interpretation of the carriage return (<CR>) character when in Epson Emulation Mode.

	Option 6	Results In
†	disabled	<CR>= Carriage Return
	enabled	<CR>= Carriage Return and Line Feed

### Group E Option 7 – Printing Zeros

When in Epson Emulation Mode, this Option allows you to specify the printing of zeros with or without slashes.

	Option 9	Results In
†	disabled	Print zeros without slashes
	enabled	Print zeros with slashes

### Group E Option 8 – Pica Default Font

This Option allows the Current Font to remain in effect whenever Epson Pica Mode is entered.

	Option A	Results In
†	disabled	Use the default Pica font as the Pica Mode font.
	enabled	Use the Current Font as the Pica Mode font.

## GROUP L — Selecting Default Landscape Font

This Group allows you to select a default font that will be accessed whenever the printer is in landscape orientation and no “current font” is specified. The font selection process is similar to that for selecting the Current Font.

### Group L Option 0 – Warm Restart

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

### Group L Options 1 through 5 – Landscape Font

These Options are used to enter the five-digit font number (00001 to 65535). Each Option controls a different place in the font number as shown in the table below.

## Option Results In

- 1 Allow entry of the ten-thousands digit of the landscape font number
- 2 Allow entry of the thousands digit of the landscape font number
- 3 Allow entry of the hundreds digit of the landscape font number
- 4 Allow entry of the tens digit of the landscape font number
- 5 Allow entry of the units digit of the landscape font number

Use this procedure to change the landscape font:

1. Press the **ONLINE** key. When the green light in the key is out, the printer is off-line.
2. Press the **GROUP** key repeatedly until "L 0" is showing in the LED display.
3. Press the **OPTION** key to display "L 1".
4. Press the **TOGGLE** key. The display will show "1 . 0". The decimal point in the display indicates "font number entry mode."
5. Press the **OPTION** key to display the ten-thousands digit of the font number after the decimal point.
6. Press the **TOGGLE** key to enter the digit. This will display "L" and the next Option number in sequence.
7. Repeat Steps 3, 4, and 5 for Options 2 through 5 until all digits of the font number have been entered.

Use Option 0 (warm restart) to save the selection.

## **GROUP P — Selecting Default Portrait Font**

This Group allows you to select a default font that will be accessed whenever the printer is in portrait orientation and no “current font” is specified. (The default portrait font is Font 382.) The font selection process is similar to that for selecting the Current Font.

### **Group P Option 0 – Warm Restart**

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **[TOGGLE]** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

### **Group P Options 1 through 5 – Portrait Font**

These Options are used to enter the five-digit font number (00001 to 65535). Each Option controls a different place in the font number as shown in the table on the following page.

<b>Option</b>	<b>Results In</b>
1	Allow entry of the ten-thousands digit of the portrait font number
2	Allow entry of the thousands digit of the portrait font number
3	Allow entry of the hundreds digit of the portrait font number
4	Allow entry of the tens digit of the portrait font number
5	Allow entry of the units digit of the portrait font number

Use this procedure to change the portrait font:

1. Press the **ONLINE** key. When the green light in the key is out, the printer is off-line.
2. Press the **GROUP** key repeatedly until "P 0" is showing in the LED display.
3. Press the **OPTION** key to display "P 1".
4. Press the **TOGGLE** key. The display will show "1 . 0". The decimal point in the display indicates "font number entry mode."
5. Press the **OPTION** key to display the ten-thousands digit of the font number after the decimal point.
6. Press the **TOGGLE** key to enter the digit. This will display "P" and the next Option number in sequence.
7. Repeat Steps 3, 4, and 5 for Options 2 through 5 until all digits of the font number have been entered.

Use Option 0 (warm restart) to save the selection.

## **GROUP Q — Qume Emulation Mode**

The Group Q (Qume) options control the QMS SmartWriter during Qume Emulation Mode.

### **Group Q Option 0 – Warm Restart**

Option 0 of this or any other Group is used as a "warm restart." Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, "Selecting Current Font.") Refer to Section 4, "Operation," for keypad instructions.

## Group Q Options 1 and 2 – Proportional or Fixed Spacing

This Option allows you to select “proportional” or “fixed” character spacing when in Qume Emulation Mode. When a font is described as “proportional,” the horizontal space occupied by each character varies with the actual width of the character. For example, in a proportional font, the character “i” occupies less space than the character “m.” When printing text, proportional fonts give a more “natural” look because of these differences in horizontal space. A “fixed-space” font’s characters all occupy the same amount of horizontal space. Although a fixed-space font is not attractive when printing pages of text, it is suited to tabular material since it is easier to align in a column. The characteristics that make a font proportional or fixed-space are not controlled by this Option alone. Therefore, selecting fixed-spacing through this Option will not make a proportional font fixed-space.

	Option 1	Option 2	Results In
	disabled	disabled	Proportional character spacing
†	enabled	disabled	Fixed character spacing (10 characters per inch)
	disabled	enabled	Fixed character spacing (12 characters per inch)
	enabled	enabled	Fixed character spacing (15 characters per inch)

## Group Q Option 3 – Line Spacing

This Option allows you to specify the Line Spacing when the QMS SmartWriter is in Qume Emulation Mode.

	Option 3	Results In
†	disabled	Line spacing = 6 lines per inch
	enabled	Line spacing = 8 lines per inch

In order to print text that "looks right," proper line spacing is essential. Line spacing is measured from baseline to baseline. It could, therefore, also be thought of as "line height." Since the QMS SmartWriter has a resolution of 300 dots per inch, a line spacing of 6 lines per inch yields lines that are 50 dots from baseline to baseline (300 dots per inch divided by 6 lines per inch = 50 dots per line). When selecting 6 lines per inch line spacing, you should be using a font that will fit into this 50 dot line. Fonts that are "10-point" will fit into this line. Appendix A includes Width Tables of the 10 point fonts that are standard on the SmartWriter. Selecting 8 lines per inch spacing will yield 37 dots per line. Fonts classified as 7-point match the 37 dot vertical requirement. Most standard QMS SmartWriter fonts are larger than this. Using these fonts will result in less space between lines than is ideal. You should print a sample before using this spacing with the standard fonts.

Using the Vertical Motion Index command in Qume Emulation Mode will allow you to more closely match the line spacing to the font in use. This Vertical Motion Index command is explained in this section under Supported Commands.

#### **Group Q Option 4 - Carriage Returns**

This Option controls how the QMS SmartWriter interprets <CR> characters.

<b>Option 4</b>	<b>Results In</b>
† disabled	<CR> =<CR>
enabled	<CR> =<CR><LF>

## Group Q Option 5 – Automatic Carriage Return/Line Feed

This Option controls the action that the printer will take when it reaches the right margin on the page. If most of your files are processed by a word processor or editor, there are already carriage returns and line feeds at the right margin. When this Option is disabled, it allows the word processor to make decisions on where to put carriage returns and line feeds. If this Option is enabled, files which already have carriage returns and line feeds at the right margin will no print properly because the printer will also insert its carriage returns and line feeds.

### Option 5 Results In

- † disabled No <CR><LF>at right margin
- enabled Perform automatic <CR><LF> at right margin.

## Group Q Option 6 – Font Table Proportional Spacing

This Option controls the proportional spacing used by a word processor package when the printer is in Qume Emulation Mode. **For best results, this Option should be disabled when using a word processing software package. When this Option is disabled, you should only use the 10 cpi font in proportional spacing.** The 10 cpi font has a table of character widths designed for it that a word processing package would use to give the most attractive spacing between characters. The table would not provide the same results with any other font. **If the Option is enabled, you will be able to use fonts other than the 10 cpi font with a word processing package. However, using these fonts will cause the page margins to shift.** If Option 6 is disabled and proportional spacing is selected, HMI will have no effect on spacing.

### Option 6 Results In

- † disabled Use the font table for character spacing when in proportional spacing.
- enabled Do not use the font table for character spacing.

## GROUP 0 — System Function Options

This Group controls some of the basic operation capabilities of the printer.

### Group 0 Option 0 – Warm Restart

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

### Group 0 Option 1 – Copy Count Reset

This Option allows you to abort the current copy count sequence and reset the copy count to zero. This Option takes effect immediately; there is no enabling or disabling as with other Options. Use the following procedure to invoke this Option:

1. Press the **ONLINE** key on the QMS SmartWriter. The printing process will be interrupted immediately.
2. Press the **GROUP** key until the display shows “0 0.”
3. Press the **OPTION** key until the display shows “0 1.”
4. Press the **TOGGLE** key. This resets the copy count to zero.
5. Press the **ONLINE** key.

## Group 0 Option 2 – Clear Buffer

This Option allows you to clear all of the current data already put together as pages in the QMS SmartWriter's buffer. This Option will also abort font "test pages" that print whenever the **TEST** key on the keypad is depressed. This Option takes effect immediately; there is no enabling or disabling as with other Options. Use the following procedure to invoke this Option:

1. Press the **ONLINE** key on the QMS SmartWriter if the amber light in the **ONLINE** key is on.
2. Press the **GROUP** key until the display shows "0 0".
3. Press the **OPTION** key until the display shows "0 2".
4. Press the **TOGGLE** key. This will empty the buffer or abort the test pages.
5. Press the **ONLINE** key. The printer is ready to print again.

## Group 0 Option 3 – Hex Dump

This Option allows you to put the QMS SmartWriter into Hex Dump Mode. When in Hex Dump Mode the printer prints the hex values of the data it receives. All characters' values, including control characters, are printed. This is useful for determining exactly what characters the printer is actually receiving. Hex dump data prints on the left side of the page. Matching print data appears on the right side of the page. Control characters (values less than Hex 20) and any unprintable characters appear on the right side as periods. To exit the Hex Dump Mode, disable this Option and toggle Option 0 of any Group (warm restart).

	Option 3	Results In
†	disabled	Normal operation
	enabled	Hex Dump Mode operation

## Group 0 Option 4 – Form Feed/Carriage Return

This Option controls how the QMS SmartWriter interprets Form Feed (<FF>) characters that are followed by Carriage Return (<CR>) characters. If carriage returns following form feeds are ignored, printing will start at the Top Margin.

### Option 4 Results In

- |            |                      |
|------------|----------------------|
| † disabled | <FF>+ <CR>= <FF><CR> |
| enabled    | <FF>+ <CR>= <FF>only |

## Group 0 Option 5 – Configuration Reset

This Option is a printer configuration reset. When this Option is used, all Options will return to their factory configuration settings (indicated by “†” throughout this section). This Option takes effect immediately; there is no enabling or disabling as with other Options. Use the following procedure to invoke this Option:

1. Press the **ONLINE** key. This takes the printer off-line.
2. Press the **GROUP** key until the display shows “00.”
3. Press the **OPTION** key until the display shows “05.”
4. Press the **TOGGLE** key. This resets all configuration Options.
5. Press the **ONLINE** key to bring the printer back on-line.

## **Group 0 Option 6 – Reset Command and Font Translation Tables**

This Option controls whether or not the Command and Font Translation Tables will be reset when a new emulation mode is entered or a warm restart (Option 0) is performed. The function of the Translation Tables is explained in Section 7.

### **Option 6 Results In**

- † disabled Reset Command and Font Translation Tables when entering new emulation mode or performing warm restart.
- enabled Do not reset Translation Tables.

## **Group 0 Option 7 – Suppress Blank Pages**

This Option is used to prevent the QMS SmartWriter from ejecting blank sheets of paper. If this Option is enabled, the printer will not eject a page when it receives a Form Feed (<FF>) command unless there is some data in the buffer.

### **Option 7 Results In**

- disabled <FF> command always ejects page.
- † enabled <FF> will not cause page to eject if buffer is empty.

## **Group 0 Option 8 – Suppress Status Summary Sheet**

This Option controls the printing of a Status Summary Sheet. A Status Summary Sheet, listing conditions of the printer including fonts, is printed automatically at power-up and whenever a “warm restart” (Option 0 of any Group) is performed. If this Option is enabled, the Status Summary Sheet will not print when a warm boot is performed.

### **Option 8 Results In**

- † disabled Print Status Summary Sheet at warm restart.
- enabled Never print Status Summary Sheet at warm restart.

## Group 0 Option 9 – Immediate Command Table Reset

This Option initiates an immediate reset of the Command Translation Table (explained in Section 7). To reset the table to its default values, press the **ONLINE** key to take the printer off-line and then press the **GROUP** and **OPTION** keys to access Group 0 Option 9 (**0 9** showing in the keypad display window). Press the **TOGGLE** key to reset the Command Translation Table. The printer will be returned to on-line status.

## Group 0 Option A – Immediate Font Table Reset

This Option initiates an immediate reset of the Font Translation Table (explained in Section 7). To reset the table to its default values, press the **ONLINE** key to take the printer off-line and then press the **GROUP** and **OPTION** keys to access Group 0 Option A (**0 A** showing in the keypad display window). Press the **TOGGLE** key to reset the Font Translation Table. The printer will be returned to on-line status.

## GROUP 1 — Selecting Emulation Mode and Page Size/Orientation

These Options allow you to select emulation mode, the size of paper being used, and the orientation of characters on the page when printed on the QMS SmartWriter.

### Group 1 Option 0 – Warm Restart

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

## Group 1 Options 1 and 2 – Emulation Mode

These Options allow you to specify the Emulation Mode that you wish to use. A description of each mode is given earlier in this manual.

	Option 1	Option 2	Results In
	disabled	disabled	ANSI Mode
	enabled	disabled	Diablo Emulation Mode
†	disabled	enabled	Epson Emulation Mode
	enabled	enabled	Qume Emulation Mode

## Group 1 Option 3 – Page Orientation

This Option controls how the QMS SmartWriter will orient its printing on the page. This is a Power-up Default Orientation. Any changes made to this Option will affect page margins (see Group 4).

	Option 3	Results In
†	disabled	Portrait Orientation
	enabled	Landscape Orientation

## Group 1 Options 4 through 6 – Paper Size

These Options control the size of paper to be used during **Manual Paper Feed** operation. The choices are: A4 (Europe), 8.3x 11.7 inches (210x297mm); B5 (Europe), 7.2x10.1 inches (182x257mm); Legal (USA), 8.5x14 inches (216x356mm); Letter (USA), 8.5x11 inches (216x279mm); and Mini, 3.9x5.5 inches (100x140mm).

	Option 4	Option 5	Option 6	Results In
	disabled	disabled	disabled	A4 paper size
	enabled	disabled	disabled	B5 paper size
	disabled	enabled	disabled	Legal paper size
†	enabled	enabled	disabled	Letter paper size
	disabled	disabled	enabled	Mini paper size

## **GROUP 2 — Copy Count (1 to 9 copies)**

The Group 2 Options allow you to specify the number of multiple copies of each printed page that the QMS SmartWriter should print. These Options work in conjunction with the Group 3 Options. The status of the Group 3 will affect these Options.

### **Group 2 Option 0 – Warm Restart**

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

### **Group 2 Options 1 to 9 – Copy Count ( 1 through 9)**

Options 1 through 9 control the number of copies that the QMS SmartWriter will print per page. For example, if Option 1 is enabled and the other Options in this Group are disabled, the QMS SmartWriter will print one copy per page. If Option 7 is enabled and the other Options in this Group are disabled, seven copies will be printed. Use Option 0 to initiate changes made to this Option.

## **GROUP 3 — Copy Count (multiples of 10)**

The Group 3 Options work in conjunction with Group 2 Options to give the QMS SmartWriter the capability of printing up to 99 duplicates per page. The status of Group 2 will affect these Options.

### **Group 3 Option 0 – Warm Restart**

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting

**Current Font.”)** Refer to Section 4, “Operation,” for keypad instructions.

### **Group 3 Options 1 through 9 – Copy Count**

Options 1 through 9 control the number of copies (in multiples of ten) that the QMS SmartWriter will print per page. If Option 3 is enabled and the other Options in this Group are disabled, thirty copies per page will be printed. If Group 2 Option 7, for example, is also enabled, 37 copies will be printed. Use Option 0 to initiate changes made to this Option.

## **GROUP 4 — Page Margin Settings**

The Group 4 Options provide limited control of the QMS SmartWriter for the Page Margin Setting Options. **This Group is not reset to a “factory configuration setting” when you “enable” Group 0 Option 5.**

### **Group 4 Option 0 – Warm Restart**

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **[TOGGLE]** key. This will cause changes to the configuration options to take effect. (**NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”**) Refer to Section 4, “Operation,” for keypad instructions.

## Group 4 Options 1 through 4 – Left Margin

Options 1, 2, 3, and 4 work together to allow you to tell your QMS SmartWriter the Left Margin Setting for the page the QMS SmartWriter is to print. To determine the setting to use, measure from the left edge of the paper to the place where you want the margin to be on the page. Then select the Left Margin listed below that is closest to your measurement.

				Left	
	Option 1	Option 2	Option 3	Option 4	Margin
	disabled	disabled	disabled	disabled	0.00 inches
†	enabled	disabled	disabled	disabled	0.25 inches
	disabled	enabled	disabled	disabled	0.50 inches
	enabled	enabled	disabled	disabled	0.75 inches
	disabled	disabled	enabled	disabled	1.00 inches
	enabled	disabled	enabled	disabled	1.25 inches
	disabled	enabled	enabled	disabled	1.50 inches
	enabled	enabled	enabled	disabled	1.75 inches
	disabled	disabled	disabled	enabled	2.00 inches
	enabled	disabled	disabled	enabled	2.25 inches
	disabled	enabled	disabled	enabled	2.50 inches
	enabled	enabled	disabled	enabled	2.75 inches
	disabled	disabled	enabled	enabled	3.00 inches
	enabled	disabled	enabled	enabled	3.25 inches
	disabled	enabled	enabled	enabled	3.50 inches
	enabled	enabled	enabled	enabled	3.75 inches

## Group 4 Options 5 through 8 – Right Margin

Options 5, 6, 7, and 8 work together to allow you to tell your QMS SmartWriter the Right Margin Setting for the page the QMS SmartWriter is to print. To determine the setting to use, measure from the right edge of the paper to the place where you want the margin to be on the page. Then select the Right Margin listed below that is closest to your measurement.

	Option 5	Option 6	Option 7	Option 8	Right Margin
	disabled	disabled	disabled	disabled	0.00 inches
†	enabled	disabled	disabled	disabled	0.25 inches
	disabled	enabled	disabled	disabled	0.50 inches
	enabled	enabled	disabled	disabled	0.75 inches
	disabled	disabled	enabled	disabled	1.00 inches
	enabled	disabled	enabled	disabled	1.25 inches
	disabled	enabled	enabled	disabled	1.50 inches
	enabled	enabled	enabled	disabled	1.75 inches
	disabled	disabled	disabled	enabled	2.00 inches
	enabled	disabled	disabled	enabled	2.25 inches
	disabled	enabled	disabled	enabled	2.50 inches
	enabled	enabled	disabled	enabled	2.75 inches
	disabled	disabled	enabled	enabled	3.00 inches
	enabled	disabled	enabled	enabled	3.25 inches
	disabled	enabled	enabled	enabled	3.50 inches
	enabled	enabled	enabled	enabled	3.75 inches

## Group 4 Options 9 through C – Top Margin

Options 9, A, B, and C work together to allow you to tell your QMS SmartWriter the Top Margin Setting for the page the QMS SmartWriter is to print. To determine the setting to use, measure from the top edge of the paper to the place where you want the margin to be on the page. Then select the Top Margin listed below that is closest to your measurement.

	Option 9	Option A	Option B	Option C	Top Margin
†	disabled	disabled	disabled	disabled	0.00 inches
	enabled	disabled	disabled	disabled	0.25 inches
	disabled	enabled	disabled	disabled	0.50 inches
	enabled	enabled	disabled	disabled	0.75 inches
	disabled	disabled	enabled	disabled	1.00 inches
	enabled	disabled	enabled	disabled	1.25 inches
	disabled	enabled	enabled	disabled	1.50 inches
	enabled	enabled	enabled	disabled	1.75 inches
	disabled	disabled	disabled	enabled	2.00 inches
	enabled	disabled	disabled	enabled	2.25 inches
	disabled	enabled	disabled	enabled	2.50 inches
	enabled	enabled	disabled	enabled	2.75 inches
	disabled	disabled	enabled	enabled	3.00 inches
	enabled	disabled	enabled	enabled	3.25 inches
	disabled	enabled	enabled	enabled	3.50 inches
	enabled	enabled	enabled	enabled	3.75 inches

## Group 4 Options D through F – Bottom Margin

Options D, E, and F work together to allow you to tell your QMS SmartWriter the Bottom Margin Setting for the page the QMS SmartWriter is to print. To determine the setting to use, measure from the bottom edge of the paper to the place where you want the margin to be on the page. Then select the Bottom Margin listed below that is closest to your measurement.

	Option D	Option E	Option F	Bottom Margin
†	disabled	disabled	disabled	0.00 inches
	enabled	disabled	disabled	0.25 inches
	disabled	enabled	disabled	0.50 inches
	enabled	enabled	disabled	0.75 inches
	disabled	disabled	enabled	1.00 inches
	enabled	disabled	enabled	1.25 inches
	disabled	enabled	enabled	1.50 inches
	enabled	enabled	enabled	1.75 inches

## GROUP 5 — Common Interface Options

The Options of this Group provide limited control of the QMS SmartWriter for interface specifications that are common to both parallel (Centronics type) and serial interfaces.

### Group 5 Option 0 – Warm Restart

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

### **Group 5 Option 1 – Interface Type**

This Option allows you to specify the type of interface you are using with the QMS SmartWriter. If the proper interface is not established between host and printer, there can be no communication.

	<b>Option 1</b>	<b>Results In</b>
	disabled	Parallel (Centronics type) interfacing
†	enabled	Serial interfacing

### **Group 5 Option 2 – Online/Offline**

This Option allows you to control whether the QMS SmartWriter powers-up off-line or on-line. When off-line, the QMS SmartWriter is under your control. The printer will not receive communication from the host when off-line. If changes to configuration must be made whenever the printer is turned on, the printer should power-up off-line.

	<b>Option 2</b>	<b>Results In</b>
	disabled	Power-up off-line
†	enabled	Power-up on-line

### **Group 5 Options 3, 4, 5 – Print Buffer Configuration**

Options 3, 4, and 5 work together to allow you to tell your QMS SmartWriter the number of input data characters it can hold at one time before it must stop receiving data. This is called specifying the size of the Print Buffer (Input Buffer). There are a variety of selections for this Option in order to meet most application requirements. Generally, the larger this Print Buffer is, the faster your data is printed and the sooner your computer is free to do other things. The range is from 132 characters to 8K (8 times 1024) characters – characters in size.

	<b>Option 3</b>	<b>Option 4</b>	<b>Option 5</b>	<b>Print Buffer Size</b>
	disabled	disabled	disabled	132 characters
	enabled	disabled	disabled	256 characters
	disabled	enabled	disabled	512 characters
	enabled	enabled	disabled	1K characters
	disabled	disabled	enabled	2K characters
	enabled	disabled	enabled	4K characters
	disabled	enabled	enabled	6K characters
†	enabled	enabled	enabled	8K characters

### **Group 5 Options 6 and 7 – 8th Bit**

Options 6 and 7 allow you to tell the QMS SmartWriter how you want it to handle the 8th bit received in each group of "data bits". These Options are especially important if you are using your QMS SmartWriter for graphics applications. (See Epson Emulation and ANSI Modes.)

	<b>Option 6</b>	<b>Option 7</b>	<b>Results In</b>
†	disabled	disabled	Pass bit 8 unchanged
	disabled	enabled	Strip bit 8
	enabled	disabled	Give bit 8 a value of "1"
	enabled	enabled	Reverse the value of bit 8

## **GROUP 6 — Serial Interface Options**

The Group 6 Options provide limited control of the QMS SmartWriter for interface specification that apply to serial interfaces only. These Options specify certain protocols (rules) that must be set the same for the QMS SmartWriter and the "Host" (computer). See Section 1 for more information on protocols and serial communication.

## Group 6 Option 0 – Warm Restart

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

## Group 6 Option 1 – Parity

This Option allows you to tell the printer whether or not it should do parity checking (a type of error checking). This Option must be set according to the same setting on your computer system. After setting this Option, Options 2 and 3 are used to further define the parity checking to be performed.

	Option 1	Results In
†	disabled	No parity checking performed.
	enabled	Parity checking performed.

## Group 6 Options 2 and 3 – Parity

These Options allow you to specify the type of parity checking the QMS SmartWriter should perform. This should be set according to the same setting on your computer.

	Option 2	Option 3	Results In
†	disabled	disabled	Odd parity
	enabled	disabled	Even parity
	disabled	enabled	Mark parity
	enabled	enabled	Space parity

### **Group 6 Option 4 – Stop Bits**

This Option allows you to specify the number of stop bits the QMS SmartWriter should expect in communication from the Host. This should be set according to the same setting on your computer.

	<b>Option 4</b>	<b>Results In</b>
†	disabled	One stop bit
	enabled	Two stop bits

### **Group 6 Option 5 – Data Bits**

This Option allows you to specify the number of data bits the QMS SmartWriter should expect in communication from the Host. This should be set according to the same setting on your computer.

	<b>Option 5</b>	<b>Results In</b>
†	disabled	Eight data bits
	enabled	Seven data bits

### **Group 6 Options 6 through 9 – Bit Rate**

Options 6, 7, 8, and 9 allow you to tell the QMS SmartWriter the bit rate to expect for each data character communicated between the QMS SmartWriter and the “Host” (computer). This should be set according to the same setting for your computer.

				Bit Rate (bits per second)
Option 6	Option 7	Option 8	Option 9	
disabled	disabled	disabled	disabled	9600
enabled	disabled	disabled	disabled	50
disabled	enabled	disabled	disabled	75
enabled	enabled	disabled	disabled	110
disabled	disabled	enabled	disabled	134.58
enabled	disabled	enabled	disabled	150
disabled	enabled	enabled	disabled	300
enabled	enabled	enabled	disabled	600
disabled	disabled	disabled	enabled	1200
enabled	disabled	disabled	enabled	1800
† disabled	enabled	disabled	enabled	2400
enabled	enabled	disabled	enabled	3600
disabled	disabled	enabled	enabled	4800
enabled	disabled	enabled	enabled	7200
disabled	enabled	enabled	enabled	9600
enabled	enabled	enabled	enabled	19200

### Group 6 Option A – DTR

Option A allows you to tell the QMS SmartWriter whether or not to use Data Terminal Ready (DTR) data throttle to halt communications between the QMS SmartWriter and the “Host” (computer). Match the specification to your computer uses.

	Option A	Results In
	disabled	Do not use DTR data throttle
†	enabled	Use DTR data throttle

### Group 6 Option B – RTS

Option B allows you to tell the QMS SmartWriter whether or not to use Request To Send (RTS) data throttle to halt communications between the QMS SmartWriter and the “Host” (computer). Match the specification your computer uses.

	Option B	Results In
†	disabled	Do not use RTS data throttle
	enabled	Use RTS data throttle

## Group 6 Option C – XON/XOFF

This Option allows you to specify whether or not the QMS SmartWriter will use the XON/XOFF protocol to halt and resume communication between it and the host. This should be set according to the same setting on your computer.

Option C	Results In
disabled	Do not use XON/XOFF protocol
† enabled	Use XON/XOFF protocol

## GROUP 7 — Parallel Interface Options

The Group 7 Options provide limited control of the QMS SmartWriter for interface specifications that apply to parallel interfaces only.

### Group 7 Option 0 – Warm Restart

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

### Group 7 Option 1 – Printer Error

This Option allows you to specify whether or not the QMS SmartWriter will “go busy” when there is a printer error. This should be set according to the same setting on your computer.

Option 1	Results In
† disabled	Do not “go busy” on printer error
enabled	“Go busy” on printer error

### **Group 7 Option 2 – Set Printer Error**

This Option allows you to specify whether or not the QMS SmartWriter will “set the printer error bit” when there is a printer error. This should be set according to the same setting on your computer.

#### **Option 2 Results In**

- |            |   |
|------------|---|
| † disabled | Do not “set printer error” on printer error |
| enabled    | “Set printer error” on printer error        |

### **Group 7 Option 3 – Set Fault Bit**

This Option allows you to specify whether or not the QMS SmartWriter will “set the fault bit” when there is a printer error. This should be set according to the same setting on your computer.

#### **Option 3 Results In**

- |            |                                     |
|------------|-------------------------------------|
| † disabled | Do not “set fault” on printer error |
| enabled    | “Set fault” on printer error        |

### **Group 7 Option 4 – Off-Line on Error**

This Option allows you to specify whether or not the QMS SmartWriter will “go off-line” when there is a printer error. This should be set according to the same setting on your computer.

#### **Option 4 Results In**

- |            |                                       |
|------------|---------------------------------------|
| † disabled | Do not “go off-line” on printer error |
| enabled    | “Go off-line” on printer error        |

### **Group 7 Option 5 – Busy on Off-Line**

Option 5 allows you to tell the QMS SmartWriter whether or not to “go busy” when the QMS SmartWriter is taken off-line. “Enabling” this Option is especially useful if your computer is an IBM PC. Data can be lost because the PC continues sending data unless a “busy signal” is sent by the QMS SmartWriter. Match the specification your computer uses.

	<b>Option 5</b>	<b>Results In</b>
	disabled	Do not "go busy" on off-line
†	enabled	"Go busy" on off-line

### **Group 7 Option 6 – Data Flow Control**

Option 6 is used to tell the QMS SmartWriter when to use the "busy bit" to control the data flow from the Host (computer). This Option applies directly to Option 5 above. The selections for these two Options should match for reasons mentioned above.

	<b>Option 6</b>	<b>Results In</b>
	disabled	Do not use the "busy bit" to control data flow from Host
†	enabled	Use the "busy bit" to control data flow from Host

## **GROUP 8 — Printer Alignment**

The Group 8 Options provide limited control for aligning the QMS SmartWriter Zero Reference Point. The Zero Reference Point is the point on the page from which the QMS SmartWriter makes its printing measurements. This should normally be to the left corner of the page.

### **Group 8 Option 0 – Warm Restart**

Option 0 of this or any other Group is used as a "warm restart." Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, "Selecting Current Font.") Refer to Section 4, "Operation," for keypad instructions.

### Group 8 Options 1 through 4 – Horizontal Alignment

Options 1, 2, 3, and 4 work together to allow you to tell your QMS SmartWriter the horizontal distance from its “left edge of the page” to move its Zero Reference Point. Refer the Options 5 through 8 (below) to specify vertical movement for this Zero Reference Point.

	Option 1	Option 2	Option 3	Option 4	Horizontal Distance
	disabled	disabled	disabled	disabled	0.00 inches
	enabled	disabled	disabled	disabled	0.05 inches
†	disabled	enabled	disabled	disabled	0.10 inches
	enabled	enabled	disabled	disabled	0.15 inches
	disabled	disabled	enabled	disabled	0.20 inches
	enabled	disabled	enabled	disabled	0.27 inches
	disabled	enabled	enabled	disabled	0.32 inches
	enabled	enabled	enabled	disabled	0.37 inches
	disabled	disabled	disabled	enabled	0.43 inches
	enabled	disabled	disabled	enabled	0.48 inches
	disabled	enabled	disabled	enabled	0.53 inches
	enabled	enabled	disabled	enabled	0.59 inches
	disabled	disabled	enabled	enabled	0.64 inches
	enabled	disabled	enabled	enabled	0.69 inches
	disabled	enabled	enabled	enabled	0.75 inches
	enabled	enabled	enabled	enabled	0.80 inches

### Group 8 Options 5 through 8 – Vertical Alignment

Options 5, 6, 7, and 8 work together to allow you to tell your QMS SmartWriter the vertical distance from its “top edge of the page” to move its Zero Reference Point. Refer to the Options 1 through 4 (above) to specify horizontal movement for this Zero Reference Point.

	Option 5	Option 6	Option 7	Option 8	Vertical Distance
	disabled	disabled	disabled	disabled	0.00 inches
†	enabled	disabled	disabled	disabled	0.05 inches
	disabled	enabled	disabled	disabled	0.10 inches
	enabled	enabled	disabled	disabled	0.15 inches
	disabled	disabled	enabled	disabled	0.20 inches
	enabled	disabled	enabled	disabled	0.27 inches
	disabled	enabled	enabled	disabled	0.32 inches
	enabled	enabled	enabled	disabled	0.37 inches
	disabled	disabled	disabled	enabled	0.43 inches
	enabled	disabled	disabled	enabled	0.48 inches
	disabled	enabled	disabled	enabled	0.53 inches
	enabled	enabled	disabled	enabled	0.59 inches
	disabled	disabled	enabled	enabled	0.64 inches
	enabled	disabled	enabled	enabled	0.69 inches
	disabled	enabled	enabled	enabled	0.75 inches
	enabled	enabled	enabled	enabled	0.80 inches

## GROUP 9 — Factory Settings

The Group 9 Options are used for factory diagnostics or for limited control of the optional Paper Plus™ sheet feeder if ordered. If you are using the Paper Plus sheet feeder, refer to its Operator's Manual for instructions on setting these Options. If you are not using a sheet feeder you should not alter the settings of these Options unless instructed to do so by a QMS representative.

### Group 9 Option 0 – Warm Restart

Option 0 of this or any other Group is used as a “warm restart.” Use the keypad to access Option 0 of any Group and press the **TOGGLE** key. This will cause changes to the configuration options to take effect. (NOTE: Do not use Option 0 to save changes to Group C, “Selecting Current Font.”) Refer to Section 4, “Operation,” for keypad instructions.

### **Group 9 Option D – Debugger**

This Option is used to tell the QMS SmartWriter whether or not to scan the debugger address space for fonts.

#### **Option D Results In**

- |            |  |
|------------|--|
| † disabled | Do not scan the debugger address for fonts |
| enabled    | Scan the debugger address for fonts        |

### **Group 9 Option E – Diagnostic Page**

This Option is used to tell the QMS SmartWriter to print a “diagnostic page” showing the cause of the last error that caused the printer to stop printing.

#### **Option E Results In**

- |            |                                    |
|------------|------------------------------------|
| † disabled | Do not print the “diagnostic page” |
| enabled    | Print the “diagnostic page”        |

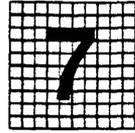
### **Group 9 Option F – Enter Debugger Mode**

This Option should be enabled if the debugger is installed and is to be initialized on power-up.

#### **Option F Results In**

- |            |                                  |
|------------|----------------------------------|
| † disabled | Initialize debugger only.        |
| enabled    | Initialize debugger on power-up. |

# Seven Special Commands



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## Overview

The Seven Special Commands described in this section are software commands which may be used in any emulation mode. **In order to use them, however, your word processing/computer system must allow embedding of ASCII control characters using either decimal, hex, or octal values.**

These commands are very useful for changing fonts, changing paper source, and performing other changes to the printer's configuration that would otherwise require interrupting the printer and using the keypad. One command in particular (QMSRED) allows you to redefine the <ESC> character to be a printable character.

## Prerequisites

Before beginning this section, you should be familiar with your word processor/computer system's operation with regards to transmission of ASCII control characters using decimal, hex or octal values. Appendix B of this manual lists the ASCII control characters.

## Key Terms

**ASCII** – American National Standard Code for Information Interchange. A standard 8-bit coded character set for information interchange among data processing systems and associated equipment.

**Configuration** – The process of setting certain characteristics of the printer that determine how it will handle data.

**Control Characters** – ASCII characters with a Hex value of 20 or lower.

**Copy Count** – The number of copies to be printed at one time.

**Decimal Values** – Numeric values associated with ASCII characters.

**Default** – A pre-set condition of the printer. Default conditions are labelled in this manual with “†”.

**Download Font** – A font that is loaded into the printer’s memory from an external source.

**Emulation** – Imitating another printer or device so that the same commands may be sent to either printer with the same or similar results.

**Font** – A complete alphabet of upper and lower case letters, figures, and punctuation marks in a certain style and weight.

**Group** – A set of “Options” for configuring a certain characteristic of the printer.

**Hex Dump** – An operating mode where all incoming data is printed as hex values and printable characters in order to determine the characters actually being received by the printer.

**Hex Value** – A system of letters and numerals for representing the ASCII characters.

**Keypad** – The controls on the front panel of the QMS SmartWriter.

**Octal Value** – A “Base 8” numbering system for representing the ASCII characters.

**Option** – One setting (off or on) for a particular characteristic of the printer.

**Orientation** – The direction across the page where printing occurs. Orientation may be either “portrait” (across the narrow dimension) or “landscape” (across the wide dimension).

**Overlay** – A string of printer-supported commands which may be stored in RAM and recalled at any time.

**RAM** – Random Access Memory. This memory is cleared whenever the printer power is turned off.

**Status Summary Sheet** – A page automatically printed at power-up (or on demand) that lists available fonts, enabled options, and other printer conditions.

**Warm Boot** – Toggling Option 0 of any Group in order to initiate changes made to the configuration options. When Option 0 is showing in the LED display on the keypad, pushing the **TOGGLE** key will “save” the status of all Options.

## Transmitting Control Characters

Throughout this section, reference will be made to “control characters.” Control characters are those ASCII characters with a Hex value less than 20 and which have no printable equivalent. Your computer system or the software package you are using will have a specific method of embedding these characters in the data stream and you should refer to its documentation before experimenting with these Seven Special Commands. The QM-SRED command explained in this section also provides a method of embedding control characters.

Each terminal and computer system is different. Refer to your system’s documentation before experimenting with the Seven Special Commands.

## Command Format Defined

The following information explains the components or parts of the Seven Special Commands. Be sure to read this section carefully so that you understand the various parts of a command as well as which parts are required and which parts may sometimes be omitted. This information is also repeated in the *QMS/ANSI x3.64 Programming Manual*.

**<ESC>**

This character is called the ESCape character and it requires special considerations. Since <ESC> is an unprintable character, your system and/or software package must be able to use unprintable characters in order to use the Seven Special Commands in any way other than actually writing a program. You will need to embed the hexadecimal value, the decimal value, or the octal value (depending on your system) for this ESCape character if your system allows you to embed it. Refer to your system documentation.

