

--- TROY Security Printing Solutions ---  
**Programmer's Reference Guide**

**Seventh Edition – April 2006**

# Preface

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# Preface

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## Printing History

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### **NOTICE**

**This document is the current edition of the TROY Security Printing Solutions Programmer's Reference Guide, containing extensions to the PCL 5e printer language for the exclusive use of TROY Group Inc. and its assignees.**

# Preface

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# Preface

## Inside This Guide

TROY Group Inc. has developed a set of programming extensions to the Hewlett Packard PCL 5e programming language. These extensions are available in the TROY MICR Series printers, sold exclusively by TROY Group Inc. and its distributors. While some of the features contained in this guide are compatible with previous printers sold by TROY, this guide was specifically developed to support the TROY 4200, 4300, and 9000 Series (or later) printers.

This guide provides a technical definition of these extension commands and how to apply them within the context of a program to perform useful work. As such, this guide was written for people with some programming knowledge, and more specifically, programming knowledge using the HP PCL 5e printer language. Before attempting to use this guide, it is strongly recommended the reader review the PCL 5 Printer Language Technical Reference Guide and the Printer Job Language Technical Reference Manual, available from Hewlett Packard Company in the PCL 5e Technical Reference Bundle.

Because virtually all TROY PCL 5e extension commands require the programmer to be able to write an *escape* character (decimal 27, hexadecimal 0x1B) into a file or out to the printer, before beginning to use this guide, be certain to identify within your programming environment how you will output this character. Many, if not all, Microsoft Windows printer drivers do not support sending the escape character directly to a printer. Should you need assistance, please contact TROY Technical Support.

Technical assistance is available Monday – Friday, 8:00 AM to 8:00 PM (Eastern Standard Time). Please call **(800) 332-6427** or **(304) 232-0899** (outside the U.S.).

You may also send a fax to TROY Technical Support at **(304) 232-0996** or an email to: [techsupport@troygroup.com](mailto:techsupport@troygroup.com)

This guide has been written as a companion to the TROY Security Printing Solutions User's Guide. You are encouraged to review the TROY Quick-Start Guide, the TROY Security Printing Solutions User's Guide, and the TROY MICR Basics Handbook. It is recommended that you have these documents available before proceeding.

## Chapter Summaries

### Chapter 1 – Introduction

This chapter provides a brief introduction to this guide, defining how the guide is organized and how to effectively use the information presented.

### Chapter 2 – Security Settings

This chapter introduces the administrator and user-level security for the printer. Configuring the printer requires an administrator password (login) and placing the printer in a special *download mode*. Many of the print job-based secure features of TROY Security Printing Solutions also require the use of a user login. This chapter defines how to programmatically define and use login security in the printer.

### Chapter 3 – Printing Control

This chapter describes many of the printer-centric features of TROY Security Printing Solutions and how to control them programmatically. Refer to this chapter for the following commands: MICR mode, printer type, TROY *ExPT* offsets, automatic image rotation, paper tray mapping, configuration and quality page printing, alternate escape character definition, alternate command set, Printer, MICR and JOB PIN security, languages supported and related commands.

### Chapter 4 – Secure and Public Resources

This chapter describes how printer resources (fonts, macros, and data files) can be stored in the TROY flash-file system contained on the TROY DIMM/memory card. Commands to add and delete fonts, macros, and data files as either *public* or *secure* resources, and how to print the list of current resources in the printer are discussed.

### Chapter 5 – Data Capture Fonts

This chapter describes how to create your own *data capture* fonts for TROY Security Printing Solutions. Data capture fonts are used in the TROYmark™ security printing and audit reporting. Also covered is the *invisible font* feature. NOTE: The TROY Printer Utility can also be used to easily create data capture fonts.

### Chapter 6 – Barcode Fonts

This chapter describes how to create and print nine different types of correctly formatted and scanable linear barcodes using a PCL5 selection sequence.

## Chapter Summaries (cont.)

### **Chapter 7 – TROYmark™ Settings**

This chapter describes how to enable and specify the inclusion and exclusion regions for TROYmark™ security printing. TROYmark™ pattern level selection is discussed, as well as custom pattern creation.

### **Chapter 8 – Audit Options**

This chapter introduces all the audit settings that can be used to control how audit records are stored and how custom audit reports can be created.

### **Chapter 9 – Secure Audit**

This chapter describes how to enable audit data collection, how to programmatically print an audit report (based upon the settings configured in Chapter 8: *Audit Options*) and how to delete audit records from the TROY flash-file system.

### **Chapter 10 – Secure Seals**

This chapter describes the use and implementation of the Secure Seal feature, which enables the TROY printer to print a security seal on the face of a check. The printed seal contains encoded check information (i.e., payee name, date, check number, etc.) that can only be read when the seal is scanned and decoded by the check processor.

### **Chapter 11 – Pattern Processing**

This chapter describes the Pattern Processing feature, which enables the TROY printer firmware to parse the print data stream for certain regular expressions, modifying the incoming data stream as specified by the substitution string.

### **Chapter 12 – Decryption**

This chapter describes the various decryption modes supported by TROY Security Printing Solutions, how to configure the printer's symmetric key pass-phrase, how to configure the printer to only print encrypted jobs and how to configure a print job to be decrypted.

### **Chapter 13 – Printer-Specific Features**

This chapter describes various features that are available only on specific printer models. As of this publishing, this list of printer-specific features includes the TROY 2200 printer's page counting system for toner low warnings.

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## Chapter Summaries (cont.)

### Chapter 14 – Diagnostics

This chapter describes internal diagnostics capabilities available in TROY Security Printing Solutions. Job routing and the ability to print hexadecimal listings of print jobs is described.

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## Related Documentation

***TROY Security Printing User's Guide***  
(Available on the TROY Security Printing Solutions CD)

***TROY Quick-Start Guide***  
(Available on the TROY Security Printing Solutions CD)

***TROY MICR Basics Handbook***  
(Available on the TROY Security Printing Solutions CD)

***PCL 5 Printer Language – Technical Reference Guide***  
(Available from the Hewlett Packard Co.)

***PCL 5 Comparison Guide***  
(Available from the Hewlett Packard Co.)

***Printer Job Language - Technical Reference Manual***  
(Available from the Hewlett Packard Co.)

The following related manuals provide additional information about TROY Security Printing Solutions, including their features and functions.

This document contains extensive information on the installation, configuration, operation, and maintenance of the TROY Security Printing Solutions.

This document provides experienced users with a fast method for installing and configuring TROY Security Printing Solutions, including setting up a PC with the relevant Microsoft Windows printer driver and configuration files for TROY fonts.

This document defines how to create a check compatible with the ANSI X/9B Committee's recommendations for bank clearing.

This document defines the PCL 5e programming language.

This document contains updates to the PCL 5e printer language, specific to Hewlett-Packard printer models.

This document defines the PJI programming language.

# Preface

## How To Use This Guide

This guide is organized into chapters of relevant information. Each page within each chapter is laid out to view on-screen and many items are linked together for easy navigation. The following diagram illustrates the format of all pages in this guide.

### Chapter 3

### Printer Settings

#### Print Quality Document

**Also Available Via:**

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

**Usage Restrictions:**

Since the quality document contains MICR characters, a valid user login is required to print this document.

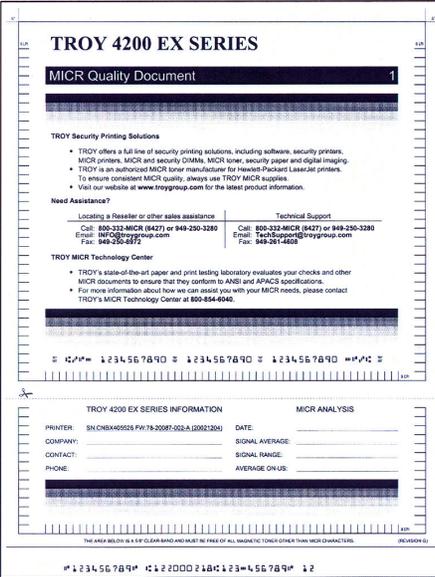
**Example:**

```
^c% - 12345X      HP PJJ UEL
@PJJ JOB NAME="Sample" ^c ^l
@PJJ SET RESOLUTION=600 ^c ^r ^f
@PJJ ENTER LANGUAGE="PCL" ^c ^l
^cE              PCL Reset
^c&u600D         Set printer and PCL
^c*t600R         resolution to 600 dpi
^c&l100          Set page orientation
^c&l17H          Set paper tray
^c&u5WUSER1      Specify name
^c%p3WCAT        Specify password
^c%u1S           Login
^c% - 12403X     Print Quality Doc.
^c%u0S          Logout
^c% - 12345X     HP PJJ UEL
@PJJ EOJ NAME="Sample" ^c ^l
^c% - 12345X     HP PJJ UEL
```

This command is used to print the internal MICR quality document. The quality document is useful for diagnosing MICR print quality problems.

```
^c % - 1 2 4 0 3 X
```

See the TROY Security Printing Solutions User's Guide and the TROY Quick-Start Guide for usage instructions.



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The left-hand column defines the usage of each command and provides an example of how each command would appear in a file. Comments are noted to the right of example commands. The right-hand column presents detailed information about the command and supporting illustrations as applicable. The escape character (decimal 27, hexadecimal 0x1B) is abbreviated “<sup>E</sup>c” throughout this manual.

## TROY Security Printing Solutions

TROY Group, Inc. offers a line of Security Printing Solutions delivering varying levels of operational and secure check-printing capabilities. Throughout this document references are made to product features supported by specific Security Printing Solutions. The following is a summary of current TROY Security Printing Solutions.

**TROY MICR Font DIMM/Memory Card:** designed for use in selected Hewlett-Packard LaserJet printers, the TROY MICR Font DIMM/Memory Card features an enhanced collection of MICR, OCR (Optical Character Recognition), barcode, and security fonts designed for printing financial documents. None of the operational or security features listed in this guide pertain to this product. This product can be added to a standard Hewlett Packard printer.

**TROY MICR Secure Font DIMM/Memory Card:** designed for use in selected Hewlett-Packard LaserJet printers, the TROY MICR Secure DIMM/Memory Card contains all the features of the TROY MICR Font DIMM/Memory Card, plus print file decryption, auditing, and printer-based security PINs, user names and passwords, and a flash-file system for storing of printing resources such as company logos, electronic forms, and custom fonts.

**TROY MICR Printer:** a Hewlett-Packard printer pre-configured with the TROY MICR DIMM/Memory Card, plus TROY's MICR toner sensing system, a TROY MICR toner cartridge, and optional paper tray locks. This product is designed for printing high-quality MICR documents and utilizes several convenient, easy-to-use operational features, including a flash-file system for storage of printing resources such as company logos, electronic forms, and custom fonts.

**TROY MICR Secure Printer:** a Hewlett-Packard printer pre-configured with the TROY MICR Secure DIMM/Memory Card (described above), plus TROY's MICR toner sensing system, a TROY MICR toner cartridge, and optional paper tray locks. This product is designed for the secure printing of high-quality MICR documents and utilizes several convenient, easy-to-use operational and security features, including a flash-file system for storage of printing resources such as company logos, electronic forms, and custom fonts.

## TROY Security Printing Solutions (cont.)

**TROY MICR Secure EX Printer:** a Hewlett-Packard printer pre-configured with the TROY MICR Secure DIMM/Memory Card (described on the previous page), plus TROY's MICR toner sensing system, a TROY MICR toner cartridge, a printer keylock switch, input paper tray locks, and also includes the TROYmark feature, AutoProtect font, and Secure Seal technology. This top-of-the-line product is designed for the secure printing of high-quality MICR documents and utilizes several convenient, easy-to-use operational and security features, including a flash-file system for storage of printing resources such as company logos, electronic forms, and custom fonts.

**TROY IRD Printer** – a Hewlett-Packard printer pre-configured with the TROY MICR DIMM/Memory Card (described on previous page), plus TROY's MICR toner sensing system, a TROY MICR toner cartridge, a duplexer, and optional paper tray locks. This product is designed for printing high-quality IRD MICR documents and utilizes several convenient, easy-to-use operational features, including a flash-file system for storage of printing resources such as company logos, electronic forms, and custom fonts.

**TROY IRD Secure EX Printer** – a Hewlett-Packard printer pre-configured with the TROY MICR Secure Memory Card (described on previous page), plus TROY's MICR toner sensing system, a TROY MICR toner cartridge, a printer keylock switch, input paper tray locks, a duplexer, and also includes the TROYmark feature, AutoProtect font, and Secure Seal technology. This top-of-the-line product is designed for the secure printing of high-quality IRD MICR documents and utilizes several convenient, easy-to-use operational and security features, including a flash-file system for storage of printing resources such as company logos, electronic forms, and custom fonts.

**TROY IRD 9050 1<sup>UP</sup> / IRD 9050 1<sup>UP</sup> Secure EX Printer** – contains the features of the TROY MICR 9050 printer and has the additional ability to print IRD 1-up forms using a specially redesigned TROY IRD duplexer and TROY IRD paper trays designed to accommodate both forward and return single IRD forms. The printer also includes a 100-sheet multipurpose tray for printing test and configuration pages using standard size paper. The Secure EX model includes the addition of paper tray locks, a printing enable/disable lock switch, and additional security features designed to enhance printing security.

## Printer Security States

To help maintain a secure MICR printing environment, TROY Security Printing Solutions have security features that, in combination, create security states. The interdependency of these security states ensures the integrity of the MICR printing security features, which can be enabled and/or configured to meet your specific security requirements. These features can be accessed through the TROY Printer Utility or the printer control panel, as well as through programming commands included in this guide.

When a MICR print job is sent to the printer, the printer firmware monitors up to five security states to determine if the pre-defined set of conditions are correct to allow the MICR job to print.

The five security features include the following:

- **MICR Mode:** MICR mode must be *enabled* to allow the printing of MICR documents. If *disabled*, the printer will not print valid MICR lines.
- **Login Status** (not supported in MICR printer and MICR Font DIMM): Two types of logins are supported – administrator and user. If user logins are implemented, the printer requires a valid user login before gaining access to any of the printer's secure resources.
- **Printer and MICR PINs** (not supported in MICR printer and MICR Font DIMM/Memory Card): Electronic print locks allow the printer's secure resources to be electronically locked (allowing only non-MICR documents to print), or the printer can be completely disabled (no documents will print) without the user entering the matching PIN number at the printer control panel.
- **Keylock Position** (Secure *EX* Printers Only): The three-position keylock allows the printer's secure resources to be physically locked (allowing only non-MICR documents to print), or the printer can be completely disabled (no documents will print).
- **MICR Toner Cartridge Sensing:** Prevents the printing of MICR documents with standard (non-MICR) toner by sensing the presence of a TROY MICR toner cartridge.

**NOTE:** See the table in Section 2 of the *TROY Security Printing Solutions User's Guide* for a list of features that are dependent on various combinations of printer security states.

## Properly Formed Jobs

### Example 1 – PJJ Job Wrapping:

{PJJ wrapper header}

```
EC%-12345X      HP PJJ UEL
@PJJ JOB NAME="Sample" CR LF
@PJJ SET RESOLUTION=600 CR LF
@PJJ ENTER LANGUAGE=PCL CR LF
ECE              PCL Reset
```

{Your PCL here}

{PJJ wrapper trailer}

```
EC%-12345X      HP PJJ UEL
@PJJ EOJ NAME="Sample" CR LF
EC%-12345X      HP PJJ UEL
```

### Example 2 – Proper PCL Page Form:

{PJJ wrapper header from above}

```
EC&u600D        Set printer and PCL
EC*t600R        resolution to 600 dpi
EC&100          Set page orientation
EC&17H          Set paper tray
```

{First page PCL here}

```
EC&10H          Print first page
EC&100          Set page orientation
EC&17H          Set paper tray
```

{Next or last page PCL here}

```
EC&10H          Print next/last page
```

{PJJ wrapper trailer from above}

Recent changes in how Hewlett Packard LaserJet printers manage print jobs makes it more important than ever that you create well formed print jobs for TROY Security Printing Solutions. Please follow these rules and workflow when creating print jobs.

**NOTE:** Throughout this guide examples may be shown with or without their associated print job command wrappers. If no print job wrapper is listed, this is done solely to increase readability of this guide. Always wrap print jobs as indicated below.

Hewlett Packard's Printer Job Language (PJJ) provides both printer configuration control as well as print job definition for all print data streams. By defining the start and end of each print job using PJJ commands you can be assured your TROY Security Printing Solution will properly print all files it receives. This is known as *wrapping* the job in PJJ (see Example 1 to the left).

The example to the left shows the proper way to wrap any print job sent to a TROY MICR printer.

Example 2 on the left shows the proper way to begin all PCL 5e print streams and would be inserted in the PJJ from the previous example where the words **Your PCL here** appear. It is recommended you repeat the page orientation and paper tray selection commands at the top of each page, affording the maximum flexibility for printed document styles and content.

**NOTE:** All PCL 5e print jobs should be printed at 600 dpi to ensure optimum secure font appearance.

**NOTE:** You should never use the <sup>F</sup><sub>F</sub> character or the <sup>E</sup><sub>C</sub> E PCL Reset command to terminate pages. Always use the <sup>E</sup><sub>C</sub>&10H command to denote the end of any PCL 5e page.

## Default and Temporary Printer Settings

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v1D</code>	<b>Enter download</b>
.	
.	Default commands
.	
<code>^C%vØD</code>	<b>Exit download</b>
<code>^C%uØS</code>	Logout

This is an example of the structure of a print job to change *default* settings in a TROY Security Printing Solution. Notice the matching pairs of Login/Logout and Enter/Exit download mode commands.

### Example:

<code>^C%u5WUSER1</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
.	
.	Job-specific cmds
.	
<code>^C%uØS</code>	Logout

This is a sample print job structure containing *job-specific* commands.

Each feature of a TROY Security Printing Solution has a default setting stored within the printer. These default settings determine how each printer feature will function when a print job is sent to the printer. The administrator can change the default settings to meet the needs of a variety of MICR printing environments using the TROY Printer Utility or the printer control panel. These settings can also be changed programmatically using the TROY PCL 5 extension commands described in this guide.

Changing the default settings within a TROY Security Printing Solution requires the administrator or a program to login to the printer using the administrator login and place the printer in what is called *download mode*. (A user cannot login and place the printer in download mode.) When in download mode, the printer stores changes to printer settings in the printers non-volatile memory and makes those changed settings active for the current and all subsequent print jobs.

Other features can only be accessed by an administrator login, even though they will not result in changes to the printer settings.

There are also a number of features that can be accessed by providing a user login. Such features can be varied on a print job by print job basis. Temporarily changing the MICR mode or default paper tray mappings are examples of job-specific features. After each print job has completed printing, all feature settings return to their default values.