**NOTE:** If your system allows you to embed the <ESC> character, you can, if you wish, use the QMSRED command explained in this section to redefine a printable character (such as “^”) to represent the <ESC> character. If your system will not allow you to embed the <ESC> character, refer to the BASIC program in “Software Commands” in Section 4 that utilizes the QMSRED command.

**<ESC>[**

The ESCape character followed by a bracket is called the “command initiator.” It is used to begin the Seven Special Commands.

**;**

Semicolons are used as separators between certain parts (called “parameters”) of a command. It is important that you use them correctly in order for the QMS SmartWriter to understand what you mean. Read the paragraphs below for an explanation of when and where to use semicolons.

**p1, p2, p3, p4, etc.**

These middle components of a command format are called “parameters.” You will always substitute a numeric value in place of the “p1”, “p2”, etc., portion of a command. Be sure to read the section entitled “Numeric Parameters Defined” so that you understand what values may be used. If an invalid value is used, the parameter will be ignored.

The variables “p1,” “p2,” and so on, generally indicate a specific number of numeric parameters which may be used with a particular command. As explained below, you may sometimes wish to omit one or more of these parameters but you may never send more than is specified.

**Ps**

Parameters which are indicated with a "Ps" generally mean that the command will perform various functions and you may choose several functions in one command. These commands are called multiple parameter commands.

In the case of multiple parameter commands, all parameters do not need to be present. If a leading or middle parameter is omitted, a parameter separator (;) must be used but if the trailing parameter is omitted, no separator is required. Examples are given with most multiple parameter commands in this section. Omitting a parameter will cause the default value for that parameter to be used if a default value exists. Default values are noted with appropriate commands.

**NOTE:** Spaces should not be included when using the commands unless the "Space" character <SP> is actually written in the command.

**s, x, }**

These three characters are only a sample of what is called the "terminator" of a command. The command terminator is used to define or identify the specific command you want to use. Each example below is used to enable a different Seven Special Command.

<ESC>[Psh <ESC>[Psk

## **Numeric Parameters Defined**

Many Seven Special Commands require that you indicate one or more numeric parameters. These numeric values will be listed in the description of each command. Each value will have a different meaning in the command. Values that are not in the specified ranges of the commands are invalid and will cause all or part of the command to be ignored.

## **Summary of Commands**

The Seven Special Commands described here can be issued from any emulation mode. A detailed description of each along with command syntax follows the summary.

- **QMSSFO** is used to call up a desired font from memory. This same command is used to delete individual fonts from the QMS SmartWriter RAM.
- **QMSPGO** is used to change the orientation of printing on the page (portrait or landscape).
- **QMSFCTL** allows you to select manual feed or cassette feed paper source without taking the printer off-line. This command is also used to select the size of paper being used.
- **QMSSCNT** is used to change the "copy count" from one to as many as 5000 copies.
- **QMSMOD** allows you to switch from one emulation mode to another without using the QMS SmartWriter keypad.
- **QMSCTL** can be used to pause the QMS SmartWriter, enter Hex Dump Mode, print a Status Summary Sheet or print font test pages.
- **QMSRED** is used to redefine the Command and Font Translation tables or to reset these tables to their original state.

This command is used to select or delete a Font or Overlay.

The "p1" parameter is used to indicate the number of the desired Font or Overlay to be selected or deleted. The number may be in the range of 0 to 32767. If you omit this parameter, the default font number will be automatically selected in the specified (or default) Orientation. Default fonts are selected through configuration Groups L and P.

The "p2" parameter is used to indicate whether the number in "p1" is for a portrait orientation font or landscape orientation font or for an overlay. The valid values for "p2" are:

- p2 = 0 = Portrait Font**
- p2 = 1 = Landscape Font**
- p2 = 2 = Overlay**

If "p1" is omitted and "Overlay" is selected in "p2", the entire command will be ignored (because omitting "p1" automatically selects "Font." If "p2" is not the same as your current orientation, the font selected in "p1" will be stored until you change page orientation. See QMSPGO.

The "p3" parameter is used to indicate the action for the printer to take. The valid values for "p3" are:

- p3 = 0 = Delete font**
- p3 = 1 = Select font**
- p3 = 2 = Delete ALL fonts  
and overlays (ignores p1 and p2).**
- p3 = 3 = Delete only fonts  
and overlays in orientation  
selected in p2 (p1 ignored).**

Only download fonts may be deleted. The fourteen resident fonts cannot be deleted.

No other values are valid for "p2" and "p3". Invalid parameters will cause the command to be ignored.

**Note for Epson Emulation Mode Users:**

This command takes priority over the Epson Pica default

font and any font selected through this command will remain in effect whenever Epson Pica Mode is entered. You may use this command to select the Epson Pica font or you may send an Epson Reset command to select the Pica font. Performing an Option 0 "warm boot" of the printer will also select the Epson default Pica font.

**Examples:**

<ESC>[382s	Selects Font 382
<ESC>[32768s	Invalid parameter; command ignored
<ESC>[s	Selects the power-up default font in the current orientation
<ESC>[14;s	Selects Overlay 14
<ESC>[772;0;0s	Deletes Font 772 in Portrait

**<ESC>[ p1 p] QMSPGO**

This command is used to select Portrait or Landscape Page Orientation.

Whenever a new page orientation is selected, the most recently used font in that orientation becomes the "current font." If the selected orientation has not been used since power-up (or since the last Reset), the current font will be the power-up default font for the selected orientation.

The valid values for "p1" are 0 (Portrait Orientation) or 1 (Landscape Orientation). If the parameter is omitted, the power-up default orientation will be selected. The power-up default orientation is set through Group 1 Option 3.

**Examples:**

<ESC>[0p	Selects Portrait Orientation
<ESC>[1p	Selects Landscape Orientation
<ESC>[17p	Invalid parameter; command is ignored
<ESC>[p	Selects power-up default orientation

Changing the page orientation will not affect the VALUES for the Top, Bottom, Left, and Right Margins. See Figure 7.1.

### Figure 7.1

Remember that the margins are established at a specified distance from the edge of the paper. When you change orientations, you are changing the reference point for the margins. If, for example, the Left Margin for Landscape Orientation is set at 9" when Portrait Orientation is selected, the Left Margin will still be set at 9" from the left edge of the paper. This places the left margin one-half inch beyond the right edge of the paper. The QMS SmartWriter will sense an error and the Left Margin will default to the left edge of the paper. Always establish new margins when changing orientations.

#### **<ESC>[p1;p2x QMSFCTL**

This command allows you to select the Page Feed Source and the paper size. If you are using an optional Paper Plus™ sheet feeder, there are additional parameters to the QMSFCTL command that are not listed here. Refer to the Operator's Guide included with the Paper Plus for details of the *Software Access Options*.

The valid values for “p1” are 0 (cassette feed) or 1 (manual feed). If the parameter is omitted, the power-up default Page Feed Source (cassette feed) is selected. If invalid parameters are used, the command will be ignored.

The valid values for “p2” are:

p2 = 0 = A4 paper size (Europe)  
p2 = 1 = B5 paper size (Europe)  
p2 = 2 = Legal paper size (USA)  
p2 = 3 = Letter paper size (USA)  
p2 = 4 = Mini paper size

**Examples:**

<ESC>[1;3x Selects manual feed, letter size  
<ESC>[x Selects default source and paper size  
<ESC>[1x Selects manual feed, default paper size  
<ESC>[;2x Selects default paper source, legal size

### **<ESC>[ p1 u ] QMSCCNT**

This command allows you to specify the number of multiple copies of the current printing job the QMS SmartWriter will print. The number of copies will remain in effect until a new QMSCCNT command is entered or until a “warm boot” or power-off/power-on is performed. The range of valid values for “p1” are 1 through 5000. A value of zero or omitting this parameter will select the default value (1). Values greater than 5000 will cause the command to be ignored.

**Examples:**

<ESC>[10u Print 10 copies  
<ESC>[297u Print 297 copies  
<ESC>[u Print 1 copy (default)  
<ESC>[0u Print 1 copy (default)  
<ESC>[12000u Invalid parameter; command is ignored

**<ESC>[p1;p2r**

## **QMSMOD**

This command allows you to change Printer Emulation Modes and/or perform a Reset from any Mode. The Print Characteristics (e.g., tabs, margins, etc.) will not be affected when changing Emulation Modes. However, performing a Reset will return these parameters to their power-up default condition: Current Font, Page Margins, Horizontal and Vertical Tabs, Character Spacing, Line Spacing, and Absolute Horizontal and Vertical Position.

The valid values for "p1" are:

- p1 = 0 = Do NOT change Mode**
- p1 = 1 = Select ANSI x3.64 Mode**
- p1 = 2 = Select Diablo 630 Emulation Mode**
- p1 = 3 = Select Epson FX-80 Emulation Mode**
- p1 = 4 = Select Qume Sprint Emulation Mode**
- p1 = 99 = Return to previous mode**

The valid values for "p2" are:

- p2 = 0 = Reset to power-up conditions in selected emulation mode upon entering that mode.**
- p2 = 1 = Do not perform a reset when entering the selected emulation mode.**

The command to return to the previous mode is **<ESC>[99r**. This returns the printer to the last emulation mode that was used. This command can be used to switch between two different modes. If the following commands were issued in sequence the results would be as indicated.

- <ESC>[3r Enter Epson Emulation Mode**
- <ESC>[2r Leave Epson, enter Diablo Mode**
- <ESC>[99r Leave Diablo, return to Epson**
- <ESC>[99r Leave Epson, return to Diablo**

### Examples:

- <ESC>[r Perform a reset within the current Mode (equivalent to <ESC>[0;0r)
- <ESC>[3r Change to Epson Emulation Mode and perform a reset upon entering that mode
- <ESC>[;r Perform a reset within the current Mode
- <ESC>[4;1r Change to Qume Emulation Mode and do not perform a reset.

### <ESC>[ Ps <SP>r QMSCTL

This is the QMS Extended Print Control command. It has four unique functions that are accessed by changing the values for the "Ps" parameter. The <SP>character (hex 20) must be included in the command. The valid values for "Ps" are:

- <ESC>[0<SP>r **Pauses printer.** This is used as necessary to stop printer operation in order to change paper size, current font, or similar functions.
- <ESC>[1<SP>r **Enter Hex Dump Mode.** This allows you to place the QMS SmartWriter in Hex Dump Mode. Hex Dump Mode has its own page margins built into this command. In Hex Dump Mode, the hex value of all incoming data is printed. The hex value of every character received by the printer will be printed in 32 pairs on the left side of the page. Printable characters will appear on the right side. Unprintable characters and control characters (hex 20 and lower) will appear on the right side as periods. This command produces the same results as enabling Group 0 Option 3. Hex Dump Mode automatically establishes pre-set page margins in the printer. To exit Hex Dump Mode, perform a warm boot or power the printer off/on.

- <ESC>[2<SP>r** **Print Status Summary Sheet.** The Status Summary Sheet contains information on configuration Options and fonts. This is the same page that is printed automatically at power-up.
- <ESC>[3<SP>r** **Print Font Test Pages.** This parameter causes the printer to print a sample page for each font in its memory (downloaded and resident). Each page contains a complete character set.

Values other than these will cause the command to be ignored.

### **<ESC>[p1;p2;p3;p4;p5;p6;p7;p8<SP>`** **QMSRED**

**WARNING:** This feature of your QMS printer is designed for use by advanced programmers. Study these instructions carefully before using this command.

The QMSRED command is a very powerful programmer tool which may be used to modify the Command and Font Translation Tables. These tables (along with the standard 256 cell ASCII set of commands and characters) are used by the printer when it is translating data that it receives from the host computer. The decimal value locations in the Command and Font Translation Tables can be reassigned thereby giving you great control over how the printer converts incoming data into printed output. A feature of the QMS SmartWriter printer and the QMSRED command allows you to store any modifications made to these translation tables in ZPRAM (RAM that is not affected by turning the printer off) so that modified translation tables will be available immediately on printer power-up. Resetting the tables may also be performed through the QMSRED command.

Before you can use the QMSRED command, you must become acquainted with the decimal values associated with the translation tables, the decimal values associated with the standard ASCII command (or control) characters, the locations of the printable characters in the fonts,

and the locations of any “unprintable information” (i.e., empty locations) in the fonts. Both the Command Translation Table and the Font Translation Table have 256 assignable locations. The font tables in Appendix A of this manual will help you find the Hex value signifying the location of each character in each resident font in your printer. The conversion tables in Appendix B will enable you to convert Hex values to decimal values (the QMSRED command uses only decimal values) and will also show the decimal values of the ASCII control characters.

### **Changing the Command Translation Table**

When you use the QMSRED command to modify the Command Translation Table, you are able to reassign decimal values normally associated with “printable” ASCII characters to decimal values associated with ASCII control characters. For example, the decimal value associated with the ASCII character ^ (decimal 94) can be reassigned to the ASCII control character <ESC> (decimal 27). Such a reassignment could be very helpful for users whose host computer or software does not allow them to send an <ESC> sequence to the printer or to imbed an <ESC> sequence in a document. By redefining the ^ to serve as an <ESC>, the special QMS commands described in this section and the supported emulation commands may be imbedded in a document and sent to the printer.

#### **Important Considerations:**

- *Once the Command Translation Table is modified, it will affect all emulation modes.*
- *Modifications to the Command Translation Table affect all fonts.*
- *If two or more people are using the same printer, all users need to be aware of modified translation tables.*

## Changing the Font Translation Table

When you use the QMSRED command to modify the Font Translation Table, you are able to reassign decimal values associated with a font's characters to decimal values associated with other characters of the font that ordinarily may be outside the accesible range for your computer (such as characters in Font 382 from Hex 00 to Hex 0F). For example, if you were using Font 382 (Epson Pica 10 point) while in Diablo Emulation Mode and wished to print the symbol for the Japanese yen, you could reassign the decimal value for the yen symbol (decimal 31 in Font 382) to the decimal value for another character in the font (preferably a character that you would not need to print). If you used the QMSRED command to reassign decimal 31 (yen symbol) to decimal 36 (dollar sign) and you have selected Font 382, the printer will print a yen symbol whenever you send a dollar sign from your computer.

### Important Considerations:

- *When the printer is in Epson Emulation Mode, the Font Translation Table is ignored. Any modifications to the translation table will not affect fonts selected during Epson Emulation Mode.*
- *Modifications to the Font Translation Table affect all fonts selected during any other mode except Epson Emulation Mode. All fonts, however, do not have the same characters in the same locations. If, in the example above, you reassigned the dollar sign to act as a yen symbol and selected Font 7504 (Courier), nothing would print when you sent the dollar sign to the printer. Font 7504 does not have a character in decimal 31. Refer to the font tables in Appendix B for the correct locations of all characters in the resident fonts.*
- *If two or more people are using the same printer, all users need to be aware of modified translation tables.*

## Command Parameters

The “p1” parameter in the QMSRED is used to indicate whether you wish to modify the Command Translation Table or the Font Translation Table.

**p1 = 0 = Command Translation Table**  
**p1 = 1 = Font Translation Table**

If “p1” is greater than 1, the entire command will be ignored.

The “p2” parameter is used to indicate whether the table specified in “p1” is to be redefined, reset to the power up default setting.

**p2 = 0 = Redefine table specified in p1.**  
**p2 = 1 = Reset table specified in p1 to power up default settings.**

**IMPORTANT:** Knowing how to reset the translation tables to their factory default values could be helpful if you ever lose track of which decimal values have been reassigned. Whenever  $p2 = 1$ , the table specified in  $p1$  is reset to the default values (decimal values 0 to 255). Whenever the printer is powered off/on or whenever a warm boot is performed (see Group 0 Option 6 in Section 6 for Configuration Reset of these tables). This is a printer keypad procedure and is described in Section 6 (see Group 0 Option 5). A configuration reset will reset all configuration options (including page margins, default fonts, interface setting, etc.) to factory default settings. After performing the configuration reset, you may use any of the following to reset the translation tables:

- Group 0 Option 9 to reset the Command Translation Table.
- Group 0 Option A to reset the Font Translation Table.
- Warm boot to reset both tables (depending on Group 0 Option 6).
- Power the printer off/on.

**CAUTION:** In Plot or Graphics Mode, redefined characters may cause problems (depending upon what characters have been redefined). Plot mode is only affected by the Command Translation Table. Perform a configuration reset followed by a reset of the Command Translation Table before sending Plot or Graphics Mode data to the printer.

At power-up, the command and font translation tables are initialized to 0-255.

Parameters “p3;p4”, “p5;p6”, and “p7;p8” are “paired” parameters and must always be used in pairs. Through these three pairs of parameters three decimal values may be reassigned with each QMSRED command. The first half of a paired parameter (i.e., p3, p5, p7) indicates the decimal value of a location in the translation table. The decimal value in the second half of the paired parameter will be reassigned to the decimal value in the first half (p3, p5, or p7).

**WARNING:** When redefining the Command Translation Table, never enter 27 in p3, p5 or p7. This would have serious consequences for your printer or software.

The decimal value in the second half of a paired parameter ("p4", "p6", or "p8") will be reassigned to the value that was specified in "p3," "p5," or "p7."

Valid values for parameters "p3" through "p8" are the decimal values 0 through 255.

**Example:**

`<ESC>[0;94;27<SP>` Reassign decimal 27 to decimal 94 in the Command Translation Table. Every time the printer receives a decimal 94 it will act on it as if it were decimal 27 (<ESC>).

`<ESC>[1;0;47;158<SP>` Reassign decimal 158 to decimal 47 in the Font Translation Table. Every time the printer receives a decimal 47 ("f") it will act on it as if it were decimal 158 (cent sign). Valid only when not in Epson Emulation Mode.

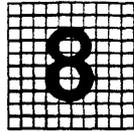
You may use the BASIC command `LPRINT` to send the QMSRED to the printer. Redefining decimal 94 to serve as decimal 27 would require sending this command in BASIC:

```
LPRINT CHR$(27) ; "[0;0;94;27 ~"
```

Always be sure to include the space before the tilde when sending the command.



# Useful Hints



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## Overview

This section provides useful applications for certain features of the SmartWriter. Special information to clarify specific situations is also included in this section.

Conditions which may apply to all users regardless of emulation mode are covered first.

## Objectives

The purpose of this section is to give you some extra help by pointing out some features that may not be immediately obvious.

## Cancel Option

Group 0, Option 2 (covered in Section 6) allows you to cancel a print job once it begins printing. If you begin a job and discover that the print cartridge needs changing, simply cancel the job by using Group 0, Option 2 rather than wasting the paper by printing poor quality copies.

If you have your SmartWriter set for multiple copy count and accidentally send a file for which you only need one copy, toggle Group 0 Option 2 and the remainder of the print job will be cleared from the buffer.

This Group and Option will also abort printing of so many pages of font samples when you press the **TEST** key.

Pressing the **TOGGLE** key when Group 0, Option 2 appears in the display window not only stops the print job but clears out all data that has been received up to this point but has not been printed.

## Form Feed Key

When the printer is idle it will show a **PI** or **di** (printer idle or download idle). However, any command sequence, even an unprintable one such as a carriage return <CR> will cause the printer to be active and display **PA** or **dA** (printer active).

A **PA** will also appear in the display window if a partial page is buffered in but not ejected from the printer because of a missing form feed command.

Press the **FORM FEED** key to determine whether printable or unprintable data caused the printer to show an active status when nothing appears to be happening. If there is any printable data in the buffer, the page will be printed and ejected. If there is no printable data, see **Suppress Blank Pages** below.

## Suppress Blank Pages

Group 0, Option 7 (covered in Section 6) may be used to prevent blank pages from being ejected from the printer when the **FORM FEED** key is pressed.

## Don't Print Status Summary Sheet

Group 0, Option 8 (explained in Section 6) may be used to avoid printing a Status Summary Sheet every time you do a warm restart of the printer. A warm restart is automatically performed when you change an Option setting and toggle a 0 Option to save the change and put the printer back on-line.

A Status Summary Sheet will be printed (regardless of the setting of Group 0, Option 8) when you turn the printer on and if you request a Status Summary Sheet using the QMS/ANSI Special Command QMSCTL explained in Section 7.

## Data Light

The SmartWriter has a Data Light to indicate when data is actually being received. It looks like this: **PA .** or **dA .**

## Addressable v.s. Printable Areas

Even though you can address all areas of a page, due to the print engine used in the SmartWriter, you cannot print all the way up to the edges of a page.

For example, many software packages use a forms length of 66 lines for an 8 1/2 by 11 sheet of paper printed in Portrait orientation. You will need to change the forms length to 63 because that is the number of lines which can actually be printed on that size paper in that orientation. Data that exceeds the printable 63 lines without a form feed will be lost in the unprintable region of the page. Print a copy of the Test Page to see the unprintable areas of a page.

The number of characters which may be printed across the width of the page will be determined by the size of the font being used and the orientation of the page.

See the tables of addressable and printable areas in Section 13, "Printer Specifications."

## Lost Data Upon Power-Up

When the printer is first turned on, it goes through a warm-up and test cycle. If you attempt to send data to the printer before this cycle is completed, you will lose data. You can safely send data once a **PI** appears in the display window.

## Epson Graphics - Page Orientation

You can only use Portrait page orientation when printing Epson graphics unless you are using a software package

such as Lotus 1-2-3 which will allow you to rotate the graphics data.

## **Diablo - Using Proportional Spacing**

Group D Option 6 (explained in Section 6) should be disabled when using off-the-shelf software packages. You should also use 10 point fonts or the spacing will not look good. Fonts that are larger or smaller than 10 points do not work well with the Diablo Font Tables.

If you are not using a software package or have a custom package that doesn't use the Diablo Font Tables, you may enable Group D Option 6 and use any font available.

## **Qume - Using Proportional Spacing**

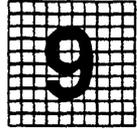
Group Q Option 6 (explained in Section 6) should be disabled when using off-the-shelf software packages. You should also use 10 point fonts or the spacing will not look good. Fonts that are larger or smaller than 10 points do not work well with the Qume Font Tables.

If you are not using a software package or have a custom package that doesn't use the Qume Font Tables, you may enable Group Q Option 6 and use any font available.

## **Current Font in Epson Emulation Mode**

Upon entering Epson Emulation Mode, the Current Font (Group C) will default to Font 382, the Epson Pica Mode font. If you wish to have the default font (Group P or L) become the Current Font when Epson Emulation Mode is entered, change the setting of Group E Option A (see Section 6).

# Diablo 630 Emulation Mode



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## Overview

The SmartWriter emulates the Xerox® 1730/Diablo® 630 model letter-quality printers. References made in this manual to the Diablo 630 also apply to the Xerox 1730. This section covers commands supported by the SmartWriter whenever it is in Diablo Emulation Mode.

If you are using a word processor, you do not need to read this section. Once your word processor is correctly installed and is configured to work with a printer that emulates a Diablo 630, you may use your word processor commands to edit and send your files to the SmartWriter.

The explanations of the supported Diablo commands are given for those of you who may be writing computer programs and must actually use these commands. Diablo commands which are not supported by the SmartWriter generally are required for the Diablo 630 printer to overcome certain hardware limitations.

In addition to the commands explained in this section, there are Seven Special QMS/ANSI Commands that are also honored when in Diablo Emulation Mode. These are software commands which allow you to change fonts, change emulation modes, change page orientation, change paper source, change the copy count, access the Extended Printer Control or redefine the command or font tables. The software commands are a special feature of the SmartWriter and are very useful. In particular, the QMSRED command which allows you to redefine the translation tables may be used to change the <ESC> character to a printable equivalent. This simplifies the

entering of the special ESCape sequences required for accessing the QMS/ANSI Commands. A BASIC program that uses the QMSRED command is provided for you in "Software Commands" in Section 4.

## Objectives

In this section you will become familiar with the Diablo commands that are supported and unsupported by the QMS SmartWriter. You will also learn which commands may be replaced by some functions of the SmartWriter keypad. Examples of the output you can expect from your printer are also presented to help you understand the supported commands.

## Prerequisites

The SmartWriter will only recognize the commands listed in this Section when Diablo Emulation Mode is selected. To configure the SmartWriter for Diablo Emulation use the following settings for Group 1:

Option 1	Option 2	Results In
enabled	disabled	Diablo Emulation Mode

Diablo Emulation Mode may also be entered by using the QMS/ANSI Special command QMSMOD explained in Section 7.

## Key Terms

**Configuration** – The process of selecting certain printer features using the front panel keypad or software (QMS/ANSI) commands.

**Default** – A preset condition of the printer.

**Disable/Enable** – The status of an Option. "Disable" is to turn off (0) and "enable" is to turn on (1).

**Emulation** – In this manual, emulation refers to the ability of the printer to respond to commands that are intended for a different type of printer. For example, Diablo Emulation Mode means that when the QMS SmartWriter is configured in this mode, it responds to most of the same commands sent from the host as would a Diablo printer.

**Font** – A typeface in a particular style.

**Group** – The major classification of configuration parameters. Each Group refers to a different printer emulation mode, printer feature, or printer system parameter.

**HMI** – Horizontal Motion Index. A value used for setting the “characters per inch” that the printer will use when in Diablo Emulation Mode.

**Option** – The “sub-classification” within Groups. Each Option controls a different printer default condition.

**Parameter** – The variables within a command that determine the action which the command will perform.

**Resolution** – The density of the printed image expressed in “dots per inch”.

**VMI** – Vertical Motion Index. A value used for setting the “lines per inch” that the printer will use when in Diablo Emulation Mode.

## Summary of Supported Diablo Commands

There are five categories of Diablo Emulation commands: Single Character, Formatting, Print Position, Special Feature, and Word Processing Sequences. The supported commands are listed on the next few pages as a means of quick reference. The meanings of the categories and the commands will be explained later in this section.

### Single Character Commands

<BS> Backspace  
<CR> Carriage Return  
<FF> Form Feed  
<HT> Horizontal Tab  
<LF> Line Feed  
<SP> Space  
<VT> Vertical Tab  
<SI> Shift-In  
<SO> Shift-Out

### Formatting Commands

<ESC>T Set Top Margin to Current Line  
<ESC>L Set Bottom Margin to Current Line  
<ESC>9 Set Left Margin  
<ESC>0 Set Right Margin  
<ESC><RS> \* Set Vertical Motion Index (n+1)  
<ESC><US> \* Set Horizontal Motion Index (n+1)  
<ESC>1 Set Horizontal Tab Stop  
<ESC>- Set Vertical Tab Stop  
<ESC>8 Clear Horizontal Tab at Current Position  
<ESC>2 Clear all Horizontal and Vertical Tab Stops  
<ESC>C Clear Top and Bottom Margins

### Print Position Commands

<ESC><HT> \* Absolute Horizontal Tab to Position 'n'.  
<ESC><VT> \* Absolute Vertical Tab to Line 'n'.  
<ESC>D Reverse Line Feed  
<ESC>U Forward 1/2 Line Feed

\* These commands have variable parameters.

## Special Printer Features

<ESC><CR>P	Total Reset
<ESC>7	Print Suppression "ON" (Convert Characters to Spaces until <CR>)
<ESC>3	Graphics "ON" (Clear with <CR>)
<ESC>4	Graphics "OFF"
<ESC>5	Forward Printing
<ESC>6	Reverse Printing
<ESC>S	Return HMI to Keyboard Option Value
<ESC>Y	Print Special Character (cent)
<ESC>Z	Print Special Character (apostrophe)

## Word Processing Command Sequences

<ESC>P	Proportional Spacing "ON"
<ESC>Q	Proportional Spacing "OFF"
<ESC>X	Cancel all WP Options Except Proportional Spacing
<ESC><DC1>	* Offset Selection set to 'n' until <CR>
<ESC><BS>	* Backspace 1/120 inch
<ESC>=	Automatic Line Centering "ON"
<ESC>M	Automatic Margin Justification (until <CR> or vertical motion)
<ESC>E	Underscore "ON"
<ESC>R	Underscore "OFF"
<ESC>O	Bold Print "ON" until <CR>
<ESC>&	Bold/Shadow Print "OFF"
<ESC>W	Shadow Print "ON" until <CR>

## Remote Diagnostic Options

<ESC><SUB>1	Request Status Byte 1
-------------	-----------------------

\* These commands have variable parameters.

When using the supported commands, refer to the ASCII conversion table in Appendix B at the back of this manual to determine the value for "n" in those commands which require variable parameters. Use the appropriate conversion value (ASCII, Hex, Decimal, etc.) required by your computer system and the programming language being used.

## Unsupported Diablo Commands

These commands are not supported by the QMS SmartWriter. If these commands are used, they will simply be absorbed and will not affect printing.

### Diablo Printer Features

<ESC>A	Print in Secondary Color (red)
<ESC>B	Print in Primary Color (black)
<ESC>/	Enable Auto Backward Printing
<ESC>\	Disable Auto Backward Printing
<ESC><SYN>	Select Foreign Language and/or Print Wheel size
<ESC>>	Normal Printing Mode
<ESC><	Reverse Printing Mode
<ESC>(	Enter program "Here is ..." mode
<ESC>)	Exit program "Here is ..." mode
<ESC><FF>	Set Lines per Page to 'n'

## HyPlot Options

- <ESC>G HyPlot ON – Absolute Move  
(cleared by <CR>)
- <ESC>G<BEL> HyPlot ON – Absolute  
Plot (cleared by <CR>)
- <ESC>V HyPlot ON – Relative Move  
(cleared by <CR>)
- <ESC>V<BEL> HyPlot ON – Relative Plot  
(cleared by <CR>)
- <ESC>. Change Plot Character to (character)
- <ESC>, Set Plot Precision

## Word Processing Option

- <ESC>% Increase Carriage Settling Time to 20ms  
(cleared by <ESC>N)
- <ESC><SO>M Program Mode ON
- <ESC>\$ Margin Control ON
- <ESC>\* Margin Control Mode determined by  
MARG CONT key setting

## Remote Diagnostic Options

<ESC><SUB>I	Initialize the Printer
<ESC><SUB>R	Remote Error Reset
<ESC><SUB>2	Request Status Byte 2
<ESC><SUB>U	Enter User (programmable) Test Mode
<ESC><SUB>W	Enter Wrap-around (Echo) Test Mode
<ESC><SUB>X	Exit Test Mode
<DEL>	Error Correct Backspace (User Test Mode Only)
<STX>	Print Contents of Print Buffer once (User Test Mode Only)
<SOH>	Print Contents of Print Buffer repeatedly (User Test Mode Only)

## Supported Diablo Commands

The commands which are supported by the printer are described on the following pages. If you have files that already contain Diablo commands, you need not make any changes to these files before sending them to the laser printer. Any Diablo commands that are not supported by the printer will be absorbed and will not interrupt printing.

## Single Character Commands

Single character commands consist of only one control character. The commands in "<>" are ASCII control characters. You must refer to "Software Commands" in Section 4 for information on embedding control characters.

- **BACKSPACE (<BS>)** moves the current position one space in the opposite direction of printing.
- **CARRIAGE RETURN (<CR>)** moves the current position to the Left Margin.
- **FORM FEED (<FF>)** ejects the current page from the printer.

- HORIZONTAL TAB (<HT>) moves the current position to the next horizontal tab stop.
- LINE FEED (<LF>) moves the current position down one line without affecting the horizontal position.
- SPACE (<SP>) moves the current position one space in the direction of printing.
- VERTICAL TAB (<VT>) moves the current position to the next vertical tab stop.
- SHIFT-IN (<SI>) accesses the Primary Character Set.
- SHIFT-OUT (<SO>) accesses the Secondary Character Set.

#### **<BS> BACKSPACE**

This command (decimal 8) will cause a backward (right to left) movement of one print position. The width of the print position is determined by the Horizontal Motion Index (HMI). If "Backward Printing" is on, the <BS> command will actually move the print position from left to right.

#### **<CR> CARRIAGE RETURN**

This command (decimal 13) causes the print position to move to the left margin. The <CR> command terminates these Diablo features: Graphics Mode, Print Suppression, Automatic Margin Justification, Bold Print (does not change the Current Font), and Shadow Print.

If you have enabled Group D Option 3, this command will move the print position to the left margin and down one line.

**<FF> FORM FEED**

This command (decimal 12) causes the current print page to be ejected from the printer. Printing will continue at the top and left margins of the next page.

**<HT> HORIZONTAL TAB**

This command (decimal 9) causes the print position to move to the first set Tab Stop to the right of the current position. If no tabs have been set, or if none were set beyond the current print position, an <HT> command will not change the current print position.

**<LF> LINE FEED**

This command (decimal 10) moves the print position down one line. The actual distance of the vertical movement is determined by the Vertical Motion Index (VMI).

**If Group D Option 3 is enabled, the QMS SmartWriter will automatically attach this command to every <CR> command. If Group D Option 4 is enabled, the QMS SmartWriter will perform two line feeds for every <LF>.**

**<SP> SPACE**

This command (decimal 32) causes the current print position to move to the right one print position. The width of the print position is determined by the Horizontal Motion Index (HMI) or the "pitch" selected in Group D Options 1 and 2. If "Backward Printing" is on, movement will actually be one print position to the left.

**<VT> VERTICAL TAB**

This command (decimal 11) causes the current print position to move down the page to the first set Vertical Tab. If no tabs are set beyond the current print position, the current print position will not change.

## **<SI> SHIFT-IN**

The Shift-In control character (decimal 15) accesses the Primary Character Set for 7-Bit users. 8-Bit users can access the Primary Character Set (with or without using Shift-In) by sending the appropriate value for the desired printable equivalent. The Extended Character Set (ECS) is explained later in this section.

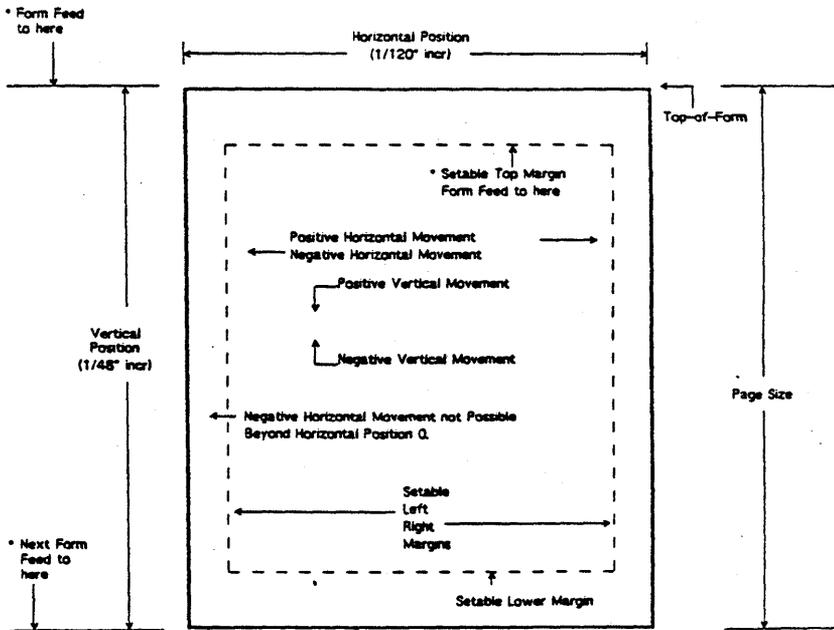
## **<SO> SHIFT-OUT**

The Shift-Out Control Character (decimal 14) enables 7-Bit users to access all but two characters in the Secondary Character Set. When <SO> is sent, the printer converts subsequent values (00-7F) to the Secondary Character range (80-FF). The <SP> and <SI> of the Primary Character Set are the only two characters which will not be converted. The <SI> will return you to the Primary Character Set.

8-Bit users may access the Secondary Character Set (with or without the Shift-Out) by sending the appropriate value for the desired printable equivalent.

The Extended Character Set (ESC) is explained later in this section.

# Figure 9.1 Diablo Emulation Mode Page Formatting



## Formatting Commands

The following commands are used to define the format of printed material on a page. Figure 9.1 is helpful for identifying some of the page format parameters.

- SET TOP MARGIN
- SET BOTTOM MARGIN
- SET LEFT MARGIN
- SET RIGHT MARGIN
- SET VERTICAL MOTION INDEX is used to establish the line spacing value.
- SET HORIZONTAL MOTION INDEX is used to establish the character spacing value.
- SET HORIZONTAL TAB AT CURRENT POSITION
- SET VERTICAL TAB AT CURRENT POSITION
- CLEAR HORIZONTAL TAB is used to clear all horizontal tab stops.
- CLEAR ALL VERTICAL AND HORIZONTAL TABS
- CLEAR TOP AND BOTTOM MARGINS

## **<ESC>T** SET TOP MARGIN

Use this command to set the Top Margin. The Top Margin may not be set below the Bottom Margin.

Set the Top Margin by issuing the <LF> command for each line down from the top of the page until you reach the point of the desired Top Margin. **The actual distance represented by a line feed is determined by the Vertical Motion Index.** After the desired number of line feeds have been issued, enter an <ESC>T command to set the margin.

For example, sending the following commands would set the top margin at the fourth line from the top of the page:

```
<LF><LF><LF><LF><ESC>T
```

A default Top Margin may be set by using the keypad to configure Group 4 Options 9, A, B, and C. Refer to Section 6 for details of these Options.

## **<ESC>L** SET BOTTOM MARGIN

Use this command to set the Bottom Margin. The Bottom Margin may not be set above the Top Margin.

Setting the Bottom Margin is similar to setting the top margin. The Bottom Margin is measured off the top of the page. Issue the desired number of <LF> commands from the top of the page. After reaching the desired bottom margin, issue the <ESC>L command. **The actual distance represented by each <LF> command is determined by the Vertical Motion Index.**

A default Bottom Margin may be set by using the keypad to configure Group 4 Options D, E, and F. Refer to Section 6 for details of these Options.

## **<ESC>9 SET LEFT MARGIN**

The default left margin is the left edge of the page. The left margin setting is measured from the left edge of the page and may not be set beyond the Right Margin.

Issue <SP> commands until you reach the desired Left Margin. The actual distance represented by each <SP> command is determined by the Horizontal Motion Index or by the “pitch” set in Group D Options 1 and 2. When you have reached the desired Left Margin, issue the <ESC>9 command.

For example, the following sequence of commands would establish a Left Margin three “print positions” from the left edge of the page:

```
<SP><SP><SP><ESC>9
```

The Left Margin may also be set by using the keypad to configure Group 4 Options 1, 2, 3, and 4. Refer to Section 6 for details of these Options.