The tables on the following pages (except for the Fonts table) indicate which commands can only be sent to a printer when it is in download mode, which commands may be sent to a printer that is explicitly not in download mode (job-specific), and which commands can be sent to a printer in either mode (both).

## Quick Reference Tables

The following tables summarize all TROY extensions to the PCL 5e printer language. Each entry is linked to the page in this guide containing details about the command.

### TROY Security Fonts

Function	TROY Solution	PCL 5e Extension Command
E-13B MICR Font (Legacy TROY solutions)	All	$E_C(\emptyset Q$ $E_C(s\emptyset p8.\emptyset\emptyset h8.8v\emptyset s\emptyset b\emptyset T$
E-13B MICR Font (Current TROY solutions)	All	$E_C(\emptyset Q$ $E_C(s1p12.\emptyset\emptyset v\emptyset s\emptyset b\emptyset T$
CMC-7 MICR Font (Legacy TROY solutions)	All	$E_C(\emptyset Q$ $E_C(s\emptyset p8.\emptyset\emptyset h8.8v\emptyset s\emptyset b1T$
CMC-7 MICR Font (Current TROY solutions)	All	$E_C(\emptyset Q$ $E_C(s1p12.\emptyset\emptyset v\emptyset s\emptyset b1T$
OCR-A Font	All	$E_C(\emptyset 0$ $E_C(s1p\Box v\emptyset s\emptyset b1\emptyset 4T$
OCR-B Font	All	$E_C(10$ $E_C(s1p\Box v\emptyset s\emptyset b11\emptyset T$
TROY Auto Protect Font	All	$E_C(19U$ $E_C(s1p\Box v\emptyset s\emptyset b166\emptyset 2T$ $E_C\%m1I$
TROY Micro Print Font	All	$E_C(1\emptyset U$ $E_C(s\emptyset p8\emptyset.\emptyset h\emptyset.8v\emptyset s\emptyset b\emptyset T$
TROY Reverse Helvetica Font	All	$E_C(9U$ $E_C(s1p\Box v\emptyset s33b2458\emptyset T$
TROY Security Font	All	$E_C(4Q$ $E_C(s1p\Box v\emptyset s\emptyset b\emptyset T$
Enhanced Convenience Font	All	$E_C(3Q$ $E_C(s1p18.\emptyset v\emptyset s\emptyset b\emptyset T$
Large Convenience Font	All	$E_C(1Q$ $E_C(s\emptyset p5.\emptyset h16.\emptyset v\emptyset s\emptyset b\emptyset T$
Small Convenience Font	All	$E_C(2Q$ $E_C(s\emptyset p6.\emptyset\emptyset h22.\emptyset v\emptyset s\emptyset b\emptyset T$

□ = desired point size

## Quick Reference Tables (cont.)

### International Security Fonts

Function	TROY Solution	PCL 5e Extension Command
TROY Security Font (Spanish)	All	$E_C(4Q$ $E_C(s1p□vØsØb4T$
Large Convenience Font (British)	All	$E_C(1Q$ $E_C(sØp5.14h16.Ø9vØsØb1T$
Small Convenience Font (British)	All	$E_C(2Q$ $E_C(sØp6h22.68vØsØb1T$
Large Convenience Font (French)	All	$E_C(1Q$ $E_C(sØp5.14h16.Ø9vØsØb2T$
Small Convenience Font (French)	All	$E_C(2Q$ $E_C(sØp6h22.68vØsØb2T$
Large Convenience Font (Italian)	All	$E_C(1Q$ $E_C(sØp5.14h16.Ø9vØsØb3T$
Small Convenience Font (Italian)	All	$E_C(2Q$ $E_C(sØp6h22.68vØsØb3T$
Large Convenience Font (Spanish)	All	$E_C(1Q$ $E_C(sØp5.14h16.Ø9vØsØb4T$
Small Convenience Font (Spanish)	All	$E_C(2Q$ $E_C(sØp6h22.68vØsØb4T$

□ = desired point size

**NOTE:** International security fonts must be installed into the TROY flash-file system DIMM using the TROY Printer Utility. The fonts files are located on the TROY Security Printing Solutions CD in the \Intl folder.

## Quick Reference Tables (cont.)

### Chapter 2 – Security Settings

Function	TROY Solution	Command Availability	PCL 5e Extension
Specify Name	All	Both	E <sub>c</sub> %u#W <i>data</i>
Specify Password	All	Both	E <sub>c</sub> %p#W <i>data</i>
Login	All	Both	E <sub>c</sub> %u1S
Logout	All	Both	E <sub>c</sub> %uØS
Enter Download Mode	All	Download	E <sub>c</sub> %v1D
Exit Download Mode	All	Download	E <sub>c</sub> %vØD
Printer Lock PIN	All Secure	Download	E <sub>c</sub> %l#W <i>data</i>
MICR Lock PIN	All Secure	Download	E <sub>c</sub> %m#W <i>data</i>
Job Name and PIN	All Secure	Download	(See Chapter 2)
Toner Sensor Response	All Printers	Download	E <sub>c</sub> %t#E
Add User	All Secure	Download	E <sub>c</sub> %u2S
Delete User	All Secure	Download	E <sub>c</sub> %u3S
Change Password	All	Download	E <sub>c</sub> %u4S
Delete All Users	All Secure	Download	E <sub>c</sub> %u5S
Print User List	All	Download	E <sub>c</sub> %u-1S

## Quick Reference Tables (cont.)

### Chapter 3 – Printing Control

Function	TROY Solution	Command Availability	PCL 5e Extension
MICR Mode Enable	All	Both	$\text{E}_c\% - 12400X$
MICR Mode Disable	All	Both	$\text{E}_c\% - 12401X$
Print E-13B Quality Document	All	Both	$\text{E}_c\% - 12403X$
Print CMC-7 Quality Document	All	Both	$\text{E}_c\% - 12404X$
Print Configuration Page	All	Both	$\text{E}_c\% - 12420X$
Printer Type	All	Download	$\text{E}_c\%t\#X$
Remap Paper Tray	All	Both	$\text{E}_c\%i\#T$
Specify Paper Trap Mapping	All	Download	$\text{E}_c\%i\#W \textit{ data}$
Alternate Escape Character	All	Both	$\text{E}_c\%e\#W \textit{ data}$
Alternate Command Set	(Optional)	Download	$\text{E}_c\%i\#E$
ExPT Image Offset X	All	Download	$\text{E}_c\%o\#I$
ExPT Image Offset Y	All	Download	$\text{E}_c\%o\#J$
ExPT MICR Line Offset X	All	Download	$\text{E}_c\%o\#M$
ExPT MICR Line Offset Y	All	Download	$\text{E}_c\%o\#N$
Automatic Page Rotation	All	Both	$\text{E}_c\%o\#R$
Languages Supported	All Secure	Download	$\text{E}_c\%l\#T$

## Quick Reference Tables (cont.)

### Chapter 4 – Secure and Public Resources

Function	TROY Solution	Command Availability	PCL 5e Extension
Add Public Font	All	Download	$\text{E}_c^*c4F$
Add Secure Font	All Secure	Download	$\text{E}_c^*c5F$
Add Public Macro	All	Download	$\text{E}_c\&f9X$
Add Secure Macro	All Secure	Download	$\text{E}_c\&f1\emptyset X$
Print Resource List	All	Download	$\text{E}_c\%v2D$
Delete All Public Resources	All	Download	$\text{E}_c\%v7D$
Delete All Secure Resources	All Secure	Download	$\text{E}_c\%v8D$
Delete All Resources	All Secure	Download	$\text{E}_c\%v9D$
Delete All Public Fonts	All	Download	$\text{E}_c\%v1\emptyset D$
Delete All Secure Fonts	All Secure	Download	$\text{E}_c\%v11D$
Delete All Fonts	All Secure	Download	$\text{E}_c\%v12D$
Delete All Public Macros	All	Download	$\text{E}_c\%v13D$
Delete All Secure Macros	All Secure	Download	$\text{E}_c\%v14D$
Delete All Macros	All Secure	Download	$\text{E}_c\%v15D$

### Chapter 5 – Data Capture Fonts

Function	TROY Solution	Command Availability	PCL 5e Extension
Data Capture Type	All Secure	Job-specific	$\text{E}_c\%m\#T$
Invisible Print Data	Secure EX	Job-specific	$\text{E}_c\%m\#I$

## Quick Reference Tables (cont.)

### Chapter 6 – Barcode Fonts

Function	TROY Solution	PCL 5e Extension Command
UPC - A	All	$E_c(8Y$ $E_c(s1p\Box v\emptyset s\emptyset b246\emptyset\emptyset T$
UPC - E	All	$E_c(8Y$ $E_c(s1p\Box v\emptyset s\emptyset b2461\emptyset T$
EAN - 8	All	$E_c(8Y$ $E_c(s1p\Box v\emptyset s\emptyset b2462\emptyset T$
EAN - 13	All	$E_c(8Y$ $E_c(s1p\Box v\emptyset s\emptyset b2463\emptyset T$
Interleaved 2 of 5	All	$E_c(4Y$ $E_c(s1p\Box v\emptyset s\emptyset b2464\emptyset T$
Code 39 (3 of 9)	All	$E_c(\emptyset Y$ $E_c(s1p\Box v\emptyset s\emptyset b2467\emptyset T$
Code 128	All	$E_c(\emptyset Y$ $E_c(s1p\Box v\emptyset s\emptyset b247\emptyset\emptyset T$
POSTNET	All	$E_c(15Y$ $E_c(s1p\Box v\emptyset s\emptyset b2477\emptyset T$
Reverse POSTNET	All	$E_c(\emptyset Y$ $E_c(s1p\Box v\emptyset s33b2477\emptyset T$

□ = desired point size

## Quick Reference Tables (cont.)

### TROY Fonts for Code 128

Char Set A	Char Set B	Char Set C	Index	TROY Character Set		
ASCII	ASCII	Value	Value	Decimal	ASCII	Hex
Space	Space	00	0	32	SP	20
!	!	01	1	33	!	21
"	"	02	2	34	"	22
#	#	03	3	35	#	23
\$	\$	04	4	36	\$	24
%	%	05	5	37	%	25
&	&	06	6	38	&	26
'	'	07	7	39	'	27
(	(	08	8	40	(	28
)	)	09	9	41	)	29
*	*	10	10	42	*	2A
+	+	11	11	43	+	2B
,	,	12	12	44	,	2C
-	-	13	13	45	-	2D
.	.	14	14	46	.	2E
/	/	15	15	47	/	2F
0	0	16	16	48	0	30
1	1	17	17	49	1	31
2	2	18	18	50	2	32
3	3	19	19	51	3	33
4	4	20	20	52	4	34
5	5	21	21	53	5	35
6	6	22	22	54	6	36
7	7	23	23	55	7	37
8	8	24	24	56	8	38
9	9	25	25	57	9	39
:	:	26	26	58	:	3A
;	;	27	27	59	;	3B
<	<	28	28	60	<	3C
=	=	29	29	61	=	3D

## Quick Reference Tables (cont.)

### TROY Fonts for Code 128 (cont.)

Char Set A	Char Set B	Char Set C	Index	TROY Character Set		
ASCII	ASCII	Value	Value	Decimal	ASCII	Hex
>	>	30	30	62	>	3E
?	?	31	31	63	?	3F
@	@	32	32	64	@	40
A	A	33	33	65	A	41
B	B	34	34	66	B	42
C	C	35	35	67	C	43
D	D	36	36	68	D	44
E	E	37	37	69	E	45
F	F	38	38	70	F	46
G	G	39	39	71	G	47
H	H	40	40	72	H	48
I	I	41	41	73	I	49
J	J	42	42	74	J	4A
K	K	43	43	75	K	4B
L	L	44	44	76	L	4C
M	M	45	45	77	M	4D
N	N	46	46	78	N	4E
O	O	47	47	79	O	4F
P	P	48	48	80	P	50
Q	Q	49	49	81	Q	51
R	R	50	50	82	R	52
S	S	51	51	83	S	53
T	T	52	52	84	T	54
U	U	53	53	85	U	55
V	V	54	54	86	V	56
W	W	55	55	87	W	57
X	X	56	56	88	X	58
Y	Y	57	57	89	Y	59
Z	Z	58	58	90	Z	5A

## Quick Reference Tables (cont.)

### TROY Fonts for Code 128 (cont.)

Char Set A	Char Set B	Char Set C	Index	TROY Character Set		
ASCII	ASCII	Value	Value	Decimal	ASCII	Hex
[	[	59	59	91	[	5B
\	\	60	60	92	\	5C
]	]	61	61	93	]	5D
		62	62	94	^	5E
_	_	63	63	95	_	5F
NUL	`	64	64	96	`	60
SOH	a	65	65	97	a	61
STX	b	66	66	98	b	62
ETX	c	67	67	99	c	63
EOT	d	68	68	100	d	64
ENQ	e	69	69	101	e	65
ACK	f	70	70	102	f	66
BEL	g	71	71	103	g	67
BS	h	72	72	104	h	68
HT	i	73	73	105	i	69
LP	j	74	74	106	j	6A
VT	k	75	75	107	k	6B
FF	l	76	76	108	l	6C
CR	m	77	77	109	m	6D
SO	n	78	78	110	n	6E
SI	o	79	79	111	o	6F
DLE	p	80	80	112	p	70
DC1	q	81	81	113	q	71
DC2	r	82	82	114	r	72
DC3	s	83	83	115	s	73
DC4	t	84	84	116	t	74
NAK	u	85	85	117	u	75
SYN	v	86	86	118	v	76
ETB	w	87	87	119	w	77

## Quick Reference Tables (cont.)

### TROY Fonts for Code 128 (cont.)

Char Set A	Char Set B	Char Set C	Index	TROY Character Set		
ASCII	ASCII	Value	Value	Decimal	ASCII	Hex
CAN	x	88	88	120	x	78
EM	y	89	89	121	y	79
SUB	z	90	90	122	z	7A
ESC	{	91	91	123	{	7B
FS		92	92	124		7C
GS	}	93	93	125	}	7D
RS	~	94	94	126	~	7E
US	DEL	95	95	127	DEL	7F
FNC3	FNC3	96	96	128		80
FNC2	FNC2	97	97	129		81
Shift	Shift	98	98	130		82
Code C	Code C	99	99	131		83
Code B	FNC4	Code B	100	132	IND	84
FNC4	Code A	Code A	101	133	NEL	85
FNC1	FNC1	FNC1	102	134	SSA	86
Start A	Start A	Start A	103	135	ESA	87
Start B	Start B	Start B	104	136	HTS	88
Start C	Start C	Start C	105	137	HTJ	89
Stop	Stop	Stop	106	138	VTS	8A

**NOTE:** ASCII characters beyond the decimal value of 127 are not printable characters and are not typically used within the Code 128 barcode.

## Quick Reference Tables (cont.)

### TROY Fonts for Code 39

TROY Character Set		
Decimal	ASCII	Hex
48	0	30
49	1	31
50	2	32
51	3	33
52	4	34
53	5	35
54	6	36
55	7	37
56	8	38
57	9	39
65	A	41
66	B	42
67	C	43
68	D	44
69	E	45
70	F	46
71	G	47
72	H	48
73	I	49
74	J	4A
75	K	4B
76	L	4C
77	M	4D
78	N	4E
79	O	4F
80	P	50
81	Q	51
82	R	52
83	S	53
84	T	54
85	U	55
86	V	56
87	W	57
88	X	58
89	Y	59
90	Z	5A

## Quick Reference Tables (cont.)

### TROY Fonts for Code 39 (cont.)

TROY Character Set		
Decimal	ASCII	Hex
45	-	2D
46	.	2E
32	SPACE	20
36	\$	24
47	/	2F
43	+	2B
37	%	25
42	* (stop/start)	2A

### TROY Fonts for POSTNET

Font & Barcode Element	Count	Character Range Decimal; Hex; ASCII	ASCII (if used as a digit)											
			0	1	2	3	4	5	6	7	8	9		
Start	1	91; 5B; [												
Data	5, 9, 11	48-57; 30-39; 0-9	0	1	2	3	4	5	6	7	8	9		
Checksum	1	48-57; 30-39; 0-9	0	1	2	3	4	5	6	7	8	9		
Stop	1	93; 5D; ]												

## Quick Reference Tables (cont.)

### TROY Fonts for EAN 13, EAN 8, UPC-A, and UPC-E

Font and Barcode Element	Ct	Character Range (Dec; Hex; ASCII)	ASCII (if used as a digit)									
			0	1	2	3	4	5	6	7	8	9
<b>EAN 13</b>												
Visual system number, left guard	1	97-106; 61-6A; a-j	a	b	c	d	e	f	g	h	i	j
Left side odd parity	6	48-57; 30-39; 0-9	0	1	2	3	4	5	6	7	8	9
Left side even parity		75-84; 4B-54; K-T	K	L	M	N	O	P	Q	R	S	T
Middle guard	1	109; 6D; m										
Right side even parity	6	65-74; 41-4A; A-J	A	B	C	D	E	F	G	H	I	J
Right guard	1	93; 5D; ]										
<b>EAN 8</b>												
Start guard	1	91; 5B; [										
Left side odd parity	4	48-57; 30-39; 0-9	0	1	2	3	4	5	6	7	8	9
Middle guard	1	109; 6D; M										
Right side even parity	4	65-74; 41-4A; A-J	A	B	C	D	E	F	G	H	I	J
Right guard	1	93; 5D; ]										
<b>UPC-A</b>												
Visual system number, left guard, left side odd parity system number	1	97-106; 61-6A; a-j	a	b	c	d	e	f	g	h	i	J
Left side odd parity	5	48-57; 30-39; 0-9	0	1	2	3	4	5	6	7	8	9
Middle guard	1	109; 6D; m										
Right side even parity	5	65-74; 41-4A; A-J	A	B	C	D	E	F	G	H	I	J
Right side even parity checksum, right guard, visual checksum	1	110-119; 6E-77; n-w	n	o	p	q	r	s	t	u	v	w
<b>UPC-E</b>												
Visual system number, left guard	1	97-106; 61-6A; a-j	a	b	c	d	e	f	g	h	i	J
Left side odd parity	6	48-57; 30-39; 0-9	0	1	2	3	4	5	6	7	8	9
Left side even parity		65-74; 41-4A; A-J	A	B	C	D	E	F	G	H	I	J
Right guard, visual checksum	1	110-119; 6E-77; n-w	n	o	p	q	r	s	t	u	v	w

## Quick Reference Tables (cont.)

### Chapter 7 – TROYmark™ Settings

Function	TROY Solution	Command Availability	PCL 5e Extension
TROYmark Control	Secure EX	Job-specific	E <sub>c</sub> %w#M
TROYmark Regions	Secure EX	Job-specific	E <sub>c</sub> %w#B
Region Anchor X	Secure EX	Job-specific	E <sub>c</sub> %w#X
Region Anchor Y	Secure EX	Job-specific	E <sub>c</sub> %w#Y
Region Width	Secure EX	Job-specific	E <sub>c</sub> %w#H
Region Height	Secure EX	Job-specific	E <sub>c</sub> %w#V
Specify TROYmark Pattern	Secure EX	Download	E <sub>c</sub> %w#P
Download TROYmark Pattern	Secure EX	Download	E <sub>c</sub> %w#W <i>data</i>

### Chapter 8 – Audit Options

Function	TROY Solution	Command Availability	PCL 5e Extension
Sort By	All Secure	Download	E <sub>c</sub> %a#S
Audit Paper Tray	All Secure	Download	E <sub>c</sub> %a#T
Print Range Recent	All Secure	Download	E <sub>c</sub> %a11E
Print Range All	All Secure	Download	E <sub>c</sub> %a12E
Report Type Summary	All Secure	Download	E <sub>c</sub> %a13E
Report Type Detailed	All Secure	Download	E <sub>c</sub> %a14E
Sort Order Ascending	All Secure	Download	E <sub>c</sub> %a15E
Sort Order Descending	All Secure	Download	E <sub>c</sub> %a16E
Auto Delete Disable	All Secure	Download	E <sub>c</sub> %a3ØE
Auto Delete Enable	All Secure	Download	E <sub>c</sub> %a31E
Auto Report Disable	All Secure	Download	E <sub>c</sub> %a32E
Auto Report Enable	All Secure	Download	E <sub>c</sub> %a33E

## Quick Reference Tables (cont.)

### Chapter 9 – Secure Audit

Function	TROY Solution	Command Availability	PCL 5e Extension
Audit Recording Disabled	All Secure	Download	<code>%a0E</code>
Audit Recording Summary	All Secure	Download	<code>%a1E</code>
Audit Recording Detail	All Secure	Download	<code>%a2E</code>
Print Audit Report	All Secure	Both	<code>%a1D</code>
Delete Audit Data	All Secure	Both	<code>%a2D</code>

### Chapter 10 – Secure Seals

Function	TROY Solution	Command Availability	PCL 5e Extension
Specify data ID	All Secure	Job-specific	<code>%v#I</code>
Specify contents of data for last ID provided. # is replaced with length of data following W.	All Secure	Job-specific	<code>%v#W</code>
Delete all non-secure data	All Secure	Job-specific	<code>%v16D</code>
Delete all secure data	All Secure	Job-specific	<code>%v17D</code>
Delete all data	All Secure	Job-specific	<code>%v18D</code>
Delete one data for last ID provided.	All Secure	Job-specific	<code>%v31D</code>
Change data to secure for last ID provided.	All Secure	Job-specific	<code>%v32D</code>
Change data to non-secure for last ID provided.	All Secure	Job-specific	<code>%v33D</code>
Download data into print stream for last ID provided.	All Secure	Job-specific	<code>%v34D</code>
Specify name of data for last ID provided. # is replaced with length of data following W, which is 8 + length of name data	All Secure	Job-specific	<code>%h#W&lt;00&gt;&lt;00&gt;&lt;00&gt;&lt;03&gt;&lt;00&gt;&lt;01&gt;&lt;00&gt;&lt;00&gt;&lt;name&gt;</code>

**NOTE:** Secure Seal PCL commands are valid only when the printer is in modify mode.

## Quick Reference Tables (cont.)

### Secure Seal Field Descriptions

Field Letter	Field Name	Field Type	Max Size	Description
T	Template Name	alphanumeric	80	Encoding template name as stored in TROY NV area.
P	Payee Name	alphanumeric	32	Payee name
V	Check Value	numeric	16	Dollar value of the check (includes optional decimal point)
A	Account #	numeric	20	Account number of the checking account
B	Routing #	numeric	20	Routing number of the bank
D	Date	numeric	20	Date of the check (YYYYMMDD, YYYY/MM/DD, or DD/MM/YYYY)
N	Transaction #	numeric	20	Transaction number of the check
C	Check #	numeric	20	Check number
X	X Location	numeric	6	Specifies X location of the seal if the seal option "Use Location" is enabled. Units are 1/720" (decipoints).
Y	Y Location	numeric	6	Specified Y location of the seal if the seal option "Use Location" is enabled. Units are 1/720" (decipoints).
R	Resolution	numeric	3	Designates seal print resolution in DPI. Must be one of 75, 100, 150, 200, 300 (default), or 600.

## Quick Reference Tables (cont.)

### Secure Seal Options

Name	Effect of option when enabled	Bit
Use Metadata	Seal data from TROY metadata tagged fields, if available. Otherwise field data must be specified in seal command.	0
Auto Print	Auto print seal for each page. Location option must be enabled.	1
Use Location	Seal prints at location specified by X, Y position, otherwise seal prints at current PCL location on page.	2
Show Error	Display error information on front panel of printer, otherwise errors are silently ignored.	3

### Chapter 11 – Pattern Processing

Function	TROY Solution	Command Availability	PCL 5e Extension
Enable pattern processor	All Secure	Job-specific	$\text{E}_c\%h8W<00><00><00><05><00><04><00><01>$
Disable pattern processor	All Secure	Job-specific	$\text{E}_c\%h8W<00><00><00><05><00><04><00><00>$
Remove all patterns	All Secure	Job-specific	$\text{E}_c\%h8W<00><00><00><05><00><02><00><00>$
To add a pattern	All Secure	Job-specific	$\text{E}_c\%h\#W<00><00><00><05><00><01><00><00><$ one byte with binary length of regex><one byte with binary length of sub><sub string>
Activate pattern processor report	All Secure	Download	$\text{E}_c\%-12440X$

## Quick Reference Tables (cont.)

### Chapter 12 – Decryption

Function	TROY Solution	Command Availability	PCL 5e Extension
Decryption Password	All Secure	Job-specific	$\text{E}_c\%c\#W$ <i>data</i>
Decryption Control	All Secure	Job-specific	$\text{E}_c\%c\#T$
Decryption Mode	All Secure	Download	$\text{E}_c\%c\#M$

### Chapter 13 – Printer-Specific Features

Function	TROY Solution	Command Availability	PCL 5e Extension
Pages Per Cartridge	All 2200	Download	$\text{E}_c\%t\#L$
Reset Page Counter	All 2200	Download	$\text{E}_c\%-124\emptyset2X$
Disable Toner Low Warnings	All 2200	Download	$\text{E}_c\%-1241\emptysetX$
Enable Toner Low Warnings	All 2200	Download	$\text{E}_c\%-12411X$

### Chapter 14 – Diagnostics

Function	TROY Solution	Command Availability	PCL 5e Extension
Input Job Routing	All	Download	$\text{E}_c\%r\#I$
Output Job Routing	All	Download	$\text{E}_c\%r\#O$
Jobs To Route	All	Download	$\text{E}_c\%r\#J$

## Introduction

### Administrator Name and Password

An administrator password is used within the TROY Security Printing Solutions printers to secure the printer's configuration settings. The printer uses a permanent default user name (*ADMIN*) that cannot be deleted or modified; however, the administrator password can be modified using the TROY Printer Utility or the printer control panel. The administrator default password is blank (no password); however, administrators are encouraged to setup a unique password to restrict access to the TROY Security Printer's configuration settings.

**NOTE:** The administrator's password is stored in the printer's non-volatile flash memory and will remain resident even when the printer power is cycled (switched OFF and ON).

**NOTE:** It is the administrator's responsibility to safeguard all name and password information, including paper printouts and the electronic name and password lists (UPL files) saved on the administrator's computer.

Although the administrator password can be set via the printer control panel, TROY strongly recommends using the TROY Printer Utility to set or modify the administrator password. The TROY Printer Utility will automatically update the printer's administrator password whenever the password is changed in the printer utility. However, changing the administrator password at the printer control panel will not update the TROY Printer Utility password (there is no bi-directional communication). The printer's administrator password and the TROY Printer Utility password must be identical in order to access the printer features through the TROY Printer Utility.

**NOTE:** Initially, the default password for the printer is blank (no password). To maintain printer security, it is strongly recommended that the administrator change the password to prevent unauthorized access to the printer control panel.

**NOTE:** Some TROY Security Printing Solutions support only numeric password entry from the printer control panel. As an additional security measure, by configuring these printers with an alphanumeric password, the administrator can lock out control panel access to printer features. Refer to the User's Guide for your TROY Security Printing Solution for further details.

## Introduction (cont.)

### User Names and Passwords (MICR Secure and MICR Secure *EX* models only)

This feature allows the administrator to set up to 20 user names and passwords (one administrator and 19 users) to prevent unauthorized access of the printer's secure resources and other security features. All names and passwords are stored in the secure memory area of the printer's memory and can be assigned and/or modified by the administrator using the TROY Printer Utility. The administrator can print a list of active user names and passwords using the TROY Printer Utility or printer control panel.

If the administrator configures a printer with one or more user names and passwords, the following list of features will only be accessible to print jobs or user requests at the control panel when a valid user name and password is used to log in.

- Access to the TROY MICR fonts.
- Access to all resources stored in the secure area of the printer's flash-file system.
- Changes to the MICR mode.
- Disabling of the paper tray mapping set by an administrator to secure check paper in a paper tray.
- Printing of audit reports and deletion of audit records.
- Printing of sample reports containing MICR characters (Windows Demonstration and PCL Demonstration pages).

User names will be automatically recorded in the enhanced audit data (Secure and Secure *EX* printers only) for each print job initiated by a user. The system default user password is blank (no password) and not entering a user password when assigning a new user will allow that user to access the printer's secure resources without using a password. Attempts to add duplicate users will be ignored. If you choose not to set up user names and passwords, TROY strongly recommends that administrators set up an administrator password to prevent unauthorized access to the printer features and settings from the TROY Printer Utility, the TROY Port Monitor, or the printer control panel.

## Specify Name

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	√

### Usage Restrictions:

This command is available to all users.

### Example:

```

EC%u5WADMIN      Specify name
EC%pØW           Specify password
EC%u1S           Login
    
```

### TROY-specific commands

```

EC%uØS           Logout
    
```

This example shows the factory default login sequence for the administrator. When TROY Security Printing Solutions are initially powered on, each will have blank passwords.

This command is used to specify the name that will be used to login to the printer, to add as a new user, to delete from the printer, or whose password is to be changed.

<sup>E</sup><sub>C</sub> % u # W *data*

# = Number of characters (bytes) contained in the *data*

Default = Ø

Range = Ø - 8 (values outside range will be clamped and excess characters printed)

The format for characters contained in the *data* is as follows:

- Each character must be in the range of Ø – 9 or A – Z or “ ” (space character)
- Lower case letters are not supported and are not automatically converted
- The *data* should **not** be terminated with a <sup>C</sup><sub>R</sub> <sup>L</sup><sub>F</sub>.

If *data* contains any invalid characters, the entire command is ignored.

When specifying the administrator name, that name must be “ADMIN”.

The order of Specify Name and Specify Password commands within a file is irrelevant. TROY’s recommended practice (stated throughout this guide) is to specify the name before the password.

## Specify Password

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	√

### Usage Restrictions:

This command is available to all users.

### Example:

```

EC%u5WUSER1      Specify name
EC%p3WCAR        Specify password
EC%u1S           Login
    
```

### TROY-specific commands

```

EC%uØS           Logout
    
```

This example shows a sample user login.

This command is used to specify the password that will be used to login to the printer as well as when adding or deleting a user or changing a login password.

<sup>E</sup><sub>C</sub> % p # W *data*

# = Number of characters (bytes) contained in the *data*

Default = Ø

Range = Ø - 8 (values outside range will be clamped and excess characters printed)

The format for characters contained in the *data* is as follows:

- Each character must be in the range of Ø – 9 or A – Z or “ ” (space character)
- Lower case letters are not supported and are not automatically converted
- The *data* should **not** be terminated with a <sup>C</sup><sub>R</sub> <sup>L</sup><sub>F</sub>.

If *data* contains any invalid characters, the entire command is ignored.

The default administrator password is <blank>, specified as <sup>E</sup><sub>C</sub> % p Ø W

The order of Specify Name and Specify Password commands within a file is irrelevant. TROY’s recommended practice (stated throughout this guide) is to specify the name before the password.

## Login and Logout

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	√

### Usage Restrictions:

This command is available to all users.

### Example:

$\text{E}_c\%u5WADMIN$	Specify name
$\text{E}_c\%p6WSECRET$	Specify password
$\text{E}_c\%u1S$	<b>Login</b>
$\text{E}_c\%a1D$	Print audit report
$\text{E}_c\%u\emptyset S$	<b>Logout</b>

This example illustrates how to print an audit report. In order to print the report, which is considered secure information, a valid login must be provided. Note: In this example, a user login could have been provided instead of the administrator login.

This command uses the last specified name and password and logs user into the printer.

$\text{E}_c\%u\#S$

# =  $\emptyset$  – Logout  
1 – Login

Default =  $\emptyset$

Range =  $\emptyset$  - 1 (values outside range will be ignored if they are not other commands)

If an invalid name or password is specified, the login will fail and the printer will remain in its previous login security state.

The following is a partial list of printer features that require a valid login in order to use them.

- Change the default settings for TROY Security Printing Solution configuration options.
- Enter download mode (see below).
- Add and delete secure resources stores on the secure file system.
- Print TROY signatures, logos and other data stored in the secure file system.
- Add, change or delete user names and passwords.
- Print the user name and password list.
- Configure, print and delete audit records.
- Use TROY's ExPT technology to adjust the image and MICR line on a page.
- Re-map paper trays.
- Configure the languages supported and decryption mode in use.
- Print sample and maintenance documents containing MICR characters.

**NOTE:** If an end-of-job is observed in the print job data stream and no explicit logout commands is received, the printer will automatically log the current user off of the printer. As good programming practice, it is still recommended to logout at the end of each print job.

## Download Mode

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must be logged in as the administrator to place the printer into *download mode*.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	<b>Enter download</b>
<code>E_c%u5WUSER1</code>	Specify name
<code>E_c%p3WCAT</code>	Specify password
<code>E_c%u2S</code>	Add user
<code>E_c%vØD</code>	<b>Exit download</b>
<code>E_c%uØS</code>	Logout

This example illustrates how to add a user login to a printer. Prior to adding the user, the printer must be placed into download mode, which requires a valid administrator login.

Each feature of a TROY Security Printing Solution has a default setting within the printer. These default settings determine how each printer feature will function when a print job is sent to the printer. The administrator can change the default settings to meet the needs of a variety of MICR printing environments using the TROY Printer Utility, the printer control panel, or programmatically via the commands shown here.

There are also a number of features that can be varied on a print job by print job basis. Using data encryption and default paper tray mappings are examples of job-specific features. After each print job completes, all feature settings return to their default values. Use the TROY Port Monitor to select job-specific features.

This command is used to enter or exit the download mode state.

`E_c % v # D`

# = Ø – Exit download mode  
1 – Enter download mode

Default = Ø (Exit download mode)

Range = Ø - 1 (values outside range will be ignored if they are not other commands)

When logged into a TROY Security Printing Solution as the administrator, in order to change default configuration and printer settings stored in TROY's DIMM (flash-file system), you must first enter *download mode*. Operating in download mode informs the printer that commands received to change printer settings are to not only be utilized for the current print job, but for all print jobs that follow – even after a power cycle of the printer.

**NOTE:** If an end-of-job is observed in the print job data stream and no explicit command is received to exit from download mode, the printer will automatically exit download mode. As good programming practice, it is recommended to exit download mode as soon as you are through changing printer settings, no later than the end of the print job.

## Printer Lock PIN

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	√

### Usage Restrictions:

**TROY MICR Secure and Secure EX only**

You must place the printer into *download mode* before using the **PIN Lock** command.

### Example:

$E_C \% u5WADMIN$	Specify name
$E_C \% p\emptyset W$	Specify password
$E_C \% u1S$	Login
$E_C \% v1D$	Enter download
$E_C \% 14W1234$	<b>Set printer lock PIN</b>
$E_C \% v\emptyset D$	Exit download
$E_C \% u\emptyset S$	Logout

In this example a Printer Lock PIN of “1234” is enabled.

```
@PJL TROY PRINTER UNLOCK
PIN=1234 $C_R^L_F$ 
```

TROY Security Printing Solutions can be “locked” such that no print job will print until the user enters an administrator-specified PIN (Personal Identification Number) at the control panel of the printer. The Printer Lock PIN command is used to both enable and disable this feature as well as to specify the PIN number to be entered at the control panel to release jobs for printing. The command used to set the Printer Lock PIN is:

$E_C \% 1 \# W \textit{data}$

# = Number of characters (bytes) contained in the *data*

Default =  $\emptyset$

Range =  $\emptyset - 4$  (values outside range will be clamped and excess characters printed)

The format for characters contained in the *data* is as follows:

- Each character must be in the range of  $\emptyset - 9$
- A *data* (value) of  $\emptyset$  is the default and disables the Printer Lock PIN
- Any *data* (value) between 1 and 9999 enables the Printer Lock PIN
- The *data* should **not** be terminated with a  $C_R^L_F$ .

When using a TROY MICR Secure *EX* printer containing a physical keylock, the physical keylock takes precedence over the Printer Lock PIN. Once the physical keylock is positioned to allow jobs to print, if the Printer Lock PIN is enabled, the user must enter the matching Printer Unlock PIN to release the job for printing.

It is also possible to unlock a Printer Lock PIN from within a print job. By including the following TROY PJL command with a matching Printer Unlock PIN in the PJL header of a print job, the Printer Lock PIN can be disabled just for the job containing the following command. This command can also be included in the Port Monitor’s PJL Include file as a means to automate delivery of the unlock command in Windows.

**@PJL TROY PRINTER UNLOCK PIN=# $C_R^L_F$**

# = Matching PIN number to the Printer Lock PIN

## MICR Lock PIN

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

#### TROY MICR Secure and Secure EX only

You must place the printer into download mode before using the PIN Lock command.

### Example:

$E_C \% u 5 W A D M I N$	Specify name
$E_C \% p \emptyset W$	Specify password
$E_C \% u 1 S$	Login
$E_C \% v 1 D$	Enter download
$E_C \% 1 1 W \emptyset$	<b>Disable MICR lock PIN</b>
$E_C \% v \emptyset D$	Exit download
$E_C \% u \emptyset S$	Logout

In this example the MICR Lock PIN is disabled by setting the value to  $\emptyset$ .

```
@PJL TROY MICR UNLOCK PIN= $\emptyset$ 
 $C_R^L F$ 
```

TROY Security Printing Solutions can be “locked” such that no MICR print job will print until the user enters an administrator-specified PIN number at the control panel of the printer. The MICR Lock PIN command is used to both enable and disable this feature as well as to specify the PIN number to be entered at the control panel to release MICR jobs for printing. The command used to set the MICR Lock PIN is as follows:

$E_C \% m \# W data$

# = Number of characters (bytes) contained in the *data*

Default =  $\emptyset$

Range =  $\emptyset$  - 4 (values outside range will be clamped and excess characters printed)

The format for characters contained in the *data* is as follows:

- Each character must be in the range of  $\emptyset$  – 9
- A *data* (value) of  $\emptyset$  is the default and disables the MICR Lock PIN
- Any *data* (value) between 1 and 9999 enables the MICR Lock PIN
- The *data* should **not** be terminated with a  $C_R^L F$ .