## **<ESC>0 SET RIGHT MARGIN**

Setting the Right Margin is similar to setting the Left Margin. The Right Margin is also measured from the left edge of the page.

Issue <SP> commands until you reach the desired Right Margin. The actual distance represented by each <SP> command is determined by the Horizontal Motion Index or by the “pitch” established in Group D Options 1 and 2. When you reach the desired Right Margin, issue the <ESC>0 command to set the Right Margin.

The Right Margin may also be set by using the keypad to configure Group 4 Options 5, 6, 7, and 8. Refer to Section 6 for details of these Options.

## **<ESC><RS><n>** SET VERTICAL MOTION INDEX

Use this command (also known as VMI) to set the Line Spacing value. Values for the most common VMI settings are given below. To compute a value for the VMI not given, use the formula below. "LPI" is your desired number of lines per inch.

$$\text{VMI} = (48 \div \text{LPI}) + 1$$

Once you have arrived at a VMI value, locate this number in the Decimal column of the ASCII table in Appendix B. Depending on your computer system, this Decimal value or the Hex or Octal equivalent of this value is what you substitute for "n" in the command.

The range for VMI is 0 to 125. The most common settings for "n" in the VMI command sequence are: 13 (4 lines per inch), 9 (6 lines per inch), and 7 (8 lines per inch).

### **Examples:**

**<ESC><RS><CR>** 4 lines per inch.  
**<ESC><RS><BEL>** 8 lines per inch.

Refer to your terminal's documentation for instructions on embedding the Hex, Octal, or Decimal values of control characters in the command sequence.

## **<ESC><US><n>** SET HORIZONTAL MOTION INDEX

Use this command (also known as HMI) to set the Character Spacing value. Values for the most common HMI settings are given below. To compute a value for the HMI not given, use the formula below. "CPI" refers to the desired characters per inch setting.

$$\text{HMI} = (120 \div \text{CPI}) + 1$$

Once you have arrived at a HMI value, locate this number in the Decimal column of the ASCII table in Appendix B. Depending on your computer system, this Decimal value or the Hex or Octal equivalent of this value is what you substitute for "n" in the command.

The range for HMI is 1 to 125. The most common settings for "n" in the HMI command sequence are: 9 (15 characters per inch), 10 (13 characters per inch), 11 (12 characters per inch), 12 (11 characters per inch), 13 (10 characters per inch), 25 (5 characters per inch). The 10, 12, and 15 characters per inch values can be set through the QMS SmartWriter keypad (Group D Options 1 and 2).

**Examples:**

<ESC><US><CR> 10 characters per inch.  
<ESC><US><VT> 12 characters per inch.

Refer to your terminal's documentation for instructions on embedding the Hex, Octal, or Decimal values of control characters in the command sequence.

**<ESC>1 SET HORIZONTAL TAB AT CURRENT POSITION**

This command is used to set individual tab stops. Move the current position to the desired tab position by issuing the proper number of <SP> commands. The actual distance represented by a <SP> is determined by the HMI. Issue the above command at the current position to set the tab stop. To determine the desired tab stop positions, use the following formula:

$$\text{Horizontal Tab} = (\text{Horizontal Position} \div \text{HMI}) + 1$$

The "Horizontal Tab" will be the number of the tab stop (1 - 160). "Horizontal Position" is a whole number expressing the number of 1/120 inch increments from the left edge of the page.

## **<ESC>- SET VERTICAL TAB AT CURRENT POSITION**

This command is used to set the individual vertical tab stops. Move the current position to the desired tab position by issuing the required number of <LF> commands. The height of each line is determined by the VMI. Issue the above command at the current position to set the tab stop. To determine the desired tab stop positions, use the following formula:

$$\text{Vertical Tab} = (\text{Vertical Position} \div \text{VMI}) + 1$$

The "Vertical Tab" will be the number of the vertical tab stop (1 - 126). "Vertical Position" is a whole number expressing the number of 1/48 inch increments from the top edge of the page.

## **<ESC>8 CLEAR HORIZONTAL TAB**

This command is used to clear a tab stop at the current position.

## **<ESC>2 CLEAR ALL VERTICAL AND HORIZONTAL TABS**

When this command is issued, all vertical and horizontal tab stops will be cleared.

## **<ESC>C CLEAR TOP AND BOTTOM MARGINS**

Use this command to clear the Top and Bottom Margins and return them to the default margins.

## Print Position Commands

Use the following commands to move the print position to any point on the page. These commands provide added flexibility by allowing Reverse Line Feeds and special usage Vertical and Horizontal Tab commands.

- **ABSOLUTE HORIZONTAL TAB** is used to move the current position anywhere within the first 126 horizontal print positions within the current line.
- **ABSOLUTE VERTICAL TAB** is used to move the current line anywhere within the first 126 lines.
- **REVERSE LINE FEED** moves the current position one line above the current line.
- **REVERSE HALF LINE FEED** moves the current position one half line above the current line.
- **FORWARD HALF LINE FEED** moves the current position one half line below the current line.

**<ESC><HT><n>**

### **ABSOLUTE HORIZONTAL TAB**

Use this command to move the current print position anywhere within the first 126 horizontal print positions regardless of margin settings. The leftmost print position (left edge of the page) is position 1. The actual amount of space to be moved will vary with the setting of the HMI. Locate the print position to be moved to in the Decimal column of the ASCII table in Appendix B. Enter this decimal value (or Hex or Octal, depending on your computer system) in place of "n" in the above command sequence. The actual horizontal position moved to after the Absolute Tab operation has been completed may be calculated as follows:

$$\text{Horizontal Position} = (\text{Horizontal Tab Stop} - 1) \times \text{HMI}$$

The Absolute Horizontal Tab command value is not stored in memory. The command sequence must be sent whenever you wish to use it.

**Examples:**

<ESC><HT><SUB> Tab to position 26.  
<ESC><HT>& Tab to position 38.

**<ESC><VT><n> ABSOLUTE VERTICAL TAB**

Use this command to move the current print position anywhere within the first 126 possible lines on the page regardless of margin settings. The topmost print position (top edge of the page) is position 1. The actual amount of space to be moved will vary with the setting of the VMI. Locate the line number to be moved to in the Decimal column of the ASCII table in Appendix B. Enter this decimal value (or Hex or Octal, depending on your computer system) in place of "n" in the above command sequence. The actual vertical position moved to after the Absolute Tab operation has been completed may be calculated as follows:

$$\text{Vertical Position} = (\text{Vertical Tab Stop} - 1) \times \text{VMI}$$

The Absolute Vertical Tab command value is not stored in memory. The command sequence must be sent whenever you wish to use it.

**Examples:**

<ESC><VT><DC4> Tab to line 20.  
<ESC><VT><US> Tab to line 31.

**<ESC><LF> REVERSE LINE FEED**

This command is used to return to the print line above the current line. The actual backward distance will depend

on the current setting of the VMI. This command cannot be used to move backward beyond the Top Margin.

#### **<ESC>D REVERSE HALF LINE FEED**

This command is used to move one-half line above the current print line. The actual backward distance will depend on the current setting of the VMI. This command cannot be used to move backward beyond the Top Margin. This command is not affected by Graphics Mode.

#### **<ESC>U FORWARD HALF LINE FEED**

This command is used to move one-half line below the current print line. The actual forward distance will vary with the current setting of the VMI.

## **Special Printer Features**

The escape sequence commands in this section allow access to special Diablo features such as Graphics Mode, Forward and Backward Printing, Print Suppression and Printer Reset Commands.

- **TOTAL RESET TO POWER-UP DEFAULTS** returns the Diablo Emulation Mode conditions to power-up status.
- **PRINT SUPPRESSION ON** replaces all printable characters with spaces.
- **GRAPHICS ON** places the printer in "Graphics Mode."
- **GRAPHICS OFF** causes the printer to resume normal printing.
- **FORWARD PRINTING** causes printing from left to right.
- **REVERSE PRINTING** causes printing from right to left.

- RETURN HMI TO KEYPAD OPTION VALUE re-sets HMI to the value selected in the Group D Options.
- PRINT SPECIAL CHARACTER allows access to the Hex 9E and Hex 9F characters (cent sign and apostrophe).

### **<ESC><CR>P TOTAL RESET TO POWER-UP DEFAULTS**

Using this command will cause the printer to be returned to ALL the default conditions. It has the same results as turning the printer "OFF" and, then, back "ON" except that no data will be lost by using the Reset command. The default conditions that are reset are as follows:

Primary Character Set <SI>.  
 Margins set to their default value.  
 Bold and Shadow print disabled.  
 Character Spacing set to keyboard selection.  
 Offset Selection is cleared.  
 Auto Underscore is turned "OFF."  
 Forward Print Mode enabled.  
 Line Spacing set to keyboard selection.  
 All Horizontal and Vertical Tabs cleared.  
 Print Position set to Top and Left Margins of next page.  
 Graphics Mode disabled.  
 Print Suppression cleared.

### **<ESC>7 PRINT SUPPRESSION "ON"**

When Print Suppression is "ON" all printable characters are replaced by spaces. This command does not affect ESCape and Control sequences. It is cleared with a <CR>.

### **<ESC>3 GRAPHICS "ON"**

This command is used to enter Graphics Mode. Once in Graphics Mode, certain conditions change. The print position does not automatically move after each character

is printed when in Graphics Mode. Space, Backspace and Tab commands cause movement of the print position in increments of 1/60 inch. The Line Feed command causes movement in 1/48 inch increments. Vertical Tab, Form Feed, Top-of-Form, Forward and Reverse 1/2 Line Feed and margin commands are unchanged by Graphics Mode. A Carriage Return as well as the Graphics "OFF" command will exit Graphics Mode.

#### **<ESC>4 GRAPHICS "OFF"**

Either this command or a Carriage Return will exit you from Graphics Mode and return you to the normal operating mode.

#### **<ESC>5 FORWARD PRINTING**

This command is used to return character printing to the forward direction. Forward Printing is the default condition so the command is actually used to discontinue Reverse Printing.

#### **<ESC>6 REVERSE PRINTING**

This command is used to reverse character printing from left-to-right to right-to-left. It also causes the effects of the Space and Backspace commands to be reversed.

#### **<ESC>S RETURN HMI TO KEYPAD OPTION VALUE**

This command returns the control of the Horizontal Motion Index or character spacing to the value which you selected using the front panel keypad. (Refer to the Group D Options in Section 6 of this manual.)

#### **<ESC>Y PRINT SPECIAL CHARACTER**

This command prints the Print Wheel Character under ASCII Hex 9E which is the cent character for the "non-Epson" resident Fonts.

## **<ESC>Z PRINT SPECIAL CHARACTER**

This command prints the Print Wheel Character under ASCII Hex 9F which is the apostrophe character for the "non-Epson" resident Fonts.

## **Word Processing Command Sequences**

The Word Processing (WP) commands facilitate word processing applications for the Diablo communications terminal. All Word Processing features in this section are disabled when Graphics Mode is on.

- PROPORTIONAL SPACING ON
- PROPORTIONAL SPACING OFF
- OFFSET SELECTION allows modification of character spacing when in Proportional Spacing.
- BACKSPACE 1/120" moves the current position back 1/120 inch.
- AUTO LINE CENTERING
- AUTO MARGIN JUSTIFY
- UNDERSCORE ON
- UNDERSCORE OFF
- BOLD PRINT ON
- BOLD/SHADOW PRINT OFF
- SHADOW PRINT ON
- CANCEL ALL WP OPTIONS EXCEPT PS

## **<ESC>P** PROPORTIONAL SPACING "ON"

This command provides you with the equivalent of the proportionally spaced character print wheels (PS) available for Diablo printers. Proportionally spaced characters are assigned a width value according to the actual width of the character. Wide characters such as "w" and "m" are assigned a greater width value than narrow characters such as "i" and "l". The HMI is not changed when in Proportional Spacing Mode. The HMI only affects tabbing and the blank space between words.

All numeric characters on the PS print wheels have the same width value. This allows numerical data to be printed in straight columns even while in Proportional Spacing Mode. (Use the same HMI and Tab command for each line of numerical data when printing in columns.)

## **<ESC>Q** PROPORTIONAL SPACING "OFF"

Use this command to turn Proportional Spacing Mode off.

### **Examples:**

The following are examples of proportional spacing using font 382, "Epson Pica."

Proportional spacing takes effect after the <ESC>P. Proportionally spaced characters are closer together than fixed spaced characters. This may or may not be the appearance you desire.

The proportional spacing has been turned off for this sentence.

## **<ESC><DC1>n**    **OFFSET SELECTION**

This command allows you to modify character spacing for fixed and proportional space printing. The usual way to modify character spacing for fixed or monospaced characters is to adjust the HMI value. However, the HMI command is ignored when in Proportional Space printing. This command may be used to add or subtract space between proportionally printed characters (“kerning”) in increments of 1/120 inch. Valid values for increasing space range from 1 to 64. Valid values for decreasing space range from 0 to 63.

Once you have determined the amount of space to add or subtract, convert the amount to a binary number that uses bit 7 as the positive or negative sign.

- Bits 1-6**    Amount of space to add/subtract  
                  (1/120 inch increments)
- Bit 7**        0 (positive) or 1 (negative)

Locate this number in the Binary column of the ASCII Conversion Table in APPENDIX B at the back of this manual. Then, substitute the equivalent Hex, Decimal, or Octal value (as required by your system) for “n” in the command above.

## **<ESC><BS>**    **BACKSPACE 1/120”**

If you send this command, the print position is moved backward 1/120 inch.

## **<ESC>=**    **AUTO LINE CENTERING**

The Auto Line Centering command is used to center titles or other lines of data. The command must be sent first. The data which is to be centered should then be entered and followed by a Carriage Return or a Line Feed command. The words will be centered between the margins, or, if the line is long, they will be centered beyond the Right and Left Margins. This command will override Auto Justify if the Auto Justify command is on. The Auto Line Centering command is turned off by a

## **Examples:**

This input

<ESC>=Always center your titles.

generated this example:

Always center your titles.

## **<ESC>M AUTO MARGIN JUSTIFY**

This command is used to provide even Right and Left Margins using either fixed space characters or Proportional Space Mode. Each line of data is stored until a Carriage Return or Line Feed is received. The Carriage Return or Line Feed causes the data in that line to be printed between the two margin settings. Auto Justify remains in effect for subsequent lines until an <ESC>X is received.

Auto Justify will begin after the first Carriage Return following the Auto Justify command. If too many or too few characters are sent for the amount of space available, the line will not be justified.

### **Examples:**

The following passage uses font 380, "Epson Compressed."

Justification causes the right and left page margins to be "even" or "flush." Justified margins will only occur when enough characters appear on the line and, the number of characters does not exceed the right margin. If too many or too few characters are on the line, the line will not justify.

Justification is turned off by the <ESC>X command.

### **<ESC>E** UNDERSCORE "ON"

This command is used to indicate where you want Underscoring to begin. An <ESC>R indicates where the Underscoring should end. Underscore will continue on subsequent lines until you send the <ESC>R command. The Total Reset command will also terminate Underscoring.

### **<ESC>R** UNDERSCORE "OFF"

This command terminates the Underscore Mode. An <ESC>X also terminates the Underscoring command; however, this command will also cancel all other word processing commands except Proportional Spacing at the same time.

### **<ESC>O** BOLD PRINT "ON"

The Bold Print "ON" command causes each printable character to be printed twice. The print position is moved 1 dot down for the second printing of the character. A Carriage Return, <ESC>& or <ESC>X will exit the Bold Print Mode. Remember, <ESC>X will cancel all other word processing options except Proportional Spacing.

### **<ESC>&** BOLD/SHADOW PRINT "OFF"

This command may be used to terminate both Bold and Shadow Print Modes.

### **<ESC>W** SHADOW PRINT "ON"

The Shadow Print "ON" command causes each printable character to be printed twice. The print position is moved 1 dot horizontally for the second printing of the character. This results in a slightly wider or thicker character. A Carriage Return, <ESC>& or <ESC>X will terminate Shadow Print Mode. Remember, <ESC>X will cancel all other word processing options except Proportional Spacing.

**<ESC>X CANCEL ALL WP OPTIONS  
EXCEPT PS**

This command cancels all word processing options except Proportional Spacing. It may be used to cancel a particular command if no other word processing features are being used or if you no longer need the word processing features that were selected.

**Examples:**

The example below was generated by the following input:

<ESC>EDiablo Emulation allows you  
to underline, <ESC>R <ESC>O**embolden**,  
<ESC>& or print in <ESC>W"shadow  
print."<ESC>&

Diablo Emulation allows you to  
underline, embolden, or print in  
"shadow print."

## **Extended Character Set (ECS)**

The Extended Character Set (also known as the Secondary Character Set) is found in the 10 cpi font. This character set contains a full range of special mathematical and scientific symbols in addition to the normal or Primary Character Set (Hex 00 to 7F). The ECS may be accessed with either the Standard ECS 7-Bit ASCII Mode or the Standard ECS 8-Bit ASCII Mode. The tables at the end of this section provide a listing of the complete Extended Character Set.

### **ECS 7-Bit ASCII Mode**

For those systems which use a 7-Bit ASCII Mode of operation, the Primary Character Set codes 00-7F are in effect at power-up. To access the Secondary Character Set, send the Shift-Out <SO> command to the printer. Once this <SO> command has been sent, the only Primary Character Set commands which will be recognized are the Shift-In <SI> and Space <SP> commands. All other control codes are used to address Secondary Characters. The <SI> character will return you to use of the Primary Character Set.

### **ECS 8-Bit ASCII Mode**

For those systems which use an 8-Bit ASCII Mode of operation, the Primary Character Set codes 00-7F are in effect at power-up. To access the Secondary Character Set, send the Shift-Out <SO> command to the printer. Once this <SO> command has been sent, all codes 00-FE are accessible. The Shift-In <SI> character will return you to use of only the Primary Character Set. The software power-up Reset command, <ESC><CR> P, will also return you to just the Primary Character Set.

## Primary Character Set

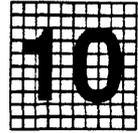
	0x	1x	2x	3x	4x	5x	6x	7x
0	0	0	20	0 30	@ 30	P 26	` 12	p 28
1	0	0	! 11	1 30	A 30	Q 30	a 29	q 29
2	0	0	" 17	2 30	B 28	R 29	b 30	r 26
3	0	0	# 27	3 30	C 28	S 25	c 27	s 26
4	0	0	\$ 23	4 30	D 30	T 28	d 30	t 25
5	0	0	% 30	5 30	E 27	U 30	e 27	u 30
6	0	0	& 30	6 30	F 27	V 29	f 25	v 30
7	0	0	' 12	7 30	G 30	W 30	g 28	w 30
8	0	0	( 21	8 30	H 30	X 30	h 30	x 30
9	0	0	) 21	9 30	I 24	Y 30	i 26	y 30
A	0	0	* 21	: 12	J 29	Z 25	j 19	z 25
B	0	0	+ 27	; 12	K 30	[ 16	k 30	{ 19
C	0	0	, 12	< 15	L 30	\ 23	l 26	8
D	0	0	- 27	= 27	M 30	] 16	m 30	} 19
E	0	0	. 12	> 15	N 30	^ 23	n 29	~ 22
F	0	0	/ 22	? 26	O 30	- 30	o 25	0

## Extended Character Set

	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
0	0	* 27	20	Π 30	e 25	π 30	° 16	° 16
1	← 29	∞ 30	A 30	P 27	α 28	ρ 24	¹ 16	¹ 16
2	→ 29	∂ 26	B 29	Σ 28	β 22	σ 28	² 16	² 16
3	↑ 21	0	Γ 28	Τ 29	γ 28	τ 26	³ 16	³ 16
4	↓ 21	0	Δ 30	Υ 30	δ 23	υ 25	⁴ 16	⁴ 16
5	⊙ 26	0	E 28	Φ 27	ε 23	φ 27	⁵ 16	⁵ 16
6	□ 24	0	Z 26	X 30	ζ 23	χ 25	⁶ 16	⁶ 16
7	∞ 26	0	H 30	Ψ 30	η 28	ψ 28	⁷ 16	⁷ 16
8	¶ 28	0	Θ 30	Ω 30	θ 26	ω 28	⁸ 16	⁸ 16
9	† 26	0	I 25	Σ 28	ι 15	ι 26	⁹ 16	⁹ 16
A	£ 29	0	K 30	∇ 30	κ 22	· 12	± 26	+ 26
B	{ 30	0	Λ 30	{ 16	λ 25	√ 29	− 26	− 26
C	} 30	0	M 30	} 16	μ 30	{ 16	≤ 25	× 27
D	° 18	0	N 30	[ 15	ν 26	} 15	≥ 25	÷ 26
E	Α 30	∅ 27	Ξ 25	] 15	ξ 25	· 12	~ 22	∞ 30
F	0	15	O 30	∫ 30	ο 26	/ 19	≈ 22	0



# Epson FX-80 Emulation Mode



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## Overview

The SmartWriter emulates the Epson® FX-80™ printer. This section covers the commands supported by the SmartWriter whenever it is in Epson Emulation Mode.

If you are using a word processor, you do not need to read this section. Once your word processor is correctly installed and is configured to work with a printer that emulates an Epson FX-80, you may use your word processor commands to edit and send your files to the SmartWriter.

The explanations of the supported Epson commands are given for those of you who may be writing computer programs and must actually use these commands. Epson commands which are not supported by the SmartWriter generally are required for the Epson FX-80 printer to overcome certain hardware limitations.

In addition to the commands explained in this section, there are Seven Special QMS/ANSI Commands that are also honored when in Epson Emulation Mode. These are software commands which allow you to change fonts, change emulation modes, change page orientation, change paper source, change the copy count, access the Extended Printer Control or redefine the command or font translation tables. The software commands are a special feature of the SmartWriter and are very useful. In particular, the QMSRED command which allows you to redefine the translation tables may be used to change the <ESC> character to a printable equivalent. This simplifies the entering of the special ESCape sequences required for accessing the Special QMS/ANSI Commands.

These software commands are explained in detail in Section 7 of this manual.

## Objectives

In this section you will become familiar with the Epson commands that are supported and not supported by the QMS SmartWriter printer. You will also learn which commands may be replaced by some functions of the SmartWriter keypad. Examples of the output you may expect from your printer are also presented to help you understand the supported commands.

## Prerequisites

The SmartWriter will only recognize the commands listed in this section when Epson Emulation Mode is selected. To configure the SmartWriter for Epson Emulation Mode use the following settings for Group 1:

	Option 1	Option 2	Results In
†	disabled	enabled	Epson Emulation Mode

**NOTE:** Epson Emulation Mode is the factory default emulation mode for SmartWriter.

Epson Emulation Mode may also be entered by using the QMS/ANSI Special Command QMSMOD explained in Section 7 of this manual.

## Key Terms

**Configuration** – The process of setting certain characteristics of the printer that determine how it will handle data.

**Default** – A pre-set condition of the printer.

**Disable/Enable** – The status of an Option. “Disable” is to turn off (0) and “enable” is to turn on (1).

**Emulation** – In this manual, emulation refers to the ability of the printer to respond to commands that are intended for a different type of printer. For example, Epson Emulation Mode means that when the SmartWriter is configured in this mode, it responds to most of the same commands sent from the host as would an Epson printer.

**Font** – A typeface in a particular style.

**Group** – The major classification of configuration parameters. Each Group refers to a different printer emulation mode, printer feature, or printer system parameter.

**Option** – The “sub-classification” within Groups. Each Option controls a different printer default condition.

**Parameter** – The variables within a command that determine the action which the command will initiate.

**Resolution** – The density of the printed image expressed in “dots per inch”.

## Summary of Supported Epson Commands

There are eight categories of supported Epson Emulation Mode commands: Print Width, Print Quality, Print Modes, Paper Feed, Forms Control, Formatting, Special Features, and Graphics. The supported commands are listed on the next few pages as a means of quick reference. The meanings of the categories and the commands will be explained later in this section.

### Print Width Commands

- <ESC>M Enable Elite Mode
- <ESC>P Disable Elite Mode
- <ESC><SI> Enable Compressed Mode
- <SI> Enable Compressed Mode (decimal 15)
- <DC2> Disable Compressed Mode (decimal 18)

### Print Quality Commands

- <ESC>E Enable Emphasized Mode
- <ESC>F Disable Emphasized Mode
- <ESC>G Enable Double-Strike Mode
- <ESC>H Disable Double-Strike Mode
- <ESC>S0 Enable Superscript
- <ESC>S1 Enable Subscript
- <ESC>T Disable Superscript and Subscript
- <ESC>p1 Enable Proportional Mode
- <ESC>p0 Disable Proportional Mode
- <ESC>-1 Enable Underline Mode
- <ESC>-0 Disable Underline Mode
- <ESC>4 Enable Italic Character Set
- <ESC>5 Disable Italic Character Set

### Selecting Print Modes

- <ESC>! Master Print Mode Select
- <ESC>@ Master Reset Code

### **Paper Feed Commands**

- <LF>** Line Feed (decimal 10)
- <ESC>0** Sets Line Spacing to 1/8 inch
- <ESC>1** Sets Line Spacing to 7/72 inch
- <ESC>2** Sets Line Spacing to 1/6 inch
- <ESC>A** Sets Line Spacing to n/72 inch
- <ESC>3** Sets Line Spacing to n/216 inch
- <ESC>J** Perform immediate one-time line feed of n/216th inch without carriage return
- <ESC>j** Perform immediate one-time reverse line feed of n/216th line feed without carriage return

### **Forms Control Commands**

- <FF>** Form Feed (decimal 12)
- <CR>** Carriage Return (decimal 13)
- <ESC>C<NUL>** Sets Forms Length to “n” inches
- <ESC>C** Sets Forms Length to “n” lines

### **Special Printer Features**

- <BS>** Backspace
- <ESC>>** Set High-Order Bit “ON”
- <ESC>=** Set High-Order Bit “OFF”
- <ESC>#** Accept High-Order “as is” from computer
- <ESC>R** Select International Character Set

### **Formatting Commands**

- <ESC>l** Set Left Margin
- <ESC>Q** Set Right Margin
- <ESC>D** Set Horizontal Tabs
- <HT>** Horizontal Tab
- <ESC>B** Set Vertical Tabs
- <VT>** Vertical Tab
- <ESC>bx** Define Vertical Tab Channels
- <ESC>/** Select Vertical Tab Channel

## Graphics Modes

- <ESC>K Selects Single-Density Graphics Mode
- <ESC>L Selects Double-Density Graphics Mode
- <ESC>Y Selects High Speed Double-Density Mode
- <ESC>Z Selects Quadruple-Density Graphics Mode
- <ESC>\* Selects Graphics Density "n"
- <ESC>% Select Character Set
- <ESC>& Define Characters in RAM Area (Download Font)
- <ESC>: Copy ROM Characters to User RAM Area
- <ESC>I1 Enable Printing of the Symbols that are not stored in 0-31 decimal which are not used as Control Codes.
- <ESC>I0 Disable Printing of the Symbols that are not stored in 0-31 decimal which are not used as Control Codes.
- <ESC>6 Enables Printing Codes 128 - 159 decimal
- <ESC>7 Disable Printing Codes 128 - 159 decimal

When using the supported commands, refer to the ASCII conversion table in Appendix B at the back of this manual to determine the value for "n" in those commands which require variable parameters. Use the appropriate conversion value (ASCII, Hex, Decimal, etc.) required by your computer system and the programming language being used.

## Unsupported Epson Commands

The following Epson commands are not supported by the SmartWriter. If these commands are sent to the printer, they will be absorbed and will not affect printer operation.

### **Print Width Commands**

- <SO>** Enable One-Line Expanded Mode (decimal 14)
- <ESC><SO>** Enable One-Line Expanded Mode (decimal 14)
- <ESC><DC4>** Disable One-Line Expanded Mode (decimal 20)
- <ESC>W1** Enable Continuous Expanded Mode
- <ESC>W0** Disable Expanded Mode

### **Forms Control Commands**

- <ESC>N** Produces a Variable Skip-Over-Perforation
- <ESC>O** Disable Skip-Over-Perforation
- <ESC>8** Disabled Paper-Out Sensor
- <ESC>9** Enable Paper-Out Sensor

### **Formatting Commands**

- <ESC>U1** Enable Continuous Unidirectional Mode
- <ESC>U0** Disable Continuous Unidirectional Mode
- <ESC><** Enable One-Line Unidirectional Mode

### **Special Printer Features**

- <CAN>** Cancels the Text in the Print Buffer (decimal 24)
- <DEL>** Deletes the Most Recent Text Character in the Print Buffer
- <ESC>i1** Enable Immediate Mode
- <ESC>i0** Disable Immediate Mode
- <ESC>s1** Enable Half-Speed Mode
- <ESC>s0** Disable Half-Speed Mode

### **Graphics Modes**

- <ESC>^0** Select Single-Density Nine-Pin Graphics Mode
- <ESC>^1** Select Double-Density Nine-Pin Graphics Mode

## **Supported Epson Commands**

The commands which are supported by the printer are described on the following pages. If you have files that already contain Epson commands, you need not make any changes to these files before sending them to the

laser printer. Any Epson commands that are not supported by the printer will be absorbed and will not interrupt printing.

## Print Width Commands

The Print Width Commands are used to change character and line spacing.

- **ENABLE ELITE MODE** causes printing at 12 characters per inch.
- **DISABLE ELITE MODE** allows a different Print Width Command to be selected or returns the printer to Pica Mode.
- **ENABLE COMPRESSED MODE** causes printing at 17 characters per inch.
- **DISABLE COMPRESSED MODE** allows a different Print Width Command to be selected or returns the printer to Pica Mode.

The QMS SmartWriter emulates the Pica, Elite and Compressed print widths of the Epson FX-80. Like the FX-80, only one Print Width can be used at a time. Pica Mode is the factory default power-up Print Width. In Pica Mode, you can print 10 characters per inch (cpi). Unlike the Epson printer, the QMS SmartWriter has no limit on the number of characters per line that you may print. The number of characters that will fit on a line is determined by the font size, the print mode (cpi) selected, the page size, and the page orientation.

Selecting a new Print Width may not be honored at all times. Certain Print Widths take priority over others as shown in Table 10.1 (Pica is the default and has the lowest priority). When using Elite or Compressed Mode, a Width Statement may be required to enable more than 80 characters per line to be sent before a <CR> is automatically inserted into the data stream. Refer to your

computer system's documentation to determine the correct format needed to do this.

**Elite**  
**Proportional**  
**Compressed**  
**Pica**

**Table 10.1. Mode Priorities**

<b>Typeface</b>	<b>Spacing</b>
Roman (default) Italic	Monospaced (default) Proportional
<b>Pitch</b>	<b>Quality</b>
Pica (default) Elite Compressed	Single-Strike (default) Double-Strike Emphasized

**Table 10.2. Print Defaults Summarized**

### **<ESC>M ENABLE ELITE MODE**

Elite Mode prints at 12 cpi. This Mode takes priority over all other Print Widths. You may access Single-Strike, Double-Strike, Italic, Superscript, and Subscript Print Qualities when in Elite Mode. You may not use Pica, Proportional, Emphasized, or Compressed Modes when in Elite Mode. If the command to access any of these modes is sent before Elite Mode is disabled, the command will be ignored. Printing will continue in Elite Mode.

### **<ESC>P DISABLE ELITE MODE**

This command turns Elite Mode off and allows a different Print Width to be selected. If no other Print Width is specified, printing will resume in Pica Mode.

### **<ESC><SI>or <SI> ENABLE COMPRESSED MODE**

This command (decimal 15) turns on Compressed Mode. Compressed Mode prints at 17 cpi and will take priority over Pica Print Width. Any of the Print Quality commands may be used when in this Mode. Compressed Mode may be set as the default printing mode for Epson Emulation by using the keypad to configure Group E Option 1.

## **<DC2> DISABLE COMPRESSED MODE**

This command (decimal 11) turns Compressed Mode off. If no other Print Width is specified, printing will resume in Pica Mode.

### **Examples:**

This is Pica Mode (10 cpl).

This is Elite Mode (12 cpl).

This is Compressed Mode (17 cpl).

## **Print Quality Commands**

The Epson FX-80 Print Qualities that are emulated by the SmartWriter are: Single-Strike, Emphasized, Double-Strike, Superscript, Subscript, Proportional, and Italic. The underlining capability is also considered a print quality and may be combined with any of the other print qualities. As in Print Width Commands, some Print Quality Commands take priority over others. Additionally, some Print Width Commands take priority over some Print Quality Commands. Table 10.3 defines the different Print Width/Print Quality combinations.

Unlike the FX-80, Print Quality Commands for Emphasized Mode, Double-Strike Mode, and Underline Mode will not reduce the SmartWriter's print speed. All Print Quality Commands will remain on until they are dis-

abled by the appropriate command or until the printer is powered-off.

**Due to the greater dot resolution of the SmartWriter, characters are always solid lines and will never appear to be constructed of dots.**

	PICA PRINT	SUPER SCRIPT	SUB SCRIPT	ITALICS	UNDER LINE	SUPER SCRIPT ITALICS	SUPER SCRIPT UNDER LINE	SUB SCRIPT ITALICS	SUB SCRIPT UNDER LINE	ITALICS UNDER LINE	SUPER SCRIPT ITALICS UNDER LINE	SUB SCRIPT ITALICS UNDER LINE
SINGLE-STRIKE PICA	XXX			XXX	XXX					XXX		
SINGLE-STRIKE ELITE	XXX			XXX	XXX					XXX		
SINGLE-STRIKE COMPRESSED	XXX			XXX	XXX					XXX		
SINGLE-STRIKE EMP PICA	XXX			XXX	XXX					XXX		
DOUBLE-STRIKE PICA	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
DOUBLE-STRIKE ELITE	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
DOUBLE-STRIKE COMPRESSED	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX
DOUBLE-STRIKE EMPHASIZED PICA	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XXX

POSSIBLE PRINT COMBINATIONS

Table 10.3.

- **EMPHASIZED MODE** causes characters to be printed slightly darker and wider than normal.
- **DISABLE EMPHASIZED MODE** returns the printer to single-strike printing.
- **DOUBLE-STRIKE MODE** causes characters to be printed slightly darker but no wider than normal.
- **DISABLE DOUBLE-STRIKE MODE** returns the printer to single-strike printing.
- **SUPERSCRIP**T causes characters to be printed slightly above the normal baseline.
- **SUBSCRIPT** causes characters to be printed slightly below the normal baseline.
- **DISABLE SUPERSCRIP**T/**SUBSCRIPT MODE** disables the above two commands.
- **PROPORTIONAL MODE** causes proportional character spacing in Emphasized Pica Mode.
- **DISABLE PROPORTIONAL MODE** returns the printer to the mode in effect prior to entering Proportional Mode.
- **UNDERLINE MODE** causes characters to be printed with underscoring.
- **DISABLE UNDERLINE MODE** terminates the Underline Mode.
- **ITALIC MODE** causes printing in a slanted typeface.
- **DISABLE ITALIC MODE** terminates Italic Mode.

### **<ESC>E** EMPHASIZED MODE

In Emphasized Mode, characters are printed twice with the second printing of the character being slightly offset horizontally. Characters printed in Emphasized Mode will appear slightly darker than Single-Strike and slightly wider than Double-Strike. **This mode can only be combined with Pica Mode.** Emphasized Pica Mode may be set as the default printing mode for Epson Emulation by using the keypad to configure Group E Option 2.

### **<ESC>F** DISABLE EMPHASIZED MODE

Turns Emphasized Mode off and returns printer to Single-Strike.

### **<ESC>G** DOUBLE-STRIKE MODE

Double-Strike characters appear darker but no wider than Single-Strike characters.

### **<ESC>H** DISABLE DOUBLE-STRIKE MODE

Turns Double-Strike Mode off and returns printer to Single-Strike.

#### **Examples:**

This is normal Pica Mode.

This is Emphasized Pica Mode.

This is Double-Strike Pica.

## **<ESC>S0 SUPERSCRIPT**

When Superscript Mode is enabled, characters will be printed full-size but raised above the normal print line. **Superscript characters are always printed in Double-Strike. Superscript cannot be used with Proportional Mode.** Superscript Mode stays on until the command to terminate is received.

## **<ESC>S1 SUBSCRIPT**

When Subscript Mode is enabled, characters will be printed full-size but lowered below the normal print line. This differs slightly from the FX-80 which prints subscript characters at half the size of normal characters. **Subscript characters are always printed in Double-Strike. Subscript cannot be used with Proportional Mode.** Subscript Mode stays on until the command to terminate is received.

## **<ESC>T DISABLE SUPERSCRIPT/SUBSCRIPT MODE**

This command terminates either Superscript or Subscript Mode. This command returns the printer to Single-Strike unless Double-Strike was enabled before entering Superscript or Subscript Mode. In that case, the printer will be returned to Double-Strike Mode.

### **Examples:**

The example below was generated by the following input:

E = mc<ESC>S02

<ESC>TH<ESC>S12<ESC>TO

E = mc<sup>2</sup>

H<sub>2</sub>O

## **<ESC>p1** PROPORTIONAL MODE

Proportional Mode allots space to each character according to the width of that character. The space allotted to “i” will be less than that allotted to “m”. This results in more natural looking spacing within words. Proportional Mode may not be used in Elite, Compressed, Superscript, Subscript, or Double-Strike Mode. Proportional Mode automatically uses Emphasized Pica and, therefore appears to be darker and bolder than Single-Strike. Printing speed is not affected.

## **<ESC>p0** DISABLE PROPORTIONAL MODE

This command terminates Proportional Mode and returns the printer to the Mode that was in effect before entering Proportional Mode.

### **Examples:**

Proportional spacing takes effect after the <ESC>p1. Proportionally spaced characters are closer together than fixed spaced characters. This may or may not be the appearance you desire.

The proportional spacing has been turned off for this sentence.

## **<ESC>-1** UNDERLINE MODE

The Underlining facility may be used with any Print Width or Print Quality. Underline Mode is also turned on by “-CHR\$<SOH>”.

## **<ESC>-0** DISABLE UNDERLINE MODE

This command terminates the Underline Mode.

**Examples:**

Underline Mode may be used  
with any Print Width or Print  
Quality.

## **<ESC>4** ITALIC MODE

Italic Mode causes printing in slanted typeface. This mode may be used with Pica, Elite, or Compressed Modes and with Single-Strike, Double-Strike, Emphasized, Proportional, Underlining, Superscript, or Subscript Print Qualities.

## **<ESC>5** DISABLE ITALIC MODE

This command terminates Italic Mode.

### **Examples:**

*This is font 382 in Italic Mode.*

This is<sup>s</sup>*superscript Italic Mode*

## **Selecting Print Modes**

The two Print Mode Commands affect multiple conditions with one command. The Select command will be used frequently. The Reset command should be invoked with care.

- **MASTER PRINT MODE SELECT** allows you to access any of eight different print mode combinations in one command.
- **MASTER RESET CODE** resets the printer to its power-up default conditions.

**<ESC>!n**

## MASTER PRINT MODE SELECT

The Master Print Mode is a powerful command that provides a convenient way to access any of the eight Print Mode combinations listed below. A Master Print Mode command will take priority over any existing Print Mode. There is no command to disable a Master Print Mode command. Exiting from the Master Print Mode requires that either a new Master Print Mode command or a specific Print Mode command be sent.

### Master Print Mode Command

<i>n</i>	<i>Combination</i>
@	Single-Strike Pica
A	Single-Strike Elite
D	Single-Strike Compressed
H	Single-Strike Emphasized Pica
P	Double-Strike Pica
Q	Double-Strike Elite
T	Double-Strike Compressed
X	Double-Strike Emphasized Pica

The decimal, hex, or octal values of these printable characters may also be sent in place of "n."

#### Examples:

You can use the Master Print Mode Select command to choose between many different print combinations which would normally require several keystrokes.

## **<ESC>@** MASTER RESET CODE

This command resets the SmartWriter to its power-up default conditions. All text and control codes will be cleared from the print buffer and all download fonts will be deleted. Use this command with extreme caution!

## Paper Feed Commands

The Paper Feed Commands control movement of the paper through the SmartWriter. These commands include changing line spacing values and reverse line feeds.

- **LINE FEED** advances the current position one line in the direction of printing.
- **SET LINE SPACING TO 1/8 INCH** establishes a line spacing value of 8 lines per inch.
- **SET LINE SPACING TO 7/72 INCH** establishes a line spacing value of “7-dot spacing.”
- **SET LINE SPACING TO 1/6 INCH** establishes a line spacing value of 6 lines per inch.
- **SET LINE SPACING TO  $n/72$  INCH** allows you to establish your own line spacing value in  $1/72$ ” increments.
- **SET LINE SPACING TO  $n/216$  INCH** allows you to establish your own line spacing value in  $1/216$ ” increments.
- **SINGLE  $n/216$  <LF> WITHOUT <CR>** causes an immediate line feed of  $n/216$ ”.
- **SINGLE  $n/216$  REVERSE <LF> WITHOUT <CR>** causes an immediate reverse line feed of  $n/216$ ”.

## **<LF> LINE FEED**

This command (decimal 10) causes the printer to execute a line feed. The following Line Spacing values and Reverse and Half-Line Feed commands determine the distance and direction of paper movement when the Line Feed command is received. The <LF> will not be executed until the end of the print line regardless of where the command is entered on the line. (See <ESC>J and <ESC>j commands for immediate line feeds.)

## **<ESC>0 SET LINE SPACING TO 1/8 INCH**

This command sets the Line Spacing to 8 lines per inch. Whenever a <LF> command is received, the paper will move 1/8 inch. This line spacing increment is also referred to as 9-dot spacing.

## **<ESC>1 SET LINE SPACING TO 7/72 INCH**

This command will cause the paper to move 7/72 inch whenever a <LF> command is received. This line spacing increment is also referred to as 7-dot spacing.

## **<ESC>2 SET LINE SPACING TO 1/6 INCH**

This command is used to return the printer to the default Line Spacing of 6 lines per inch. Whenever a <LF> command is received, the paper will move 1/6 inch. This line spacing increment is also referred to as 12-dot spacing.

## **<ESC>A<n> SET LINE SPACING TO n/72 INCH**

This command allows you to establish your own line spacing in 1/72 inch increments. The range of values for 'n' in the command are 0-85. If your computer has difficulty with values below 13, use "0+128" for 0, "1+129" for 1, "2+130" for 2, etc.

### **Examples:**

**<ESC>A<EM>** Set line spacing to 25/72"

**<ESC>A<VT>** Set line spacing to 11/72"

**<ESC>3<n> SET LINE SPACING TO n/216 INCH**

This command allows you to establish your own line spacing in 1/216 inch increments. This is a very fine spacing which closes the dot-gaps in Graphics Mode. The range of values for 'n' in the command are 0-255.

**Examples:**

<ESC>3B Set line spacing to 66/216"  
<ESC>3<CR> Set line spacing to 13/216"

**<ESC>J<n> SINGLE n/216 <LF> WITHOUT <CR>**

This command causes an IMMEDIATE line feed of n/216 inch. The command is only executed if the "<ESC>A" command (described above) for variable line spacing is controlling line spacing. The <ESC>J command is valid for one line only. The printer is returned to the current line spacing after the command is acted on.

**<ESC>j<n> SINGLE n/216 REVERSE <LF>  
WITHOUT <CR>**

This command causes an IMMEDIATE line feed of n/216 inch "up" the page. The command is only executed if the <ESC>A command for variable line spacing is controlling line spacing. The <ESC>j command is valid for one line only. The printer is returned to the current line spacing after the command is acted on. Unlike the FX-80, this command may be used when printing mailing labels.

## Forms Control Commands

The Forms Control Commands allow you to place the current print position almost anywhere on the page. These commands will be most useful when printing on pre-printed forms. Remember, paper size and orientation must be considered when using these commands.

- FORM FEED ejects the current page from the printer.
- CARRIAGE RETURN moves the current position to the Left Margin depending on the status of Group E Option 2.
- SET FORMS LENGTH TO 'n' INCHES establishes a value in inches for the length of the page to be printed.
- SET FORMS LENGTH TO 'n' LINES establishes a value in lines for the length of the page to be printed.

### **<FF> FORM FEED**

This command (decimal 12) allows you to execute a Form Feed without having to take the printer off-line and use the **FORM FEED** key. If a Top-of-Form has been set, the print position will advance to that point. If no Top-of-Form is set, advance will be to the top of the page.

### **<CR> CARRIAGE RETURN**

This command (decimal 13) causes the printer to execute a carriage return. The status of Group E Option 2 affects how a <CR> is interpreted.

**<ESC>C<NUL><n>**

## SET FORMS LENGTH TO 'n' INCHES

This command is used to set Forms Length in terms of the desired number of inches per page. The valid range for 'n' in the command depends on the size of paper being used. For letter size paper, the range is 1-11. For legal size paper, the range is 1-14. If this command is sent at the Top Margin, it will establish a Bottom Margin and act as a Skip-over-Perforation command.

### Examples:

**<ESC>C<NUL><VT>** Set Forms Length to 11"  
**<ESC>C<NUL><ENQ>** Set Forms Length to 5"

**<ESC>C<n>**

## SET FORMS LENGTH TO 'n' LINES

This command is used to set Forms Length in terms of the desired number of lines per page. The number of lines per page combines with the number of lines per inches to determine the number of lines per inch. The valid range for 'n' in the command is 0-127. If the number of lines per page exceeds the size of the paper, the forms length will automatically be set at the bottom of the paper. If this command is sent at the Top Margin, it will establish a Bottom Margin and act as a Skip-over-Perforation command.

### Examples:

**<ESC>CB** Set Forms Length to 66 lines  
**<ESC>C<CAN>** Set Forms Length to 24 lines

## Formatting Commands

The Formatting Commands are used to position the printed material on the page as desired. Remember that Pica Mode (10 CPI) is the default Print Width. Elite Print Mode has 12 CPI and Compressed Print Mode has 17 CPI.

- SET LEFT MARGIN
- SET RIGHT MARGIN

- SET HORIZONTAL TABS establishes up to 32 different horizontal tab stops in one command.
- HORIZONTAL TAB moves the current position to the next horizontal tab stop.
- SET VERTICAL TABS establishes up to 16 different vertical tab stops in one command.
- VERTICAL TAB moves the current position to the next vertical tab stop.
- DEFINE VERTICAL TAB CHANNELS establishes up to 16 different vertical tab stops in each of eight different channels.
- SELECT VERTICAL TAB CHANNEL 'x' selects the vertical tab channel to be used.

#### **<ESC>l<n> SET LEFT MARGIN**

The <ESC>l (*lower-case "L"*) establishes the left margin at the column number specified by 'n'. The valid values for 'n' in the command depend on the Print Mode in use. If Pica Print Mode is used, the range of values for 'n' are 0-78. In Elite Mode, the values for 'n' are 0-93. In Compressed Mode, the values for 'n' are 0-133. Any other values are ignored. New margins do not go into effect until after the next <CR>. Once the left margin is established, it remains in effect until changed by a new Set Left Margin command or until the printer is powered-off. The left margin setting is not affected by the Print Width.

The Set Left Margin command clears the printer buffer when it is received. Do not issue the Set Left Margin command at the END of a line.

Changing the left margin will affect the horizontal tab settings. Tabs should be set after the left margin is established. The Master Reset Code (<ESC>@) will reset the left margin to the power-up default (0).

**Examples:**

<ESC>I<FF> Set Left Margin at column 12.

<ESC>I<DC4> Set Left Margin at column 20.

The Left Margin may also be set by using the keypad to configure Group 4 Options 1, 2, 3, and 4. Refer to Section 9 for details of these Options.

### **<ESC>Q<n> SET RIGHT MARGIN**

This command establishes the right margin at the column number specified by 'n'. The valid values for 'n' depend on the Print Mode in use. If Pica Print Mode is used, the range of values for 'n' are 2-80. In Elite Mode, the values for 'n' are 3-96. In Compressed Mode, the values for 'n' are 4-137. The right margin must always be greater than the left margin or the QMS SmartWriter will ignore the right margin. Changing the Print Width may require changing the right margin in order to maintain an even right hand edge. The Set Right Margin command should be sent AFTER changing or selecting Elite or Compressed Print Widths.

**Examples:**

<ESC>QF Set Right Margin at column 70.

<ESC>QP Set Right Margin at column 80.

The Right Margin may also be set by using the keypad to configure Group 4 Options 5, 6, 7, and 8. Refer to Section 9 for details of these Options.

## **<ESC>D<n<sub>1</sub>><n<sub>2</sub>>...<n<sub>32</sub>><NUL>** SET HORIZONTAL TABS

This command is used to specify up to 32 columns for setting horizontal tabs. This command does not move the current print position. The valid values for 'n' in the command are: 0-79 in Pica Mode, 0-95 in Elite Mode, and 0-131 in Compressed Mode. In the command, n<sub>1</sub> represents the column location for the first tab stop, n<sub>2</sub> represents the column location for the second tab stop, etc.

A horizontal tab cannot be larger than the maximum column for the Print Width being used. Tabs will remain in effect until changed by a new <ESC>D command or until the printer is powered-off. A Master Reset Code will delete existing tabs and establish the default tabs which are located every eight Pica columns.

### **Examples:**

<ESC>D<ENQ><LF><NUL>    Set tabs at columns 5 and 10.  
<ESC>D<RS>(2=<NUL>)    Set tabs at columns 30, 40,  
50, and 61.

## **<HT>** HORIZONTAL TAB

This command (decimal 9) moves the current print position to the next horizontal tab. Tabs may be skipped over by sending the <HT> commands with no text until the desired tab stop is reached.

## **<ESC>B<n<sub>1</sub>><n<sub>2</sub>>...<n<sub>16</sub>><NUL>** SET VERTICAL TABS

This command is used to specify up to 16 vertical tab stops. The command does not move the current print position. The valid values for 'n' in the command are 1-255 but a tab stop cannot exceed the number of lines per page (established by <ESC>C command). In the command, n<sub>1</sub> represents the line number for the first tab stop, n<sub>2</sub> represents the line number for the second tab stop, etc.

Vertical tabs remain in effect until changed by a new <ESC>B command or until the printer is powered-off. A Master Reset Code (<ESC>@) will reset the vertical

tabs to default power-up conditions. The default tab stops are located at every other line beginning at line 1 (Top-of-Form = 0) and ending at line 65. Changing the Line Spacing value does not change the vertical tab stop settings.

**Examples:**

- `<ESC>B<ENQ><SP><NUL>` Set Vertical Tabs at lines 5 and 32.
- `<ESC>B<SI><RS>=<NUL>` Set Vertical Tabs at lines 15, 30, 45, and 61.

**<VT> VERTICAL TAB**

This command (decimal 11) moves the current print position to the next vertical tab stop. You can skip over tab stops by sending <VT> commands with no text until the desired tab stop is reached.

**<ESC>b $x$ < $n_1$ >< $n_2$ >...< $n_{16}$ ><NUL> DEFINE VERTICAL TAB CHANNELS**

This command establishes up to 16 vertical tab stops in up to eight different channels. The different channels may be accessed as necessary to use in different situations. The <ESC>b command does not move the current print position. This command is useful for jobs needing multiple sets of tab stops. In the command,  $x$  is any number from 0-7 and defines the channel being set,  $n_1$  is a number representing the line location of the first tab stop,  $n_2$  is the line number of the second tab stop, etc. The command must be terminated by <NUL> (Hex 00).

**Examples:**

- `<ESC>b0<VT><SYN><NUL>` Define Vertical Tab Channel 0 to have Vertical Tabs at lines 11 and 22.
- `<ESC>b3<VT><SYN>!,<NUL>` Define Vertical Tab Channel 3 to have Vertical Tabs at lines 11, 22, 33, and 44.

**<ESC>/<n>**

## **SELECT VERTICAL TAB CHANNEL "n"**

This command selects one of the eight vertical tab channels established by the <ESC>b command. In the command, "n" is the number of the desired channel.

- <ESC>/<NUL>** Select Vertical Tab Channel 0.
- <ESC>/<ETX>** Select Vertical Tab Channel 3.

## **Special Printer Features**

Three of the four special features below allow High-Order Bit Control to enable users of either seven-bit or eight-bit systems to operate effectively with the QMS SmartWriter. The first two commands, <ESC>> and <ESC>=, may be used for special situations. The third command, <ESC>#, is the command which should be used in most cases.

- **SET HIGH-ORDER CONTROL AND HIGH-ORDER BIT ON**
- **SET HIGH-ORDER BIT OFF**
- **SET HIGH-ORDER CONTROL TO "OFF"**
- **SELECT INTERNATIONAL CHARACTER SET** allows you to access up to nine different character sets for international use.

**<ESC>>**

## **SET HIGH-ORDER CONTROL AND HIGH-ORDER BIT ON**

This command sets the High-Order Control and High-Order Bit to "ON". When the High-Order Bit is "ON", the eighth or "Most Significant Bit" (MSB) is always read as "ON". This command will remain in effect until changed by one of the other two High-Order Bit Control commands or until a "warm restart" or complete power-off/power-on is performed. The <ESC>> command will not affect interpretation of the ESCape codes by the printer.

### **<ESC>= SET HIGH-ORDER BIT OFF**

This command sets the High-Order Bit to “OFF” after an <ESC> command has been sent. When the High-Order Bit is “OFF”, the eighth or “Most Significant Bit” (MSB) is always read as “OFF”. This command will remain in effect until changed by one of the other two High-Order Bit Control commands or until a “warm restart” or complete power-off/power-on is performed. The <ESC>= command will not affect interpretation of the ESCape codes by the printer.

### **<ESC># SET HIGH-ORDER CONTROL TO “OFF”**

This command sets the High-Order Control to “OFF” so that the eighth or Most Significant Bit (MSB) can be interpreted “as is” (either off or on). This command will remain in effect until changed by one of the other two High-Order Bit Control commands or until a “warm restart” or complete power-off/power-on is performed.

### **<ESC>Rn SELECT INTERNATIONAL CHARACTER SET**

The QMS SmartWriter allows access to special characters for nine different countries through this command. The values for ‘n’ in the command are:

<NUL>	USA	<ETX>	England	<ACK>	Italy
<SOH>	France	<EOT>	Denmark	<BEL>	Spain
<STX>	Germany	<ENQ>	Sweden	<BS>	Japan

Refer to your host computer or word processor documentation for instructions on embedding the ASCII control characters in the place of ‘n’ in the above command.

The International Character Set may also be accessed through Group E Options 3 through 5. If you are using a word processor, type the visible equivalents of the decimal values at the top of each column. The character that prints will be the character associated with that value in the selected character set. The international character sets will also print in italics if Italic Mode is selected.

**Examples:**

<ESC>R<STX> Selects German character set  
<ESC>R<BEL> Selects Spanish character set

The special international characters appear in Table 10.4.

**Table 10.4. International Characters**

	35	36	64	91	92	93	94	96	123	124	125	126
USA	*	\$	@	[	\	]	^	'	(		)	-
FRANCE	*	\$	à	'	ç	š	^	'	e	ù	é	"
GERMANY	*	\$	š	Ä	ö	Ü	^	'	ä	ö	ü	ß
U.K.	£	\$	@	[	\	]	^	'	(		)	-
DENMARK	*	\$	@	Æ	Ø	Å	^	'	æ	ø	å	~
SWEDEN	*	Ö	É	Ä	Ö	Å	Ü	e	ä	ö	å	Ü
ITALY	*	\$	@	'	\	e	^	ù	à	ó	e	ì
SPAIN	₧	\$	@	í	Ñ	¿	^	'	ñ	]	-	-
JAPAN	*	\$	@	[	¥	]	^	'	(		)	-

**INTERNATIONAL CHARACTER SETS**

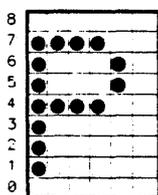
You may also print the International Character Set using the Italic Mode as shown in the table below.

	35	36	64	91	92	93	94	96	123	124	125	126
USA	#	\$	@	[	\	]	^	'	(	/	)	-
FRANCE	#	\$	à	'	ç	š	^	'	e	ù	é	"
GERMANY	#	\$	š	Ä	ö	Ü	^	'	ä	ö	ü	ß
U.K.	£	\$	@	[	\	]	^	'	(	/	)	-
DENMARK	#	\$	@	Æ	Ø	Å	^	'	æ	ø	å	~
SWEDEN	#	Ö	É	Ä	Ö	Å	Ü	e	ä	ö	å	Ü
ITALY	#	\$	@	'	\	e	^	ù	à	ó	e	ì
SPAIN	₧	\$	@	í	Ñ	¿	^	'	ñ	]	-	-
JAPAN	#	\$	@	[	¥	]	^	'	(	/	)	-

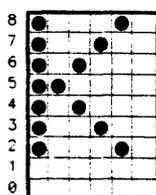
**ITALIC INTERNATIONAL CHARACTER SETS**

## Graphics Mode

The QMS SmartWriter supports the Epson FX-80 Single, Double, and Quadruple Density Graphics. It does not emulate the FX-80 consecutive-dot or slower speed with increased density limitations. A unique <ESC>command is used to enter each graphics density. In each density, two additional parameters in the command specify the number of horizontal dot columns to reserve for graphics data. The number of vertical dot rows per column that will be reserved for graphics data is determined by the type of computer system you are using (7-bit or 8-bit). Figure 10.1 shows how the different systems plot dots in a column. Notice that 7-bit systems do not use the top and bottom dot rows while 8-bit systems use the top row.



7-Bit Format



8-Bit Format

**Figure 10.1**

Dot positions 1-8 correspond to the 8 bits in a binary number. The ASCII equivalent of a binary bit pattern is sent to the system to tell which dots to print. A "1" means "ON" or "print" and "0" means "OFF" or "don't print." Since ASCII values are used, there is a single, unique decimal number (0-255) assigned for each possible combination of the "ON" and "OFF" bits. This means there is a unique number for each possible combination of dot patterns.

For most graphics, you will want to change to 7-dot line spacing if you are using a 7-bit system and 8-dot line spacing if you are using an 8-bit system. Refer to the Paper Feed Commands explained earlier in this section.

To enter Graphics Mode using any of the command sequences, the high-order bit must be "OFF." For 7-bit systems, this means sending the <ESC>= command if you encounter difficulty in entering Graphics Mode.

Any "Enter Graphics Mode" command causes a buffer dump to the printer so that any text is not lost. The Master Reset Code, if issued at the end of a graphics program, will not affect the graphics data but may cause any text following the graphics program to be lost. **Plot mode data and print data will not print on the same line accurately.**

Some systems may not allow use of low ASCII codes 0-31. You will need to design around this problem, use other numbers with similar dot patterns or POKE codes directly to the printer. Check your system documentation for assistance.

A command called Variable-Density Graphics Mode is provided to switch from one dot density to another while remaining in Graphics Mode.

A Width Statement may be required by some computer systems to prevent the printer from sending a <CR> before a graphics line is completed (especially if it is wide graphics pattern such as Double or Quadruple-Density dot patterns). Consult your system documentation for the appropriate Width Statement format for your computer.

**NOTE:** The difference in dot size and density between the Epson printer and the QMS SmartWriter will condense graphics. Circular shapes will appear slightly elongated when printed on the SmartWriter.

- **SELECT SINGLE-DENSITY GRAPHICS MODE**  
places the printer in Graphics Mode and specifies the number of columns to be reserved for graphics data.
- **SELECT HIGH-SPEED DOUBLE-DENSITY MODE**  
places the printer in Graphics Mode and specifies the number of columns to be reserved for graphics data.

- **SELECT LOW-SPEED DOUBLE-DENSITY MODE** places the printer in Graphics Mode and specifies the number of columns to be reserved for graphics data. There is no restriction on speed with the QMS SmartWriter.
- **SELECT QUADRUPLE-DENSITY MODE** places the printer in Graphics Mode and specifies the number of columns to be reserved for graphics data.
- **SELECT VARIABLE DENSITY MODE** places the printer in Graphics Mode and allows you to change densities as necessary.
- **DEFINE CHARACTER IN RAM AREA** allows you to create download fonts or single characters.
- **SELECT CHARACTER SET** allows you to print with user-defined characters.
- **COPY ROM CHARACTERS TO USER RAM** will access characters that have not been defined in RAM from the printer ROM when printing with user-defined character sets.
- **ENABLE PRINTING OF CODES (DECIMAL 0 - 31)** causes certain control codes in the decimal 0-31 range to be printed.
- **DISABLE PRINTING OF CODES (DECIMAL 0 - 31)** disables printing of control codes in the decimal 0-31 range.
- **ENABLE PRINTING OF CODES (DECIMAL 128 - 159)** allows you to redefine the "High-Order Control Codes" (decimal 128-159).
- **DISABLE PRINTING OF CODES (DECIMAL 128 - 159)** disables printing of control codes in the decimal 128-159 range.

**<ESC>K<n<sub>1</sub>><n<sub>2</sub>>**

### **SELECT SINGLE-DENSITY GRAPHICS MODE**

This command places the QMS SmartWriter in Single-Density Graphics Mode and identifies which columns are to be reserved for graphics data. The maximum number of dots per row in this density is 480. In the command, n<sub>1</sub> is the number of single dot columns to be reserved for graphics data and n<sub>2</sub> represents the number of 'groups' of dot columns to be reserved for graphics data (each group = 256 single dot columns).

Seven-bit system users may need to enter Single-Density Graphics Mode twice in the same line if the full page width is needed for graphics data. Reserve 383 columns for graphics data the first time and then reserve 97 columns the second time.

#### **Examples:**

<b>&lt;ESC&gt;K&lt;224&gt;&lt;SOH&gt;</b>	Reserve 480 dot columns.
<b>&lt;ESC&gt;K&lt;DEL&gt;&lt;SOH&gt;</b>	Reserve 383 dot columns.
<b>&lt;ESC&gt;Ka&lt;NUL&gt;</b>	Reserve 97 dot columns.

**<ESC>Y<n<sub>1</sub>><n<sub>2</sub>>**

### **SELECT HIGH-SPEED DOUBLE-DENSITY MODE**

This command places the QMS SmartWriter in Double-Density Graphics Mode and identifies which columns are to be reserved for graphics data. The maximum number of dots per row in this density is 960 (480 x 2 = 960). Unlike the FX-80, there is no restriction on any dot-combination in this speed and density. You may print the same dot-combination in consecutive columns.

#### **Examples:**

<b>&lt;ESC&gt;Y&lt;192&gt;&lt;ETX&gt;</b>	Reserve 960 dot columns.
<b>&lt;ESC&gt;Y&lt;140&gt;&lt;SOH&gt;</b>	Reserve 500 dot columns.

**<ESC>L<n<sub>1</sub>><n<sub>2</sub>>**

### **SELECT LOW-SPEED DOUBLE-DENSITY MODE**

This command is treated the same as an <ESC>Y. Unlike the FX-80, there is no restriction on speed in this density. See the <ESC>Y command for values of n<sub>1</sub> and n<sub>2</sub>.

**<ESC>Z<n<sub>1</sub>><n<sub>2</sub>>**

## **SELECT QUADRUPLE-DENSITY MODE**

This command places the QMS SmartWriter in Quadruple-Density Graphics Mode and identifies which columns are to be reserved for graphics data. The maximum number of dots per row in this density is 1920 (480 x 4 = 1920). To reserve the maximum number of dot columns (1920) for graphics data, send <ESC>Z<128><BEL>(128 + [7 x 256] = 1920).

**<ESC>\*x<n<sub>1</sub>><n<sub>2</sub>>**

## **SELECT VARIABLE DENSITY MODE**

This command places the QMS SmartWriter in Graphics Mode and allows you to change densities (Single, Double, Quadruple) as necessary without exiting Graphics Mode. The values for *x* in the command are:

- <NUL> Single Density
- <SOH> Low-Speed Double-Density
- <STX> High-Speed Double-Density
- <ETX> Quadruple-Density

The values for *n<sub>1</sub>* and *n<sub>2</sub>* specify the dot columns to be reserved for graphics data. Refer to the <ESC>K, <ESC>Y, and <ESC>Z commands for details of maximum dot columns for each density.

## **Graphics Pin Combination Patterns**

Once decimal numbers for the various pin-combination patterns have been calculated, you can store these numbers in DATA statements separating each decimal value with a comma. A READ (n) statement in a program LOOP simplifies the process of sending pin patterns for each column of dots to be printed. A RESTORE statement can be used to repeat a pattern a variable number of times. These statements are standard BASIC commands.

Graphics software packages are available for the Epson which automatically generate the graphics, like bar graphs, that are usually used with personal computers. These packages eliminate the need for all the program-

ming mentioned in the above paragraph and are also supported by the QMS SmartWriter printer.

## Plotter Graphics

Your QMS SmartWriter has the capability to operate as a "plotter." Entire manuals have been written explaining how to send dot-patterns for plotting using BASIC or any other language normally used. Consult one of these. Here again, software packages are available.

## User-Defined Characters

In addition to the standard fonts or character sets, the QMS SmartWriter, like the FX-80, can be used to create you own special letters, numbers and symbols. Standard character sets are stored in ROM whereas user-defined characters must be created and stored in RAM. RAM is generally used as a text buffer but because the QMS SmartWriter has more memory, it may usually be used simultaneously for user-defined characters. However, a special command must be sent to print user-defined characters and override the ROM fonts.

### `<ESC>&<r><n12 DEFINE CHARACTER IN RAM AREA`

This command is used to create download fonts. It may be used when creating an entire character set or just a single letter or character. (Beware that download fonts are deleted if the Master Reset Code is used.) In the command, *r* = RAM area to be used (in most cases '0') and *n<sub>1</sub>* and *n<sub>2</sub>* indicate the range of characters to be defined. For example, the following command would indicate that the characters A through E were about to be defined:

`<ESC>& 0<65><69>`

The visible equivalents of `<65>` and `<69>` (A and E) could have also been substituted in the command. If only one character were to be defined, then the value in *n<sub>1</sub>* and *n<sub>2</sub>* would be the same.

The valid range of values for *n<sub>1</sub>* and *n<sub>2</sub>* is 0-255 (except

values 0-31, 127-259, and 255 which are control codes and may only be used after sending a special ESCape sequence explained in "Control Codes Redefined" later in this section).

After receiving the above command, the printer expects 12 data numbers; one attribute and 11 dot pattern numbers (separated by commas). The user-defined character must fit into the same 9-dot high by 11-dot wide matrix as the standard ROM characters. Only 7 or 8 dots of the 9-dot matrix are actually used depending on whether you have a 7 or 8-bit system. Only 9 dots of the 11-dot wide matrix is used for defining characters. This allows for space between printed characters. Remember, the printer will still expect values for all spaces. Adjacent (or overlapping) dots are not permitted.

The first or "attribute" byte tells whether the top 7 or 8 dots (most cases) are to be printed or whether it will be the bottom 7 or 8 dots (for lowercase descenders). If the High-Order Bit is "ON" (= 1) then the top dots are printed. If the High-Order Bit is "OFF" (= 0) then the bottom dots are printed. The printer checks the attribute byte before printing each character. Seven-bit system users should refer to the <ESC>> and <ESC>= commands explained previously in this section.

The attribute byte is also used if proportional characters are desired. Remember that proportional means that space is allotted according to the width of each character. The attribute byte indicates where, in the 11-dot matrix, to begin and where to end printing of each letter. In addition, proportional characters require 12 values to define them rather than 11 since Proportional automatically means Emphasized characters. A total of 13 values, counting the attribute byte, are necessary to define each character.

**<ESC>%<n<sub>1</sub>><n<sub>2</sub>>**

### **SELECT CHARACTER SET**

This command overrides the standard ROM characters in order to print user-defined characters. In the command, n<sub>1</sub> may be "0" (select ROM characters) or "1" (select

RAM characters) and  $n_2$  is usually "0" (area available).

To activate the user-defined RAM characters:

`<ESC>%<SOH><NUL>`

To return to the ROM standard fonts:

`<ESC>%<NUL><NUL>`

`<ESC>:<NUL><NUL><NUL>`

## COPY ROM CHARACTERS TO USER RAM

If you activate the user-defined RAM character set and attempt to print a number, letter or symbol which has not been defined, the printer will print blank spaces. The ROM characters will not override. Using the above command will, however, copy the ROM characters down to the RAM area. This will avoid having to switch back and forth between the two areas.

## Graphics Using 7-Bit Systems

If you have a 7-bit system, there are some problems in Graphics Mode which you must get around. The Enter Graphics Mode `<ESC>` commands use the  $n_1$  and  $n_2$  parameters. Seven-bit users, however, cannot use these parameters alone to access the full 8-inch page width. In 7-bit systems, the  $n_1$  range is 0-127 instead of 0-255. (The  $n_2$  parameter range is not affected in 7-bit systems.)

The following table lists the available ranges of  $n_1$  and  $n_2$  for different widths.

$(n_1 = 0-127)$	+	$(n_2 = 0)$	=	widths of 0-127 dots
$(n_1 = 0-127)$	+	$(n_2 = 1)$	=	widths of 256-383 dots
$(n_1 = 0-127)$	+	$(n_2 = 2)$	=	widths of 512-639 dots
$(n_1 = 0-127)$	+	$(n_2 = 3)$	=	widths of 768-895 dots
$(n_1 = 0-127)$	+	$(n_2 = 4)$	=	widths of 1024-1151 dots
$(n_1 = 0-127)$	+	$(n_2 = 5)$	=	widths of 1280-1407 dots
$(n_1 = 0-127)$	+	$(n_2 = 6)$	=	widths of 1536-1663 dots
$(n_1 = 0-127)$	+	$(n_2 = 7)$	=	widths of 1792-1919 dots

For example, Single Density has 480 dot columns in the full 8 inches. However, 383 is the maximum available to 7-bit system users (512, the next lowest number, is too much). The only way around this is to send two Single Density Graphics Mode commands in the same line—one for 383 columns and one for 97 columns.

## Control Codes Redefined

In the command for user-defined characters, the ASCII characters 0-31, 127-159, and 255 cannot be used to re-define characters. These slots are generally reserved for control codes (used to give directions to the printer). If you need the additional space for user-defined characters, the commands explained here are available to redefine these codes.

### **<ESC>I1** ENABLE PRINTING OF CODES (decimal 0-31)

This command enables printing of many of the codes in the decimal 0-31 range. However, not all of the control codes will be printable in spite of this command. For example, <ESC>27 is the control code for the Escape character. This should never be disabled. Codes which access special modes or send directions to the printer cannot be printed as normal characters. These include 7-15, 17-20, 24, and 27.

A printable equivalent of all other characters in the 0-31 range will print when this command is used. The Hex values for decimal 0-31 are X'00' through X'1F'.

The control code locations (7-15, 17-20, 24, and 27) can still be used by also sending <ESC>R when using the International Character Set. Some of this will not work with 7-bit systems.

### **<ESC>I0** DISABLE PRINTING OF CODES (decimal 0-31)

This command disables printing of all decimal 0-31 control codes.

**<ESC>6**

## **ENABLE PRINTING OF CODES (decimal 128-159)**

This command allows you to redefine the “High-Order Control Codes” (decimal 128-159).

**WARNING:** Do not use this command when the High-Order Bit Control command is “ON” (<ESC>>). The High-Order Bit Control command must be set to read the High-Order Bit “as is” (<ESC>#).

**<ESC>7**

## **DISABLE PRINTING OF CODES (decimal 128-159)**

This command disables printing of all High-Order Control Code equivalents of the Low-Order Control Codes (decimal 7-15, 17-20, 24, and 27). All other control codes in this range will print.

### **Mode Strings**

If you have user-defined all 256 available spaces in RAM for special symbols, you may wish to easily access the standard characters in ROM so that you can switch back and forth. To do this, define each character set (ROM and RAM) as a character string and use them in your program to switch access.

## **Double-High, Double-Wide Letters**

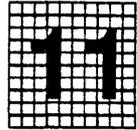
Use two 9 x 11 matrices to define an extra wide character. However, you should be careful to define the first half in Proportional (Emphasized Mode) in order to take care of the column with no printed dots. Seven-bit system users should refer to “Core Characters” below.

The same technique with line spacing adjustments can be used to define double-high or double-wide/double-high characters. A little experimentation can produce some very interesting results. The logical ASCII numbers to use for defining an extra large letter would be the ASCII equivalent of the Upper and Lowercase Roman and the Upper and Lowercase Italic of that character (T and t and *T and t*).

## **Core Characters**

Defining large letters can very quickly use up all available ASCII values. It might be desirable to design some basic curved and straight line patterns which can be mixed and matched to "form" letters or logos. This is the only way a 7-bit system can handle extra large characters.

# Qume Emulation Mode



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## Overview

The SmartWriter emulates the Qume® Sprint 9/45, Sprint 9/55, and the Sprint 11 Plus letter-quality printers. This section covers the commands that are supported whenever the SmartWriter is in Qume Emulation Mode.

If you are using a word processor, you do not need to read this section. Once your word processor is correctly installed and is configured to work with a printer that emulates a Qume printer, you may use your word processor commands to edit and send your files to the SmartWriter.

The explanations of the supported Qume commands are given for those of you who may be writing computer programs and must actually use these commands. Qume commands which are not supported by the SmartWriter generally are required for the Qume printer to overcome certain hardware limitations.

In addition to the commands explained in this section, there are Seven Special QMS/ANSI Commands that are also honored when in Qume Emulation Mode. These are software commands which allow you to change fonts, change emulation modes, change page orientation, change paper source, change the copy count, access the Extended Printer Control or redefine the command or font translation tables. The software commands are a special feature of the SmartWriter and are very useful. In particular, the QMSRED command which allows you to redefine the translation tables may be used to change the <ESC> character to a printable equivalent. This simplifies the entering of the special ESCape sequences required for accessing the Special QMS/ANSI Commands. These software commands are explained in detail in Section 7 of this manual.

## Objectives

In this section you will become familiar with the Qume commands that are supported and unsupported by the QMS SmartWriter. You will also learn which commands may be replaced by some functions of the SmartWriter keypad. Examples of the output you can expect from your printer are also presented to help you understand the supported commands.

## Prerequisites

The SmartWriter will only recognize the commands listed in this section when Qume Emulation Mode is selected. To configure the SmartWriter for Qume Emulation Mode, use the following settings for Group 1:

Option 1	Option 2	Results In
enabled	enabled	Qume Emulation Mode

Qume Emulation Mode may also be entered by using the QMS/ANSI Special Command QMSMOD explained in Section 7.

## Key Terms

**Configuration** – The process of setting certain characteristics of the printer that determine how it will handle data.

**Default** – A pre-set condition of the printer.

**Disable/Enable** – The status of an Option. “Disable” is to turn off (0) and “enable” is to turn on (1).

**Emulation** – In this manual, emulation refers to the ability of the printer to respond to commands that are intended for a different type of printer. For example,

when the printer is configured in Qume Emulation Mode, the SmartWriter will respond to most of the same commands as a Qume printer would.

**Font** – A typeface in a particular style.

**Group** – The major classification of configuration parameters. Each Group pertains to a different printer emulation mode, printer feature, or printer system parameter.

**Option** – The “sub-classification” within Groups. Each Option controls a different printer default condition.

**Parameter** – The variables within a command that determine the action which the command will initiate.

**Resolution** – The density of the printed image expressed in “dots per inch.”

# Summary of Supported Qume Commands

There are five categories of supported Diablo Emulation Commands: Single Character, Formatting, Print Position, Print Quality, and Special Printer Features. The supported commands are listed on the next few pages as a means of quick reference. The meanings of the categories and the commands will be explained later in this section.

## Single Character Commands

<BS> Backspace  
<CR> Carriage Return  
<FF> Form Feed  
<HT> Horizontal Tab  
<LF> Line Feed  
<SP> Space

## Formatting Commands

<ESC>+ Set Top Margin  
<ESC>- Set Bottom Margin  
<ESC>9 Set Left Margin  
<ESC>0 Set Right Margin  
<ESC>L \*Set Vertical Motion Index  
<ESC><RS> \*Set Vertical Motion Index  
<ESC>E \*Set Horizontal Motion Index  
<ESC><US> \*Set Horizontal Motion Index  
<ESC>1 Set Horizontal Tab Stop  
<ESC>( Tab Set List  
<ESC>) Tab Clear List  
<ESC>8 Clear Individual Tab Stops  
<ESC>2 Clear all Horizontal Tab Stops

\* These commands have variable parameters.