When using a TROY MICR Secure *EX* printer that has a physical keylock, the physical keylock takes precedence over the MICR Lock PIN. Once the physical keylock is positioned to allow MICR jobs to print, if the MICR Lock PIN is enabled, the user must enter the matching MICR Unlock PIN to release the MICR job for printing.

It is also possible to unlock a MICR Lock PIN from within a print job. By including the following TROY PJL command with a matching MICR Unlock PIN in the PJL header of a print job, the MICR Lock PIN can be disabled just for the job containing the following command. This command can also be included in the Port Monitor’s PJL Include file as a means to automate delivery of the unlock command in Windows.

**@PJL TROY MICR UNLOCK PIN=#  $C_R^L F$**

# = Matching PIN number to the MICR Lock PIN

## Job Name and PIN

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	
TROY Port Monitor	√

### Usage Restrictions:

TROY MICR Secure and Secure EX only

### Example:

{PJL wrapper header}

```

EC%-12345X      HP PJL UEL
@PJL JOB NAME="Sample" CR LF
@PJL SET RESOLUTION=600 CR LF
@PJL TROY JOB NAME TEST1
PIN=5678 CR LF
@PJL ENTER LANGUAGE=PCL CR LF
ECE           PCL Reset
    
```

{Your PCL here}

{PJL wrapper trailer}

```

EC%-12345X      HP PJL UEL
@PJL EOJ NAME="Sample" CR LF
EC%-12345X      HP PJL UEL
    
```

In this example the user would be prompted at the printer control panel to enter the Unlock PIN (5678) for the job named TEST1.

TROY Security Printing Solutions can also be “locked” on a job-by-job basis such that a specific print job will not print until the user enters a user-specified PIN number at the control panel of the printer. The Job Name and PIN command is used to both specify the job name to appear on the control panel identifying the job, as well as to specify the PIN number to be entered at the control panel to release a job for printing. The command used to set the Job Name and PIN is as follows:

**@PJL TROY JOB NAME *name* PIN=#** <sup>C</sup><sub>R</sub> <sup>L</sup><sub>F</sub>

*name* = A user-defined string to be displayed on the control panel, not to exceed 16 characters in length.

# = The PIN number that must be entered at the control panel to release the job for printing.

Default *name* = ""

Default PIN Number = Ø (PIN disabled)

PIN number range = Ø - 9999 (values outside range will be clamped)

When using a TROY MICR Secure EX printer that has a physical keylock, the physical keylock takes precedence over the Job Name and PIN command. Once the physical keylock is positioned to allow jobs to print, if the Job Name and PIN is enabled, the user must enter the matching Job Unlock PIN to release the job for printing.

**NOTE:** This command can also be included in the Port Monitor's PJL Include file as a means to automate delivery of the Job Name and PIN lock command in Windows.

## Toner Sensor Response

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR printers only

You must place the printer into download mode before using the Toner Sensor Response command.

### Example:

$E_C \% u5WADMIN$	Specify name
$E_C \% pØW$	Specify password
$E_C \% u1S$	Login
$E_C \% v1D$	Enter download
$E_C \% tØE$	<b>Set to Halt</b>
$E_C \% vØD$	Exit download
$E_C \% uØS$	Logout

In this example the Toner Sensor Response is set to Halt if TROY MICR toner is not sensed when a MICR print job has been received.

TROY Security Printers contain a toner sensor to detect when TROY MICR toner is installed in the printer. This security feature, in combination with the MICR mode command, MICR fonts, physical keylock and MICR Lock PIN, help to ensure all MICR documents are actually printed using MICR toner.

When a TROY Security Printer detects a MICR print job but does not detect that TROY MICR toner is installed in the printer, a security warning is displayed on the printer's control panel informing the user to either install TROY MICR toner or cancel the print job. This response is called **Halt** and is the default security response to this situation.

It is sometimes desirable for a TROY Security Printer to respond differently when not detecting TROY MICR toner during MICR print jobs. The Toner Sensor Response command is used to set the response type.

$E_C \% t \# E$

# = Toner Sensor Response type

Default = Ø (Halt)

Range = Ø - 3 (values outside range will be ignored)

The Toner Sensor Response options:

- Ø – Halt: Prompt the user to install TROY MICR toner or cancel the job. The user cannot print the job without installing TROY MICR toner. {Default}
- 1 – Warn: Print the user to install TROY MICR toner. The user can either press the Go key (after which time the printer ignores the response from the toner sensor for the remainder of the job) or cancel the job.
- 2 – Ignore: The toner sensor is disabled and provides no security feedback.
- 3 – Flush: Automatically flushes any MICR print job received when the toner sensor does not sense TROY MICR toner.

## Add User

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

#### TROY MICR Secure and Secure EX only

You must place the printer into download mode before using the Add User command.

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v1D</code>	Enter download
<code>^C%u5WUSER1</code>	New user name
<code>^C%p3WCAT</code>	New user password
<code>^C%u2S</code>	<b>Add user</b>
<code>^C%vØD</code>	Exit download
<code>^C%uØS</code>	Logout

In this example a new user “USER1” with the password “CAT” was added to the printer.

This command is used to add a user name and password.

`^C % u 2 S`

Up to twenty user names and passwords can be configured to prevent unauthorized users from accessing the printer’s secure resources (digital images of signatures, logos, macros, MICR fonts, etc.) and other MICR features. Although the use of user names and passwords is not required to operate the TROY MICR Secure printers, TROY highly recommends using user names and passwords to increase peer-to-peer security, and to maintain a higher level of accountability of the users in your MICR printing network.

After logging in as the administrator, to add a user name and password to the printer, specify the new name and password using the same Specify Name and Specify Password commands as used for login, followed by the Add User command instead of the Login command. The printer will not automatically confirm the addition. However, by printing the user list either from the printer control panel, TROY Printer Utility, or programmatically via the Print User List command (see below), you can ensure the user name and password was successfully added.

**NOTE: Duplicate names are not allowed. Attempts to add duplicate names are rejected by the printer and an error message appears on the control panel.**

## Delete User

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure EX printers only

You must put the printer in download mode before using the Delete User command.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%u5WUSER2</code>	Name to delete
<code>E_c %u3S</code>	<b>Delete user</b>
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

In this example user “USER2” is deleted from the printer.

This command is used to delete a user name and password.

```
E_c % u 3 S
```

After logging in as the administrator, to delete a user name and password to the printer, specify the user name to delete using the same Specify Name command as used for login, followed by the Delete User command instead of the Login command. The printer will not automatically confirm the deletion. However, by printing the user list either from the printer control panel, the TROY Printer Utility, or programmatically via the Print User List command (see below), you can ensure the user name and password was successfully deleted.

**NOTE:** You are never allowed to delete the ADMIN user name.

**NOTE:** If no matching user name is found, this command is ignored.

## Change Password

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must place the printer into *download mode* before using the Change Password command.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%u5WUSER1</code>	Specify name
<code>E_c%p4WBIRD</code>	New password
<code>E_c%u4S</code>	<b>Change password</b>
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

In this example user “USER1”'s password was changed from “CAT” (in the example above) to “BIRD”.

This command is used to change a password.

```
E_c % u 4 S
```

Since the administrator login cannot be deleted from the printer, use the change password command to create a secure password for the administrator. This command can also be used to change the password of any user login stored in the printer.

After logging in as the administrator, to change a password, specify the existing user name and *new* password using the same Specify Name and Specify Password commands as used for login, followed by the Change Password command instead of the Login command. The printer will not automatically confirm the password change. However, by printing the user list either from the printer control panel, the Printer Utility, or programmatically via the Print User List command (see below), you can ensure the password was successfully changed.

**NOTE:** If no matching user name is found, no change takes place.

## Delete All Users

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

**TROY MICR Secure EX printers only**

You must place the printer into download mode before using the Delete All Users command.

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v1D</code>	Enter download
<code>^C%u5S</code>	<b>Delete all users</b>
<code>^C%vØD</code>	Exit download
<code>^C%uØS</code>	Logout

This command is used to delete all users names and passwords.

```
^C % u 5 S
```

After logging in as the administrator, to delete all user names and passwords in the printer (excluding the ADMIN administrator name and password), simply execute the delete all users command. The printer will not automatically confirm the removal of all users. However, by printing the user list either from the printer control panel, the Printer Utility, or programmatically via the Print User List command (see below), you can ensure that all names and passwords were successfully deleted.

**NOTE:** You are never allowed to delete the ADMIN user name and password.

## Print User List

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

**TROY MICR Secure EX printers only**

You must be logged in as the administrator to use the Print User List command.

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%u-1S</code>	<b>Print user list</b>
<code>^C%uØS</code>	Logout

This command prints the current user list for a printer.

```
^C % u - 1 S
```

After logging in as the administrator, to print the list of all user names and passwords currently stored within the printer, execute the print user list command. The user list will be printed on paper from the default paper tray.

### Example User List Report

TROY 4200 EX SERIES - User List Report		
User:	Authorization Level:	Password:
ADMIN	Administrator	
GREGG	User	THECHIEF
HENRY	User	QADUDE
JEFF	User	DOCMAN
KEITH	User	PFMGUY
KIM	User	ECOQUEEN
MARIO	User	FONTMAN
RON	User	MRMECH
SCOTT	User	MRCONFIG
WARNER	User	BIDIMAN

**NOTE:** Because the names and passwords for all users will be printed, including the administrator password, the administrator is urged to carefully manage all printed user lists.

## MICR Mode

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	
TROY Port Monitor	√

### Usage Restrictions:

Can be set using the TROY Port Monitor. A valid user login is required to change the MICR mode.

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%-124ØØX</code>	<b>Enter MICR mode</b>
<code>^C%uØS</code>	Logout

This command is used to change the state of the MICR Mode of a TROY Security Printing Solution.

`^C % - # X`

# = 124ØØ – Enable (enter)  
124Ø1 – Disable (exit)

Default = N/A

Range = 124ØØ – 124Ø1 (values outside range may apply to other printer commands)

When using a TROY MICR Series printer, the following functions are performed at the beginning of each print job:

- Disable automatic jam recovery
- Set the printer's print density to the optimum value for MICR printing
- Enable low toner sensing and notification

When MICR mode is enabled, the following additional functions are performed:

- Check the state of the MICR toner sensor. If TROY MICR toner is not installed the printer will respond per the Toner Sensor Response command noted later in this chapter.
- Check the state of the keylock (Secure printers only). If the keylock is not in the Print MICR position, the printer will prompt the user to change the position to Print MICR.
- Verify the job contains a valid user or administrator login. If the job does not contain a valid login, the job is aborted.

While MICR Mode is enabled, any font call to a TROY MICR font will cause the toner sensor, keylock, and login tests to be re-validated. If MICR mode is disabled and TROY fonts are requested within the print job, the Courier font will be substituted in place of the TROY MICR font to maintain the security of the printer.

## MICR Mode (cont.)

When the state of the MICR Mode is changed within the context of a print job, it will return to its previous state when the print job completes or is cancelled. When changed outside of a job (via the printer control panel, for example), the state will persist until changed at a later time. MICR Modes do not persist through a power cycle of the printer. The MICR Mode will be affected by the Printer Type setting (see page 3-5).

## Print Quality Document

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

Since the quality document contains MICR characters, a valid user login is required to print this document.

### Example:

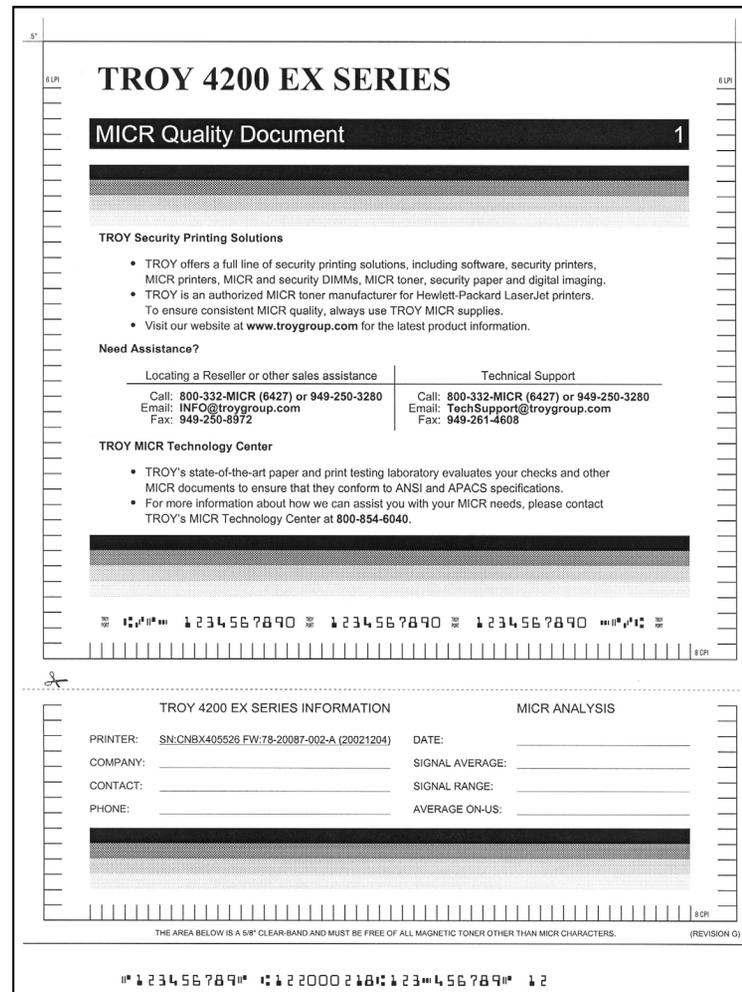
```

E_C% -12345X      HP PJL UEL
@PJL JOB NAME="Sample" C_R L_F
@PJL SET RESOLUTION=600 C_R L_F
@PJL ENTER LANGUAGE="PCL" C_R L_F
E_C E             PCL Reset
E_C &u600D        Set printer and PCL
E_C *t600R        resolution to 600 dpi
E_C &l00           Set page orientation
E_C &l7H           Set paper tray
E_C %u5WUSER1     Specify name
E_C %p3WCAT       Specify password
E_C %u1S           Login
E_C % -12403X     Print Quality Doc.
E_C %u0S          Logout
E_C % -12345X     HP PJL UEL
@PJL EOJ NAME="Sample" C_R L_F
E_C % -12345X     HP PJL UEL
    
```

This command is used to print the internal MICR quality document. The quality document is useful for diagnosing MICR print quality problems.

E\_C % - 1 2 4 0 3 X

See the TROY Security Printing Solutions User's Guide and the TROY Quick-Start Guide for usage instructions.



## Print Configuration Page

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

This command is available to all users.

### Example:

```

EC%-12345X      HP P J L U E L
@P J L J O B N A M E="S a m p l e" CR LF
@P J L S E T R E S O L U T I O N=600 CR LF
@P J L E N T E R L A N G U A G E="P C L" CR LF
ECE            P C L R e s e t
EC&u600D      S e t p r i n t e r a n d P C L
EC*t600R      r e s o l u t i o n t o 600 d p i
EC&l0O        S e t p a g e o r i e n t a t i o n
EC&l7H        S e t p a p e r t r a y
EC%-12420X    P r i n t C o n f i g . P a g e
EC%-12345X    H P P J L U E L
@P J L E O J N A M E="S a m p l e" CR LF
EC%-12345X    H P P J L U E L
    
```

This command is used to print the internal TROY Security Printing Solution configuration page. The configuration page contains the state of all TROY custom settings and modes.

<sup>E</sup><sub>C</sub>% - 1 2 4 2 0 X

See the TROY Security Printing Solutions User Guide and the Quick Start Guide for usage instructions.

**TROY 4200 EX SERIES - Configuration Page**

Firmware Part Number: 78-20087-002-A	Firmware Date Code: 20021204.194333	
Serial Number: CNBX405526	Printer Page Count: 2385	
Printer Type: MICR On (no timeout)	Current MICR Mode: Enabled	
Keylock Installed: Yes	Keylock Setting: Print TROY Certified MICR	
Toner Sensor Installed: Yes	Current Toner Type: MICR	
Toner Sensor Response: Halt		
Printer Lock (PIN): Disabled	MICR Lock (PIN): Disabled	
Languages Supported: All		
Decryption Mode: Job by Job		
Audit Data Capture: Detailed		
Print Range: All		
Report Type: Detailed		
Sort Order: Ascending		
Sort By: Print Order		
Paper Tray: 7		
Auto-Report: No		
Auto-Delete: No		
Alternate Escape: ASCII 161 (Decimal)	Alt Command Set: Enabled	
Image Offset X: +0	Image Offset Y: +0	
MICR Offset X: +0	MICR Offset Y: +0	
Auto Page Rotation: Disabled		

TROYmark Patterns:

LIGHT

MEDIUM

DARK

CUSTOM 1

CUSTOM 2

CUSTOM 3

Tray Remapping: Enabled

## Printer Type

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must put the printer in *download mode* before using the Printer Type command.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%t2X</code>	<b>MICR on</b>
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

This command is used to define the printer type. The printer type defines the state of the MICR mode when the printer is powered ON. The current MICR mode is changed to the mode defined by the printer type after the Printer Type command is executed.

`E_c % t # X`

- # = Ø – Use DIMM switches to determine printer type (hardware settings)
  - 1 – MICR **off** without timeout {TROY MICR Secure printers only}
  - 2 – MICR **on** without timeout
  - 3 – MICR **off** with timeout {TROY MICR Secure printers only}
  - 4 – MICR **on** always

Default = 0 (Use DIP switches, that by default are set to MICR on without timeout)  
 Range = Ø - 4 (values outside range will be ignored)

Printer Type	Feature Description
Ø Hardware Settings	The printer will conform to the default printer type setting established by TROY when the TROY Security Printing Solution was ordered.
1 MICR Off (Secure printers)	Default MICR mode is disabled. When the printer is powered ON, the MICR mode will automatically be set to disabled.
2 MICR On	Default MICR mode is enabled. When the printer is powered ON, the MICR mode will automatically be set to enabled.
3 MICR Off (with timeout) (Secure printers)	Default MICR mode is disabled. At the end of every print job, the MICR mode will automatically be set to disabled. The printer's I/O timeout will be used to determine job boundaries if print jobs are not encapsulated by HP PjL.
4 MICR Always	Default MICR mode is enabled. When powered ON, the MICR mode will automatically be set to enabled. After each byte of data is received, the printer performs the toner sensor and keylock tests. The MICR mode command is ignored when using this type.