## Print Position Commands

<ESC><BS>	Backspace
<ESC>C	*Absolute Horizontal Tab to a Column Number
<ESC><HT>	Absolute Horizontal Tab to a Column Number
<ESC>P	*Absolute Vertical Tab to a Line Number
<ESC><VT>	*Absolute Vertical Tab to a Line Number
<ESC>LF	Negative Line Feed
<ESC>D	Negative 1/2 Line Feed
<ESC>U	Positive 1/2 Line Feed
<ESC>H	*Relative Horizontal Motion
<ESC>V	*Relative Vertical Paper Motion
<ESC> ,	Auto Line Feed "ON"
<ESC> .	Auto Line Feed "OFF"
<ESC>5	Turn "OFF" Programmed Backward Printing
<ESC>6	Turn "ON" Programmed Backward Printing
<ESC>W	Auto Carriage Return/Line Feed "ON"
<ESC>Z	Auto Carriage Return/Line Feed "OFF"

## Print Quality Commands

<ESC>\$	WPS "ON"
<ESC>%	WPS "OFF"
<ESC>I	Auto Underscore Mode "ON"
<ESC>J	Auto Underscore Mode "OFF"
<ESC>K	*Bold Overprint Mode "ON"
<ESC>M	Bold Overprint Mode "OFF"
<ESC>Q	Shadow Print "ON"
<ESC>R	Shadow Print "OFF"
<ESC>N	No Escapement/Motion to be performed after printing next immediate character.

\* These commands have variable parameters.

## Special Printer Features

<ESC><SUB>I	Total Reset/Restore
<ESC><CR>P	Alternate Total Reset/Restore
<ESC>S	No Print "ON"
<ESC>T	No Print "OFF"
<ESC>3	Graphics "ON" 1/60"
<ESC>G	Graphics "ON" 1/120"
<ESC>4	Graphics "OFF"
<ESC>/	Print Character located at Wheel Position 002
<ESC><SP>	Print Character located at Wheel Position 004

When using the supported commands, refer to the ASCII conversion table in Appendix B at the back of this manual to determine the value for "n" in those commands which require variable parameters. Use the appropriate conversion value (ASCII, Hex, Decimal, etc.) required by your computer system and the programming language being used.

## Unsupported Qume Commands

The following commands are not supported by the QMS SmartWriter. If these commands are sent, they will be absorbed by the printer and will not affect printing.

### Qume Printer Features

<ESC>F	Set Form Length
<ESC>O	Right Margin Control "ON"
<ESC>Y	Right Margin Control "OFF"
<ESC>>	Auto Bidirectional Printing "ON"
<ESC><	Auto Bidirectional Printing "OFF"

### Program Mode Commands

<ESC><SO>	Shift to Program Mode
<ESC>#	Enter Secondary Mode
<ESC><SI>	Return to Normal Mode
<ESC>ae	Enable Twintellect Download Table
<ESC>ad	Disable Twintellect Download Table
<ESC>a	Download or Modify Twintellect Table

## Printer Commands

<BEL> Bell  
<ESC>X Force Execution

## Sheet Feeder Commands

<ESC>i Sheet Insert from Tray One  
<ESC>e Sheet Eject

## Test Commands

<ESC><SUB><SO> Terminal Self-Test  
<ESC>@T Enter User Test Mode  
<STX> Perform User Test Once  
<SOH> Perform User Test Continuously  
<ENQ> Halt Continuous User Test  
<ESC><SI> Return to Normal Mode

## Supported Qume Commands

The Qume commands which are supported by the printer are described on the following pages. If you have files that already contain Qume commands, you need not make any changes to these files before sending them to the SmartWriter. Any Qume commands that are not supported by the printer will be absorbed and will not interrupt printing.

## Single Character Commands

The following commands require only a single character or keystroke in order to access the various features.

- BACKSPACE (<BS>) moves the current position one print position in the opposite direction of printing.
- CARRIAGE RETURN (<CR>) moves the current position to the Left Margin.

- **FORM FEED (<FF>)** ejects the current page from the printer.
- **HORIZONTAL TAB (<HT>)** moves the current position to the next horizontal tab stop.
- **VERTICAL TAB (<VT>)** moves the current position to the next vertical tab stop.
- **LINE FEED (<LF>)** moves the current position down one line without affecting the horizontal position.
- **SPACE (<SP>)** moves the current position one print position in the direction of printing.

### **<BS> BACKSPACE**

This command will cause a backward (usually) movement of one column width. The column width depends on the current pitch (10, 12, or 15) and the current setting of the Horizontal Motion Index. If Backward Print is "ON," the Backspace movement will actually be forward.

### **<CR> CARRIAGE RETURN**

Sending this command causes the print position to move all the way to the Left Margin. The command terminates both Graphics Modes and Backward Printing.

This command also affects or is affected by the following commands:

- |                      |   |
|----------------------|---|
| Auto Line Feed "ON"  | May get a <LF> depending upon this setting. |
| Right Margin Setting | Reaching Right Margin generates a <CR>.     |
| Underscoring "ON"    | Terminated by <CR>.                         |

**<FF> FORM FEED**

This command will cause the current print page to be ejected from the printer so that printing may begin on the next page. The print position will be at the Top and Left Margin of the new page. Issuing a Form Feed command will terminate Underscore Mode if it is "ON".

**<HT> HORIZONTAL TAB**

This command will cause the print position to move to the first set tab stop to the right. If no tabs have been set, the print position will move to the right edge of the page. If tabs were set but none were set beyond the current print position, a tab command will cause the print position to move to the leftmost tab stop in addition to an automatic Line Feed.

**<VT> VERTICAL TAB**

This command will cause the print position to move to the first set tab stop down the page. If no vertical tab stops have been set, the print position will move to the next top-of-form.

**<LF> LINE FEED**

This command moves the print position down one Line Space. The actual distance of the Line Space is established by setting the Vertical Motion Index or the Alternate Vertical Motion Index. The Line Spacing will also be affected if Graphics Mode is "ON". Line Spacing will then be either 1/60 inch or 1/120 inch. If Underscore Mode is "ON", the Line Feed command will turn it "OFF".

## **<SP> SPACE**

Using the Space Command will move the print position one column width, usually, to the right. The width of the column will depend on the current pitch (10, 12, or 15), the Horizontal Motion Index or its Alternate command, the Right Margin setting and Graphics Mode "ON" (1/60 inch or 1/120 inch). If Backward Printing is "ON", a Space command will actually cause the print position to move one column width to the left.

## **Formatting Commands**

The Formatting Commands are used to define the parameters of printed material on a page. Be sure to consider the current paper size and page orientation when you establish these parameters.

- SET TOP MARGIN
- SET BOTTOM MARGIN
- SET LEFT MARGIN
- SET RIGHT MARGIN
- VERTICAL MOTION INDEX is used to establish the line spacing value.
- ALTERNATE VERTICAL MOTION INDEX provides an alternate method of establishing the line spacing value.
- HORIZONTAL MOTION INDEX is used to establish the character spacing.
- ALTERNATE HORIZONTAL MOTION INDEX provides an alternate method of establishing the character spacing value.
- SET HORIZONTAL TAB STOP

- TAB SET LIST allows you to set all horizontal tabs with one command.
- CLEAR INDIVIDUAL TAB STOP clears the tab at the current position.
- CLEAR ALL HORIZONTAL TAB STOPS

#### **<ESC>+ SET TOP MARGIN**

Use this **<ESC>+ (plus sign)** command to set the Top Margin anywhere within the page length except below the Bottom Margin or the bottom edge of the page. Use Line Feed commands until the desired Top Margin is reached and then issue the Top Margin command. For example, the following sequence of commands would establish a top margin four lines from the top of the page:

**<LF><LF><LF><LF><ESC>+**

The actual physical distance represented by a **<LF>** command depends on the Vertical Motion Index or the lines per inch selected in Group Q Option 3. Once set, all subsequent pages will begin at this Top Margin until the value is changed. The default Top Margin is the Top-of-Form.

The Top Margin may also be set by using the keypad to configure Group 4 Options 9, A, B, and C. Refer to Section 6 for details of these Options.

#### **<ESC>- SET BOTTOM MARGIN**

Use this **<ESC>- (minus sign)** command to set the Bottom Margin anywhere within the Form Length except above the Top Margin or below the bottom edge of the page. Send Line Feed commands until the desired line is reached and then issue the Set Bottom Margin command. The actual physical distance represented by each **<LF>** command depends on the Vertical Motion

**Index or the lines per inch selected in Group Q Option 3.** This Bottom Margin will remain in effect for all subsequent pages until you change it or send a Reset/Restore command. The default is the bottom of the form as defined by the Form Length command or the last line on the page depending on your current paper size.

The Bottom Margin may also be set by using the keypad to configure Group 4 Options D, E, and F. Refer to Section 6 for details of these Options.

### **<ESC>9 SET LEFT MARGIN**

This command is used to set the Left Margin. Space over to the desired column using the required number of <SP> commands and issue the Set Left Margin command. For example, the following sequence of commands will establish the Left Margin at the fourth column from the left edge of the page:

**<SP><SP><SP><SP><ESC>9**

A subsequent Carriage Return will position you at the specified Left Margin. A Backspace, however, can be used to move outside the Left Margin if desired. The actual physical distance represented by a <SP> command depends on the Horizontal Motion Index or by the character spacing selected in Group Q Options 1 and 2.

If a second Left Margin is set, it will be relative to the first Left Margin setting, i.e., the second value is added to first value. A Reset/Restore command will return the Left Margin setting to column 0.

The Left Margin may also be set by using the keypad to configure Group 4 Options 1, 2, 3, and 4. Refer to Section 6 for details of these Options.

## **<ESC>0 SET RIGHT MARGIN**

The Right Margin setting is measured from the left edge of the page. Issue the required number of <SP> commands to reach the desired Right Margin and issue the <ESC>0 command. The physical distance represented by each <SP> command depends on the Horizontal Motion Index or the character spacing selected in Group Q Options 1 and 2. For example, if the Horizontal Motion Index is set for 10 characters per inch and the page orientation is portrait, issuing 80 <SP> commands and the <ESC>0 command would set a Right Margin of one-half inch.

The default Right Margin is the right-most print column of the page depending on the current paper size.

The Right Margin may also be set by using the keypad to configure Group 4 Options 5, 6, 7, and 8. Refer to Section 6 for details of these Options.

## **<ESC>Ln<sub>1</sub>n<sub>2</sub> VERTICAL MOTION INDEX**

This command (also known as VMI) sets the number of lines per inch (lpi) which the printer will print. Lines are spaced in increments of 1/48 inch. The valid range of values for the VMI is 1-159 (48 lpi - .3 lpi). In the command above, "n<sub>1</sub>" represents the "tens" digit of the VMI values below 100. For VMI values above 100, n<sub>1</sub> will be a letter from the table below. For all VMI values, n<sub>2</sub> is always the units digit (0-9).

VMI	n <sub>1</sub>	n <sub>2</sub>
100-109	A	0-9
110-119	B	0-9
120-129	C	0-9
130-139	D	0-9
140-149	E	0-9
150-159	F	0-9

For example, 4 lpi means that there will be a line of text every 1/4 inch or, in other words, every 12/48 inch. Therefore, the command to establish a line spacing of 4 lpi would be <ESC>L12. The command to establish line spacing of 1 line every 3 inches (144/48 inch or .33 lpi) would be <ESC>LE4.

Some common settings for VMI are <ESC>L12 (4 LPI), <ESC>L08 (6 LPI), and <ESC>L06 (8 LPI). Vertical line spacing of 6 LPI or 8 LPI may also be set by using the keypad to configure Group Q Option 3.

Invalid parameters are ignored. Zero digits MUST be entered, i.e., both  $n_1$  and  $n_2$  must have values entered whether the number is "6" (<ESC>L06) or "130" (<ESC>LD0).

#### **<ESC><RS><n>** ALTERNATE VMI

This command is an alternate method of establishing Line Spacing. Use the formula below to find a value for VMI (lpi refers to the desired lines per inch):

$$\text{VMI} = (48 \div \text{lpi}) + 1$$

Enter the VMI value as a Hex, Decimal, or Octal value (depending on your system) for "n" in the command above. For example, if you wish to establish a line spacing of 4 lpi, the VMI value would be 13 ( $48 \div 4 + 1$ ) and the command would be <ESC><RS><CR> (<CR> is the ASCII character equivalent to decimal 13).

The most common settings of the VMI are:

- 4 lpi <ESC><RS><CR>
- 6 lpi <ESC><RS><HT>
- 8 lpi <ESC><RS><BEL>

## **<ESC>E<sub>n<sub>1</sub>n<sub>2</sub></sub> HORIZONTAL MOTION INDEX**

This command (also known as HMI) sets the number of characters per inch (cpi) which the printer will print. Characters are spaced in increments of 1/120 inch. The valid range of values for the HMI is 1-159 (120 cpi - .75 cpi). In the command above, "n<sub>1</sub>" represents the "tens" digit of the HMI values below 100. For HMI values above 100, n<sub>1</sub> will be a letter from the table below. For all HMI values, n<sub>2</sub> is always the units digit (0-9).

HMI	n <sub>1</sub>	n <sub>2</sub>
100-109	A	0-9
110-119	B	0-9
120-129	C	0-9
130-139	D	0-9
140-149	E	0-9
150-159	F	0-9

For example, 10 cpi means that there will be a character every 12/120 inch. Therefore, the command to establish character spacing of 10 cpi would be <ESC>E12. The command for 1 cpi (1 inch column width) would be <ESC>EC0.

Some common settings for HMI are:

<ESC>E08 15 cpi  
<ESC>E09 13 cpi  
<ESC>E10 12 cpi  
<ESC>E11 11 cpi  
<ESC>E12 10 cpi

Invalid parameters are ignored. Zero digits MUST be entered, i.e., both n<sub>1</sub> and n<sub>2</sub> must have values entered whether the HMI value is "9" (<ESC>E09) or "120" (<ESC>EC0). Character spacing of 10 cpi, 12 cpi, or 15 cpi may also be set by using the keypad to configure Group Q Options 1 and 2.

## **<ESC><US><n> ALTERNATE HMI**

This command is an alternate method of establishing Character Spacing. Use the following formula to arrive

at a value for HMI (cpi in the command refers to the desired characters per inch):

$$\text{HMI} = (120 \div \text{cpi}) + 1$$

Enter the value for HMI as a Hex, Decimal, or Octal value in place of "n" in the command above. For example, to establish character spacing of 10 cpi, the HMI value would be 13 ( $\text{HMI} = 120 \div 10 + 1$ ) and the command would be `<ESC><US> <CR>` (`<CR>` is the ASCII character equivalent to decimal 13).

The most common settings of the HMI are:

15 cpi `<ESC><US><HT>`  
13 cpi `<ESC><US><LF>`  
12 cpi `<ESC><US><VT>`  
11 cpi `<ESC><US><FF>`  
10 cpi `<ESC><US><CR>`  
5 cpi `<ESC><US><EM>`

#### **`<ESC>1` SET HORIZONTAL TAB STOP**

This command may be used to set individual tab stops by issuing the required number of Space commands to the position of the desired tab stop and then issuing the tab command. The number of tab stops on a physical page will depend upon the current pitch as follows:

10 pitch = 132 tab stops or columns  
12 pitch = 154 tab stops or columns  
15 pitch = 198 tab stops or columns

Once set, tab stops are absolute and changing pitch without readjusting tab stop locations will cause undesired results. In other words, since pitch determines column width, a tab stop at column 10 would be located in three different places on the page depending on a pitch of 10, 12 or 15.

## **<ESC>( TAB SET LIST**

This command allows you to set all tabs with one command. Each column where a tab is desired is represented by a two-digit ASCII value. Up to 159 Tabs may be set. Values from 1-99 are represented as 01-99. Values from 100-159 are represented as follows:

Left two digits	Right digit
A = 10	
B = 11	
C = 12	0-9
D = 13	For all
E = 14	
F = 15	

Each two-digit ASCII value must be separated with a comma, and the command must be terminated with a period. The actual command syntax is:

**<ESC>(n<sub>1</sub>,n<sub>2</sub>,...n<sub>159</sub>.**

For example, **<ESC>(05,25,B0.** would establish tab stops at positions 5, 25, and 110. Since each ASCII value is unique, tabs may be set in any order.

## **<ESC>) TAB CLEAR LIST**

This command may be used to clear up to 159 tabs using one command. The format and rules are the same as for the Tab Set List, above.

## **<ESC>8 CLEAR INDIVIDUAL TAB STOPS**

This command will clear the Tab at the current print position. Remember, changing pitch will cause a Tab setting to "shift" location on the page.

**<ESC>2**

## **CLEAR ALL HORIZONTAL TAB STOPS**

This command will clear all Horizontal Tab stops without having to identify the particular column numbers. Both Reset/Restore commands and a power ON/OFF cycle will also clear all Tab stops.

## **Print Position Commands**

Use the following commands in order to locate printed material in the desired area anywhere on the page.

- **BACKSPACE 1/120"** moves the current position 1/120 inch in the opposite direction of printing.
- **ABSOLUTE HORIZONTAL TAB TO COLUMN** moves the current position to a specific column number.
- **ALTERNATE ABSOLUTE HORIZONTAL TAB TO COLUMN** provides an alternate method of moving to a specific column.
- **ABSOLUTE VERTICAL TAB TO LINE** moves the current position down a specific number of lines.
- **ALTERNATE ABSOLUTE VERTICAL TAB** provides an alternate method of moving down a specific number of lines.
- **NEGATIVE LINE FEED** moves the current position to the previous line without affecting the horizontal position.
- **NEGATIVE HALF LINE FEED** moves the current position halfway to the previous line without affecting the horizontal position.
- **POSITIVE HALF LINE FEED** moves the current position halfway to the next line.

- **RELATIVE HORIZONTAL MOTION** allows you to move the current position in any horizontal direction.
- **RELATIVE VERTICAL MOTION** allows you to move the current position in any vertical direction.
- **AUTOMATIC LINE FEED "ON"** causes the printer to execute a line feed whenever a carriage return (<CR>) is received.
- **AUTOMATIC LINE FEED "OFF"** disables the AUTOMATIC LINE FEED.
- **BACKWARD PRINTING** causes the printer to print from right to left.

**<ESC><BS> BACKSPACE 1/120"**

This command causes a backward (usually) movement of 1/120 inch. If Backward Printing is "ON", the movement will actually be forward or to the right.

**<ESC>C<sub>n<sub>1</sub></sub>n<sub>2</sub> ABSOLUTE HORIZONTAL TAB TO COLUMN**

This command moves the print position to a specific column using a two-digit ASCII value to represent the column number. For columns 1-99, use 01-99. For columns 100-159, use the following to determine the ASCII value:

n <sub>1</sub> (Left two digits)	n <sub>2</sub> (Right digit)
A = 10	
B = 11	
C = 12	
D = 13	
E = 14	
F = 15	
	0-9
	For all (A - F)

**<ESC><HT>*n***

### **ALTERNATE ABSOLUTE HORIZONTAL TAB**

This command moves the print position to a specific column (within the first 125 columns) using a single ASCII value (*n*) to determine the movement.

To arrive at a value for *n* in the command above, use this formula:

$$n = x + 1$$

*x* = Decimal value (from Appendix B) representing the column to which the print position will move.

The range of valid values for *x* is 1 to 125.

For example, moving the print position to column 96 would require issuing this command: **<ESC><HT>a**. To arrive at "a" as a value for *n* in the command, you would add 1 to 96 (the column where the print position will move to) and then locate 97 in the "Decimal" column of the ASCII CONVERSION TABLE in Appendix B. The decimal value 97 represents the lowercase "a" character. This "a" can then be substituted for *n* in the Alternate Absolute Horizontal Tab command.

**<ESC>P*n*<sub>1</sub>*n*<sub>2</sub>**

### **ABSOLUTE VERTICAL TAB TO A LINE**

This command slews or skips down a specified number of lines (from 00 to 127) in one movement. The values 0-127 are represented by two-digit ASCII values.

Values from 1-99 are represented as 1-99. For example, if you wish to skip down 85 Line Spaces, the command is <ESC>P85. Values from 100-127 are represented as follows:

Left two digits	Right digit
A = 10	0-9
B = 11	For all (A - D)
C = 12	
D = 13	

For example, a skip of 113 Line Spaces would require an <ESC>PB3. The maximum number of line skips (127) would require the command <ESC>PC7.

This command is affected by the Top Margin, Bottom Margin, Form Length, and Vertical Motion Index commands.

#### **<ESC><VT><n>** ALTERNATE ABSOLUTE VERTICAL TAB

This is an alternate command to the one above. It allows you to skip down a specified number of lines using one two-digit ASCII value. Values may be from 0-125. Determine the number of lines to skip and then locate this number in the Decimal column of the ASCII Conversion Table in Appendix B at the back of this manual. Use the appropriate Hex, Decimal, etc., equivalent that is required by your system.

This command is affected by the same commands as the above.

#### **Examples:**

- <ESC><VT><DC1> Tab down 17 lines.
- <ESC><VT><US> Tab down 31 lines.

### **<ESC><LF> NEGATIVE LINE FEED**

A Negative Line Feed command will cause the print position to return to the previous line. The actual backward distance will depend on the setting of the Line Spacing value i.e.,  $1/48 - 159/48$ .

### **<ESC>D NEGATIVE 1/2 LINE FEED**

This command will cause the print position to go back  $1/2$  of the Line Spacing value as set in the Vertical Motion Index. If the value is an odd number, such as  $9/48$ , the distance will be rounded down to the nearest  $1/48$  inch.

### **<ESC>U POSITIVE 1/2 LINE FEED**

The positive  $1/2$  Line Feed command will cause the print position to move forward  $1/2$  the Line Spacing value as determined by the setting of the Vertical Motion Index. Again, an odd number will be rounded down to the nearest  $1/48$  inch.

### **<ESC>H $n_1n_2n_3$ RELATIVE HORIZONTAL MOTION**

This command allows the print position to be moved  $1/120$  inch to  $1584/120$  inch, either left or right, of the current position. The values in  $n_1$ ,  $n_2$  and  $n_3$  indicate how far and in which direction the print position is to be moved. Determine how many  $1/120$ th inches you wish to move and if the move is to be left or right of the current position.

Use Table 11.1 to find the values for  $n_1$ ,  $n_2$ , and  $n_3$  in the following example.

To move 3 inches to the right =  $360/120$  inch

Take the highest value from the "1st Character" chart (below) that can be subtracted from 360 for the " $n_1$ " value. ( $360-256 = 104$ ,  $256 = A$  because movement is to the right,  $n_1 = A$ )

Take the highest value in the "2nd Character" chart that can be subtracted from the above remainder. ( $104 - 96 = 8$ ,  $96 = F = n_2$ )

Take the highest value in the "3rd Character" chart that can be subtracted from the above remainder. ( $8 - 8 = 0$ ,  $8 = H = n_3$ )

Therefore, the command to move 3 inches to the right would be `<ESC>HAFH`. Values must be given for  $n_1$ ,  $n_2$  and  $n_3$  even if the second and third values are zeroes.

n <sub>1</sub>		
DISTANCE	RIGHT/BELOW	LEFT/ABOVE
0	@	P
256	A	Q
512	B	R
768	C	S
1024	D	T
1280	E	U
1536	F	V

n <sub>2</sub>	
DISTANCE	
0	@
16	A
31	B
48	C
64	D
80	E
96	F
112	G
128	H
144	I
160	J
176	K
192	L
208	M
224	N
240	O

n <sub>3</sub>	
DISTANCE	
0	@
1	A
2	B
3	C
4	D
5	D
6	F
7	G
8	H
9	I
10	J
11	K
12	L
13	M
14	N
15	O

Table 11.1. Values for Relative Horizontal Motion Command

## **<ESC>V $n_1n_2n_3$ RELATIVE VERTICAL MOTION**

This command allows the print position to be moved 1/48 inch to 1791/48 inch, either above or below, the current position. The values in  $n_1$ ,  $n_2$  and  $n_3$  indicate how far and in which direction the print position is to be moved. Determine how many 1/48th inches you wish to move and if the move is to be above or below the current position.

Determine the values for  $n_1$ ,  $n_2$  and  $n_3$  in the same manner as for "Relative Horizontal Motion" using the three charts on the previous page.

## **<ESC>, AUTOMATIC LINE FEED "ON"**

This command is used if you want an Automatic Line Feed whenever a Carriage Return is executed. This function may also be set by using the keypad to configure Group Q Option 4.

## **<ESC>. AUTOMATIC LINE FEED "OFF"**

This command turns the Automatic Line Feed Mode "OFF". The default for this feature is "OFF". This command does not affect the setting of Group Q Option 4.

## **<ESC>6 BACKWARD PRINTING**

This command reverses the normal print position movement of left-to-right to right-to-left. It also causes the Backspace command to be reversed. Horizontal Tab commands are not affected.

## **<ESC>5 BACKWARD PRINTING "OFF"**

This command causes Backward Printing Mode to be terminated. A Carriage Return command will also return printing to forward motion.

**<ESC>W AUTO CARRIAGE RETURN/LINE  
FEED ON**

This command causes an automatic carriage return and line feed whenever printing reaches the right margin. This movement is ignored when the printer is in Graphics Mode. The Auto Carriage/Line Feed may also be set by using the keypad to configure Group Q Option 5.

**<ESC>Z AUTO CARRIAGE RETURN/LINE  
FEED OFF**

This command turns off the automatic carriage return and line feed (<ESC>W). The setting of Group Q Option 5 will not be affected by this command.

## Print Quality Commands

The commands explained in this section cause the quality or characteristics of printing to be altered.

- WPS "ON" implements proportional character spacing.
- WPS "OFF" disables proportional character spacing.
- UNDERSCORE MODE "ON"
- UNDERSCORE MODE "OFF"
- BOLD OVERPRINT "ON"
- BOLD OVERPRINT "OFF"
- SHADOW PRINT "ON"
- SHADOW PRINT "OFF"
- NO ESCAPEMENT/PRINT POSITION MOVE allows two different characters to be printed in the same position.

**<ESC>\$ WPS "ON"**

This command implements Proportional Character Spacing. That means that each character is assigned a print space (in 1/120th inch increments) according to the width of the character. Wide characters such as "w" or "m" are allotted more space than narrow characters such as "l" or "i." Proportional spacing may also be enabled by using the keypad to configure Group Q Options 1 and 2.

**<ESC>% WPS "OFF"**

This command terminates WPS Mode. Positioning returns to fixed character spacing. The settings of Group Q Options 1 and 2 are not affected by this command.

**Examples:**

Proportional spacing takes effect after the <ESC>\$. Proportionally spaced characters are closer together than fixed spaced characters. This may or may not be the appearance you desire.

The proportional spacing has been turned off for this sentence.

**<ESC>I UNDERSCORE MODE "ON"**

This command will cause Underscoring of characters, words, phrases, sentences or whole paragraphs beginning at the point where this command is received. Underscore Mode continues for subsequent lines until it is terminated by the Underscore Mode "OFF" command

described next. Spaces which have been Tabbed over will be Underscored.

**<ESC>J UNDERSCORE MODE "OFF"**

This command causes the Underscore Mode to be turned "OFF".

**<ESC>Kn BOLD OVERPRINT "ON"**

The Bold Overprint command will cause each character that follows to be printed a second time after a 1 dot move Vertically. The Qume values from 1 to 4 (n) for this parameter will actually only cause each character to be printed twice. The character will appear to be darker or bolder. Bold Overprint will continue until it is turned "OFF" using the command below.

**<ESC>M BOLD OVERPRINT "OFF"**

This command turns Bold Overprint "OFF".

**<ESC>Q SHADOW PRINT "ON"**

Shadow Printing causes each character to be printed twice, with the second printing being moved 1 dot Horizontally to the right of the first printing. If WPS Mode is "ON", Shadow Print will also be Proportionally Spaced. Shadow Print will cause a line of text to be slightly longer than the same line printed with Shadow Print "OFF". If WPS Mode is "OFF", character widths are slightly reduced to maintain column widths for Tabbing. Bold Overprint Mode may be used with this command to achieve both a Vertical and Horizontal emboldening of the characters.

## **<ESC>R SHADOW PRINT "OFF"**

Shadow Print is terminated by this command.

### **Examples:**

The example below was generated by following input:

```
<ESC>IQume Emulation allows you to
underline,<ESC>J <ESC>Kembolden, <ESC>Mor
print in<ESC>Q"shadow print."<ESC>R
```

Qume Emulation allows you  
to underline, embolden, or  
print in "shadow print."

## **<ESC>N NO ESCAPEMENT/PRINT POSITION MOVE**

This command may be used to print two different characters in the same print position. The command actually causes the print position to remain stationary after printing the character immediately following the command so that a second character may be over-printed on the first. Zeroes with slashes and special symbols may be printed in this manner. This command is affected by Graphics Mode "ON" and "OFF" commands.

### **Example:**

The example below was generated by the following input:

```
EI Ni<ESC>Nn~o    2<ESC>NO/<ESC>NO/
```

```
EI NIÑO        200
```

## Special Printer Features

The ESCape sequence commands in this section allow access to special printer features such as Graphics Mode and Printer Reset Commands.

- TOTAL RESET/RESTORE causes the printer to return to ALL default conditions.
- ALTERNATE TOTAL RESET/RESTORE provides an alternate method of returning the printer to its default conditions.
- NO PRINT "ON" allows commands to be entered but not printed.
- NO PRINT "OFF" causes printing to resume.
- PRINTWHEEL POSITION 002 (and) 004 allows you to access two special character codes which cannot normally be printed.
- GRAPHICS "ON" 1/60" cause the Space and Backspace commands to move the current position 1/60 inch.
- GRAPHICS "ON" 1/120" causes the Space and Backspace space commands to move the current position 1/60 inch.
- GRAPHICS "OFF" disables the above two commands.

### **<ESC><SUB>I TOTAL RESET/RESTORE**

Using this command will cause the printer to be returned to ALL the default conditions. It has the same results as turning the printer "OFF" and then back "ON" except that no data is lost by using the Reset command. Subsequent printing will begin on the next page.

**<ESC><CR>P ALTERNATE TOTAL RESET/RESTORE**

This command may be used as an alternate to the above command. The results are the same. ALL the default conditions are reset.

**<ESC>S NO PRINT "ON"**

This command allows words, such as passwords, to be entered but not printed (masked).

**<ESC>T NO PRINT "OFF"**

This command turns No Print "OFF".

**Example:**

The example below was generated by following input:

`<ESC>S`This won't print.`<ESC>T`This will.

This will.

**<ESC>/ PRINTWHEEL POSITION 002**

The ASCII Character Code provides a unique code for 94 of the 96 characters (21-7E Hex) on the print wheel. Issuing this command allows you to access the character defined by Hex 20 in the current font you are using. (This corresponds to position 002 on a print wheel.) This character may not always be the same character in all fonts.

## **<ESC><SP> PRINTWHEEL POSITION 004**

The ASCII Character Code provides a unique code for 94 of the 96 characters (21-7E Hex) on the print wheel. Issuing this command allows you to access the character defined by Hex 7F in the current font you are using. (This corresponds to position 004 on a print wheel.) This character may not always be the same character in all fonts.

## **<ESC>3 GRAPHICS "ON" - 1/60"**

Graphics Mode commands affect print position movement or spacing. When this Graphics command is used, the Space and Backspace commands move the print position 1/60 inch. Line Feed and Negative Line Feed commands cause the print position to move 1/48 inch and the Automatic Line Feed command is ignored altogether. Any Character Printing command will cause no change in print position after the character is printed.

The Graphics Mode may be terminated by any of the following:

- Graphics Mode "OFF"
- Carriage Return
- Either Reset/Restore Command
- Power the printer OFF/ON

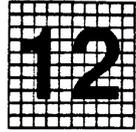
## **<ESC>G GRAPHICS "ON" - 1/120"**

Like the Graphics command above, this command affects the movement and spacing of the print position. The only difference between the two commands is that this command causes the Space and Backspace commands to move the print position 1/120 inch. All other conditions are the same as indicated above.

## **<ESC>4 GRAPHICS "OFF"**

This command may be used to terminate both of the above Graphics Mode "ON" commands.

# Maintenance and Troubleshooting



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## Overview

This Section gives the “why,” “when,” and “how” of basic maintenance that will help your QMS SmartWriter last longer and serve you better. The Troubleshooting portion of this section tells you what to do about possible operating problems, error codes in the Display Window and print quality problems. The last page tells you how to get help for a problem you can’t resolve.

## Objectives

The objectives of this section are 1) to tell you what basic maintenance YOU can do and how to do it; 2) to show you how to clear a paper jam; 3) to explain the error codes that may appear in the Display Window and what to do about them; 4) to explain the contents and importance of a Diagnostic Page; and 5) to explain how print quality problems may be corrected.

## Prerequisite Knowledge

We assume that you are familiar with the major parts of the SmartWriter.

We also assume that you know how to raise the upper half of the printer, open the right side door and remove or insert a Print Cartridge. This information is explained with illustrations in Section 2 and is not repeated here. Refer to the instructions in Section 2 if you need help.

## Key Terms

**Print Cartridge** – A disposable cartridge containing dry toner and a print drum.

**Error Code** – A two character code appearing in the display window of the control panel indicating an error condition in the printer.

**Diagnostic Page** – A page ejected by the printer after an error that lists the problem or problems which caused the printer to stop printing.

**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 image.

**Image** – The representation on the printed page of the data sent to the printer. It is formed of closely placed dots of toner which are placed on the page electrostatically and fused.

## User Maintenance

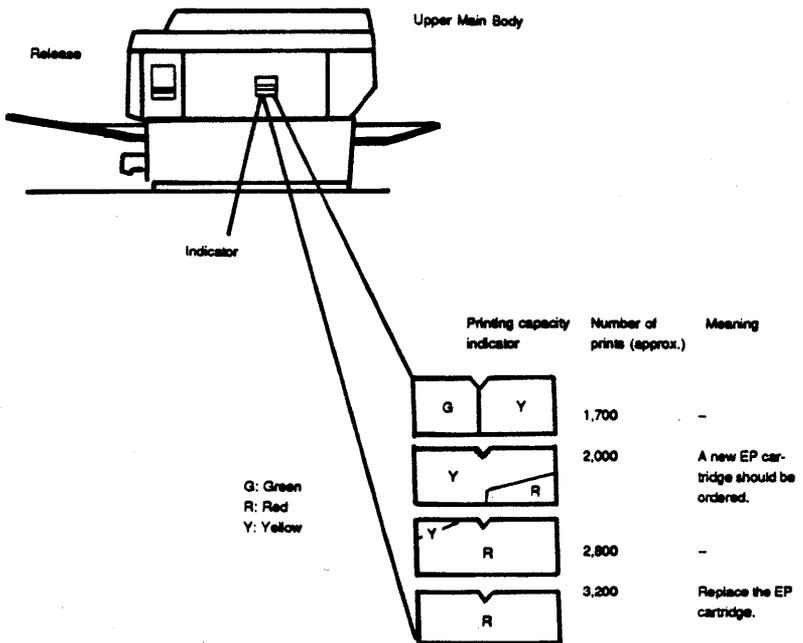
Cleaning and maintaining your SmartWriter will result in clean, crisp printed copies. You can do the basic maintenance tasks yourself. Become familiar with the routine maintenance that helps insure consistent, high-quality printing from your QMS printer.

## Print Cartridge

The QMS SmartWriter uses a dry toner print cartridge. You don't need to measure the toner or worry about spilling it. When the old print cartridge is used up, you remove the whole cartridge and replace it with a new cartridge.

## When to Replace the Print Cartridge

The print cartridge has a color-coded indicator that shows through a window in the right side door of the SmartWriter. This indicator is green on a new cartridge. As the cartridge is used, the color changes from green to yellow to red. When the indicator begins to show red, about 2,000 copies will have been printed. You should order another print cartridge at this time. The print cartridge will be good for about 1,000 more copies. See Figure 12.1 for a comparison of indicator color and number of copies printed.



**Figure 12.1 Cartridge-Life Indicator**

White stripes and faint areas on the printed page mean the toner in the print cartridge is low or that it needs to be redistributed. (See "Print Quality Problems" in the Troubleshooting pages of this section.) If faint areas occur after the color indicator turns red, it is best to replace the existing print cartridge.

## How to Replace the Print Cartridge

1. To access the existing print cartridge, open the right side door of the QMS SmartWriter as explained in Section 2, "Print Cartridge Installation," Step 1.
2. Remove the old print cartridge and discard it. Hold the cartridge as level as possible in order to avoid spilling toner on you or the surrounding area.
3. Distribute the toner in the new print cartridge by holding it horizontally and rotating it at 45-degree angles several times.
4. Insert the print cartridge and pull the black tab to remove the sealing tapes.
5. For details, cautions and illustrations, see Steps 2, 3, 4, and 5 under "Print Cartridge Installation" in Section 2.
6. Generally, the Fixing Assembly Cleaner needs replacing at this time, too. A new Fixing Assembly Cleaner is included in the print cartridge box. Read "Replacing the Fixing Assembly Cleaner" which follows.

## Fixing Assembly Cleaner

The Fixing Assembly Cleaner is a long plastic stick that has a felt pad along the whole length. This pad is used to keep the Fixing Roller clean. The Fixing Roller should be cleaned when replacing the Fixing Assembly Cleaner. If the printer has been recently used, this area may be hot. Do not burn yourself.

## **Replacing the Fixing Assembly Cleaner**

1. The upper half of the printer must be raised. Lift the green Fixing Assembly Cover using the extended lip on the right front. The existing Cleaner cannot be removed until the green Assembly Cover is raised.
2. The Fixing Assembly Cleaner is in a groove in the Fixing Assembly Cover. It has a green felt-covered extension on the right-hand end of the Fixing Assembly Cover. Grasp this extension and slide it out toward the right. Throw the old Fixing Assembly Cleaner away. The felt which covers the stick will have toner on it so avoid touching it.
3. Follow Steps 1, 2, 3, and 4 for "Fixing Assembly Cleaner Installation" in Section 2.
4. Clean the Fixing Roller as described below.

## **Cleaning the Fixing Roller**

The Fixing Roller is located under the Fixing Assembly Cover. Toner collects across the top of the Roller.

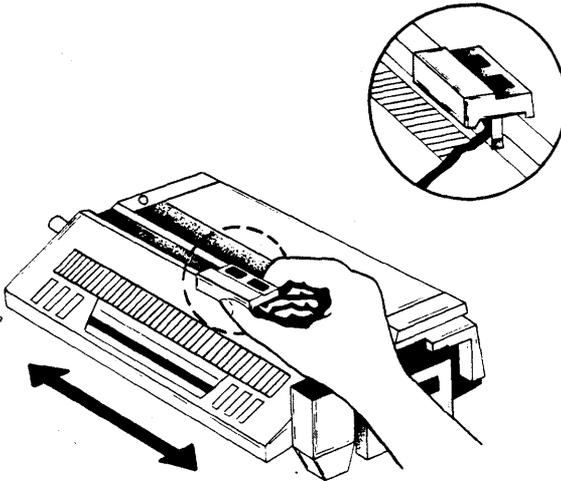
1. Turn the power switch off.
2. Clean the Fixing Roller with a damp (not wet) cloth after the printer has cooled down.
3. Close the Fixing Assembly Cover before lowering the upper half of the SmartWriter.

## **Corona Wires**

There are two wires, the Primary Corona Wire and the Transfer Corona Wire, which require cleaning from time to time.

## Cleaning the Primary Corona Wire

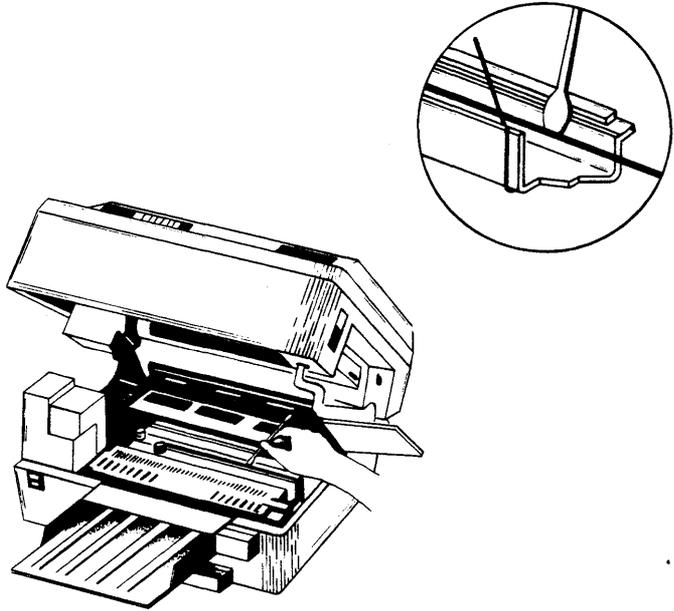
1. Lift up the upper half of the printer , open the right door, and remove the print cartridge. Locate the Wire Cleaner stored inside the printer toward the right front. See Figure 2.6 in Section 2 if you need help.
2. The Primary Corona Wire is located in the top side of the print cartridge and is labeled "Corona Wire." A thin plastic shield protects the wire.
3. Insert the wire cleaner into the long slot of the print cartridge (Figure 12.2). The plastic shield gives way to allow the wire cleaner to reach the Primary Corona Wire inside.
4. Move the wire cleaner back and forth in order to clean the Primary Corona Wire.



**Figure 12.2** Cleaning the Primary Corona Wire

## Cleaning the Transfer Corona Wire

1. The Transfer Corona Wire is located in the lower half of the printer . This very fine wire is hard to see against the chrome background.
2. Use a cotton swab (provided with the print cartridge) to gently clean the Transfer Corona Wire (Figure 12.3). It may be helpful to dip the swab in alcohol if there is a stubborn spot on the wire.
3. After cleaning, close the upper half of the printer .

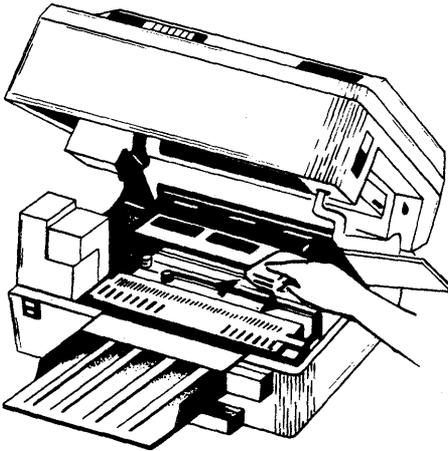


**Figure 12.3** Cleaning the Transfer Corona Wire

## Cleaning the Transfer Guide

The Transfer Guide is the brass-colored area toward the back of the inside of the SmartWriter. Paper dust collects in this area.

1. Raise the Upper Half of the printer.
2. Moisten a cloth and wipe the Transfer Guide clean (Figure 12.4).



**Figure 12.4** Cleaning the Transfer Guide

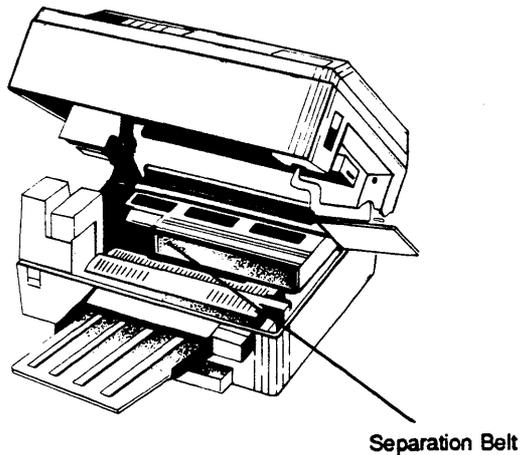
## The Separation Belt

The Separation Belt is a thin plastic strip that has a plastic loop A on one end and a metal loop on the other. This belt helps guide paper through your printer and lasts for about 50,000 pages. It should be cleaned occasionally. Eventually, it will need to be replaced.

### Cleaning the Separation Belt

When a black line appears on the right edge of the printed page, the Separation Belt probably needs to be cleaned.

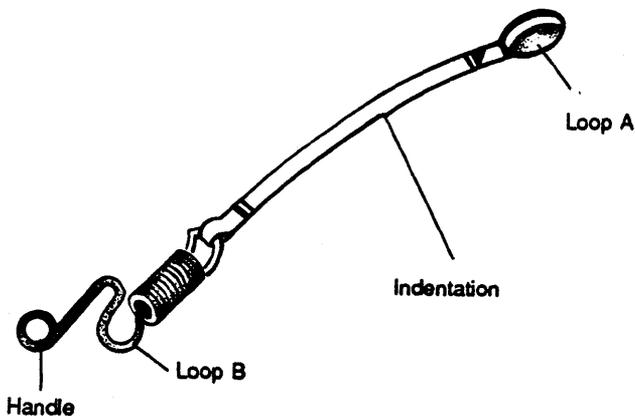
1. Raise the upper half of the printer. Locate the separation belt using Figure 12.5 as a guide.
2. If there is any residue on the belt, clean it with a cotton swab or soft cloth.



**Figure 12.5 The Separation Area**

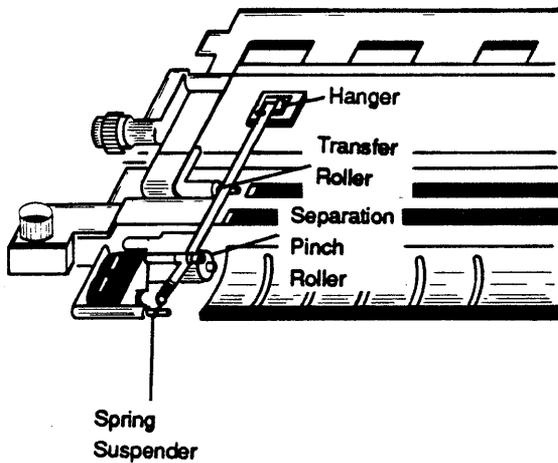
The separation belt helps guide paper through your printer and lasts for about 50,000 pages. If the belt breaks, you can easily replace it as follows:

1. Open Loop A on the separation belt with a screwdriver (Figure 12.6).
2. Remove the old belt by sliding Loop A from its hanger and unhooking Loop B from the spring suspender.
3. Hang Loop A of the new belt from the right side of the upper Transfer Guide (Figure 12.6). The indentation on the belt should be on the right.



**Figure 12.6 The Separation Belt**

4. Pass the separation belt over the transfer roller and under the separation pinch roller (Figure 12.7).
5. Hook Loop B to the underside of the spring suspension side of the spring suspender. That completes the replacement process.



**Figure 12.7 Connections for the Separation Belt**

## Clearing a Paper Jam

Paper in the SmartWriter passes through four main areas (Figure 12.8): (1) the manual feed area, (2) the cassette feed area, (3) the separation/feeder area, and (4) the fixing/delivery area.

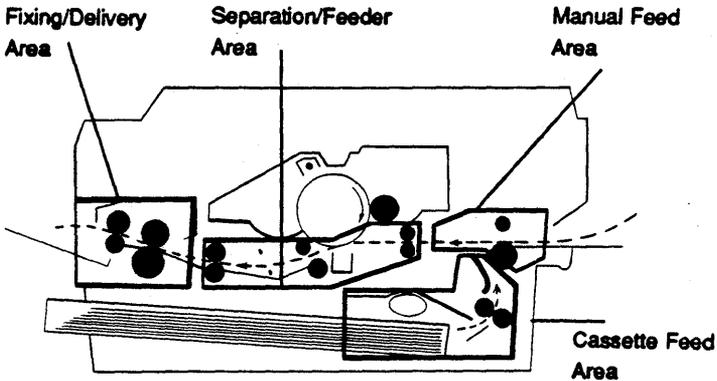
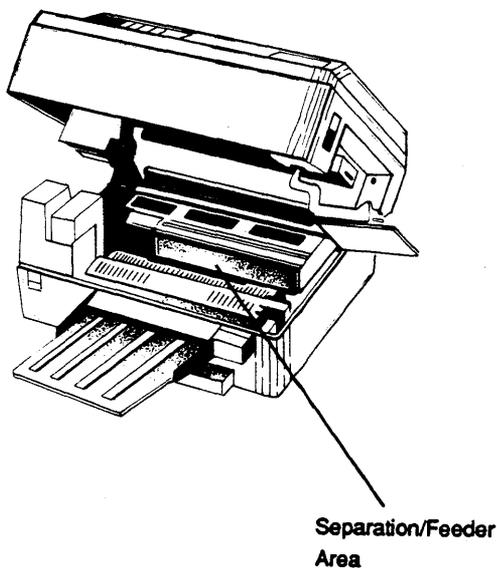


Figure 12.8 Paper Path

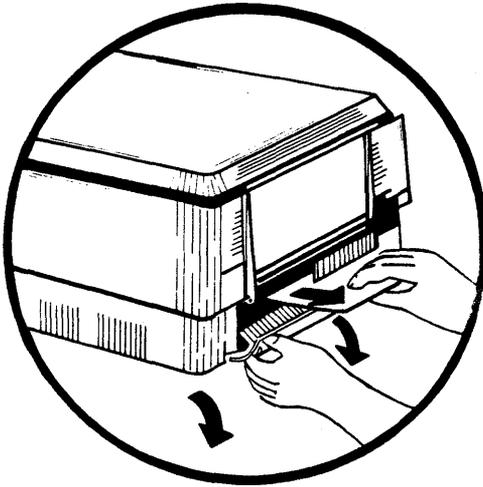
When a paper jam occurs, a **PJ** appears in the printer's display window (see "Error Codes" in this section). Frequent jams in any area indicate that the area should be checked and repaired or cleaned. Clear paper jams as follows:

1. Open the upper half of the printer.
2. Carefully remove any jammed paper from the separation/feeder area (Figure 12.9).



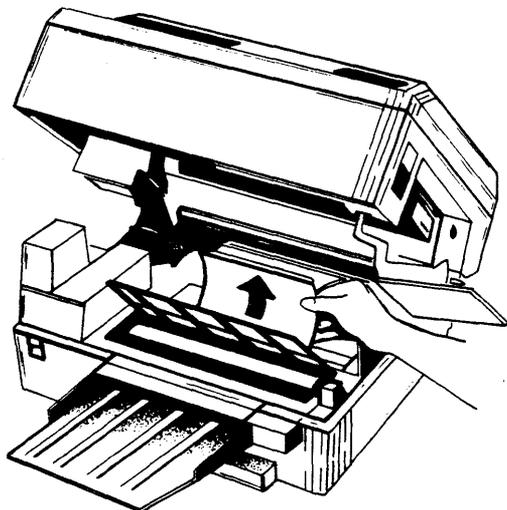
**Figure 12.9 Separation/Feeder Area**

3. Open the rear door (Figure 12.10) and carefully remove any jammed paper there.



**Figure 12.10 Rear Door**

4. If the paper jam has not been cleared, as a last resort check for the jam under the green Fixing Assembly Cover (Figure 12.11). Be careful, it may be hot.



**Figure 12.11 The Fixing Assembly Area**

Close the upper half of the printer after the paper jam is cleared. The page that was being printed when the jam occurred will be reprinted.

## Troubleshooting

The rest of this section deals with the information you will need to determine the cause of and solve the majority of problems normally associated with a printing environment. You will be introduced to the error codes that can potentially appear in the keypad's display window; the diagnostic page that the QMS SmartWriter prints to inform you of problems and oversights; and the general print quality problems that appear from time to time as a natural result of the printing demands you put on your SmartWriter.

### Error Codes

Error codes are two-digit codes that appear in the display window of the printer's keypad. They alert you to a problem as it occurs.

- **CE (Controller Error)** - - alerts you to the fact that an error has occurred to cause the printer's Controller to stop normal functions. Take note of the events that preceded this Controller "halt." Turn the printer Off and back On again. The printer will print a diagnostic page for the error. It is important to keep the diagnostic page in a safe place for future reference. Try the task again that led to the error. If the problem reoccurs, contact your dealer/distributor (see "Placing a Service Call" at the end of this section).
- **CO (Cartridge Out)** - - alerts you to the fact that there is no print cartridge installed in your printer. Refer to "Print Cartridge Installation" in Section 2 for installation instructions.
- **FE (Font Error)** - - alerts you to the fact that there are no fonts available for printing. Turn the printer Off and back On in order to get a diagnostic page for the error. Save the diagnostic page and contact your dealer/distributor (refer to "Placing a Service Call" at the end of this section).

- **IE (Interface Error)** - - alerts you to the fact that there is a problem with the interface protocols (see discussion for Configuration Groups 5, 6, and 7). Check to make sure that the interface characteristics set in your printer match those of the Host (computer, etc.) connected to your SmartWriter.
- **PE (Printer Error)** - - alerts you to the fact that there is some problem in the Print Engine. Contact your dealer/ distributor (refer to “Placing a Service Call” at the end of this section).
- **PJ (Paper Jam)** - - alerts you to the fact that a paper jam has occurred inside your printer. Refer to “Clearing a Paper Jam” in the “User Maintenance” area of this section.
- **PO (Paper Out)** - - alerts you to the fact that there is no paper in the Paper Cassette, or that the Paper Cassette itself is not installed. In either case, refer to Section 3 for instructions if needed. If **MANUAL FEED** is enabled, this error code would mean that there is no sheet on the Manual Feed Tray.

## The Diagnostic Page

The SmartWriter's diagnostic page is intended as both an indicator that a problem exists and an aid to the solution of the existing problem. Below is a list of the current diagnostic numbers which might be printed and the corresponding error indicated by each number.

Diagnostic Messages	
1	Errors were encountered while scanning resident prom.
2	Errors were encountered while scanning cartridge prom.
3	No portrait fonts were observed during system initialization.
4	No landscape fonts were observed during system initialization.
5	An interface error currently exists in the system.
6	The default landscape font was not observed during system initialization.
7	The default portrait font was not observed during system initialization.
8	Download font errors encountered.
9	Download overlay errors encountered.
10	Font download memory exceeded.
11	Invalid cartridge header encountered while scanning cartridge.
12	Incomplete page due to sequence queue overflow.
13	Incomplete page due to maximum sequences exceeded.
14	Maximum number of fonts exceeded.

## **Print Quality Problems**

For each problem listed below, there are normally a series of numbered options to solve it. Try the options in the sequence given and only proceed to the next option if the previous one does not solve the problem.

### **● White or Light Lines**

1. Remove the print cartridge and rotate it as you do before installing a new Cartridge. This re-distributes the toner inside the print cartridge.
2. Replace the print cartridge.
3. Place a service call (see the end of this section).

### **● Light Image (entire page)**

1. Increase the print density by using the Print Density Adjustment Dial on the left side of the SmartWriter (Section 4).
2. Remove the print cartridge and rotate it as you do before installing a new cartridge. This re-distributes the toner inside the print cartridge.
3. If the cartridge indicator is red, replace the cartridge. If it is not red, make sure the sealing tapes are properly removed from the cartridge (Section 3).
4. Place a service call (see the end of this section).

### **● Dark Image (entire page)**

1. Decrease the print density by using the Print Density Adjustment Dial on the left side of the SmartWriter (Section 4).
2. Remove the print cartridge and rotate it as you do before installing a new cartridge. This re-distributes the toner inside the print cartridge.
3. Replace the print cartridge.
4. Place a service call (see the end of this section).

## ● Blank Print

1. Increase the print density by using the Print Density Adjustment Dial on the left side of the printer (Section 4).
2. Remove the print cartridge and rotate it as you do before installing a new cartridge. This redistributes the toner inside the print cartridge.
3. If the cartridge indicator is red, replace the cartridge. If it is not red, make sure the sealing tapes are properly removed from the cartridge (Section 3).
4. Place a service call (see the end of this section).

## ● Black Image (entire page)

1. Remove the print cartridge and rotate it as you do before installing a new cartridge. This redistributes the toner inside the print cartridge.
2. Replace the print cartridge.
3. Place a service call (see the end of this section).

## ● Stain Along Right Edge of Page

1. Clean the separation belt (see "User Maintenance" in this section).
2. Replace the print cartridge.
3. Place a service call (see the end of this section).

## ● Stains On Back of Page

1. Clean the area around the manual paper feed slot at the rear of the printer with a damp cloth. Dry the area.
2. Clean the corona wires and the surrounding area (see "Cleaning the corona wires" in this section). Emphasize cleaning the underside of the print cartridge.

3. Inspect the Fixing Assembly Cleaner. If it is dirty, replace it (see “Replacing the Fixing Assembly Cleaner” in this section).
4. Place a service call (see the end of this section).

● **Dark Vertical Lines** (in direction of paper feed)

1. Inspect the Fixing Assembly Cleaner. If it is dirty, replace it (see “Relacing the Fixing Assembly Cleaner” in this section).
2. Replace the print cartridge.
3. Place a service call (see the end of this section).

● **Sharp Horizontal Black Lines** (across feed direction)

1. Place a service call (see the end of this section).

● **Blurred Horizontal Stripes**

1. Remove the print cartridge and rotate it as you do before installing a new cartridge. This re-distributes the toner inside the print cartridge.
2. Replace the print cartridge.
3. Place a service call (see the end of this section).

● **Blurred Vertical Stripes**

1. Clean the primary corona wire (see “Cleaning the Corona Wires” in this section).
2. Replace the print cartridge.
3. Place a service call (see the end of this section).

● **White Horizontal Shapes on a Black Print**

1. Replace the paper in the printer with dry paper.
2. Place a service call (see the end of this section).

● **White Vertical Lines on a Black Page**

1. Remove the print cartridge and rotate it as you do before installing a new cartridge. This re-distributes the toner inside the print cartridge.
2. If the cartridge indicator is red, replace the cartridge. If it is not red, inspect the Fixing Assembly Cleaner. Replace a dirty Fixing Assembly Cleaner (see "Replacing the Fixing Assembly Cleaner" in this section).
3. Place a service call (see the end of this section).

● **Image Easily Smears When Rubbed**

1. Place a service call (see the end of this section).

## Placing a Service Call

If you have any problems or questions concerning the installation, operation, servicing, etc., of any of our products, please first contact the Service Department of the Distributor from whom you purchased the product or, if there is a separate Service Agent, call them first. If you are not completely satisfied with their response, please do not hesitate to call the QMS office nearest you:

**QMS, Inc.**  
**Customer Technical Support**  
**P.O. Box 81250**  
**Mobile, Alabama 36689**  
**(205)633-4300**

**QMS International**  
**Customer Technical Support**  
**Weberstrasse 85**  
**CH-8400 Winterthur**  
**Switzerland**  
**Telephone: +41 52 28 46 16**

If you have any questions concerning orders, the QMS product line, etc., please call the QMS office nearest you:

**QMS, Inc.**  
**Marketing and Sales**  
**P.O. Box 81250**  
**Mobile, Alabama 36689**  
**(205)633-4300**

**QMS Boston**  
**235 Bear Hill Road**  
**Suite 103**  
**Waltham, MA 02154**  
**(617)890-4590**

**QMS California**  
**18207 E. McDermott**  
**Suite C**  
**Irvine, CA 92714**  
**(714)474-0320**

**QMS International**  
**Herculesplein 263A**  
**3584 AA Utrecht**  
**Netherlands**  
**Telephone: 030 51 80 24**

If you have any questions, suggestion, etc., about this or any other QMS Technical Manual, we want to know about them:

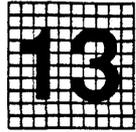
**Manager, Technical Information Services**  
**QMS, Inc.**  
**P.O. Box 81250**  
**Mobile, Alabama 36689**  
**(205)633-4300**



# Printer Specifications

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- **Type:** Desk-top page printer.
- **Printing Method:** Electrophotography (single component-dry process), laser beam scanning.
- **Print Speed (Cassette Feed)** 6.9 legal-size sheets per minute. 8.1 A4, letter, and other size sheets per minute.
- **Optical System:**
  - Laser: Semiconductor laser.
  - Scanning System: rotating six-faced mirror.
  - Scanning Pitch:
    - \* Horizontal – selectable (0-300 dots per inch)
    - \* Vertical – 300 raster lines per inch.
- **Printing System:**
  - Photosensitive Drum: Two-layer structure; conductive base, photoconductive upper layer (OPC).
  - Charging: Corona.
  - Exposure Method: Laser scanning system.
  - Development: Single-component, dry toner Toner Projection Development System.
  - Paper Supply: Manual or Cassette Feed.
  - Image Transfer: Corona transfer.
  - Separation: Fixed belt and roller.
  - Fixing Method: Heated roller (115v, 220v:500w).
  - Toner Supply: Replaceable EP cartridge.

- Paper: Plain paper; cassette feed – 16-21 lb.; manual feed – 11-33 lb.
- Cassette Feed: Maximum paper load – 10mm (.4in) maximum for A4, B5, legal, and letter sizes.
- Manual Feed: Maximum sizes – 100mm (h) X 140mm (v) to 216mm (h) X 356mm (v).
- Tray Capacity: approximately 20 sheets.
- Power Consumption:
  - \* Print Engine:
    - Operating – Max 690W (115V)
    - Standby – Typical average 120W.
- Environment:
  - \* Temperature – 10 to 32.5 degrees Celsius (50 to 90 degrees Fahrenheit)
  - \* Humidity – 20% to 80% RH
  - \* Noise Level – under 55db (A) during printing, under 45db (A) during standby.
  - \* Dimensions –
    - 475mm (w) 285.75mm (h) 533.4mm (d);
    - 18.7in (w) 11.25in (h) 21.0in (d)
  - \* Line Voltage Requirements – 115V, 60Hz; 220V, 50Hz

● **System Memory Requirements:**

- 128K Sequencer que
- 128K Page Memory
- 78.5K Font Download Memory Area
- 8K Input Buffer
- 256K System ROM (192K font storage)

Paper Size	Orient.	ADDRESSABLE AREAS				
		LINES		COLUMNS		
		6 lpi	8 lpi	10 cpi	12 cpi	16.66 cpi
Letter	Port.	66	88	80	96	132
	Land.	51	68	106	127	176
Legal	Port.	84	112	80	96	132
	Land.	51	68	136	163	227
A4	Port.	70	93	77	93	129
	Land.	49	66	112	135	188
B5	Port.	60	93	66	80	111
	Land.	42	57	97	116	162

Paper Size	Orient.	PRINTABLE AREAS				
		LINES		COLUMNS		
		6 lpi	8 lpi	10 cpi	12 cpi	16.66 cpi
Letter	Port.	63	84	80	96	132
	Land.	48	63	106	127	176
Legal	Port.	81	108	80	96	132
	Land.	48	63	136	163	227
A4	Port.	67	89	77	93	129
	Land.	46	61	112	135	188
B5	Port.	57	76	66	80	111
	Land.	39	52	97	116	162

Addressable areas are lines and columns where it is possible to locate the current print position. Printable areas are the lines and columns on the page where it is possible to actually print a character.

## Parallel Interface Cable Specification

The table on the following page describes the parallel interface cable that should be used with the QMS SmartWriter.

### NOTES TO THE 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 effectively prevent noise, these cables should be shielded and connected to the chassis of the system unit and printer, respectively.
- All interface conditions are based on TTL level. Both the rise and fall times of each signal must be less than 0.2 us.
- Data transfer must be carried out by ignoring the ACKNLG or BUSY signal.
- The cable must be of the type with an overall braided shield similar to Belden 8345.
- Connectors must have shielded housings.
- The overall shield must be bonded to the shielded housings at both ends of the cable.

Signal Pin No.	Return Pin No.	Signal	Direction	Description
1	19	*STROBE	In	STROBE pulse to read data in. Pulse width must be more than 100 nsec at receiving terminal. The signal level is normally "high"; read-in of data is performed at the "low" level of this signal.
2	20	DATA 1	In	These signals represent information of the 1st to 8th bits or parallel data respectively. Each signal is at "high" level when data is logical "1" and "low" when data is logical "0".
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	*ACKNLG	Out	Approx. 4 $\mu$ s pulse; "low" indicates that data has been received and the printer is ready to accept other data.
11	29	BUSY	Out	A "high" signal indicates that the printer cannot receive data. The signal becomes "high" in the following cases: 1) Character received that corresponds to setting in S1; 2) FIFO full condition reached; 3) In "offline" state; 4) During printer error status.
12	30	PE	Out	A "high" signal indicates that the printer is out of paper.
13	-	SLCT	Out	This signal indicates that the printer is in the selected state.
14	-	NC	-	Not Used.

Continued on next page.

Signal Pin No.	Return Pin No.	Signal	Direction	Description
15	-	NC	-	Not Used.
16	-	GND	-	Logic GND level.
17	-	CHASSIS GND	-	Printer chassis GND.
18	-	NC	-	Not Used.
19-30	-	GND	-	"Twisted-pair Return" signal; GND level.
31	-	NC	-	Not Used.
32	-	NC	-	Not Used.
33	-	GND	-	Same as with pin numbers 19-30.
34	-	NC	-	Not Used.
35	-	NC	-	Not Used.
36	-	NC	-	Not Used.

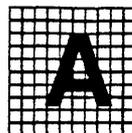
## Serial Interface Cable Specifications

An RS-232C 25-pin cable should be obtained from your dealer. This cable should have the following EIA standard pin arrangement on the end that will connect to your QMS SmartWriter serial interface port:

Pin #	Description
1	Chassis Ground
2	Transmit Data
3	Receive Data
4	Request to Send
6	Data Set Ready
7	Logic Ground
20	Data Terminal Ready



# Appendix A: Font Information



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## What Is A Font?

A QMS SmartWriter font is made up of a complete alphabet including all letters, numerals, and punctuation marks in a particular “style,” “weight,” and “point size.” Each member of a font is called a “character.”

**Style** refers to the design of the characters in the font. Helvetica, Courier, Apollo, and Bookman are examples of font styles. Within each style are many fonts. All of the fonts in any particular style are collectively referred to as a “family.”

**Weight** refers to the thickness of the lines used to draw the characters of a font. The different weights range from “light” (thin) to “medium” (“normal,” what you are reading now) to “bold” (heavy). For convenience, we will include italic and condensed variations of fonts in this weight category. Italic fonts are slanted. Condensed fonts have characters that are spaced very close together and are more elongated than normal.

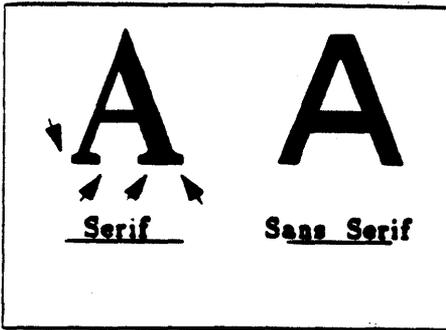
**Point Size** is the measure of the font’s height. The height of a font is the distance from the top of the highest ascender (the top of the b, d, f, h, k, or l) to the bottom of the descender (the part of the g, j, p, q, or y that descends below the baseline of the font) expressed in “points.” “Points” are printer’s points. There are approximately 72 points per inch, so one point is equal to  $1/72$ ”.

To properly identify a font, you must specify its family, weight, and point size.

## Other Characteristics

There are two other important characteristics of fonts that you should know: serifs and character spacing.

**Serifs** are the short or long strokes that project from the main line of the type characters. They are commonly known as the “feet” of the character but are also found on other parts of a character. Serifs can be of varying thicknesses. A sans serif style is a font without serifs.



**Character Spacing** is the amount of space allotted to each character. If a font is “fixed space,” all characters have the same horizontal width – an “i” takes up as much space as an “m.” Consequently, a word containing many thin characters (such as “difference”) may not look proper when printed. We are accustomed to reading “proportional” fonts. A proportional font allots different horizontal space to different characters depending on the character’s width. In a proportional font, an “m” is allotted more horizontal space than the “i.” Proportional spacing is best for printing text. Fixed spacing is convenient for preparing tabular material such as spreadsheets.

The resident fonts in the QMS SmartWriter are designed to be used as both fixed space and proportional fonts. The spacing that the printer will use depends on a command in each emulation mode that turns proportional spacing on or off. The character spacing is under your

control when proportional spacing is turned off. This will be examined in the next section.

## Font Commands

Selecting a font is accomplished through the printer's keypad (see Group C configuration options) or by using the QMS/ANSI command QMSSFO as shown below.

**<ESC>[p1;0s** Selects a portrait orientation font

**<ESC>[p1;1s** Selects a landscape orientation font

In each version, **p1** is the font number to be selected. Refer to Section 7 of this manual for information on how to use this command.

Once you have selected a font there are different operations that you can perform on it in order to fit it into your document.

**Characters Per Inch** or *cpi* commands allow you to change the amount of space allotted to each character in the font. Increasing the *cpi* decreases the space between characters. (NOTE: The *cpi* for Epson fonts 380, 381 and 382 may be changed when using Diablo or Qume Emulation. When used in Epson Emulation Mode, however, the *cpi* of these three fonts cannot be changed. Each Epson font table has its own special *cpi* built into it.)

**Lines Per Inch** or *lpi* commands allow you to change the spacing between lines in your document. Increasing the *lpi* decreases the space between lines.

In Diablo and Qume Emulation Modes, *cpi* is selected with the Horizontal Motion Index (HMI). Use the formula  $HMI = (120 \div cpi) + 1$  to arrive at a value for HMI. Then, enter the decimal equivalent of this HMI value for "n" in the command **<ESC><US><n>**. For example, to adjust *cpi* to 12:

$$\text{HMI} = (120 \div 12) + 1$$
$$\text{HMI} = 11$$

The ASCII character <VT> is equivalent to decimal value 11 (the HMI value) so enter the command <ESC> <US> <VT>. Refer to your computer system or software package documentation for instructions on using ASCII control characters. Also see Appendix B to determine the appropriate values for these control characters.

In Epson Emulation Mode, cpi is selected with the Print Width Commands. With these commands you have a choice of Pica Width (10 cpi), Elite Width (12 cpi), or Compressed Width (17 cpi). Pica Width is the default and is accessed whenever the printer is turned on or whenever the other width commands are disabled.

- <ESC>M Enable Elite Mode (12 cpi)
- <ESC>P Disable Elite, return to Pica Mode (10 cpi)
- <ESC><SI> Enable Compressed Mode (17 cpi)
- <DC2> Disable Compressed, return to Pica Mode (10 cpi)

In Diablo and Qume Emulation Modes, lpi is selected with the Vertical Motion Index (VMI). Use the formula  $\text{VMI} = (48 \div \text{lpi}) + 1$  to arrive at a value for VMI. Then, enter the decimal equivalent of this VMI value for "n" in the command <ESC><RS><n>. For example, to adjust lpi to 4:

$$\text{VMI} = (48 \div 4) + 1$$
$$\text{VMI} = 13$$

The ASCII character <CR> is equivalent to decimal value 13 (the VMI value) so enter the command <ESC> <RS> <CR>. Refer to your computer system or software package documentation for instructions on using ASCII control characters. Also see Appendix B for the appropriate values for these control characters.

In Epson Emulation Mode lpi is selected with the Paper Feed Commands.

- <ESC>0 8 lpi
- <ESC>1 7-dot line spacing (approx. 10 lpi)
- <ESC>2 6 lpi
- <ESC>A Variable lpi

The variable lpi (<ESC>A) allows you to set line spacing to any 1/72" increment (0-85). For example, to set lpi to 9 enter the command <ESC>A8. There is also a much finer variable line spacing command (<ESC>3n) that allows you to set lpi in increments of 1/216". This closes any dot gaps that may occur in Graphics Mode.

## Using Font Width Tables

The font width tables on the following pages provide you with an easy means for locating any character in the font and determining its width. At the top of each column is the first half of the characters' hex values. The second half of the hex values are listed along the left edge of the table. The width in dots for each character is given in the square with the character. Font test pages will print out when the printer is taken off-line and the **TEST** key is depressed.