## Remap Paper Trays

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	√

### Usage Restrictions:

Can be set using the TROY Port Monitor. A valid user login is required to change the paper tray mapping state.

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%i1T</code>	<b>Enable tray remap</b>
<code>^C%uØS</code>	Logout

This command is used to control the state of the printer's paper tray mapping feature.

`^C % i # T`

# = Ø – Disable  
1 – Enable

Default = 1 (Enable)

Range = Ø - 1 (values outside range will be ignored)

TROY Security Printing Solutions can be configured to use an alternate paper tray mapping sequence. Changing the paper tray mapping sequence may be necessary to adapt newer printers to older application data streams in which the PCL calls to select specific trays were different than they are with contemporary HP LaserJet Printers. This feature also provides an additional security mechanism by allowing the administrator to redirect PCL check paper tray selection commands to non-check paper trays. In this case, only authorized users with the proper user password can disable this re-mapping feature and use the default paper tray calls (thereby granting access to the check paper trays).

When enabled, the printer will map the paper tray calls to the values specified in the Specify Paper Tray Map command (see below). When disabled, the printer uses the default paper tray map (as shipped from the factory).

## Specify Paper Tray Map

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must put the printer in *download mode* before defining an alternate paper tray map.

### Example:

```

EC%u5WADMIN      Specify name
EC%pØW           Specify password
EC%u1S           Login
EC%v1D           Enter download
EC%i3WØxØ5 ØxØ2 ØxØ1
EC%vØD           Exit download
EC%uØS           Logout
    
```

In this example, only three PCL paper tray calls were being mapped. PCL paper tray call Ø1 (usually Tray 1) is being mapped to PCL tray call Ø5 (Tray 3). The PCL call for PCL paper tray Ø2 (Rear manual Feed paper) is mapped to itself (no change). PCL paper tray 3 (usually Manual Feed Envelop) is being mapped to PCL tray call Ø1 (Tray 1).

This command is used to define an alternate paper tray mapping. Only one alternate map per printer is supported.

<sup>E</sup>C % i # W data

# = Number of PCL tray calls being mapped (number of bytes of data)

Default = Ø

Range = Ø - 75 (values outside range will be ignored)

The format for *data* is as follows:

- One hexadecimal number (byte) for each logical PCL tray call.
- The data bytes received are considered in order. The first byte is the mapping for PCL Tray call #1, the second for PCL Tray call #2, and so on.
- To map any given tray, all trays before the tray to remap must be included in the mapping command. Any tray that is not to be mapped, but that must be included in the command, should be mapped to itself (e.g. 1 – 1, 2 – 2, etc.).

The typical default PCL tray mappings for all TROY Security Printing Solutions include the following:

- 1 – Tray 1 { manual feed, general }
- 2 – Rear manual feed, paper
- 3 – Manual feed, envelop
- 4 – Tray 2 { top sheet feeder tray }
- 5 – Tray 3 { optional tray on TROY MICR ‘T’ Series printers }
- 6 – Envelop feeder { not applicable }
- 7 – Auto select
- 8 – Tray 4 { 41ØØ , 42ØØ and 43ØØ only }
- 2Ø – High capacity tray { 815Ø and 9ØØØ only }
- 21 – High capacity tray { 815Ø and 9ØØØ only }
- 22 to 75 – External trays

## Alternate Escape Character

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	√

### Usage Restrictions:

You must place the printer into *download mode* before defining an alternate escape character.

### Example:

$\text{E}_c\%u5WADMIN$	Specify name
$\text{E}_c\%p\text{Ø}W$	Specify password
$\text{E}_c\%u1S$	Login
$\text{E}_c\%v1D$	Enter download
$\text{E}_c\%e1W^8_0$	<b>Alt. Escape = Øx80</b>
$\text{E}_c\%v\text{Ø}D$	Exit download
$\text{E}_c\%u\text{Ø}S$	Logout

In this example, character Øx80 (128 decimal) has been defined as the alternate escape character.

$\text{E}_c\% -1242\text{Ø}X$       Print config. Page

Once an alternate escape character is defined, it can be used in place of the normal escape command as shown above.

This command is used to define a character that can function exactly like an escape character (decimal 27, hexadecimal Øx1B). This feature is not normally required when printing from contemporary applications and environments (Windows 95 and newer).

$\text{E}_c\% e \# W \textit{data}$

# = Number of characters in the alternate escape-character sequence

Default = 1 (only one character is supported in TROY Security Printing Solutions)

Range = Ø - 1 (values outside range are ignored – they are reserved for future use)

Bytes in *data* will be in hexadecimal form.

Some environments (mainframe and mini-computer, for example) cannot output an escape character to a printer except via the printer driver. This makes it difficult for programmers to select and utilize many of the TROY security features.

This command allows a programmer to define an alternate character to be interpreted by the printer as the escape character (Øx1B). Whenever the printer sees the alternate character, it treats it as if it were an (Øx1B). TROY strongly recommends using characters above Øx7F for the alternate escape character because these characters are not commonly found in non-binary data streams.

This feature is designed to support only legacy systems and environments in which there are no other means for injecting the Øx1B character into the print job. Please contact TROY technical support should you require assistance in determining if and when to use this feature. Normally, this feature is not needed.

## Alternate Command Set

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

(Optional to TROY Secure printers and DIMMs)

You must place the printer into download mode before sending the Alternate Command Set command to the printer.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%i1E</code>	<b>Enable Alt. Cmd Set</b>
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

Some host applications are programmed to control MICR printers using what is sometimes referred to as the “%&” command set. This set of commands historically came from commands developed to control IBM printers. Today some Lexmark printers are also configured to support this legacy command set.

The optional Alternate Command Set feature translates “%&” commands into PCL 5e commands for processing in TROY Secure printers and DIMMs, providing easier application integration in some legacy MICR printing environments.

**NOTE:** Please contact your TROY Security Printing Solution reseller or TROY Group Inc. to see if this feature is applicable to your MICR printing environment.

The following command is used to enable translation of “%&” commands into PCL 5e commands.

# = Ø – Disable  
1 – Enable

Default = Ø (Disabled)

Range = Ø - 1 (values outside range will be ignored)

**NOTE:** Please contact your TROY Security Printing Solution reseller or TROY Group Inc. for a complete list of “%&” commands that can be translated into PCL 5e commands.

## TROY ExPT Image Control

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must place the printer into *download mode* before using the ExPT Image Control commands.

### Example:

$\text{E}_c \% u5WADMIN$	Specify name
$\text{E}_c \% p\emptyset W$	Specify password
$\text{E}_c \% u1S$	Login
$\text{E}_c \% v1D$	Enter download
$\text{E}_c \% o36\emptyset I$	<b>Adjust image + 1/2"</b>
$\text{E}_c \% o18\emptyset J$	<b>Adjust image + 1/4"</b>
$\text{E}_c \% v\emptyset D$	Exit download
$\text{E}_c \% u\emptyset S$	Logout

These commands are used to fine-tune the location of the whole image as printed on the page.

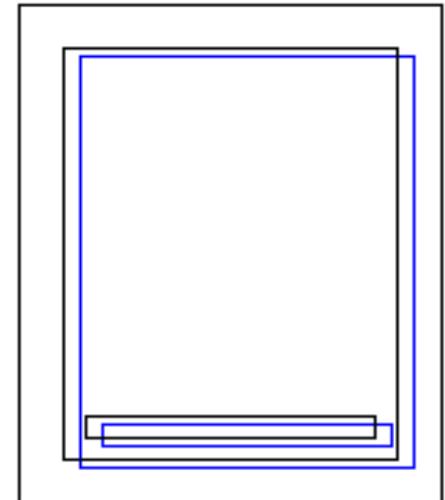
$\text{E}_c \% o \# I$                       {Image offset X – horizontal}  
 $\text{E}_c \% o \# J$                       {Image offset Y – vertical}

# = Number of 1/72 $\emptyset$  of an inch to offset the image on the page.  
 (+) moves image to the right and down, (-) moves the image to the left and up.

Default =  $\emptyset$   
 Range = -72 $\emptyset$  to +72 $\emptyset$  (values outside range will be clamped)

The ANSI X/9B specifications for the placement of the MICR line relative to the bottom and right edges of a check document are tightly controlled in order to provide accurate reading by large, high speed banking system check readers. Electronic check forms are defined typically for one specific printer. For example, a TROY MICR 42 $\emptyset\emptyset$  Secure EX may be used to print a series of check that are later printed on other TROY MICR 42 $\emptyset\emptyset$  Secure EX printers or printers from other families or manufacturers. The paper feeding accuracy and image placement of each printer (even with the same family of printers from the same manufacturer) can vary to a sufficient degree to print the MICR line out of tolerance to the ANSI X/9B specification, resulting in rejected checks by the banking system check readers.

These commands allow the administrator of the printer to micro-adjust the positioning of the entire image on the printed page, thereby adjusting the MICR line. In the example shown here, the blue lines show the image moved 1/2" right and 1/4" down.



## TROY ExPT MICR Line Control

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must place the printer into *download mode* before using the ExPT MICR Line Control commands.

### Example:

$E_c \% u5WADMIN$	Specify name
$E_c \% p\emptyset W$	Specify password
$E_c \% u1S$	Login
$E_c \% v1D$	Enter download
$E_c \% o36\emptyset M$	MICR line + 1/2"
$E_c \% o18\emptyset N$	MICR line + 1/4"
$E_c \% v\emptyset D$	Exit download
$E_c \% u\emptyset S$	Logout

These commands are used to fine-tune the location of the MICR as printed on the page.

$E_c \% o \# M$  {MICR line offset X – horizontal}  
 $E_c \% o \# N$  {MICR line offset Y – vertical}

# = Number of 1/72 $\emptyset$  of an inch to offset the MICR line on the page.

(+) moves MICR line to the right and down, (-) moves MICR line to the left and up.

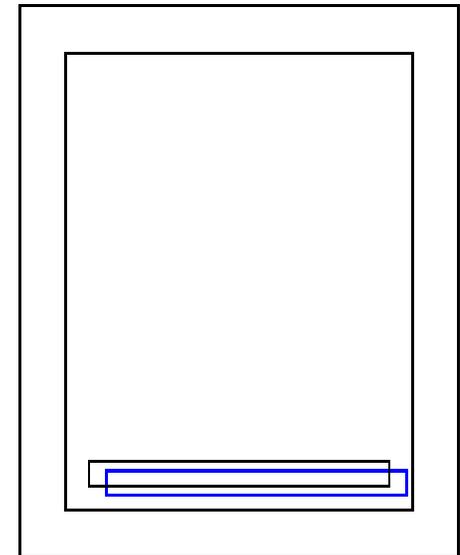
Default =  $\emptyset$

Range = -72 $\emptyset$  to +72 $\emptyset$  (values outside range will be clamped)

These commands allow the administrator of the printer to micro-adjust the positioning of the MICR line on the printed page without moving the remainder of the image. In the example shown below, the blue lines show the MICR line moving 1/2" right and 1/4" down, while the rest of the image remains in place (black lines).

**NOTE:** Both image and MICR line offsets can be used at the same time. When used in combination, the MICR line is offset relative to the image offset.

**NOTE:** If the auto-rotate feature (described on the next page) is used in conjunction with the ExPT Offsets feature, any adjustments made with the ExPT Offsets feature to the left or top offset registration will have the same effect on the page regardless of the page orientation.



## Automatic Image Rotation

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must place the printer into *download mode* before using the **Automatic Image Rotation** command.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%o1R</code>	<b>Enable image rotate</b>
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

MICR reader/sorters use the lower right-hand corner of checks and other MICR documents as their anchors for determining MICR line positioning. Laser printers align image information to the upper left corner of a piece of paper. If the check paper is not consistently cut in lengths and widths that match how a check printing application applies image data on a laser printer, the MICR line can appear mal-positioned to a MICR reader/sorter. This can result in bank rejects, costing consumers money and banks time. This problem is most noticeable when MICR lines are printed at the bottom of a page, which is the most common form of payroll and payable check format.

TROY's Security Printing Solutions feature Exact Positioning Technology (ExPT) that compensates for consistent MICR line and image placement errors usually resulting from application software that was written to print checks on pre-printed check stock that has been replaced by laser-printed documents. Variations in paper lengths and widths within reams or lots of paper can be compensated for using ExPT; however, the constant paper measurement process may become challenging for customers to manage.

The auto page rotation feature is designed to automatically rotate each page by 180 degrees, therefore, printing the MICR line at the very top of the paper where its positioning can be more accurately controlled. The auto-rotate feature does not operate unless the job has the PCL logical page orientation command embedded in the job.

The following command is used to enable or disable the Automatic Image Rotation feature.

`E_c % o # R`

# = Ø – Disable  
1 – Enable

Default = Ø (Disabled)

Range = Ø - 1 (values outside range will be ignored)

**NOTE:** Only enable the Automatic Image Rotation feature when printing portrait MICR documents in which the MICR line is at the bottom of the paper. If the automatic page rotation feature is used in conjunction with the ExPT Offsets feature, then the image and MICR offsets must be adjusted accordingly (see note on previous page).

## Languages Supported

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must place the printer into *download mode* before changing the supported printer languages.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%11T</code>	<b>Allow PCL 5 only</b>
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

The Languages Supported command provides a means to prevent jobs, formatted in printer languages such as Postscript and PCL-XL (a.k.a. PCL 6), from printing on a TROY Security Printing Solution. Restricting the languages supported to just PCL 5 increases the security of a TROY Security Printing Solution by reducing the number of ways pages can be ejected from the printer, while increasing the control an administrator has over data printed.

`E_c % 1 # T`

# = Ø – All  
1 – PCL 5

Default = Ø (All)

Range = Ø - 1 (values outside range will be ignored)

**NOTE:** When the Languages Supported feature is set to PCL 5, many LaserJet configuration and status pages will not print, and a “Job Purged” message will be displayed or printed. Hewlett Packard uses PCL-XL as the data format for many of its internal pages. Set the Languages Supported feature to All before printing the LaserJet’s configuration pages.

## Introduction

### Storing Secure and Public Resources

Each TROY Security Printing Solution contains a non-volatile file system that can be used to store public and, in TROY Secure printers and DIMMs/memory cards, secure printer resources. Digitized signatures, logos, macros, form overlays, and data files (e.g., Secure Seal template files), or other PCL resources can be stored in the file system to minimize download time and increase resource availability and security.

The TROY Secure printers and DIMMs/memory cards also provide file system space for auditing purposes. The available flash memory on the TROY DIMMs/memory cards is shared between resource and audit data storage.

The Administrator is responsible for identifying those resources that should be stored as secure resources and those that should be stored as public resources. TROY recommends the following types of printer resources be stored in secure vs. public storage:

- Digital signatures
- Payroll check forms and overlays
- Tax-related forms and overlays such as W-2 statements

If you need to store secure resources but your printer does not support secure resource storage, please consider upgrading to a TROY Secure printer or DIMM/memory card.

If user names and passwords are configured, a user must login using a valid user name and password to obtain access to these secure resources. Public resources, such as commonly used company logos or forms, can be stored in the public memory area for access by all users without requiring valid user login.

**NOTE: Resources stored in a TROY Security Printing Solution file system will remain resident even when the printer power is switched OFF and ON.**

## Introduction (cont.)

Resources are divided by PCL into three categories – fonts, macros/forms, and data files. The most common type of data file stored in the TROY DIMM/Memory Card is the Secure Seal template file (template.dat). To remain consistent with the PCL commands used to manipulate fonts, macros, and data files, TROY Security Printing Solutions support storage, access and removal of fonts, macros, and data files separately. All image files should be stored as fonts; bitmaps are not supported.

PCL also provides the means for storing fonts temporarily and permanently. TROY has extended the meaning of temporary and permanent storage when a print job containing font, macro, or data storage commands also places the printer into *download mode*. While in download mode, requests to store fonts, macros, and data files in temporary memory will cause these particular resources to be stored in the file system as public resources. Requests to store fonts, macros, or data files in permanent memory will cause these particular resources to be stored in the file system as secure resources (requiring user login to access them).

## Add Public Font

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must place the printer in *download mode* to add public fonts.

### Example:

```

E_C%u5WADMIN      Specify name
E_C%pØW           Specify password
E_C%u1S           Login
E_C%v1D           Enter download
E_C*c1ØØØØD       Font ID 1ØØØØ
E_C)s88W          Font header
                  88 bytes of font header data
E_C*cE            Character code
E_C(s1636W        Character Defn.
                  1636 bytes of character definition data
    
```

Repeat Character Code / Character Definition pairs until the entire font is downloaded into the printer

```

E_C*c4F           {Make font public}
E_C%vØD           Exit download
E_C%uØS           Logout
    
```

(Refer to the *HP PCL 5 Technical Reference Manual*, Chapter 9 – Font Management and Chapter 11 – Soft Font Creation, for more information on standard PCL 5 commands used below.)

These commands will add a public font into the TROY Security Printing Solution file system. The method for adding the font is the same as adding a soft font into the printer, except that the commands are wrapped within download mode commands.

```

E_C % v 1 D      Enter Download Mode Command
E_C * c # D      Font ID Command
    
```

# = Font ID number      Recommended to be at least 1Ø,ØØØ to avoid conflicts with other printer resources – range Ø - 32767

```

E_C ) s # W data Download Font Header Command
    
```

# = Number of bytes of font header data being downloaded

```

E_C * c # E data Character Code Command
    
```

# = The character code in decimal associated with the next character download

```

E_C ( s # W data Character Definition Command
    
```

# = Number of bytes defining the character in the *data* block

Repeat Character Code / Character Definition pairs until the entire font is downloaded into the printer

```

E_C * c 4 F      Make Font Public
E_C % v Ø D      Exit Download Mode Command
    
```

## Add Secure Font

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers, DIMMs, and memory cards only

You must place the printer in *download mode* to add secure fonts.

### Example:

```

EC%u5WADMIN    Specify name
EC%pØW         Specify password
EC%u1S         Login
EC%v1D         Enter download
EC*c1ØØØØD     Font ID 1ØØØØ
EC)s88W        Font header
    88 bytes of font header data
EC*cE          Character code
EC(s1636W      Character Defn.
    1636 bytes of character definition data
    
```

Repeat Character Code / Character Definition pairs until the entire font is downloaded into the printer

```

EC*c5F        Make font secure
EC%vØD       Exit download
EC%uØS       Logout
    
```

(Refer to the *HP PCL 5 Technical Reference Manual*, Chapter 9 – Font Management and Chapter 11 – Soft Font Creation, for more information on standard PCL 5 commands used below.)