Font Number 382  
Epson Pica (10 Point, Version 1)00382

	0x	1x	2x	3x	4x	5x	6x	7x
0	A 30	B 28	C 25	D 30	E 30	F 30	G 13	H 28
1	I 30	J 28	K 13	L 20	M 30	N 30	O 30	P 28
2	Q 28	R 30	S 20	T 30	U 30	V 30	W 28	X 28
3	Y 25	Z 30	[ 30	\ 30	^ 30	_ 30	0 28	1 30
4	! 15	" 30	# 30	\$ 30	% 30	& 30	' 28	( 28
5	) 20	* 30	+ 30	= 30	^ 30	U 30	0 30	U 28
6	Z 30	20	30	30	30	30	25	30
7	13	x 30	13	30	g 30	w 30	g 28	w 30
8	z 30	o 30	( 15	30	h 30	x 25	h 28	x 25
9	A 30	U 30	) 15	30	I 20	Y 30	20	Y 30
A	N 28	A 30	" 30	15	J 28	Z 25	J 23	Z 25
B	B 30	0 25	30	15	K 30	[ 20	K 25	[ 22
C	A 30	U 28	18	25	L 30	25	1	13
D	A 30	R 30	30	30	M 30	20	M 30	25
E	A 30	E 30	15	25	N 30	30	N 28	30
F	C 28	U 30	25	30	O 30	- 30	O 30	30

Font Number 10  
EDP Smartwriter

	0x	1x	2x	3x	4x	5x	6x	7x
0	0	0	18	ø 21	@ 21	P 21	' 12	 19
1	0	0	! 12	1 21	A 21	Q 21	 19	 19
2	0	0	" 17	2 21	B 21	R 21	b 19	r 15
3	0	0	# 21	3 21	C 21	S 20	c 19	s 18
4	0	0	\$ 20	4 21	D 21	T 21	d 19	t 16
5	0	0	% 21	5 21	E 20	U 21	e 19	u 18
6	0	0	& 21	6 21	F 20	V 21	f 15	v 20
7	0	0	' 12	7 21	G 21	W 21	g 19	w 21
8	0	0	( 17	8 21	H 21	X 21	h 18	x 20
9	0	0	) 17	9 21	I 16	Y 21	i 10	y 21
A	0	0	* 20	: 12	J 18	Z 21	j 13	z 18
B	0	0	+ 21	; 12	K 21	[ 17	k 18	{ 15
C	0	0	, 12	< 21	L 19	\ 21	l 10	11
D	0	0	- 21	= 21	M 21	] 17	m 21	} 15
E	0	0	. 12	> 21	N 21	^ 21	n 18	~ 21
F	0	0	/ 21	? 20	O 21	- 21	o 20	0

Font Number 10  
EDP Smartwriter

	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
0	0	≠ 21	0	π 21	e 20	π 21	° 15	° 15
1	ˆ 21	ˆ 15	ˆ 15					
2	→ 21	∂ 21	∂ 21	Σ 21	β 21	σ 21	ˆ 2 15	ˆ 2 15
3	† 18	0	Γ 21	Γ 21	γ 21	τ 21	ˆ 3 15	ˆ 3 15
4	↓ 18	0	Δ 21	Τ 21	δ 20	υ 19	ˆ 4 15	ˆ 4 15
5	⊙ 21	0	E 20	ϕ 21	ε 18	ϕ 21	ˆ 5 15	ˆ 5 15
6	□ 20	0	Z 21	X 21	ζ 18	X 21	ˆ 6 15	ˆ 6 15
7	ˆ 21	0	H 21	Ψ 21	η 21	ψ 21	ˆ 7 15	ˆ 7 15
8	ˆ 21	0	Θ 21	Ω 21	θ 21	ω 21	ˆ 8 15	ˆ 8 15
9	† 21	0	I 16	Σ 21	ι 14	ℓ 21	ˆ 9 15	ˆ 9 15
A	ε 21	0	K 21	∇ 21	κ 21	ˆ 12	± 21	+ 21
B	∫ 21	0	Λ 21	( 18	λ 21	√ 21	- 21	- 21
C	∫ 21	0	M 21	) 18	μ 21	{ 18	≅ 21	× 21
D	° 15	0	N 21	[ 17	ν 21	} 18	≅ 21	÷ 21
E	ˆ 21	ε 19	Ξ 21	] 17	ξ 18	ˆ 12	ˆ 21	∞ 21
F	0	12	0 21	f 21	o 20	/ 21	≈ 21	0

Font Number 380  
Epson Compressed Smartwriter

	0x	1x	2x	3x	4x	5x	6x	7x
0	à 17	š 17	17	0 17	é 17	P 17	` 12	p 17
1	è 17	ß 17	! 9	1 17	À 17	Q 17	a 17	q 17
2	ù 17	ƒ 17	" 15	2 17	B 17	R 17	b 17	r 15
3	ó 17	æ 17	# 17	3 17	C 17	S 17	c 17	s 17
4	ì 11	ø 17	\$ 17	4 17	D 17	T 17	d 17	t 16
5	ˆ 12	ø 17	% 17	5 17	E 16	U 17	e 17	u 17
6	£ 17	ˆ 18	& 17	6 17	F 16	V 17	f 16	v 17
7	ı 9	Ä 17	' 12	7 17	G 17	W 17	g 17	w 17
8	ı 17	ö 17	( 16	8 17	H 17	X 17	h 17	x 17
9	ñ 17	ü 17	) 16	9 17	I 9	Y 17	i 9	y 17
A	ñ 17	ä 17	* 17	: 11	J 17	Z 17	j 12	z 17
B	đ 17	ö 17	+ 17	; 12	K 17	[ 16	k 17	{ 16
C	ŕ 17	ü 17	ˆ 12	< 17	L 16	\ 17	l 9	ı 9
D	À 17	É 17	- 17	= 17	M 17	] 16	m 17	} 16
E	á 17	é 17	ˆ 11	> 17	N 17	^ 17	n 17	ˆ 17
F	ç 17	¥ 17	/ 17	? 17	O 17	- 17	o 17	ø 17

Font Number 380  
Epson Compressed Smartwriter

	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
0	à 17	š 17	17	0 17	é 17	P 17	˘ 12	p 17
1	é 17	ß 17	/ 13	1 17	A 17	Q 17	a 17	q 17
2	ù 17	ƒ 17	" 16	2 17	B 17	R 17	b 17	r 17
3	ò 17	z 17	# 17	3 17	C 17	S 17	c 17	s 17
4	ì 10	ø 17	\$ 17	4 17	D 17	T 16	d 17	t 15
5	˙ 12	ø 17	% 17	5 17	E 17	U 17	e 17	u 17
6	£ 17	˘ 15	& 17	6 17	F 17	V 17	f 16	v 17
7	ï 13	Ä 17	' 10	7 17	G 17	W 17	g 17	w 17
8	ˆ 17	ö 17	( 17	8 17	H 17	X 17	h 17	x 17
9	ñ 17	ü 17	) 17	9 17	I 12	Y 17	i 13	y 17
A	ñ 17	ä 17	* 17	: 12	J 17	Z 17	j 17	z 17
B	ä 17	ö 16	+ 17	; 12	K 17	[ 17	k 17	{ 17
C	À 17	ü 17	˙ 11	< 17	L 16	\ 17	l 12	/ 17
D	Á 17	É 17	- 17	= 17	M 17	] 17	m 17	} 17
E	á 16	é 17	˙ 10	> 17	N 17	^ 16	n 17	˘ 17
F	ç 17	¥ 17	/ 17	? 17	O 17	- 17	o 17	ø 17

Font Number 381  
Epson Elite Smartwriter

	0x	1x	2x	3x	4x	5x	6x	7x
0	à 23	á 23	â 20	ã 25	ä 25	å 22	ä 11	å 23
1	è 24	é 24	ê 10	ë 25	ä 25	å 25	ä 23	å 23
2	ù 23	û 25	ü 17	2 25	B 24	R 22	b 23	r 18
3	ó 25	ø 25	¸ 24	3 25	C 25	S 23	c 23	s 23
4	ì 11	í 25	î 25	4 25	D 24	T 24	d 23	t 18
5	í 11	î 25	ï 25	5 25	E 21	U 23	e 24	u 24
6	£ 25	€ 19	& 25	6 25	F 21	V 25	f 19	v 23
7	ì 10	í 23	î 11	7 25	G 25	W 25	g 24	w 25
8	ú 23	û 25	ü 15	8 25	H 23	X 24	h 21	x 20
9	ñ 24	ü 23	) 15	9 25	I 10	Y 24	i 9	y 23
A	ñ 23	ä 23	* 25	: 11	J 20	Z 21	j 14	z 21
B	ó 25	ö 25	+ 25	; 13	K 25	[ 15	k 23	{ 18
C	¸ 25	ü 23	¸ 13	< 23	L 22	\ 22	l 9	l 8
D	À 23	É 21	- 25	= 25	M 25	] 15	m 25	} 18
E	à 23	é 24	· 11	> 23	N 25	^ 19	n 23	~ 22
F	ç 23	¥ 25	/ 22	? 21	O 25	- 25	o 25	ø 25

Font Number 381  
Epson Elite Smartwriter

	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
0	à 25	š 25	20	o 25	@ 25	P 25	` 12	p 25
1	e 25	ß 25	! 15	l 25	A 25	Q 25	a 25	q 25
2	ü 25	Æ 25	" 19	2 25	B 25	R 25	b 25	r 21
3	ö 25	æ 25	# 25	3 25	C 25	S 25	c 24	s 24
4	i 15	ø 25	\$ 25	4 25	D 25	T 25	d 25	t 20
5	· 13	ø 25	% 25	5 25	E 25	U 25	e 25	u 25
6	£ 25	.. 20	& 25	6 25	F 25	V 25	f 23	v 25
7	ı 14	Ä 25	' 12	7 25	G 25	W 25	g 25	w 25
8	ł 22	ö 25	( 21	8 25	H 25	X 25	h 25	x 25
9	ñ 25	ü 25	) 21	9 25	I 16	Y 25	i 15	y 25
A	ñ 25	ä 25	* 25	: 15	J 25	Z 25	j 22	z 25
B	ā 25	ö 24	+ 25	; 16	K 25	[ 25	k 23	{ 22
C	Ā 25	ü 25	, 13	< 25	L 22	\ 20	l 14	/ 24
D	Ā 25	É 25	- 25	= 25	M 25	] 25	m 25	} 22
€	â 25	é 25	· 11	> 25	N 25	^ 21	n 25	~ 22
F	ç 25	¥ 25	/ 22	? 23	O 25	- 25	o 25	ø 25

Font Number 382  
Epson Pica Smartwriter

	0x	1x	2x	3x	4x	5x	6x	7x
0	à 30	š 25	25	ó 30	@ 30	P 30	' 13	p 28
1	é 30	ß 28	! 13	1 20	À 30	Q 30	á 30	q 28
2	ú 28	Æ 30	" 20	2 30	B 30	R 30	b 28	r 28
3	ö 25	æ 30	# 30	3 30	C 30	S 30	c 28	s 30
4	ì 15	ø 30	\$ 30	4 30	D 30	T 30	d 28	t 28
5	í 20	ø 30	% 30	5 30	E 30	U 30	e 30	u 28
6	£ 30	.. 20	& 30	6 30	F 30	V 30	f 25	v 30
7	ï 13	À 30	' 13	7 30	G 30	W 30	g 28	w 30
8	¿ 30	ö 30	( 15	8 30	H 30	X 25	h 28	x 25
9	ñ 30	Ü 30	) 15	9 30	I 20	Y 30	i 20	y 30
A	ñ 28	ä 30	* 30	: 15	J 28	Z 25	j 23	z 25
B	œ 30	ö 25	+ 30	; 15	K 30	[ 20	k 25	{ 23
C	ŕ 30	ü 28	, 18	< 25	L 30	\ 25	l 20	! 13
D	À 30	É 30	- 30	= 30	M 30	] 20	m 30	} 23
E	à 30	é 30	. 15	> 25	N 30	^ 30	n 28	~ 30
F	ç 28	¥ 30	/ 25	? 30	O 30	- 30	o 30	ø 30

Font Number 382  
Epson Pica

	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
0	à 28	ſ 30	25	o 30	@ 30	P 30	13	p 28
1	é 28	ß 28	! 25	1 23	A 30	Q 30	a 28	q 28
2	ü 28	Æ 30	" 25	2 30	B 30	R 30	b 28	r 25
3	ö 28	æ 30	# 30	3 30	C 30	S 30	c 28	s 28
4	ï 20	ø 30	\$ 28	4 30	D 30	T 30	d 30	t 25
5	· 20	ø 28	% 30	5 30	E 30	U 30	e 28	u 28
6	£ 30	.. 23	& 30	6 28	F 30	V 28	f 30	v 25
7	ï 25	Ä 30	' 13	7 30	G 30	W 30	g 28	w 30
8	l 28	ö 30	( 20	8 30	H 30	X 30	h 28	x 30
9	ñ 30	ü 30	) 20	9 28	I 25	Y 30	i 23	y 28
A	ñ 30	ä 28	* 30	: 20	J 30	Z 30	j 25	z 30
B	Q 30	ö 28	+ 30	; 23	K 30	[ 28	k 28	{ 25
C	R 30	ü 30	· 20	< 25	L 25	\ 18	l 23	/ 23
D	À 30	É 30	- 30	= 28	M 30	] 28	m 28	} 25
E	à 28	é 28	· 18	> 23	N 30	^ 25	n 25	~ 30
F	ç 28	¥ 30	/ 25	? 28	O 30	- 30	o 28	ø 30

Font Number 404  
 Q-Typewriter Smartwriter

	0x	1x	2x	3x	4x	5x	6x	7x
0	0	0	20	0 30	@ 30	P 26	' 12	p 28
1	0	0	! 11	1 30	A 30	Q 30	a 29	q 29
2	0	0	" 17	2 30	B 28	R 29	b 30	r 26
3	0	0	# 27	3 30	C 28	S 25	c 27	s 26
4	0	0	\$ 23	4 30	D 30	T 28	d 30	t 25
5	0	0	% 30	5 30	E 27	U 30	e 27	u 30
6	0	0	& 30	6 30	F 27	V 29	f 25	v 30
7	0	0	' 12	7 30	G 30	W 30	g 28	w 30
8	0	0	( 21	8 30	H 30	X 30	h 30	x 30
9	0	0	) 21	9 30	I 24	Y 30	i 26	y 30
A	0	0	* 21	: 12	J 29	Z 25	j 19	z 25
B	0	0	+ 27	; 12	K 30	[ 16	k 30	{ 19
C	0	0	, 12	< 15	L 30	\ 23	l 26	8
D	0	0	- 27	= 27	M 30	] 16	m 30	} 19
E	0	0	· 12	> 15	N 30	^ 23	n 29	~ 22
F	0	0	/ 22	? 26	O 30	- 30	o 25	0

Font Number 404  
Q-Typewriter Smartwriter

	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
0	0	≠ 27	20	Π 30	e 25	π 30	° 16	° 16
1	← 29	∞ 30	A 30	P 27	α 28	ρ 24	¹ 16	¹ 16
2	→ 29	∂ 26	B 29	Σ 28	β 22	σ 28	² 16	² 16
3	↑ 21	0	Γ 28	T 29	γ 28	τ 26	³ 16	³ 16
4	↓ 21	0	Δ 30	Υ 30	δ 23	υ 25	⁴ 16	⁴ 16
5	⊙ 26	0	E 28	Φ 27	ε 23	φ 27	⁵ 16	⁵ 16
6	□ 24	0	Z 26	X 30	ζ 23	χ 25	⁶ 16	⁶ 16
7	∞ 26	0	H 30	Ψ 30	η 28	ψ 28	⁷ 16	⁷ 16
8	¶ 28	0	Θ 30	Ω 30	θ 26	ω 28	⁸ 16	⁸ 16
9	† 26	0	I 25	Σ 28	ι 15	ℓ 26	⁹ 16	⁹ 16
A	£ 29	0	K 30	∇ 30	κ 22	· 12	± 26	+ 26
B	{ 30	0	Δ 30	{ 16	λ 25	√ 29	- 26	- 26
C	} 30	0	M 30	} 16	μ 30	{ 16	≤ 25	× 27
D	° 18	0	N 30	[ 15	ν 26	} 15	≥ 25	÷ 26
E	Å 30	ø 27	Ξ 25	] 15	ξ 25	· 12	~ 22	∞ 30
F	0	15	O 30	∫ 30	ο 26	/ 19	≈ 22	0

Font Number 444  
 Q–Typewriter Italic Smartwriter

	0x	1x	2x	3x	4x	5x	6x	7x
0	0	0	20	0 30	@ 30	P 30	10	p 30
1	0	0	!	1 30	A 30	Q 30	a 29	q 30
2	0	0	"	2 30	B 30	R 30	b 30	r 30
3	0	0	#	3 30	C 30	S 30	c 29	s 29
4	0	0	\$	4 30	D 30	T 28	d 28	t 24
5	0	0	%	5 30	E 30	U 30	e 29	u 27
6	0	0	&	6 30	F 30	V 30	f 30	v 30
7	0	0	'	7 30	G 30	W 30	g 30	w 30
8	0	0	(	8 30	H 30	X 30	h 30	x 30
9	0	0	)	9 30	I 28	Y 30	i 24	Y 30
A	0	0	*	: 15	J 30	Z 30	j 25	z 27
B	0	0	+	; 16	K 30	[ 22	k 30	{ 22
C	0	0	,	< 15	L 30	\ 22	l 23	8
D	0	0	-	= 30	M 30	] 22	m 30	} 21
E	0	0	.	> 15	N 30	^ 22	n 29	~ 24
F	0	0	/	? 26	O 30	- 30	o 26	0

Font Number 444

Q-Typewriter Italic Smartwriter

	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
0	0	≠ 27	20	Π 30	e 25	π 30	° 18	° 18
1	← 30	α 30	A 30	P 27	α 29	ρ 25	² 18	¹ 18
2	→ 30	∂ 27	B 29	Σ 28	β 25	σ 30	² 18	² 18
3	↑ 20	0	Γ 28	T 29	γ 27	τ 23	³ 18	³ 18
4	↓ 20	0	Δ 30	Υ 30	δ 22	υ 26	⁴ 18	⁴ 18
5	◊ 27	0	E 28	Φ 27	ε 21	φ 30	⁵ 18	⁵ 18
6	◻ 25	0	Z 26	X 30	ζ 20	χ 28	⁶ 18	⁶ 18
7	⋯ 24	0	H 30	Ψ 30	η 28	ψ 29	⁷ 18	⁷ 18
8	¶ 29	0	Θ 30	Ω 30	θ 22	ω 29	⁸ 18	⁸ 18
9	† 27	0	I 25	Σ 28	ι 15	ℓ 28	⁹ 18	⁹ 18
A	£ 30	0	K 30	∇ 30	κ 25	· 13	± 27	+ 27
B	[ 30	0	Δ 30	[ 15	λ 25	√ 30	- 25	- 25
C	] 30	0	M 30	] 15	μ 30	{ 15	≤ 25	× 26
D	° 17	0	N 30	[ 14	ν 22	} 14	≥ 25	÷ 25
E	Å 30	∅ 29	Ξ 25	] 14	ξ 24	· 10	~ 21	∞ 30
F	0	15	O 30	ƒ 30	° 24	/ 19	≈ 21	0

Font Number 7224  
 Claiborne Smartwriter

	0x	1x	2x	3x	4x	5x	6x	7x
0	0	0	20	□ 30	@ 30	P 29	' 10	ᵖ 28
1	0	0	! 10	1 30	A 30	Q 30	a 28	q 28
2	0	0	" 20	2 30	B 30	R 29	b 28	r 25
3	0	0	# 30	3 30	C 30	S 30	c 28	s 28
4	0	0	\$ 30	4 30	D 30	T 30	d 28	t 28
5	0	0	% 30	5 30	E 30	U 30	e 29	u 27
6	0	0	& 30	6 30	F 30	V 30	f 23	v 30
7	0	0	' 12	7 30	G 30	W 29	g 28	w 30
8	0	0	( 16	8 30	H 30	X 30	h 28	x 30
9	0	0	) 16	9 30	I 12	Y 30	i 11	y 30
A	0	0	* 23	: 11	J 29	Z 28	j 16	z 27
B	0	0	+ 29	; 12	K 30	[ 16	k 30	{ 19
C	0	0	, 12	< 21	L 29	\ 20	l 11	11
D	0	0	- 29	= 29	M 30	] 16	m 30	} 19
E	0	0	. 11	> 21	N 29	^ 25	n 27	~ 24
F	0	0	/ 20	? 30	□ 30	- 30	□ 28	0

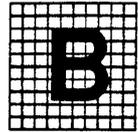
Font Number 7224  
 Claiborne Smartwriter

	8x	9x	Ax	Bx	Cx	Dx	Ex	Fx
0	0	≠ 28	0	Π 30	e 26	π 30	° 19	° 19
1	← 30	α 30	Α 30	Ρ 30	α 30	ρ 27	¹ 19	¹ 19
2	→ 30	∂ 28	Β 30	Σ 29	β 24	σ 30	² 19	² 19
3	↑ 22	0	Γ 28	Τ 30	γ 30	τ 28	³ 19	³ 19
4	↓ 22	0	Δ 30	Υ 30	δ 25	υ 24	⁴ 19	⁴ 19
5	◊ 27	0	Ε 30	Φ 28	ε 23	φ 28	⁵ 19	⁵ 19
6	◻ 27	0	Ζ 29	Χ 30	ζ 25	χ 28	⁶ 19	⁶ 19
7	⋯ 30	0	Η 30	Ψ 30	η 29	ψ 29	⁷ 19	⁷ 19
8	¶ 30	0	Θ 30	Ω 30	θ 28	ω 30	⁸ 19	⁸ 19
9	† 30	0	Ι 23	Σ 30	ι 22	ℓ 28	⁹ 19	⁹ 19
A	£ 30	0	Κ 30	∇ 30	κ 24	· 12	± 28	+ 29
B	┌ 30	0	Λ 30	( 17	λ 28	√ 30	− 28	− 29
C	└ 30	0	Μ 30	) 17	μ 30	{ 17	≤ 25	× 30
D	° 19	0	Ν 29	[ 17	ν 26	} 17	≥ 25	÷ 29
E	À 30	Φ 28	Ξ 26	] 17	ξ 28	· 12	~ 23	∞ 30
F	0	17	Ο 30	ƒ 30	ο 27	/ 23	≈ 23	0



# Appendix B

## Conversion Table



QMS ASCII CONVERSION TABLE												
ASCII	HEX	DECIMAL	OCTAL	BINARY								
				BIT <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>8</td><td>7</td><td>6</td><td>5</td></tr><tr><td>4</td><td>3</td><td>2</td><td>1</td></tr></table>	8	7	6	5	4	3	2	1
8	7	6	5									
4	3	2	1									
NUL	00	0	00	0000 0000								
SOH	01	1	01	0000 0001								
STX	02	2	02	0000 0010								
ETX	03	3	03	0000 0011								
EDT	04	4	04	0000 0100								
ENQ	05	5	05	0000 0101								
ACK	06	6	06	0000 0110								
BEL	07	7	07	0000 0111								
BS	08	8	10	0000 1000								
HT	09	9	11	0000 1001								
LF	0A	10	12	0000 1010								
VT	0B	11	13	0000 1011								
FF	0C	12	14	0000 1100								
CR	0D	13	15	0000 1101								
SO	0E	14	16	0000 1110								
SI	0F	15	17	0000 1111								
DLE	10	16	20	0001 0000								
DC1	11	17	21	0001 0001								
DC2	12	18	22	0001 0010								
DC3	13	19	23	0001 0011								
DC4	14	20	24	0001 0100								
NAK	15	21	25	0001 0101								
SYN	16	22	26	0001 0110								
ETB	17	23	27	0001 0111								
CAN	18	24	30	0001 1000								
EM	19	25	31	0001 1001								
SUB	1A	26	32	0001 1010								
ESC	1B	27	33	0001 1011								
FS	1C	28	34	0001 1100								
GS	1D	29	35	0001 1101								
RS	1E	30	36	0001 1110								
US	1F	31	37	0001 1111								
SP	20	32	40	0010 0000								
!	21	33	41	0010 0001								
"	22	34	42	0010 0010								
#	23	35	43	0010 0011								
\$	24	36	44	0010 0100								
%	25	37	45	0010 0101								
&	26	38	46	0010 0110								
'	27	39	47	0010 0111								
(	28	40	50	0010 1000								
)	29	41	51	0010 1001								
*	2A	42	52	0010 1010								

(Continued on the next page)

## QMS ASCII CONVERSION TABLE

ASCII	HEX	DECIMAL	OCTAL	BINARY
				BIT <span style="border: 1px solid black; padding: 2px;">8765</span> <span style="border: 1px solid black; padding: 2px;">4321</span>
+	2B	43	53	0010 1011
.	2C	44	54	0010 1100
-	2D	45	55	0010 1101
.	2E	46	56	0010 1110
/	2F	47	57	0010 1111
0	30	48	60	0011 0000
1	31	49	61	0011 0001
2	32	50	62	0011 0010
3	33	51	63	0011 0011
4	34	52	64	0011 0100
5	35	53	65	0011 0101
6	36	54	66	0011 0110
7	37	55	67	0011 0111
8	38	56	70	0011 1000
9	39	57	71	0011 1001
:	3A	58	72	0011 1010
;	3B	59	73	0011 1011
<	3C	60	74	0011 1100
=	3D	61	75	0011 1101
>	3E	62	76	0011 1110
?	3F	63	77	0011 1111
⊙	40	64	100	0100 0000
A	41	65	101	0100 0001
B	42	66	102	0100 0010
C	43	67	103	0100 0011
D	44	68	104	0100 0100
E	45	69	105	0100 0101
F	46	70	106	0100 0110
G	47	71	107	0100 0111
H	48	72	110	0100 1000
I	49	73	111	0100 1001
J	4A	74	112	0100 1010
K	4B	75	113	0100 1011
L	4C	76	114	0100 1100
M	4D	77	115	0100 1101
N	4E	78	116	0100 1110
O	4F	79	117	0100 1111
P	50	80	120	0101 0000
Q	51	81	121	0101 0001
R	52	82	122	0101 0010
S	53	83	123	0101 0011
T	54	84	124	0101 0100
U	55	85	125	0101 0101

(Continued on the next page)

QMS ASCII CONVERSION TABLE												
ASCII	HEX	DECIMAL	OCTAL	BINARY								
				Bit <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>8</td><td>7</td><td>6</td><td>5</td></tr></table> <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>4</td><td>3</td><td>2</td><td>1</td></tr></table>	8	7	6	5	4	3	2	1
8	7	6	5									
4	3	2	1									
V	56	86	126	0101 0110								
W	57	87	127	0101 0111								
X	58	88	130	0101 1000								
Y	59	89	131	0101 1001								
Z	5A	90	132	0101 1010								
[	5B	91	133	0101 1011								
BACKSLASH	5C	92	134	0101 1100								
]	5D	93	135	0101 1101								
^	5E	94	136	0101 1110								
~	5F	95	137	0101 1111								
ACCENT	60	96	140	0110 0000								
a	61	97	141	0110 0001								
b	62	98	142	0110 0010								
c	63	99	143	0110 0011								
d	64	100	144	0110 0100								
e	65	101	145	0110 0101								
f	66	102	146	0110 0110								
g	67	103	147	0110 0111								
h	68	104	150	0110 1000								
i	69	105	151	0110 1001								
j	6A	106	152	0110 1010								
k	6B	107	153	0110 1011								
l	6C	108	154	0110 1100								
m	6D	109	155	0110 1101								
n	6E	110	156	0110 1110								
o	6F	111	157	0110 1111								
p	70	112	160	0111 0000								
q	71	113	161	0111 0001								
r	72	114	162	0111 0010								
s	73	115	163	0111 0011								
t	74	116	164	0111 0100								
u	75	117	165	0111 0101								
v	76	118	166	0111 0110								
w	77	119	167	0111 0111								
x	78	120	170	0111 1000								
y	79	121	171	0111 1001								
z	7A	122	172	0111 1010								
{	7B	123	173	0111 1011								
	7C	124	174	0111 1100								
}	7D	125	175	0111 1101								
~	7E	126	176	0111 1110								
DEL	7F	127	177	0111 1111								

(Continued on the next page)

## QMS ASCII CONVERSION TABLE

ASCII*	HEX	DECIMAL	OCTAL	BINARY
				9 8 7 6 5 4 3 2 1
	80	128	200	1000 0000
	81	129	201	1000 0001
	82	130	202	1000 0010
	83	131	203	1000 0011
	84	132	204	1000 0100
	85	133	205	1000 0101
	86	134	206	1000 0110
	87	135	207	1000 0111
	88	136	210	1000 1000
	89	137	211	1000 1001
	8A	138	212	1000 1010
	8B	139	213	1000 1011
	8C	140	214	1000 1100
	8D	141	215	1000 1101
	8E	142	216	1000 1110
	8F	143	217	1000 1111
	90	144	220	1001 0000
	91	145	221	1001 0001
	92	146	222	1001 0010
	93	147	223	1001 0011
	94	148	224	1001 0100
	95	149	225	1001 0101
	96	150	226	1001 0110
	97	151	227	1001 0111
	98	152	230	1001 1000
	99	153	231	1001 1001
	9A	154	232	1001 1010
	9B	155	233	1001 1011
	9C	156	234	1001 1100
	9D	157	235	1001 1101
	9E	158	236	1001 1110
	9F	159	237	1001 1111
	A0	160	240	1010 0000
	A1	161	241	1010 0001
	A2	162	242	1010 0010
	A3	163	243	1010 0011
	A4	164	244	1010 0100
	A5	165	245	1010 0101
	A6	166	246	1010 0110
	A7	167	247	1010 0111
	A8	168	250	1010 1000
	A9	169	251	1010 1001
	AA	170	252	1010 1010

\* The ASCII value varies

(Continued on the next page)

## QMS ASCII CONVERSION TABLE

ASCII*	HEX	DECIMAL	OCTAL	BINARY
				BIT <span style="border: 1px solid black; padding: 2px;">8 7 6 5</span> <span style="border: 1px solid black; padding: 2px;">4 3 2 1</span>
	AB	171	253	1010 1011
	AC	172	254	1010 1100
	AD	173	255	1010 1101
	AE	174	256	1010 1110
	AF	175	257	1010 1111
	B0	176	260	1011 0000
	B1	177	261	1011 0001
	B2	178	262	1011 0010
	B3	179	263	1011 0011
	B4	180	264	1011 0100
	B5	181	265	1011 0101
	B6	182	266	1011 0110
	B7	183	267	1011 0111
	B8	184	270	1011 1000
	B9	185	271	1011 1001
	BA	186	272	1011 1010
	BB	187	273	1011 1011
	BC	188	274	1011 1100
	BD	189	275	1011 1101
	BE	190	276	1011 1110
	BF	191	277	1011 1111
	C0	192	300	1100 0000
	C1	193	301	1100 0001
	C2	194	302	1100 0010
	C3	195	303	1100 0011
	C4	196	304	1100 0100
	C5	197	305	1100 0101
	C6	198	306	1100 0110
	C7	199	307	1100 0111
	C8	200	310	1100 1000
	C9	201	311	1100 1001
	CA	202	312	1100 1010
	CB	203	313	1100 1011
	CC	204	314	1100 1100
	CD	205	315	1100 1101
	CE	206	316	1100 1110
	CF	207	317	1100 1111
	D0	208	320	1101 0000
	D1	209	321	1101 0001
	D2	210	322	1101 0010
	D3	211	323	1101 0011
	D4	212	324	1101 0100
	D5	213	325	1101 0101

\* The ASCII value varies

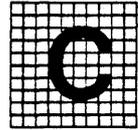
(Continued on the next page)

## QMS ASCII CONVERSION TABLE

ASCII*	HEX	DECIMAL	OCTAL	BINARY
				BIT <span style="border: 1px solid black; padding: 2px;">8</span> <span style="border: 1px solid black; padding: 2px;">7</span> <span style="border: 1px solid black; padding: 2px;">6</span> <span style="border: 1px solid black; padding: 2px;">5</span> <span style="border: 1px solid black; padding: 2px;">4</span> <span style="border: 1px solid black; padding: 2px;">3</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">1</span>
	D6	214	326	1101 0110
	D7	215	327	1101 0111
	D8	216	330	1101 1000
	D9	217	331	1101 1001
	DA	218	332	1101 1010
	DB	219	333	1101 1011
	DC	220	334	1101 1100
	DD	221	335	1101 1101
	DE	222	336	1101 1110
	DF	223	337	1101 1111
	E0	224	340	1110 0000
	E1	225	341	1110 0001
	E2	226	342	1110 0010
	E3	227	343	1110 0011
	E4	228	344	1110 0100
	E5	229	345	1110 0101
	E6	230	346	1110 0110
	E7	231	347	1110 0111
	E8	232	350	1110 1000
	E9	233	351	1110 1001
	EA	234	352	1110 1010
	EB	235	353	1110 1011
	EC	236	354	1110 1100
	ED	237	355	1110 1101
	EE	238	356	1110 1110
	EF	239	357	1110 1111
	FO	240	360	1111 0000
	F1	241	361	1111 0001
	F2	242	362	1111 0010
	F3	243	363	1111 0011
	F4	244	364	1111 0100
	F5	245	365	1111 0101
	F6	246	366	1111 0110
	F7	247	367	1111 0111
	F8	248	370	1111 1000
	F9	249	371	1111 1001
	FA	250	372	1111 1010
	FB	251	373	1111 1011
	FC	252	374	1111 1100
	FD	253	375	1111 1101
	FE	254	376	1111 1110
	FF	255	377	1111 1111

\* The ASCII value varies

# Appendix C: Configuration



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## Summary of Configuration Options

The following pages summarize the groups and options used to configure the QMS printer. A more detailed explanation of each may be found in Section 6 of this manual.

GROUP A OPTIONS _____	ANSI EMULATION OPTIONS.
GROUP C OPTIONS _____	CURRENT FONT NUMBER SELECTION GROUP.
GROUP D OPTIONS _____	DIABLO EMULATION OPTIONS.
GROUP E OPTIONS _____	EPSON EMULATION OPTIONS.
GROUP L OPTIONS _____	DEFAULT LANDSCAPE FONT NUMBER SELECTION GROUP.
GROUP P OPTIONS _____	DEFAULT PORTRAIT FONT NUMBER SELECTION GROUP.
GROUP Q OPTIONS _____	QUME EMULATION OPTIONS.
GROUP 0 OPTIONS _____	SYSTEM FUNCTIONS.
GROUP 1 OPTIONS _____	PAGE SETTINGS.
GROUP 2 OPTIONS _____	COPY COUNT UNITS.
GROUP 3 OPTIONS _____	COPY COUNT TENS.
GROUP 4 OPTIONS _____	MARGIN SETTINGS.
GROUP 5 OPTIONS _____	COMMON INTERFACE OPTIONS.
GROUP 6 OPTIONS _____	SERIAL INTERFACE OPTIONS.
GROUP 7 OPTIONS _____	PARALLEL INTERFACE OPTIONS.
GROUP 8 OPTIONS _____	ALIGNMENT MARGIN SETTINGS.
GROUP 9 OPTIONS _____	FACTORY OPTIONS.

NOTE : Toggle any group option 0 to perform a warm boot of the print engine. Also, any option not listed is not yet supported.

## GROUP A OPTIONS

ANSI EMULATION SWITCH SELECTABLE OPTIONS.  
(THIS OPTION CURRENTLY ONLY AFFECTS THE UNITS OF  
MEASURE ON THE STATUS PAGE.)

\* = factory default

1	-	2	Set the type of unit measure to use.
disabled		disabled	Unit of measure is in dots.
enabled		disabled	Unit of measure is in Decipoints.
disabled		enabled	Unit of measure is in Centimeters.
*enabled		enabled	Unit of measure is in Inches.

3		AnsI character spacing
*enable		Fixed spacing from font
disable		Proportional spacing from font

4	-	5	Line spacing
disable		disable	Font line spacing
enable		disable	4 lines per inch
*disable		enable	6 lines per inch
enable		enable	8 lines per inch

6		Print text past the right margin and absorb text that exceeds the right edge of the page.
*disable		Absorb text data that exceeds the right margin.
enable		

7		Carriage return will not perform a line feed.
*disable		Carriage return will perform a line feed.
enable		

8		Line feed will not perform a carriage return.
*disable		Line feed will perform a carriage return.
enable		

9		Line feed will not perform 2 line feeds.
*disable		Line Feed will perform 2 line feeds.
enable		

## GROUP C OPTIONS

### CURRENT FONT NUMBER SELECTION

- 1 - Selection of this option will enable entry of the ten thousands digit of the current font number.
- 2 - Selection of this option will enable entry of the thousands digit of the current font number.
- 3 - Selection of this option will enable entry of the hundreds digit of the current font number.
- 4 - Selection of this option will enable entry of the tens digit of the current font number.
- 5 - Selection of this option will enable entry of the units digit of the current font number.

Note: See font number entry procedure description at the end of this document.

## GROUP D OPTIONS

### DIABLO EMULATION SWITCH SELECTABLE OPTIONS

\* = factory default

1	2	
disabled	disabled	Proportional character spacing
*enabled	disabled	Fixed character spacing 10 cpi
disabled	enabled	Fixed character spacing 12 cpi
enabled	enabled	Fixed character spacing 15 cpi
3		
* disable	Carriage return =	Carriage return
enabled	Carriage return =	Carriage return and Automatically performs a line feed.
4		
* disable	Single line feed performs	a single line feed
enabled	Single line feed performs	a double line feed
6		
* disabled	Use the font table for character spacing when in	proportional spacing.
enable	Do not use the font table for character spacing	when in proportional spacing.

## GROUP E OPTIONS

### EPSON EMULATION SWITCH-SELECTABLE OPTIONS

\* = factory default

1

\*disabled Pica mode printing enabled  
enabled Compressed mode enabled

2

\*disabled Normal pica printing is selected  
enabled Emphasized pica printing is selected

### EPSON LANGUAGE SELECTION

3

\*enabled  
disabled  
enabled  
disabled  
enabled  
disabled  
enabled  
disabled

4

enabled  
enabled  
disabled  
disabled  
enabled  
enabled  
disabled  
disabled

5

enabled  
enabled  
enabled  
enabled  
disabled  
disabled  
disabled  
disabled

U.S.A  
France  
Germany  
England  
Denmark  
Sweden  
Italy  
Spain

6

\*disabled Carriage return will not perform a line feed  
enabled Carriage return will perform a line feed

7

\*disabled Don't keep up with partial dots during plot mode  
for horizontal motion.  
enabled Keep up with partial dots during plot mode for  
horizontal motion.

(Group E, cont.)

8

\*disabled Don't keep up with partial dots for vertical motion.  
enabled Keep up with partial dots for vertical motion.

9

\*disabled Print zeros without a slash.  
enabled Print zeros with a slash.

A

\*disabled Use the default Pica font as the Pica Mode  
font.  
enabled Use the current font as the Pica Mode font.

## GROUP L OPTIONS

### DEFAULT LANDSCAPE FONT NUMBER SELECTION

- 1 - Selection of this option will enable entry of the ten thousands digit of the default landscape font number.
- 2 - Selection of this option will enable entry of the thousands digit of the default landscape font number.
- 3 - Selection of this option will enable entry of the hundreds digit of the default landscape font number.
- 4 - Selection of this option will enable entry of the tens digit of the default landscape font number.
- 5 - Selection of this option will enable entry of the units digit of the default landscape font number.

Note: See font number entry procedure description at the end of this document.

## GROUP P OPTIONS

### DEFAULT PORTRAIT FONT NUMBER SELECTION

- 1 - Selection of this option will enable entry of the ten thousands digit of the default portrait font number.
- 2 - Selection of this option will enable entry of the thousands digit of the default portrait font number.
- 3 - Selection of this option will enable entry of the hundreds digit of the default portrait font number.
- 4 - Selection of this option will enable entry of the tens digit of the default portrait font number.
- 5 - Selection of this option will enable entry of the units digit of the default portrait font number.

Note: See font number entry procedure description at the end of this document.

## GROUP Q OPTIONS

### QUME EMULATION SWITCH SELECTABLE OPTIONS

1	2	
disabled	disabled	Proportional character spacing
*enabled	disabled	Fixed character spacing 10 characters per inch
disabled	enabled	Fixed character spacing 12 characters per inch
enabled	enabled	Fixed character spacing 15 characters per inch
3		
* disabled		Line spacing = 6 lines per inch.
enabled		Line spacing = 8 lines per inch.
4		
* disable		Carriage return will not perform a carriage return line feed
enabled		Carriage return will perform a line feed.
5		
* disable		Do not perform an automatic carriage return and a line feed at right margin.
enabled		Perform an automatic carriage return and line feed at the right margin.
6		
* disable		Use the font table for character spacing when in proportional spacing.
enabled		Do not use the font table for character spacing when in proportional spacing.



(Group 0, cont.)

7

disabled <FF> always ejects page.  
\*enabled <FF> does not eject page if buffer is empty.

8

\*disabled Print Start-Up Page at warm boot.  
enabled Never print Start-Up Page at warm boot.

9

Toggle Reset Command Translation Table.

A

Toggle Reset Font Translation Table.

GROUP 1 OPTIONS

1	2	Printer emulation selection	
disabled	disabled	Ansi X3.64 emulation	
enabled	disabled	Diablo 630 emulation	
*disabled	enabled	Epson FX-80 emulation	
enabled	enabled	Qume Sprint emulation	
3	Power-up page orientation		
*disabled	Portrait page orientation		
enabled	Landscape page orientation		
4	5	6	
disabled	disabled	disabled	A4 paper size
enabled	disabled	disabled	B5 paper size
disabled	enabled	disabled	Legal page size
*enabled	enabled	disabled	Letter page size
disabled	disabled	enabled	Mini page size

## GROUP 2 OPTIONS

This group allows the user to select 0-9 copies, depending on the option selected.

Example: If the user wants 6 copies, he enables option 6

## GROUP 3 OPTIONS

This group allows the user to select 0-9 multiplied by 10 copies, depending on the option selected.

Example: If the user wants 60 copies, he enables option 6 in Group 3 and disables all options in Group 2.

If the user wants 56 copies, he enables option 6 in Group 2 and option 5 in Group 3.

Notes: Selection of an option in Groups 2 or 3 deselects all other options in that group.