These commands will add a secure font into the TROY Secure file system. The method for adding the font is the same as adding a soft font into the printer, except that the commands are wrapped within download mode commands.

```

EC % v 1 D      Enter Download Mode Command
EC * c # D      Font ID Command
    
```

# = Font ID number      Recommended to be at least 1Ø , ØØØ to avoid conflicts with other printer resources – range Ø - 32767

```

EC ) s # W data  Download Font Header Command
    
```

# = Number of bytes of font header data being downloaded

```

EC * c # E data  Character Code Command
    
```

# = The character code in decimal associated with the next character download

```

EC ( s # W data  Character Definition Command
    
```

# = Number of bytes defining the character in the *data* block

Repeat Character Code / Character Definition pairs until the entire font is downloaded into the printer

```

EC * c 5 F      Make Font Secure
EC % v Ø D      Exit Download Mode Command
    
```

## Add Public Macro

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must place the printer in *download mode* to add public macros.

### Example:

$E_C \% u 5 W A D M I N$	Specify name
$E_C \% p \emptyset W$	Specify password
$E_C \% u 1 S$	Login
$E_C \% v 1 D$	Enter download
$E_C \& f 1 5 \emptyset \emptyset \emptyset Y$	Macro ID 150000
$E_C \& f \emptyset X$	Start macro defn.

### PCL commands within macro

$E_C \& f 1 X$	Stop macro defn.
$E_C \& f 9 X$	<b>Make macro public</b>
$E_C \% v \emptyset D$	Exit download
$E_C \% u \emptyset S$	Logout

(Refer to the *HP PCL 5 Technical Reference Manual, Chapter 12 - Macros*, for more information on standard PCL 5 commands used below.)

These commands will add a public macro into the TROY Security Printing Solution file system. The method for adding the macro is the same as adding a soft macro into the printer, except that the commands are wrapped within download mode commands.

$E_C \% v 1 D$  Enter Download Mode Command

$E_C \& f \# Y$  Macro ID Command

# = Macro ID number Recommended to be at least 15,000 to avoid conflicts with other printer resources – range 0 - 32767

$E_C \& f 0 X$  Start Macro Definition Command

### PCL commands contained in the macro are inserted here

$E_C \& f 1 X$  Stop Macro Definition Command

$E_C \& f 9 X$  **Make Macro Public**

$E_C \% v \emptyset D$  Exit Download Mode Command

All standard PCL macro rules, such as nesting levels and macro ID conflict resolution, apply to TROY public macros. Additionally, macros cannot reference other macros stored within the TROY Security Printing Solution file system.

## Add Secure Macro

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

**TROY Secure printers, DIMMs, and memory cards only**

**You must place the printer in *download mode* to add secure macros.**

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v1D</code>	Enter download
<code>^C&amp;f15ØØØY</code>	Macro ID 15ØØØ
<code>^C&amp;fØX</code>	Start macro defn.

### PCL commands within macro

<code>^C&amp;f1X</code>	Stop macro defn.
<code>^C&amp;f1ØX</code>	<b>Make macro secure</b>
<code>^C%vØD</code>	Exit download
<code>^C%uØS</code>	Logout

(Refer to the *HP PCL 5 Technical Reference Manual, Chapter 12 - Macros*, for more information on standard PCL 5 commands used below.)

These commands will add a secure macro into the TROY Security Printing Solution file system. The method for adding the macro is the same as adding a soft macro into the printer, except that the commands are wrapped within download mode commands.

`^C % v 1 D` Enter Download Mode Command

`^C & f # Y` Macro ID Command

# = Macro ID number Recommended to be at least 15,ØØØ to avoid conflicts with other printer resources – range Ø - 32767

`^C & f 0 X` Start Macro Definition Command

### PCL commands contained in the macro are inserted here

`^C & f 1 X` Stop Macro Definition Command

`^C & f 1 Ø X` **Make Macro Secure**

`^C % v Ø D` Exit Download Mode Command

All standard PCL macro rules, such as nesting levels and macro ID conflict resolution, apply to TROY public macros. Additionally, macros cannot reference other macros stored within the TROY Security Printing Solution file system.

## Add Public Data File

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must place the printer in *download mode* to add public data files.

### Example PCL data to download template named “DDSignature.est”:

```

E_C%u5WADMIN Specify ADMIN user
E_C%pØW Specify password
E_C%u1S User Login
E_C%v1D Download mode in
E_C %v20I Specify data ID of 20
E_C %v69752W Start template
{data} 69752 binary bytes
E_C%v33D To public area
E_C%v20I Specify data ID of 20
E_C%h23W Specify name
<00><00><00><03> 8 binary bytes
<00><01><00><00>
DDSignature.est Then template name
E_C%v0D Download mode out
E_C %v2D NV Report
E_C%uØS User Logout
    
```

The most common type of data file stored in the TROY DIMM/Memory Card is the Secure Seal template file (template.dat). The encoding seal template (.est file) is typically loaded into the non-volatile secure memory area of the TROY printer in the “data” area. However, for MICR printers, which do not contain a secure memory area, the encoding seal template must be loaded into the public memory area. In either case, it is easiest to use the TROY Printer Utility to perform this download. Refer to the PCL commands contained in this chapter. When downloading the template file, note the file name (also printed on the NV report), because you will use a corresponding name when configuring the seal to use that specific template file. Refer to Chapter 10 – *Secure Seals* for additional information on creating and implementing seals.

Secure Seals can be created both automatically on the end of page event as well as explicitly via a “##SEAL” command. The field data that is encoded into the seal can come explicitly from a “##SEAL” command when an explicit seal is printed, or it can come from default field values configured previously, or it can come from metadata-tagged data within the print job stream.

Three new TROY PCL commands have been added to support the configuration of the secure seal feature: an option setting command to set some general options, a command to set a company ID, and the “##SEAL” command. The ##SEAL command is used to specify the name of the seal template, the X and Y location of the seal (optional), and the various field values (payee name, account number, etc.) to be encoded into the seal.

Refer to Chapter 10 – *Secure Seals* for additional information on creating and implementing seals.

## Add Secure Data File

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

**TROY MICR/IRD Secure and Secure EX Printers only.** The seal options can be set using the TROY Printer Utility.

### Example PCL data to download template named "DDSignature.est":

```

E_C%u5WADMIN Specify ADMIN user
E_C%pØW Specify password
E_C%u1S User Login
E_C%v1D Download mode in
E_C%v20I Specify data ID of 20
E_C%v69752W Start template
{data} 69752 binary bytes
E_C%v32D To secure area
E_C%v20I Specify data ID of 20
E_C%h23W Specify name
<00><00><00><03> 8 binary bytes
<00><01><00><00>
DDSignature.est Then template name
E_C%v0D Download mode out
E_C%v2D NV Report
E_C%uØS User Logout
    
```

The most common type of data file stored in the TROY DIMM/Memory Card is the Secure Seal template file (template.dat). The encoding seal template (.est file) is typically loaded into the non-volatile secure memory area of the TROY printer in the "data" area. However, for MICR printers, which do not contain a secure memory area, the encoding seal template must be loaded into the public memory area. In either case, it is easiest to use the TROY Printer Utility to perform this download. Refer to the PCL commands contained in this chapter. When downloading the template file, note the file name (also printed on the NV report), because you will use a corresponding name when configuring the seal to use that specific template file. Refer to Chapter 10 – *Secure Seals* for additional information on creating and implementing seals.

Unlike fonts and macros, a PCL command is provided to assign a name to each ID; the default name is the same as the file name. The following PCL commands are only valid when the printer is in download mode:

```

<esc>%v#I Specify data ID
<esc>%v#W Specify contents of data file for last ID provided (# is
replaced with length of data following W)
<esc>%v31D Delete one data file for last ID provided
<esc>%v32D Change data file to secure for last ID provided
<esc>%v33D Change data file to non-secure for last ID provided
<esc>%v34D Download data into print stream for last ID provided

<esc>%h#W<00><00><00><03><00><01><00><00><name>
Specify name of data file for last ID provided (# is replaced with length of
data following W, which is 8 + length of the name data)
    
```

## Print Resources List

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must place the printer in *download mode* to print the resources list.

### Example:

```

EC%-12345X      HP P J L U E L
@P J L J O B N A M E="S a m p l e"CRLF
EC%u5WADMIN    S p e c i f y n a m e
EC%pØW         S p e c i f y p a s s w o r d
EC%u1S         L o g i n
EC%v2D         P r i n t r e s o u r c e l i s t
EC%uØS        L o g o u t
@P J L E O J N A M E="S a m p l e"CRLF
EC%-12345X      H P P J L U E L
    
```

This command prints a list of all resources currently stored in the file system on the TROY Security Printing Solution.

```
EC % v 2 D
```

Resources are separated into font and macro sections on the resource list. Those items preceded by an asterisk (\*) are secure resources.

## TROY 4050 Ex Series Printer Download Area Summary

### Directory List:

```

          / :      224 bytes
F26375.fnt : 14713 bytes
F30754.fnt :  5719 bytes
M01220.mac :    13 bytes
M03891.mac :    56 bytes
M03892.mac :    56 bytes
    
```

Total bytes used: 27136, free: 879104

### Font List (\* indicates secure):

```

* 26375 - <esc>(0U<esc>(s0p1.66h54.01v0s0b200T
  30754 - <esc>(4C<esc>(s0p3h12v0s0b103T
    
```

### Macro List (\* indicates secure):

```

    1220 - <esc>&f1220Y
*  3891 - <esc>&f3891Y
    3892 - <esc>&f3892Y
    
```

## Delete Resources Commands

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

Deletion of secure resources is supported only on *TROY Secure* printers, DIMMs, and memory cards.

You must place the printer in *download mode* to delete public or secure printer resources.

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v9D</code>	Delete all resource
<code>^C%uØS</code>	Logout

These commands delete resources currently stored in the flash-file system on the TROY Security Printing Solution file system. The following PCL commands are only valid when the printer is in download mode:

`^C % v # D`

- # = 7 – Delete all public resources
- 8 – Delete all secure resources
- 9 – Delete all resources
- 1Ø – Delete all public fonts
- 11 – Delete all secure fonts
- 12 – Delete all fonts
- 13 – Delete all public macros
- 14 – Delete all secure macros
- 15 – Delete all macros
- 16 – Delete all non-secure data
- 17 – Delete all secure data
- 18 – Delete all data

Default = N/A

Range = 7-18 (values outside range may apply to other printer commands)

## Data Capture Types

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only

### Example:

```

.          Preceding PCL
E_c(19U   Select symbol set
          Select font
E_c(s1p8.00v0s0b16602T
          Record for both
E_c%#m771T
          Data to record
          $250.00
          Select symbol set
          Select font
E_c(s1p8.00v0s0b256T
          Remaining PCL
    
```

In this example, the string “\$250.00” is recorded for TROYmark™ and auditing to use within the printer as a convenience amount. It will be printed on the document in the font selected.

Print job data, used by the TROYmark™ and user-configurable auditing features, is captured (identified and temporarily stored in the printer) through font selection. By specifying a font and then selecting one or more data capture types, all subsequent printable characters in the print job (up to the next font declaration) will be available to the printer for use as determined by the data capture type selected.

Within each data capture type command, a field identifier specifies the meaning of the data, which is then used by the printer to properly store, sort, and report based upon the declared field type.

**E<sub>c</sub> % m # T**

- # = Ø – Manually terminate data capture (in lieu of a new font call or selection)
- 1 – Reserved {record number}
- 2 – Reserved {MICR line}
- 3 – Convenience Amount
- 4 – Payee Name
- 5 – Check Date {the date printed on the check, not the date of printing}
- 6 – Reserved {user name}
- 7 – Custom 1 {user-definable field}
- 8 – Custom 2 {user-definable field}
- 9 – Custom 3 {user-definable field}
- 10–Account #
- 11–Bank #
- 12–Check #
- 13–Transaction #

The # is then summed with the following values to determine the application for the data. The value to indicate a Seal attribute (high byte of metadata tag) is 1024. As an example, the font call for bank # should be 1024+11=1035 decimal.

- # + 256 – Record as audit data
- # + 512 – Record as TROYmark data
- # + 768 – Record as both TROYmark and audit data

Default = Ø (Terminate data capture)

Range = Ø – 9, 256 – 265, 512-521, 768-777 (values outside range are ignored)

Maximum length of any data string captured – 128 characters

Maximum length of all data strings recorded for audit record storage – 128 bytes

Custom 1, 2, and 3 are concatenated into the one Custom field on the audit report.

## Invisible Print Data

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only

### Example:

```

.          Preceding PCL
E_c(19U   Select symbol set
          Select font
E_c(s1p8.00v0s0b16602T
E_c%m521T TROYmark data,
          field Custom 3

E_c%m1I   Do not print
Happy Holidays Data to record

E_c(19U   Select symbol set
E_c(s1p8.00v0s0b256T
          Select font
.
.          Remaining PCL
    
```

In this example, the string “Happy Holidays” will be printed in the TROYmark™ image, but will not appear anywhere else on the document.

Any printable data can selectively be excluded from printing on the final document using the invisible print data feature. Examples of when printing data on the final document may not be desirable include:

- When a string is to be printed within a TROYmark™ image but not printed in any other form on the document.
- When placing data into the audit record in the custom field without wanting it appearing on the document (such as an internal control number).
- TROY’s Auto-Protect security font.

The following command controls whether printable data is printed at the current position and in the current font.

```

E_c % m # I
# = 0 – Visible      {print at the current position and in the current font}
  1 – Invisible     {do not print}
    
```

Default = 0 (Visible)

Range = 0 – 1 (values outside range are ignored)

The invisible print data command remains in effect until changed, or until another font is selected.

## Introduction

TROY barcode fonts provide all the glyphs necessary to print correctly formatted and scannable barcodes. Barcode elements must be explicitly chosen from the available set of font characters. The TROY firmware does not compute checksum nor does it automatically insert start, stop, or guard characters. When a barcode has multiple character sets that must be used at different times within a barcode, the user must explicitly make that choice. The TROY firmware does not make those choices for you.

TROY barcodes are selected by sending a PCL5 font selection sequence in a PCL5 job. The different selection sequence for each font is presented in the table below, where the escape character is represented by “ $\text{E}_c$ ”. The “<Height>” insert shown prior to the “v” parameter in each escape sequence represents a placeholder to indicate that any number may be substituted in that position. After the selection sequence, the specific data to create the bar pattern should be sent. The bar pattern data is usually followed by a different selection sequence to terminate the barcode, although it is possible to use PCL placement commands to place multiple barcodes of the same type without terminating the font selection in between sending the data for each barcode.

Symbology	PCL5 Selection Sequence
POSTNET	$\text{E}_c(15\text{Y}_c(\text{s1p}<\text{Height}>\text{v0s0b24770T}$
Reverse POSTNET	$\text{E}_c(15\text{Y}_c(\text{s1p}<\text{Height}>\text{v0s33b24770T}$
Code 39	$\text{E}_c(0\text{Y}_c(\text{s1p}<\text{Height}>\text{v0s0b24670T}$
Code 128	$\text{E}_c(0\text{Y}_c(\text{s1p}<\text{Height}>\text{v0s0b24700T}$
Interleaved 2 of 5	$\text{E}_c(4\text{Y}_c(\text{s1p}<\text{Height}>\text{v0s0b24640T}$
EAN 13	$\text{E}_c(8\text{Y}_c(\text{s1p}<\text{Height}>\text{v0s0b24630T}$
EAN 8	$\text{E}_c(8\text{Y}_c(\text{s1p}<\text{Height}>\text{v0s0b24620T}$
UPC-A	$\text{E}_c(8\text{Y}_c(\text{s1p}<\text{Height}>\text{v0s0b24600T}$
UPC-E	$\text{E}_c(8\text{Y}_c(\text{s1p}<\text{Height}>\text{v0s0b24610T}$

## Interleaved 2 of 5

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure *EX* printers only

### Example:

$E_c(4Y_c(s1p26v0s0b24640T<85h>-CY<86h>$

Note: <#> - Hexadecimal value

Interleaved 2 of 5 is a numeric barcode, encoding two numeric characters per barcode element. By necessity, the barcode encodes an even number of digits, which includes a start and a stop character. The start and stop characters are not included in the checksum calculation.

A modulo 10 checksum (see POSTNET for calculation) is optional. The construction of the barcode is shown in the following condensed table. It is best used in fixed length applications because an angled (partial) scan can produce a start or stop code, causing an incorrect scan. Shorter data can be padded with leading zeros.

Index	Value	Count	TROY Character Set		
			ASCII	Decimal	Hex
Start		1	<85H>	133	85
00-14		any	! " # \$ % & ' ( ) * + , - . /	33-47	21-2F
15-24			0 1 2 3 4 5 6 7 8 9	48-57	30-39
25-31			: ; < = > ? @	58-64	3A-40
32-44			A B C D E F G H I J K L M	65-77	41-4D
45-57			N O P Q R S T U V W X Y Z	77-90	4E-5A
58-60			[ \ ]	91-93	5B-5D
61-63			^ _ `	94-96	5E-60
64-76			a b c d e f g h i j k l m	97-109	61-6D
77-89			n o p q r s t u v w x y z	110-122	6E-7A
90-99			{   } ~ <7Fh>	123-132	7B-84
Stop			1	<86h>	134

## Interleaved 2 of 5 (cont.)

The following table shows some Interleaved 2 of 5 examples. In each example, a checksum is not used. The callout for this font should occur after the PCL5 selection sequence and should be followed by a PCL5 selection sequence for a different font. In the “ASCII Callout” column, because the start and stop characters do not have printable ASCII equivalents, they are represented by a hex value and are set off by angled brackets (e.g., the text “<85h>” represents the single start character).

Number	Broken into Pairs	Hex Callout	ASCII Callout
123456	12 34 56	85 2D 43 59 86	<85h>-CY<86h>
00011090	00 01 10 90	85 21 22 2B 7B 86	<85h>!"+{<86h>

## Code 128

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure *EX* printers only

### Example:

```
Ec(0Yc(s1p26v0s0b24700T<87h>AB<83h>  
><20h>+<84h>dw<8Ah>
```

**Note:** <#> - Hexadecimal value

Code 128 is an alphanumeric barcode with three character sets (also called “code” sets). Because of its different character sets, there are special symbols used to switch from one character set to another within the barcode. There are also three corresponding start characters. Character set A provides symbols, numbers, upper case letters, and unprintable control characters from the full ASCII set. Character set B provides symbols, numbers, upper and lower case letters from the full ASCII set. Character set C is optimized for numbers and encodes two numbers for each barcode character. Any given data can be encoded into a barcode in multiple ways.

The code 128 character sets are indexed by a value from 0 to 106, referred to as the “character value” in the barcode specification. The comparable characters in the TROY font are offset by 32 positions so that most of them fall in the printable range of characters and therefore are easier to select. In other words, given a character with a character value of N (base 10), the comparable character in the TROY font can be calculated by adding 32d to N.

The code 128 barcode requires start and stop characters; however, the start and stop characters are not included in the checksum calculation. The mandatory checksum is the remainder after dividing the sum of the start character and a weighted sum of character values in the barcode by 103. The weights are the index position of that character, starting at one. The resulting checksum is used as the index value regardless of the current character set.

The table on page 1-12 in Chapter 1 shows the different character sets and location of characters in the TROY font. As an example, the table shows that if the currently selected character is in character set A, then selecting position 131 in the TROY font will select the bar pattern that indicates the change to character set C. Another example is that if currently selected character is in character set C, then selecting position 1 in the TROY font will select the bar pattern that indicates the two digit sequence “01”.

**NOTE:** ASCII characters beyond the decimal value of 127 are not printable characters and are not typically used within the Code 128 barcode.

## Code 128 (cont.)

The following table shows some Code 128 callout examples. The callout should be made after the PCL5 selection sequence for this font and should be followed by a PCL5 selection sequence for a different font. Notice the first three examples show alternative barcodes for the same data. Checksum calculations for the example shown in the first row of table below are  $103+33*1+34*2+99*3+0*4+11*5+100*6+68*7=1632$ ; 1632 divided by 103 leaves a remainder of 87. Checksum calculations for the example shown in the last row of the table are  $105+0*1+22*2=149$ ; 149 divided by 103 leaves a remainder of 46. In the “ASCII Callout” column, because some characters do not have printable ASCII equivalents (characters with a decimal value greater than 127), they are represented by the hex value and are set off by angled brackets (e.g., the text “<85h>” represents the single start character).

Data	✓ sum	Character Sets Used	Hex Callout for TROY Font	ASCII Callout for TROY Font
AB0011d	87	A ▶ C ▶ B	87 41 42 83 20 2B 84 64 77 8A	<87h>AB<83h><20h>+<84>dw<8Ah>
AB0011d	53	B	88 37 38 30 30 31 31 64 55 8A	<88h>780011dU<8Ah>
AB0011d	8	A ▶ B	87 37 84 42 30 30 31 31 64 28 8A	<87h>7<84h>B0011d(<8A>
0022	46	C	89 20 36 4E 8A	<89h><20h>6N<8Ah>

## Code 39

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure *EX* printers only

### Example:

$E_c(0Y^E_c(s1p26v0s0b24670T*ABC123\$*$

The Code 39 barcode, also known as code 3 of 9, is an alphanumeric barcode. It has a start character, any number of data characters, an optional checksum, and a stop character, which is the same as the start character. The optional checksum is the remainder after dividing the sum of each character value in the barcode by 43. The start and stop characters are not included in the checksum calculation.

The table on page 1-16 in Chapter 1 shows the different character sets and location of characters in the TROY font. To simplify the table, character ranges are given when possible. Like Code 128, the specification lays out the characters in an order different than ASCII. Because it is easier to call out using ASCII, the TROY font is arranged to fall within this range. As an example, the table shows that the barcode that encodes any character is in the corresponding spot in the ASCII table. The character that encodes “0” is in position 48, the character that encodes “\*” is in position 42, etc.

The table below shows some examples. The callout should occur after the PCL5 selection sequence for this font and should be followed by a PCL5 selection sequence for a different font. The first two examples use the optional modulo 43 checksum. Checksum calculations for the example shown in the first row of Table 7 are  $10+11+12+1+2+3=39$ ; 39 divided by 43 leaves a remainder of 39. Checksum calculations for the example shown in the second row of Table 7 are  $10+11+0+0+1+1=23$ ; 23 divided by 43 leaves a remainder of 23.

Data	Calculated Checksum	Hex Callout for TROY Font	ASCII Callout for TROY Font
ABC123	39	2A 41 42 43 31 32 33 2A	*ABC123\$*
AB0011	23	2A 41 42 30 30 31 31 33 2A	*AB0011N*
AB0011	(not used)	2A 41 42 30 30 31 31 2A	*AB0011*
0022	(not used)	2A 30 30 32 32 2A	*0022*

## POSTNET and Reverse POSTNET

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure *EX* printers only

### Example:

$^E_c(15Y^E_c(s1p18v0s0b24770T[927804])$

The POSTNET and Reverse POSTNET barcodes are specified similarly; the only difference is the glyphs for the Reverse POSTNET are reversed so that they can be printed from the back side of a page, creating a scanable image that is correctly oriented on the front of the page (envelope). This postal barcode is unlike other linear barcodes in that the data is encoded in the height of the bars. POSTNET barcodes are numeric and include start and stop characters and a checksum. POSTNET can be created with a different number of digits; the most common are five, nine, and eleven digits. The construction of the POSTNET barcode is shown on page 1-17 in Chapter 1.

For each barcode, the checksum is calculated as the smallest number that can be added to the sum of the digits so that the total sum would be a multiple of 10. For example, given data of “012345678”, the sum is 36 and hence the checksum is 4. The start and stop characters are not included in the checksum calculation.

The following table shows some examples applicable to either of the POSTNET fonts. The callout should occur after the PCL5 selection sequence for this font and should be followed by a PCL5 selection sequence for a different font.

Number	Calculated Checksum	Hex Callout for TROY Font	ASCII Callout for TROY Font
92780	4	5B 39 32 37 38 30 34 5D	[927804]
881381299	1	5B 38 38 31 33 38 31 32 39 39 31 5D	[8813812991]

## EAN and UPC Barcodes

The EAN and UPC barcodes are very similar, all being numeric with guard bars, checksums, and similar bar encoding. In general, they encode one or more number system characters, a manufacturer code, a product number code, and a checksum.

Each of the different barcodes has multiple character sets. Those character sets can be termed right or left hand depending on whether the character is to be used on the left of any middle guard bars (or there are no middle guard bars) or to be used on the right of any middle guard bars. Those character sets can also be termed odd or even parity depending on whether the sum of the bar module widths in a given character is an even or odd number of units. Both EAN-13 and UPC-E use left character sets in both odd and even parity forms; the pattern of odd and even parity encode additional information not represented by an explicit barcode glyph. Only the second number system character has an explicit barcode glyph.

For each barcode, the checksum is calculated the same way. The digit in the right-most position (just prior to any checksum) is termed “odd” and the digit to its left is “even”. Digits are counted to the left alternating in this way between even and odd. The digit values for odd positions are summed and that sum is multiplied by 3 and then added to the sums of the even positions. The checksum is the number that is added to this value to make is an even multiple of 10. So if the weighted sum is 66, the checksum is 4. The start and stop characters are not included in the checksum calculation.

The similarities in construction of these four barcode symbologies are shown in the table on the page 1-19 in Chapter 1. In this table, the components of each of the different barcode types are presented row by row. The “Count” (Ct) column gives the number of this type of barcode pattern to be used. When the parity of the barcode pattern is used to encode additional information (as mentioned above), the count is an aggregate of the types. The right columns indicate the location in the corresponding TROY font required to create this character. Detailed use and examples are shown on the following pages.

## EAN 13

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure *EX* printers only

### Example:

$^E_c(8Y^E_c(s1p26v0s0b24630Ta000001mBCD$   
*EFG]*

EAN-13 barcode incorporates a manufacturer code obtained from the European Article Numbering (EAN) authority. A product code is also incorporated in the barcode and is determined by manufacturer. The first system digit is determined by the sequence of parity patterns for the left side digits.

Besides the left, right, and middle guard patterns in the EAN-13 barcode, there are two digits for the country code, 5 digits for the manufacturer ID, 5 digits of product ID, and 1 digit for the checksum. Therefore, an EAN-13 barcode requires the placement of the start guard bar pattern, then six instances of left side odd or even parity bar patterns, then the middle guard pattern, then six instances of right side even parity bar patterns, then finally the right guard bar pattern.

As just mentioned, only the second number system character has an explicit barcode glyph. The first system number is encoded in the pattern of odd/even parity of the left-most digits. There are five explicit digits after the system number and prior to the middle guard. Representing odd parity with “odd” and even parity with “even”, the following table shows when to use a left odd or left even parity pattern for each of those digits prior to the middle guard.

First System Digit	Second System Digit Parity	Manufacturers Digit				
		1	2	3	4	5
0	Odd	Odd	Odd	Odd	Odd	Odd
1	Odd	Odd	Even	Odd	Even	Even
2	Odd	Odd	Even	Even	Odd	Even
3	Odd	Odd	Even	Even	Even	Odd
4	Odd	Even	Odd	Odd	Even	Even
5	Odd	Even	Even	Odd	Odd	Even
6	Odd	Even	Even	Even	Odd	Odd
7	Odd	Even	Odd	Even	Odd	Even
8	Odd	Even	Odd	Even	Even	Odd
9	Odd	Even	Even	Odd	Even	Odd

## EAN 13 (cont.)

The following table shows some examples. The callout should occur after the PCL5 selection sequence for this font and should be followed by a PCL5 selection sequence for a different font. In the “Bar Parity Pattern for Left Digits” column, “Even” is abbreviated as “E” and “Odd” is abbreviated as “O”.

System Number	Mfg ID to Encode	Product ID to Encode	Bar Parity Pattern for Left Digits	Calculated Checksum	ASCII Callout for TROY Font
00	00001	12345	000000	6	a000001mBCDEFG]
12	00002	00001	00EOEE	8	b20K0KMmAAAABI]
23	00003	00002	00EEOE	0	c30KK0NmAAAACA]

## EAN 8

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure *EX* printers only

### Example:

$^E_c(8Y^E_c(s1p26v0s0b24620T[1112mDEFD])$

The EAN-8 barcode has product code information assigned directly by the European Article Numbering (EAN) authority and hence does not incorporate a manufacturing code.

Besides the left, right, and middle guard patterns in the EAN-8 barcode, there are two-digits for the country code, 5 digits for the product ID, and 1 digit for the checksum. Therefore, an EAN-8 barcode requires the placement of the start guard bar pattern, then four instances of left side odd parity bar patterns, then the middle guard pattern, then four instances of right side even parity bar patterns, and then finally the right guard bar pattern.

The following table shows some examples. The callout should occur after the PCL5 selection sequence for this font and should be followed by a PCL5 selection sequence for a different font.

System Number	Product ID to Encode	Calculated Checksum	ASCII Callout for TROY Font
11	12345	3	[ 1112mDEFD ]
00	00001	7	[ 0000mAABH ]
11	00001	3	[ 1100mAABD ]

## UPC-A

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure *EX* printers only

### Example:

```
^C(8Y^C(s1p<Height>v0s0b24600T[b00001
mBCDEFq]
```

The UPC-A has an implied first system number character of 0. The table on page 6-9 shows all the left digits use the odd parity left character set. Like EAN-13, the left digits encode a manufacturer ID of up to 8 digits obtained from the European Article Numbering authority, and the right digits represent a product code assigned by the manufacturer.

The UPC-A barcode has a combined left guard and system number, 5 digits (can be extended up to 8 digits) for the manufacturer ID, 1 middle guard bar pattern, 5 digits for the product ID, and a combined checksum digit bar pattern and right guard. Therefore, a UPC-A barcode requires the placement of the combined start guard bar pattern and system number, then five instances of left side odd, then the middle guard pattern, then five instances of right side even parity bar patterns, and then finally the placement of the combined checksum bar pattern and right guard bar pattern.

The following table shows some examples. The callout should occur after the PCL5 selection sequence for this font and should be followed by a PCL5 selection sequence for a different font.

System Number	Manufacturer ID to Encode	Product ID to Encode	Calculated Checksum	ASCII Callout for TROY Font
1	00001	12345	3	[b00001mBCDEFq]
0	00002	00001	5	[a00002mAAAABs]
1	00999	00001	9	[b00999mAAAABw]

## UPC-E

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure *EX* printers only

### Example:

$^E_c(8Y^E_c(s1p26v0s0b24610Tb1C9J9Au$

The UPC-E barcode is an abbreviated form of the UPC-A barcode using a zero-suppressing compression scheme. There are no middle guard bars. Only UPC-A barcodes with system number of 0 (zero) can be represented as a UPC-E barcode. The checksum is computed based on the equivalent UPC-A barcode.

There is no explicit checksum nor is there an explicit system number. The checksum and the system number are encoded in the pattern of odd/even parity of digits. Representing odd parity with “odd” and even parity with “even”, the following table shows when to use a left odd or left even character set for each of the digits in barcode.

	Parity Encoding if System Number is 0 for each Digit Position					
Checksum	1	2	3	4	5	6
0	Even	Even	Even	Odd	Odd	Odd
1	Even	Even	Odd	Even	Odd	Odd
2	Even	Even	Odd	Odd	Even	Odd
3	Even	Even	Odd	Odd	Odd	Even
4	Even	Odd	Even	Even	Odd	Odd
5	Even	Odd	Odd	Even	Even	Odd
6	Even	Odd	Odd	Odd	Even	Even
7	Even	Odd	Even	Odd	Even	Odd
8	Even	Odd	Even	Odd	Odd	Even
9	Even	Odd	Odd	Even	Odd	Even

The UPC-A barcode has a left guard and right guard, and six digits for the data. Therefore, a UPC-A barcode requires the placement of the combined visual system number and left guard, then six instances of left side odd or even parity bar patterns, and then the placement of the combined right guard and visual checksum digit.

## UPC-E (cont.)

The zero-suppressing compression scheme to convert UPC-A barcode to an equivalent UPC-E barcode only works in some cases and is summarized in the table below. Rules should be checked in order from 1 to 6. An example of a UPC-A barcode that will not convert to a UPC-E barcode would be if the Manufacturer ID was 12345 and the product ID was any number in range 00000-00004 or in the range 00010-99999. Notice that the last digit in the zero suppressed form indicates the rule used for compression and hence the ease that a UPC-E barcode can be converted back to full UPC-A data.

Rule	Mfg. ID to Encode	Product ID to Encode	Zero Suppressed Form	Notes
1	MM000	00PPP	MMPPP0	Mfg ID ends in 000. Prod ID is 00000 - 00999
2	MM100	00PPP	MMPPP1	Mfg ID ends in 100. Prod ID is 00000 - 00999
3	MM200	00PPP	MMPPP2	Mfg ID ends in 200. Prod ID is 00000 - 00999
4	MMM00	000PP	MMMPP3	Mfg ID ends in 00. Prod ID is 00000 - 00099
5	MMMM0	0000P	MMMMP4	Mfg ID ends in 0. Prod ID is 00000 - 00009
6	MMMMM	0000P	MMMMMP	Mfg ID does not end in 0. Prod. ID is 00005-00009

## UPC-E (cont.)

The following table shows some examples. The callout should occur after the PCL5 selection sequence for this font and should be followed by a PCL5 selection sequence for a different font. In the “Bar Parity Pattern” column, “Even” is abbreviated as “E” and “Odd” is abbreviated as “O”. Use the system number to determine the Bar Parity Pattern, use the Manufacturer ID end range and Product ID range in Table 16 to suppress the zeros in the UPC-A font.

System Number	Mfg. ID to Encode	Product ID to Encode	Zero Suppressed Form (UPC-E Data)	Calculated Checksum	Bar Parity Pattern	ASCII Callout for TROY Font
1	12000	00999	129990	7	OEOEOE	b1C9J9Au
0	12100	00999	129991	9	EOOEOE	bB29J9Bv
0	12400	00001	124013	6	EOOOEE	bB240BDt
1	12340	00001	123414	2	OEOEOE	b12DE1Ep
1	12345	00005	123455	5	OEOEOE	b1CD45Fs

## TROYmark™ Control

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	
TROY Port Monitor	√

### Usage Restrictions:

TROY MICR Secure EX printers only

A valid user login is required to use the TROYmark™ feature.

### Example:

<code>E<sub>c</sub>%u5WADMIN</code>	Specify name
<code>E<sub>c</sub>%pØW</code>	Specify password
<code>E<sub>c</sub>%u1S</code>	Login
<code>E<sub>c</sub>%w2M</code>	<b>Enable, medium</b>
<code>E<sub>c</sub>%wØB</code>	Clear region list
<code>E<sub>c</sub>%w1B</code>	Inclusion region
<code>E<sub>c</sub>%wØX</code>	Region anchor X
<code>E<sub>c</sub>%w42ØØY</code>	Region anchor Y
<code>E<sub>c</sub>%w48ØØH</code>	Region width
<code>E<sub>c</sub>%w18ØØV</code>	Region height
<code>E<sub>c</sub>%w2B</code>	Exclusion region
<code>E<sub>c</sub>%w395ØX</code>	Region anchor X
<code>E<sub>c</sub>%w45ØY</code>	Region anchor Y
<code>E<sub>c</sub>%w9ØØH</code>	Region width
<code>E<sub>c</sub>%w3ØØV</code>	Region height
<i>Remaining PCL data plus data capture</i>	
<code>E<sub>c</sub>%uØS</code>	{Logout}

This command defines if the TROYmark™ feature is to be enabled, and if so, which pre-defined pattern will be used to print the TROYmark™ text.

`Ec % w # M`

# = Ø – Disable

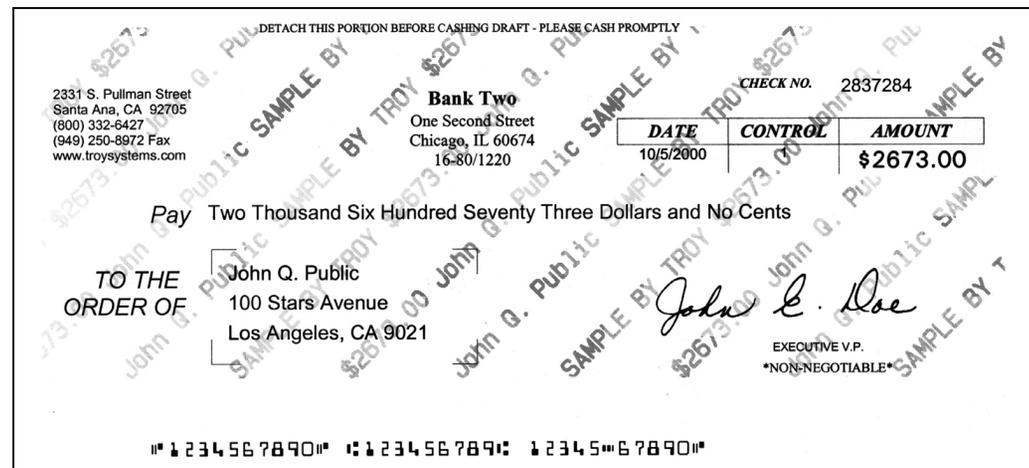
- 1 – Enable and print using printer's default light pattern
- 2 – Enable and print using printer's default medium pattern
- 3 – Enable and print using printer's default dark pattern
- 4 – Enable and print using printer's Custom 1 pattern
- 5 – Enable and print using printer's Custom 2 pattern
- 6 – Enable and print using printer's Custom 3 pattern

Default = 2 (Enable, default medium pattern)

Range = Ø - 6 (values outside range are ignored)

TROYmark™ configurations persist throughout the life of a print job, however, do not persist beyond the job and must be included in each job that desires to use this feature. Multiple TROYmark™ configurations can, however, be defined within one job should multiple document styles require multiple TROYmark™ configurations.