Selection of option zero in these or any other group causes a warm restart to be performed. Deselecting all options in a groups is most easily accomplished by selecting option 1 (which deselects all other options) and then deselecting option 1 (no options are now selected).

GROUP 4 OPTIONS

POWER-UP MARGIN SETTINGS

	1	2	3	4	Left Margin =
	disabled	disabled	disabled	disabled	0.00 inches
*	enabled	disabled	disabled	disabled	0.25 inches
	disabled	enabled	disabled	disabled	0.50 inches
	enabled	enabled	disabled	disabled	0.75 inches
	disabled	disabled	enabled	disabled	1.00 inches
	enabled	disabled	enabled	disabled	1.25 inches
	disabled	enabled	enabled	disabled	1.50 inches
	enabled	enabled	enabled	disabled	1.75 inches
	disabled	disabled	disabled	enabled	2.00 inches
	enabled	disabled	disabled	enabled	2.25 inches
	disabled	enabled	disabled	enabled	2.50 inches
	enabled	enabled	disabled	enabled	2.75 inches
	disabled	disabled	enabled	enabled	3.00 inches
	enabled	disabled	enabled	enabled	3.25 inches
	disabled	enabled	enabled	enabled	3.50 inches
	enabled	enabled	enabled	enabled	3.75 inches
	5	6	7	8	Right Margin =
	disabled	disabled	disabled	disabled	0.00 inches
*	enabled	disabled	disabled	disabled	0.25 inches
	disabled	enabled	disabled	disabled	0.50 inches
	enabled	enabled	disabled	disabled	0.75 inches
	disabled	disabled	enabled	disabled	1.00 inches
	enabled	disabled	enabled	disabled	1.25 inches
	disabled	enabled	enabled	disabled	1.50 inches
	enabled	enabled	enabled	disabled	1.75 inches
	disabled	disabled	disabled	enabled	2.00 inches
	enabled	disabled	disabled	enabled	2.25 inches
	disabled	enabled	disabled	enabled	2.50 inches
	enabled	enabled	disabled	enabled	2.75 inches
	disabled	disabled	enabled	enabled	3.00 inches
	enabled	disabled	enabled	enabled	3.25 inches
	disabled	enabled	enabled	enabled	3.50 inches
	enabled	enabled	enabled	enabled	3.75 inches

(Group 4, cont.)

9	A	B	C	Top margin =
disabled	disabled	disabled	disabled	0.00 inches
* enabled	disabled	disabled	disabled	0.25 inches
disabled	enabled	disabled	disabled	0.50 inches
enabled	enabled	disabled	disabled	0.75 inches
disabled	disabled	enabled	disabled	1.00 inches
enabled	disabled	enabled	disabled	1.25 inches
disabled	enabled	enabled	disabled	1.50 inches
enabled	enabled	enabled	disabled	1.75 inches
disabled	disabled	disabled	enabled	2.00 inches
enabled	disabled	disabled	enabled	2.25 inches
disabled	enabled	disabled	enabled	2.50 inches
enabled	enabled	disabled	enabled	2.75 inches
disabled	disabled	enabled	enabled	3.00 inches
enabled	disabled	enabled	enabled	3.25 inches
disabled	enabled	enabled	enabled	3.50 inches
enabled	enabled	enabled	enabled	3.75 inches

D	E	F	Bottom margin =
disabled	disabled	disabled	0.00 inches
* enabled	disabled	disabled	0.25 inches
disabled	enabled	disabled	0.50 inches
enabled	enabled	disabled	0.75 inches
disabled	disabled	enabled	1.00 inches
enabled	disabled	enabled	1.25 inches
disabled	enabled	enabled	1.50 inches
enabled	enabled	enabled	1.75 inches

## GROUP 5 OPTIONS

1  
\* disabled Centronics interface selected.  
enabled RS232 serial interface selected.

2  
disabled Power up off line.  
\* enabled Power up on line.

3	4	5	BUFFER SIZE SELECTION
disabled	disabled	disabled	132 chars
enabled	disabled	disabled	256 chars
disabled	enabled	disabled	512 chars
enabled	enabled	disabled	1 K
disabled	disabled	enabled	2 K
enabled	disabled	enabled	4 K
disabled	enabled	enabled	6 K
* enabled	enabled	enabled	8 K

6	7	BIT 8 STATUS TABLE
* disabled	disabled	Pass bit 8 through
disabled	enabled	Strip bit 8 on input
enabled	disabled	Set bit 8 on input
enabled	enabled	Toggle bit 8

## GROUP 6 OPTIONS

1

- \* disabled No parity checking is performed.
- enabled Parity checking is performed.

NOTE.: The first two selections in options 2 and 3 require Group 6 option 1 to be enabled.

2

3

- |            |          |                                   |
|------------|----------|-----------------------------------|
| * disabled | disabled | Odd parity generation check.      |
| enabled    | disabled | Even parity generation check.     |
| disabled   | enabled  | Mark parity generation no-check.  |
| enabled    | enabled  | Space parity generation no-check. |

4

- |            |                              |
|------------|------------------------------|
| * disabled | Use 1 stop bit in data word  |
| enabled    | Use 2 stop bits in data word |

5

- |            |                     |
|------------|---------------------|
| * disabled | Use 8 bit data word |
| enabled    | Use 7 bit data word |

(Group 6, cont.)

	6	7	8	9	
* disabled	disabled	disabled	disabled	disabled	9600 BAUD
enabled	disabled	disabled	disabled	disabled	50 BAUD
disabled	enabled	disabled	disabled	disabled	75 BAUD
enabled	enabled	disabled	disabled	disabled	110 BAUD
disabled	disabled	enabled	disabled	disabled	134.58 BAUD
enabled	disabled	enabled	disabled	disabled	150 BAUD
disabled	enabled	enabled	disabled	disabled	300 BAUD
enabled	enabled	enabled	disabled	disabled	600 BAUD
disabled	disabled	disabled	enabled	disabled	1200 BAUD
enabled	disabled	disabled	enabled	disabled	1800 BAUD
disabled	enabled	disabled	enabled	disabled	2400 BAUD
enabled	enabled	disabled	enabled	disabled	3600 BAUD
disabled	disabled	enabled	enabled	disabled	4800 BAUD
enabled	disabled	enabled	enabled	disabled	7200 BAUD
disabled	enabled	enabled	enabled	disabled	9600 BAUD
enabled	enabled	enabled	enabled	disabled	19200 BAUD

A

- disabled Do not use DTR data throttle.
- \* enabled Use DTR data throttle.

B

- \* disabled Do not use RTS data throttle.
- enabled Use RTS data throttle.

C

- disabled XON/XOFF protocol is OFF.
- \* enabled XON/XOFF protocol is ON.

## GROUP 7 OPTIONS

1

- \* disabled Do not go busy on printer error.
- enabled Go busy on printer error.

2

- \* disabled Do not set printer error on printer error.
- enabled Set printer error on printer error.

3

- \* disabled Do not set fault on printer error.
- enabled Set fault on printer error.

4

- \* disabled Do not go off line on printer error.
- enabled Go off line on printer error.

NOTE : When this option is enabled the front panel will have to be used to return the printer to the on line state.

5

- disabled Do not Go busy on off-line.
- \* enabled Go busy on off-line.

6

- disabled Do not use the busy bit to control dataflow from the host.
- \* enabled Use the busy bit to control dataflow from the host.

GROUP 8 OPTIONS

ENGINE PAPER ALIGNMENT MARGINS.

1	2	3	4	Offset from Left Edge of Paper
disabled	disabled	disabled	disabled	0.00 inches
enabled	disabled	disabled	disabled	0.05 inches
disabled	enabled	disabled	disabled	0.10 inches
enabled	enabled	disabled	disabled	0.15 inches
disabled	disabled	enabled	disabled	0.20 inches
enabled	disabled	enabled	disabled	0.27 inches
disabled	enabled	enabled	disabled	0.32 inches
enabled	enabled	enabled	disabled	0.37 inches
disabled	disabled	disabled	enabled	0.43 inches
enabled	disabled	disabled	enabled	0.48 inches
disabled	enabled	disabled	enabled	0.53 inches
enabled	enabled	disabled	enabled	0.59 inches
disabled	disabled	enabled	enabled	0.64 inches
enabled	disabled	enabled	enabled	0.69 inches
disabled	enabled	enabled	enabled	0.75 inches
enabled	enabled	enabled	enabled	0.80 inches

(Group 8, cont.)

				Offset from Top Edge of Paper
5	6	7	8	
disabled	disabled	disabled	disabled	0.00 inches
enabled	disabled	disabled	disabled	0.05 inches
disabled	enabled	disabled	disabled	0.10 inches
enabled	enabled	disabled	disabled	0.15 inches
disabled	disabled	enabled	disabled	0.20 inches
enabled	disabled	enabled	disabled	0.27 inches
disabled	enabled	enabled	disabled	0.32 inches
enabled	enabled	enabled	disabled	0.37 inches
disabled	disabled	disabled	enabled	0.43 inches
enabled	disabled	disabled	enabled	0.48 inches
disabled	enabled	disabled	enabled	0.53 inches
enabled	enabled	disabled	enabled	0.59 inches
disabled	disabled	enabled	enabled	0.64 inches
enabled	disabled	enabled	enabled	0.69 inches
disabled	enabled	enabled	enabled	0.75 inches
enabled	enabled	enabled	enabled	0.80 inches

## GROUP 9 OPTIONS

### FACTORY OPTIONS

- 1
- \* disable Do not scan the debugger address space for fonts.
  - enabled Scan the debugger address space for fonts.
- E
- \* disable The last printer interruption error will not be printed.
  - enabled The last occurrence of a printer interruption error is printed.
- F
- \* disable The debugger should only be initialized and normal execution continued if the debugger is present during system initialization.
  - enable Control should be passed to the debugger if it is present during initialization.

# Glossary

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## **ASCII**

An acronym for American Standard Code for Information Interchange. It is a 7-bit (or 8 bit) coding scheme for the computer representation of letters, numbers, and other symbols commonly found on a standard typewriter. It also represents special unprintable characters used by computer devices, e.g. carriage return, line feed, form feed, escape, etc.

## **Baseline**

An imaginary line upon which the letters in a line sit.

## **Basic**

A programming language designed for IBM computers.

## **Baud**

The measure of speed at which information is transferred indicated by changes in line condition. Baud is equivalent to bits per second (BPS) which is the number of information bits that can be sent through a channel in a second.

## **Binary**

A base 2 number system written with the digits "0" or "1". See BIT.

**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. Groups of bits are used to represent more complex statements such as a character (see ASCII). The most common grouping of bits is called a byte, consisting of eight bits.

**Bit Map**

A method of printing in which each dot of a character or graphics display is controlled by a bit of digitally coded information.

**Buffer**

A storage device used to compensate for a difference in rate or sequence of data flow when transmitting data from one device to another.

**Centronics**

An industry-standard parallel interface.

**Character**

A single letter, number, symbol, space, or punctuation mark. Printable characters are those normally associated with a typewriter. Unprintable characters are special characters normally used by a computer to control a system, e.g. line feed, backspace, carriage return, escape, bell, start of text, etc.

**Command**

An instruction comprised of a specific sequence of control characters and/or printable characters which enables a computer or printer to perform a specific task.

**Computer Program**

A set of computer commands which translates data entered by an operator into a sequence of instructions suitable for processing by the computer.

**Configure**

To select particular features using the front panel keypad of the printer.

**Control Codes**

Non-printable characters used to control the position of printed or displayed data. See LINE FEED, FORM FEED, and CHARACTER.

**Copy Count**

A configuration which allows multiple copies of each page to be printed.

**Decimal**

The number system with a base of 10.

**Default**

A preset value programmed into a computer or printer which it will use unless changed by a switch setting or software command.

**Diagnostic Page**

A page ejected by the printer following a fatal error listing the problem or problems which caused the error condition.

**Disable/Enable**

The status of an Option. "Disable" is to turn off (0) and "Enable" is to turn on (1).

## **Dot Patterns**

A sequence of “on” or “off” dots defined by the user to generate graphics.

## **Emulation**

In this manual “emulation” means that the SmartWriter 2.2 will produce similar or identical results in response to a supported Emulation Mode command as would be produced by the printer being emulated. Refer to “Choosing An Emulation Mode” in this manual for a list of Printer Emulation Modes. Refer to the individual Emulation Mode sections for lists of supported and unsupported commands.

## **Enable/Disable**

The status of an Option. “Disable” is to turn off (0) and “Enable” is to turn on (1).

## **Error Code**

A two character code appearing in the display window of the control panel indicating an error condition in the printer.

## **Escape**

A non-printable control character (usually abbreviated ESC) used with specific sequences of characters to define commands.

## **Form Feed**

A control character which causes the print or display position to move to the next page.

## **Forms Length**

The length, in lines, of printed page. The number of lines which may be printed before a Form Feed will be invoked. See Addressable Area and Printable Area Ta-

bles in the “Printer Specifications” section.

**Font**

A complete character set in one size and style.

**Graphics**

Printing, through special software commands, of graphs, diagrams, or other pictorial images.

**Group**

The major classification of configuration parameters.

**Hex**

An abbreviation of hexadecimal, a number system with the base 16. The hexadecimal system uses sixteen number symbols (0 through 9, and A through F) and is used as a simple way to represent binary numbers.

**Host Computer**

A computer transmitting data to a printer or other peripheral device.

**Image**

The representation on the printed page of the data sent to the printer. It is formed of closely placed dots of toner which are placed on the page electrostatically and fused.

**Interface**

A hardware component which allows two devices to communicate.

**Interface Cable**

A special cable used to connect the printer to the computer so they can communicate.

**Invalid**

Not understood by the printer. Refers to hardware or software communication.

**Keypad**

A pressure-sensitive panel on the front of the printer used to place the printer on or off line, toggle the Manual Feed, invoke a Form Feed, and configure the printer.

**Landscape**

A page orientation in which printing is done along the long dimension of the page. See PORTRAIT.

**Line Feed**

A character which causes the print position to move to the corresponding position on the next line. See CHARACTER.

**Memory**

Data storage capacity of a computer or printer controller.

**Mode**

One of several alternative conditions or methods of operation of a device, such as Qume Emulation Mode, Epson Emulation Mode, or Diablo Emulation Mode.

**Numeric Characters**

Characters represented by the digits 0-9.

**Octal**

A number system with the base 8. The octal system uses eight number symbols (0 through 7) and is used as a simple way to represent binary numbers.

**Option**

The "sub-classification" of Groups. Each Option controls a different printer default condition.

**Overlay**

A string of printer-supported commands which may be stored in RAM and recalled at any time.

**Page Orientation**

The relationship of the printed data to the long or short dimensions of the page. See PORTRAIT and LANDSCAPE.

**Parameter**

The variables within a command that determine the action which the command will initiate.

**Parallel**

A means of transferring data where the data bits representing each character are sent simultaneously along parallel lines or wires. See SERIAL.

**Pitch**

Characters per inch.

**Point Size**

The height of a font expressed in points, where a point is  $1/72$  inch. Also called type size.

**Portrait**

A page orientation in which printing is done along the short dimension of the page.

**Print Engine**

The “non-intelligent” portion of the printer including the laser, print drum, and paper feeding mechanism.

**Print Cartridge**

A disposable cartridge containing dry toner and a print drum.

**Print Position**

The position on the page where the next printed character will appear, determined by software commands, control codes, and text length.

**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 image.

**Print Wheel**

A rotating disk containing a type font which rotates to present a specified character to the print position.

**Printable Characters**

Characters representing letters (a-z), numbers (0-9), or punctuation (? : ; ” . , etc.).

**Proportional Characters**

Characters assigned various widths according to their letterforms.

**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 it is powered off.

**RAM**

Random Access Memory.

**ROM**

Read Only Memory.

**Raster Line**

One horizontal line of dots of a laser-printed page.

**Resolution**

The density of the printed page expressed in “dots per inch”.

**Serial**

A method of transferring data where the data bits representing each character are sent sequentially along a single line or wire. See PARALLEL.

**Specifications**

A written description listing requirements and specific technical information.

**Status Code**

A two digit code appearing in the display window of the printer’s control panel indicating an error condition or change of mode or status.

**Status Summary Sheet**

A page generated by the printer which shows the current fonts and selected printer options. This page is automatically printed each time the printer is powered up.

**Support**

Ablity to comply with software commands or produce specific results. The QMS printer supports features and software commands of Qume, Diablo, and Epson.

**Terminal**

A device, usually equipped with a keyboard and display, capable of sending and receiving information.

**Toggle**

To turn either on or off with the same action.

**Toner**

A powered ink which is electrostatically applied to the paper and then fused to form the image on the page.

**Top-Of-Form**

The first line of a page.

**Truncate**

Cut off the end of a stream of data.

**Warm Restart**

A printer feature which allows the printer controller to be reset without a power off / power on cycle. This allows configuration changes to take effect without losing any enabled options.

**Word Processing Package**

A software program which provides the ability to add, change, move, and delete text.

# Index

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## A

- Abort printing ..... 8-1
  - Addressable vs. Printable Areas ..... 8-3, 13-3
  - Alignment, Printer (Group 8)..... 6-42
    - Horizontal ..... 6-43
    - Vertical ..... 6-43
  - ANSI Mode Options (Group A)..... 6-3
    - Carriage Returns ..... 6-6
    - Character Spacing ..... 6-4
    - Line Feeds ..... 6-6
    - Line Spacing ..... 6-5
    - Overflows, Print Line ..... 6-5
    - Units of Measurement ..... 6-4
  - Application packages ..... see "Word Processors"
  - ASCII characters..... 7-3, Appendix B
  - Automatic Paper Feed..... 4-10
- 

## B

- Baud Rate ..... see "Bit Rate"
  - Bit, 7-/8- considerations..... 9-32, 10-34, 10-35, 10-40,  
10-41, 10-42, 10-43, 10-44
  - Bit Rate, setting ..... 6-37
  - Blank pages, printing ..... 12-20
  - Blank pages, suppression of ..... 6-26, 8-2
  - Bold printing ..... 9-29, 10-15, 11-28
  - Bottom Page Margin ..... 6-34
- 

## C

- Cable, Printer Interface..... 2-2
  - parallel specifications ..... 13-4
  - serial specifications ..... 13-7

Cancel print job .....	8-1
Care of printer .....	see "Maintenance"
Cartridge, font .....	4-17
Cartridge, print .....	12-2
Installation .....	2-10
How to Replace the Print Cartridge .....	12-4
When to Replace the Print Cartridge .....	12-3
Centering, Automatic Line .....	9-26
Centronics .....	3-5, 6-34, 6-35
Character Sets .....	see "Font Test Pages"
Character Set selection, international .....	6-12, 10-31
Character Spacing, fixed .....	6-4, 6-9, 6-11, 6-20, 10-8,
	11-15
Character Spacing, proportional .....	6-4, 6-9, 6-10, 6-20, 9-25,
	10-17, 11-27
Choosing an Emulation Mode .....	5-1
Adding a Printer to an Existing System .....	5-3
Printer Emulation .....	5-2
Replacing an Existing Printer .....	5-3
The Printer in a New System .....	5-4
Word Processors and Other Software .....	5-4
Cleaning the Transfer Guide .....	12-8
Clearing a Paper Jam .....	12-12
Clearing the input buffer .....	6-24
Command Translation Table .....	6-25, 6-26
Common Interface Options .....	6-34
Compressed Mode (Epson) .....	10-10
Configuration Keys .....	4-5, 4-9
Configuration Options .....	6-1
Alignment, Printer (Group 8) .....	6-42
Horizontal .....	6-43
Vertical .....	6-43
Warm Restart .....	6-42
ANSI Mode Options (Group A) .....	6-3
Carriage Returns .....	6-6
Character Spacing .....	6-4
Line Feeds .....	6-6
Line Spacing .....	6-5
Overflows, Print Line .....	6-5
Units of Measurement .....	6-4
Warm Restart .....	6-3
Copy Count (Group 2) .....	6-29
Copy Count .....	6-29

Warm Restart .....	6-3
Copy Count (Group 3) .....	6-29
Copy Count .....	6-30
Warm Restart .....	6-29
Current Font, Selecting (Group C) .....	6-6
Current Font .....	6-7
Warm Restart .....	6-7
Diagnostic Options (Group 9) .....	6-44
Debugger .....	6-45
Debugger Mode .....	6-45
Diagnostic Page .....	6-45
Warm Restart .....	6-44
Diablo Emulation Options (Group D) .....	6-9
Carriage Returns .....	6-10
Line Feeds .....	6-10
Spacing, Font Table Proportional .....	6-10
Spacing, Proportional or Fixed .....	6-9
Warm Restart .....	6-9
Emulation Mode, Page Size/Orientation (Group 1) ...	6-27
Emulation Mode .....	6-28
Page Orientation .....	6-28
Paper Size .....	6-28
Warm Restart .....	6-27
Epson Emulation Options (Group E) .....	6-11
Carriage Returns .....	6-12
Epson Print Mode .....	6-11
Horizontal Positioning .....	6-13
International Characters .....	6-12
Pica Default Font .....	6-16
Pica Print Quality .....	6-12
Printing Zeros .....	6-15
Vertical Positioning .....	6-14
Warm Restart .....	6-11
Interface Options, Common (Group 5) .....	6-34
Eighth Bit .....	6-36
Input Buffer Configuration .....	6-35
Interface Type .....	6-35
Online/Offline .....	6-35
Warm Restart .....	6-34
Interface Options, Serial (Group 6) .....	6-36
Bit Rate .....	6-38
Data Bits .....	6-38

DTR .....	6-39
Parity Checking .....	6-37
Parity Type .....	6-37
RTS .....	6-39
Warm Restart .....	6-37
XON/XOFF .....	6-40
Interface Options, Parallel (Group 7) .....	6-40
Busy on Off-Line .....	6-41
Data Flow Control .....	6-42
Off-Line on Error .....	6-41
Set Fault Bit .....	6-41
Printer Error .....	6-40
Warm Restart .....	6-40
Landscape Font, Select Default (Group L) .....	6-16
Landscape Font .....	6-16
Warm Restart .....	6-16
Portrait Font, Select Default (Group P) .....	6-18
Portrait Font .....	6-18
Warm Restart .....	6-18
Qume Emulation Options (Group Q) .....	6-19
Automatic Carriage Return/Line Feed .....	6-22
Carriage Returns .....	6-21
Line Spacing .....	6-20
Spacing, Font Table Proportional .....	6-22
Spacing, Proportional or Fixed .....	6-20
Warm Restart .....	6-19
System Function Options (Group 0) .....	6-23
Blank Page, Suppress .....	6-26
Clear Buffer .....	6-24
Configuration Reset .....	6-25
Copy Count Reset .....	6-23
Form Feed/Carriage Return .....	6-25
Hex Dump .....	6-24
Reset Command/Font Tables .....	6-26
Reset, Immediate Command Table .....	6-27
Reset, Immediate Font Table .....	6-27
Status Summary Sheet, Suppress .....	6-26
Warm Restart .....	6-23
Configuration Reset .....	6-25
Connecting printer to computer .....	3-5, 3-6
Control Characters .....	4-21, 7-3, 7-16
Conventions Used in This Manual .....	1-5

Copy Count (1 to 9 copies).....	6-29, 7-11
Copy Count (multiples of 10).....	6-29, 7-11
Corona Wires.....	12-5
Cleaning the Primary Corona Wire .....	12-6
Cleaning the Transfer Corona Wire .....	12-7
CPI.....	see "Character Spacing, fixed"
Current Font, Selecting .....	6-6

---

## D

Data Light .....	4-7, 8-3
Debugger options .....	6-45
Defaults, reset to factory .....	6-23
Deleting fonts.....	7-8
Density, Adjustment .....	4-15
Density, Epson Graphics Mode.....	10-34
Single, Epson .....	10-35
Double, Epson .....	10-35
Quadruple, Epson .....	10-36
Variable, Epson .....	10-36
Diablo 630 Emulation Mode .....	9-1
ECS .....	9-31
Extended Character Set .....	9-31
Carriage Returns .....	6-10
Line Feeds .....	6-10
Spacing, Font Table Proportional .....	6-10
Spacing, Proportional or Fixed .....	6-9
Proportional Spacing .....	8-4
Summary of Supported Diablo Commands .....	9-4
Supported Diablo Commands .....	9-8
Formatting Commands .....	9-13
Print Position Commands .....	9-19
Single Character Commands .....	9-8
Special Printer Features .....	9-21
Word Processing Command Sequences .....	9-24
Unsupported Diablo Commands .....	9-6
Diablo Emulation Options.....	6-9
Diablo - Using Proportional Spacing.....	8-4
Diagnostic Options (Group 9).....	6-45
Debugger .....	6-45
Debugger Mode .....	6-45

Diagnostic Page .....	6-45
Diagnostic Page .....	6-45, 12-18
Display Window .....	4-7
Messages .....	4-8
Don't Print Status Summary Sheet.....	8-2
Double-Sided Printing .....	4-14
Download Fonts .....	4-16

---

## E

Elite Mode (Epson).....	10-10
Eight Bit considerations.....	9-31, 10-34
Emulation, defined .....	5-2
Emulation mode, selecting.....	5-1, 6-27, 7-12
Envelopes, Feeding .....	4-11
Environment.....	3-2
Epson FX-80 Emulation Mode .....	10-1
Configuration Options .....	6-11
Carriage Returns .....	6-12
Epson Print Mode .....	6-11
Horizontal Positioning .....	6-13
International Characters .....	6-12
Pica Default Font .....	6-16
Pica Print Quality .....	6-12
Printing Zeros .....	6-15
Vertical Positioning .....	6-14
Control Codes Redefined .....	10-42
Core Characters .....	10-44
Double-High, Double-Wide Letters .....	10-43
Formatting Commands .....	10-25
Forms Control Commands .....	10-24
Graphics Modes .....	10-34
Graphics Pin Combination Patterns .....	10-38
Graphics Using 7-Bit Systems .....	10-41
Plotter Graphics .....	10-39
Summary of Supported Epson Commands .....	10-4
Paper Feed Commands .....	10-21
Print Quality Commands .....	10-11
Print Width Commands .....	10-8
Selecting Print Modes .....	10-19
Special Printer Features .....	10-30

Unsupported Epson Commands .....	10-6
User-Defined Characters .....	10-39
Epson Graphics - Page Orientation.....	8-4
Error Codes.....	4-8, 12-16
ESCape character.....	7-4, 7-16
ESCape sequences .....	see "Software Commands"

---

## F

Factory Defaults, reset to.....	6-23
Factory Settings .....	6-44
Feeding Paper .....	4-10
Automatic Paper Feed .....	4-10
Manual Feed .....	4-11
Finding a Good Location.....	3-2
Fixed Character Spacing.....	6-4, 6-9, 11-14
Fixing Assembly Cleaner .....	12-4
Cleaning the Fixing Roller .....	12-5
Installing .....	2-13
Replacing the Fixing Assembly Cleaner .....	12-5
Font (Typeface) .....	A-1
Cartridge .....	4-17
Choice of .....	4-18
Commands .....	A-3
Copying into memory .....	4-16, 4-17
Current .....	6-6
Deleting download .....	7-8
Download .....	4-16
Epson Default .....	4-19, 7-9, 8-4
Landscape, selecting default .....	6-16
Memory limitations .....	4-16
Other Characteristics .....	A-2
Portrait, selecting default .....	6-18
Resident .....	4-16
Selecting .....	4-17, 6-6, 7-9
Test Pages .....	4-5, A-5, A-29 ff.
Translation Table .....	6-26, 6-27
What is a Font? .....	A-1
Width Tables .....	A-5
Form Feed/Carriage Return interpretation .....	6-25
Form Feed Key.....	4-4, 8-2

Forms Length.....	10-25, 11-11
Function Keys .....	4-3

---

## G

General Operation .....	4-1
Display Window, The .....	4-7
Feeding Paper .....	4-10
Automatic Paper Feed .....	4-10
Manual Feed .....	4-11
Keypad, The .....	4-2
Configuration Keys .....	4-5
Function Keys .....	4-3
Print Density .....	4-15
Printing .....	4-13
Double-Sided Printing .....	4-14
Printing Status Summary Sheet .....	4-19
Software Commands .....	4-19
Graphics Mode (Epson).....	10-33
Group Key.....	4-5, 4-6

---

## H

Handles .....	3-4
Hex Dump.....	6-24, 7-15
Horizontal Tab command.....	9-10, 11-9
Absolute .....	9-19, 11-19
setting tab stops for .....	9-17, 10-28, 11-16

---

## I

Input buffer, configuring .....	6-35
Inspection .....	2-2
Printer .....	2-2
Installation.....	3-1
Finding a Good Location .....	3-2
Installing the Printer .....	3-5

Interface Cable, The .....	3-5
Loading Paper .....	3-7
Pre-installation .....	2-7
Status Summary Sheet .....	3-12
Test Your Printer Operation .....	3-11
Interface Options, Common (Group 5).....	6-34
Eighth Bit .....	6-36
Input Buffer Configuration .....	6-35
Interface Type .....	6-35
Online/Offline .....	6-35
Interface Options, Serial (Group 6).....	6-35
Bit Rate .....	6-37
Data Bits .....	6-37
DTR .....	6-38
Parity Checking .....	6-36
Parity Type .....	6-36
RTS .....	6-38
XON/XOFF .....	6-39
Interface Options, Parallel (Group 7) .....	6-39
Busy on Off-Line .....	6-40
Data Flow Control .....	6-41
Off-Line on Error .....	6-40
Set Fault Bit .....	6-40
Printer Error .....	6-39
Interface type, setting.....	6-35
International Character Set (Epson).....	6-12, 10-31
Italic Mode (Epson).....	10-18

---

## J

Justify, Auto Margin.....	9-28
---------------------------	------

---

## K

Keypad.....	4-2
-------------	-----

---

## L

Landscape Font, Selecting Default.....	6-16
Landscape Page Orientation .....	6-28, 7-9
LED.....	see "Display Window"
Left Page Margin.....	6-31
Line Spacing.....	6-5, 9-16, 10-22, 11-13
Lines per page.....	see "Forms Length"
Loading Paper.....	3-7
Location.....	3-2
Lost Data Upon Power-Up.....	8-3
LPI.....	see "Line Spacing"

---

## M

Maintenance and Troubleshooting .....	12-1
Cleaning the Transfer Guide .....	12-8
Clearing a Paper Jam .....	12-12
Corona Wires .....	12-5
Cleaning the Primary Corona Wire .....	12-6
Cleaning the Transfer Corona Wire .....	12-7
Fixing Assembly Cleaner .....	12-4
Cleaning the Fixing Roller .....	12-5
Replacing the Fixing Assembly Cleaner .....	12-5
Placing a Service Call .....	12-23
Print Cartridge .....	12-2
How to Replace the Print Cartridge .....	12-4
When to Replace the Print Cartridge .....	12-3
The Separation Belt .....	12-9
Cleaning the Separation Belt .....	12-9
Replacing the Separation Belt .....	12-10
Troubleshooting .....	12-16
Error Codes .....	12-16
Print Quality Problems .....	12-19
The Diagnostic Page .....	12-18
User Maintenance .....	12-2
Manual Feed.....	4-11
Key .....	4-4
Paper size during .....	6-28, 7-10
Software command for .....	7-10
Tray, installing .....	2-14

Manual Organization .....	1-2
Margins, Printer Page .....	6-30
Memory limitations for downloading .....	4-16
Mode, Selecting Emulation .....	5-1, 6-27, 7-12
Multiple copies .....	6-29, 7-11

---

## N

Numeric Parameters Defined .....	7-7
----------------------------------	-----

---

## O

Online Key .....	4-4
Operation, General .....	4-1
Display Window, The .....	4-7
Feeding Paper .....	4-10
Automatic Paper Feed .....	4-10
Manual Feed .....	4-11
Keypad, The .....	4-2
Configuration Keys .....	4-5
Function Keys .....	4-3
Print Density .....	4-15
Printing .....	4-13
Double-Sided Printing .....	4-14
Printing Status Summary Sheet .....	4-19
Software Commands .....	4-19
Option Key .....	4-6
Orientation, Page .....	4-19, 6-27, 7-9
Output Stacker Tray, installing .....	2-14
Overlays, selecting .....	7-8

---

## P

Page Length .....	see "Forms Length"
Page Orientation .....	4-19, 6-27, 7-9
Paper Feed .....	4-10
Paper Cassette, loading .....	3-7

Paper Jams .....	12-12
Paper size .....	7-10
Paper specifications .....	4-10, 4-11
Paper Trays, installing .....	2-14
Parallel Interface Cable Specification .....	13-4
Parallel Interface Options .....	6-40
Parity .....	6-37
Pause command .....	7-15
Pica Mode (Epson) .....	10-8
Pitch .....	see "Character Spacing"
Portrait Font, Selecting Default .....	6-6
Power Requirements .....	3-2, 13-2
Print Cartridge .....	12-2
Installation .....	2-10
How to Replace the Print Cartridge .....	12-4
When to Replace the Print Cartridge .....	12-3
Print Density .....	4-15
Printable areas of page .....	8-3, 13-3
Printer Alignment .....	6-42
Printer Emulation .....	5-2
Printer Familiarization .....	2-4
Printer Interface Cable .....	3-5
Printer Set-Up .....	2-7
Fixing Assembly Cleaner Installation .....	2-13
Paper Tray Installation .....	2-14
Print Cartridge Installation .....	2-10
Some Preliminaries .....	2-7
Printer Specifications .....	13-1
Addressable Areas .....	13-3
Parallel Interface Cable Specification .....	13-4
Printable Areas .....	13-3
Serial Interface Cable Specifications .....	13-7
Printing, double-sided .....	4-14
Printing limitations .....	4-13
Proportional spacing .....	6-4, 6-9, 6-10, 6-20, 9-25, 10-17, 11-26

---

## Q

QMSCCNT (Change copy count) .....	7-11
QMSCTL (Extended Printer Control) .....	7-15
QMSFCTL (Paper Feed Control) .....	7-10

QMSMOD (Select Emulation Mode).....	7-12
QMSPGO (Select Page Orientation).....	7-9
QMSRED (Redefine Translation Tables).....	7-16
QMSSFO (Select Font/Overlay).....	7-8
Qume Emulation Mode.....	11-1
Configuration Options.....	6-18
Automatic Carriage Return/Line Feed.....	6-22
Carriage Returns.....	6-21
Line Spacing.....	6-20
Spacing, Font Table Proportional.....	6-22
Spacing, Proportional or Fixed.....	6-20
Formatting Commands.....	11-10
Print Position Commands.....	11-18
Print Quality Commands.....	11-26
Proportional Spacing.....	8-4
Single Character Commands.....	11-7
Special Printer Features.....	11-30
Summary of Supported Qume Commands.....	11-4
Unsupported Qume Commands.....	11-6
Qume - Using Proportional Spacing.....	11-4

---

## R

RAM.....	10-39, 10-41
Redefining characters.....	see "QMSRED"
Reset.....	6-23, 6-25, 7-16
Returning Merchandise.....	2-3
Right Page Margin.....	6-32

---

## S

Safety, Laser.....	ii
Selecting Current Font.....	6-6
Selecting Default Landscape Font.....	6-16
Selecting Default Portrait Font.....	6-18
Selecting Emulation Mode.....	6-27
Selecting Page Size/Orientation.....	6-27
Separation Belt.....	12-9
Cleaning the Separation Belt.....	12-9

Replating the Separation Belt .....	12-10
Serial Interface Cable Specifications .....	13-7
Serial Interface Options .....	6-36
Service Call .....	12-23
Seven bit system considerations . 9-31, 10-34, 10-35, 10-37, 10-40, 10-41, 10-42, 10-43, 10-44	
Seven Special Commands .....	7-1
Command Format Defined .....	7-4
Numeric Parameters Defined .....	7-7
Summary of Commands .....	7-7
Transmitting Control Characters .....	7-3
Software Commands .....	4-19
Status Codes .....	4-8
Status Summary Sheet .....	3-12, 4-19, 6-24, 7-15, 8-2
Special Characters (Epson) .....	10-40
defining .....	10-40
Spacers, removal of .....	2-8
Supported Epson Commands .....	10-7
Supported Qume Commands .....	11-7
System Function Options (Group 0) .....	6-23
Blank Page, Suppress .....	6-26
Clear Buffer .....	6-24
Configuration Reset .....	6-25
Copy Count Reset .....	6-23
Form Feed/Carriage Return .....	6-25
Hex Dump .....	6-24
Reset Command/Font Tables .....	6-26
Reset, Immediate Command Table .....	6-27
Reset, Immediate Font Table .....	6-27
Status Summary Sheet, Suppress .....	6-26

---

## T

Tabs .....	see "Horizontal" or "Vertical"
Test Key .....	4-5
Toggle Key .....	4-6
Toner Cartridge .....	see "Print Cartridge"
Top Page Margin .....	6-33
Translation Tables .....	6-24, 6-25
Transmitting Control Characters .....	7-3

Troubleshooting .....	12-16
Diagnostic Page .....	12-18
Error Codes .....	12-16
Two-Sided Printing .....	4-14
Typefaces .....	see "Fonts"

---

## U

Underlining .....	9-29, 10-17, 11-26
Unpacking .....	2-1
Unsupported Diablo Commands .....	9-6
Unsupported Epson Commands .....	10-6
Unsupported Qume Commands .....	11-6
User Maintenance .....	12-2
Useful Hints .....	8-1
Addressable vs. Printable Areas .....	8-3
Cancel Option .....	8-1
Current Font in Epson Emulation .....	8-4
Data Light .....	8-3
Diablo - Using Proportional Spacing .....	8-4
Don't Print Status Summary Sheet .....	8-2
Epson Graphics - Page Orientation .....	8-3
Form Feed Key .....	8-2
Lost Data Upon Power-Up .....	8-3
Qume - Using Proportional Spacing .....	8-4
Suppress Blank Pages .....	8-2

---

## V

Vertical Tab Command .....	9-10, 10-28, 11-9
setting tab stops for .....	9-18, 10-28, 10-29

---

## W

Warm Restart .....	4-7
Wire Cleaner, installing .....	2-9
Word Processors .....	5-4, 5-6

---

## Z

Zeros, slashes in .....	6-15
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