To see the default patterns available on your printer, print out the CONFIGURATION page using the TROY INFORMATION MENU.



## TROYmark™ Regions

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	
TROY Port Monitor	√

### Usage Restrictions:

TROY MICR Secure *EX* printers only

A valid user login is required to use the TROYmark™ feature.

### Example:

$\text{E}_c\%u5WADMIN$	Specify name
$\text{E}_c\%p\emptyset W$	Specify password
$\text{E}_c\%u1S$	Login
$\text{E}_c\%w2M$	Enable, medium
$\text{E}_c\%w\emptyset B$	<b>Clear region list</b>
$\text{E}_c\%w1B$	<b>Inclusion region</b>
$\text{E}_c\%w\emptyset X$	Region anchor X
$\text{E}_c\%w42\emptyset\emptyset Y$	Region anchor Y
$\text{E}_c\%w48\emptyset\emptyset H$	Region width
$\text{E}_c\%w18\emptyset\emptyset V$	Region height
$\text{E}_c\%w2B$	<b>Exclusion region</b>
$\text{E}_c\%w395\emptyset X$	Region anchor X
$\text{E}_c\%w45\emptyset Y$	Region anchor Y
$\text{E}_c\%w9\emptyset\emptyset H$	Region width
$\text{E}_c\%w3\emptyset\emptyset V$	Region height
<i>Remaining PCL data plus data capture</i>	
$\text{E}_c\%u\emptyset S$	Logout

This command determines the type of region that subsequent size commands will define.

$\text{E}_c \% w \# B$

- # =  $\emptyset$  – Reset (clear) all regions
- 1 – Inclusion region
- 2 – Exclusion region

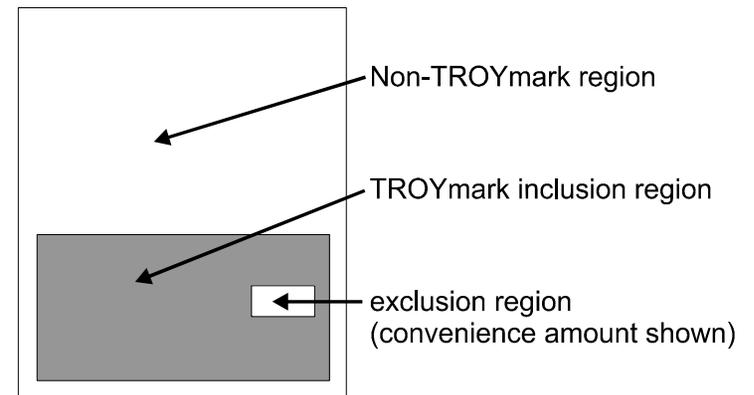
Default =  $\emptyset$  (Reset all regions)

Range =  $\emptyset - 2$  (values outside range are ignored)

TROYmark™ configurations persist throughout the life of a print job, however, do not persist beyond the job and must be included in each job that desires to use this feature. Multiple TROYmark™ configurations can, however, be defined within one job should multiple document styles require multiple TROYmark™ configurations.

At the beginning of any job setup to use TROYmark™, all regions should be cleared. This prevents lingering region definitions that may not have been cleared after abnormal job terminations from persisting into new jobs.

Only one inclusion region is allowed per printed page. Up to 10 exclusion regions are allowed per printed page. To conform to the ANSI X9/B standard for automated check processing, the convenience amount must not contain TROYmark™ images. Therefore, at a minimum, it must be excluded.



## Region Sizes

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	
TROY Port Monitor	√

### Usage Restrictions:

TROY MICR Secure *EX* printers only.

A valid user login is required to use the TROYmark™ feature.

### Example:

$E_C \% u5WADMIN$	Specify name
$E_C \% p\emptyset W$	Specify password
$E_C \% u1S$	Login
$E_C \% w2M$	Enable, medium
$E_C \% w\emptyset B$	Clear region list
$E_C \% w1B$	Inclusion region
$E_C \% w\emptyset X$	<b>Region anchor X</b>
$E_C \% w42\emptyset Y$	<b>Region anchor Y</b>
$E_C \% w48\emptyset H$	<b>Region width</b>
$E_C \% w18\emptyset V$	<b>Region height</b>
$E_C \% w2B$	Exclusion region
$E_C \% w395\emptyset X$	<b>Region anchor X</b>
$E_C \% w45\emptyset Y$	<b>Region anchor Y</b>
$E_C \% w9\emptyset H$	<b>Region width</b>
$E_C \% w3\emptyset V$	<b>Region height</b>
<i>Remaining PCL data plus data capture</i>	
$E_C \% u\emptyset S$	Logout

The following four commands define the location and size of any TROYmark™ region.

$E_C \% w \# X$  {Upper left anchor corner of the region}

$E_C \% w \# Y$  {Upper left anchor corner of the region}

$E_C \% w \# H$  {Region width}

$E_C \% w \# V$  {Region height}

# = Distance in 1/600's of an inch {e.g.  $48\emptyset\emptyset / 6\emptyset\emptyset = 8''$ }

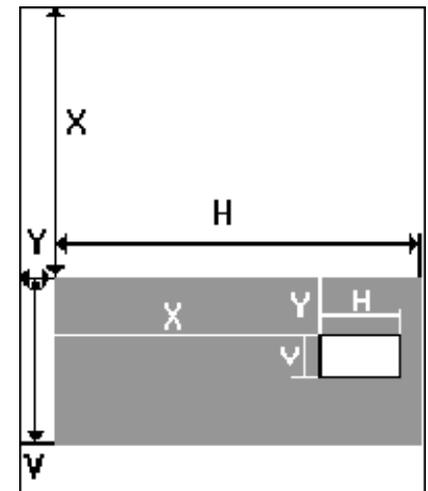
Default =  $\emptyset$

Range =  $\emptyset - 10200$  (17'') (values outside range are clamped)

TROYmark™ configurations persist throughout the life of a print job, however, do not persist beyond the job and must be included in each job that desires to use this feature. Multiple TROYmark™ configurations can, however, be defined within one job should multiple document styles require multiple TROYmark™ configurations.

When specifying the location of the inclusion region, the X and Y anchor corner values are measured from the upper left corner of the image on the printed page. The values are an absolute measure of distance from this point. The inclusion region must never be closer than 1/4'' from the MICR line.

When specifying the location of exclusion regions, the X and Y anchor corner values are measured from the upper left corner of the inclusion region. Therefore, these values are relative and will automatically adjust should the inclusion region location change.



## Custom TROYmark™ Patterns

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY MICR Secure EX printers only

You must put the printer in download mode to update the default TROYmark™ pattern values.

### Example:

<code>^c%u5WADMIN</code>	Specify name
<code>^c%pØW</code>	Specify password
<code>^c%u1S</code>	Login
<code>^c%v1D</code>	Enter download
<code>^c%w4P</code>	<b>Select pattern 4</b>
<code>^c%w32W data</code>	<b>Download pattern</b>
<code>^c%vØD</code>	Exit download
<code>^c%uØS</code>	Logout

There are three custom patterns (gray levels) that can be defined for use in TROYmark™ imaging. Each pattern is a 16 x 16 matrix of binary ones and zeros.

To change a printer pattern, the pattern to be updated must first be selected.

`^c % w # P`

- # = 1 – Reserved {printer default light pattern}
- 2 – Reserved {printer default medium pattern}
- 3 – Reserved {printer default dark pattern}
- 4 – Custom 1
- 5 – Custom 2
- 6 – Custom 3

Default = 4 (Custom 1)

Range = 4 - 6 (values outside range are ignored)

The pattern data is then downloaded into the printer.

`^c % w # W data`

# = Total number of bytes contained in the pattern

Default = 32

Range = 32 (values outside range are ignored)

The format of the *data* is as follows:

```
1000100010001000 {Row 1, sent as 0x88 0x88}
00100000100010010 {Row 2, sent as 0x22 0x22}
...
00100000100010010 {Row 16, sent as 0x22 0x22}
```

All bytes are concatenated together with no delimiters between bytes. The most significant bit of the first byte sent is the upper left corner of the pattern.

## Sort By

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only

You must put the printer in download mode before using the Sort By command.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%a3S</code>	<b>Select sort by field</b>
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

This command defines which data capture field will be used as the sort key during audit report printing.

`E_c % a # s`

- # = 1 – Audit Record Number
- 2 – MICR Line
- 3 – Convenience Amount
- 4 – Payee Name
- 5 – Date
- 6 – User Name
- 7 – Custom (concatenation of Custom 1, Custom 2 and Custom 3)

Default = 1 (Audit Record Number)

Range = 1 – 7 (values outside range are ignored)

The sort by value specified is used for all subsequent audit reports until changed.

The following table defines the type of sorting performed for each data capture field.

Field	Sort Type
1 - Audit Record Number	Numeric
2 – MICR Line	Numeric
3 – Convenience Amount	Numeric
4 – Payee Name	Alphanumeric
5 – Date	Numeric
6 – User Name	Alphanumeric
7 - Custom	Alphanumeric

## Audit Paper Tray

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only

You must place the printer into download mode before using the Audit Paper Tray command.

### Example:

```

Ec%u5WADMIN    Specify name
Ec%pØW        Specify password
Ec%u1S         Login
Ec%v1D         Enter download
Ec%a7T         Auto select tray
Ec%vØD         Exit download
Ec%uØS         Logout
    
```

This command defines which paper tray will be used during audit report printing.

```

Ec % a # T
# = 1 – Tray 2
    2 – Manual feed, paper
    3 – Manual feed, envelop
    4 – Tray 1           { manual feed, general }
    5 – Tray 3
    6 – Envelop feeder  { not applicable }
    7 – Auto select
    8 – Tray 4           { 41ØØ, 42ØØ and 43ØØ only }
    2Ø – Tray 4          { 815Ø, 9ØØØ only }
    21 – Tray 5          { 815Ø, 9ØØØ only }
    22 to 75 – External trays
    
```

Default = 7 (default paper tray)  
 Range = 1 – 75 (values outside range are ignored)

The audit paper tray value specified is used for all subsequent audit reports until changed.

**NOTE:** The tray numbers listed above reflect tray numbers for the 4050, 4100, 4200, 4300, 8000, 8100, and 8150 printer models. Please consult the HP User Guide located on the HP CD accompanying the printer for other printer tray numbers.

If paper tray mapping has been configured in the printer, the tray number specified by this command may be re-mapped by the tray-mapping configuration.

## Print Range

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only

You must put the printer in download mode before using the Print Range command.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%a12E</code>	<b>Print all records</b>
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

This command defines which set of audit records, stored in the TROY Secure printer or DIMM, will be printed during audit reporting. Audit reports can be run against all records stored in the printer (*all records*) or only on those records received since the last time an audit report was run (*recent records*). Recent records can also be thought of as incremental, a useful feature for transactional reconciliation.

`E_c % a # E`

# = 11 – Recent records  
12 – All records

Default = 12 (All records)

Range = 11 – 12 (other values may perform other commands)

The set of records selected is used for all subsequent audit reports until changed.

It is possible to print multiple copies of audit reports for the same set of recent audit records. As long as the printer receives no files containing auditable data, requests to print audit reports of recent records will use the same (last) set of recent audit records.

For example:

Record 1  
Record 2                    {Audit records previously received and printed}  
Record 3

**Record 4**  
**Record 5**                    **{Audit records just received by the printer}**  
**Record 6**

Running an audit report using recent records would print records 4 – 6. Running a subsequent report using recent records would again print records 4 – 6. However, as soon as Record 7 was received, running a subsequent audit report using recent records would include Record 7 and subsequent records received.

## Report Type

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

**TROY Secure printers and DIMMs only**

**You must put the printer in download mode before using the Report Type command.**

### Example:

```

Ec%u5WADMIN    Specify name
Ec%pØW         Specify password
Ec%u1S         Login
Ec%v1D         Enter download
Ec%a14E       Detailed report type
Ec%vØD         Exit download
Ec%uØS         Logout
    
```

This command defines the type of audit report to be printed.

<sup>E</sup>c % a # E

# = 13 – Summary  
14 – Detailed

Default = 14 (Detailed)

Range = 13 – 14 (other values may perform other commands)

The report type specified is used for all subsequent audit reports until changed.

The following table describes what will be printed for both report types from TROY Security Printing Solutions.

Product	Summary	Detail
TROY Secure Printers and DIMMs	Record number and MICR line per record. Total count of records printed at the end of the report.	Record number, MICR line plus all user-configurable data received per record. Total count of records printed plus sum of all convenience amounts recorded printed at the end of the report.

## Sort Order

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

**TROY Secure printers and DIMMs only**

**You must put the printer in download mode before using the Sort Order command.**

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v1D</code>	Enter download
<code>^C%a15E</code>	<b>Set sort ascending</b>
<code>^C%vØD</code>	Exit download
<code>^C%uØS</code>	Logout

This command defines the sorting order (ascending or descending) that will be used during audit report printing.

`^C % a # E`

# = 15 – Ascending

16 – Descending

Default = 15 (Ascending)

Range = 15 – 16 (other values may perform other commands)

The sort order value specified is used for all subsequent audit reports until changed.

## Auto-Delete

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only

You must put the printer in download mode before using the Auto-Delete command.

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v1D</code>	Enter download
<code>^C%a31E</code>	<b>Enable auto-delete</b>
<code>^C%vØD</code>	Exit download
<code>^C%uØS</code>	Logout

This command specifies whether the printer is to automatically delete all audit records included in the most recent report after printing an auto-report.

`^C % a # E`

# = 3Ø – Disable

31 – Enable

Default = 3Ø (Disable)

Range = 3Ø – 31 (other values may perform other commands)

The auto-delete mode specified will remain in effect until changed.

Auto-delete will only delete audit records from the printer after an auto-report has been printed. Auto-report must be enabled for auto-delete to function.

Using the auto-delete feature to automatically delete all audit records after automatically printing transactional reconciliation reports is a convenient means to ensure your printer's audit memory does not overflow.

## Auto-Report

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

**TROY Secure printers and DIMMs only**

**You must put the printer in download mode before using the Auto-Report command.**

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v1D</code>	Enter download
<code>^C%a33E</code>	<b>Enable auto-report</b>
<code>^C%vØD</code>	Exit download
<code>^C%uØS</code>	Logout

This command specifies whether the printer is to automatically print an audit report with the current audit report settings at the conclusion of each job received containing audit data.

`^C % a # E`

# = 32 – Disable  
33 – Enable

Default = 32 (Disable)

Range = 32 – 33 (other values may perform other commands)

The auto-report mode specified will remain in effect until changed.

Using the auto-report feature to print recent records provides a convenient method for creating transactional reconciliation reports.

## Audit Data Capture Recording Mode

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only.

You must place the printer into download mode before using the Audit Data Capture Recording Mode command.

### Example:

$\text{E}_c\%u5WADMIN$	Specify name
$\text{E}_c\%p\emptyset W$	Specify password
$\text{E}_c\%u1S$	Login
$\text{E}_c\%v1D$	Enter download
$\text{E}_c\%a2E$	<b>Detail audit record</b>
$\text{E}_c\%v\emptyset D$	Exit download
$\text{E}_c\%u\emptyset S$	Logout

This command defines which data capture fields contained within print jobs will be stored in printer audit records.

$\text{E}_c\%a\#E$

# =  $\emptyset$  – Disable

1 – Summary

2 – Detail

Default =  $\emptyset$  (Disable)

Range =  $\emptyset$  – 2 (other values may perform other commands)

The recording mode specified will remain in effect until changed.

The following table describes what will be stored for all recording modes in TROY Secure printers and DIMMs. A record-mode of *disable* records no data in the printer.

Product	Summary	Detail
TROY Secure Printers and DIMMs	Stores the MICR line and convenience amount (if present in the job) for each record. All other user configurable data is discarded.	Stores the MICR line and all user-configurable data present in the print job.

In most cases, this feature will be configured to store detailed data for all audit records. However, since there is a limit on the total amount of audit data that can be stored within the printer when printing excessively large print jobs, it is possible the printer will be unable to store all audit data for the job. In such cases, using the summary mode for audit recording reduces the amount of data captures and increases the number of records of audit data that can be stored for large print jobs.

## Print Audit Report

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only.

A valid user login is required to print an audit report.

### Example:

```

E_C%-12345X      HP UEL
@PJL JOB NAME="Print Audit" C_R L_F
@PJL SET RESOLUTION=600 C_R L_F
@PJL ENTER LANGUAGE=PCL C_R L_F
E_C E           PCL Reset
E_C %u5WADMIN   Specify name
E_C %pØW        Specify password
E_C %u1S        Login
E_C %a1D        Print Audit Report
E_C %uØS        Logout
E_C %-12345X    HP UEL
@PJL EOJ NAME="Print Audit" C_R L_F
E_C %-12345X    HP UEL
    
```

This command prints audit records using the audit configuration previously set up by the Audit Options.

```
E_c % a 1 D
```

## Delete Audit Data

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only.

A valid user login is required to delete audit records.

### Example:

```

E_C%-12345X      HP UEL
@PJL JOB NAME="Delete Audit" C_R L_F
@PJL SET RESOLUTION=600 C_R L_F
@PJL ENTER LANGUAGE=PCL C_R L_F
E_C E           PCL Reset
E_C %u5WADMIN   Specify name
E_C %pØW        Specify password
E_C %u1S        Login
E_C %a2D        Delete Audit Data
E_C %uØS        Logout
E_C %-12345X    HP UEL
@PJL EOJ NAME="Delete Audit" C_R L_F
E_C %-12345X    HP UEL
    
```

This command deletes all audit data records currently stored within the printer.

```
E_C % a 2 D
```

## Introduction

Secure Seal technology, a product of EnSeal Systems, Ltd., is designed to help check processors easily identify unauthorized alterations to printed checks. The printed seal consists of a visible company logo or other unique design along with encoded user-defined check information that is incorporated into the seal as a bit-mapped, machine-readable background pattern surrounding the logo. The encoded information is spread over the entire image, making selective alteration of the printed seal data virtually impossible. TROY has licensed the Enseal technology for use in selected TROY MICR/IRD printers.

To use the TROY Secure Seal feature, the user must first obtain a matched pair of custom encoding/decoding template files from Fiserv. The seal template files specify the visual representation of the seal as well as the set of fields encoded into the image of the seal. The encoding template (.est file) is used by the TROY printer to encode the data. The decoding template (.dst file) is used by the check processor to decode the data from the scanned image of the printed seal. Fields that can be encoded into the seal include the payee name, account number, date, check value, routing number, transaction number, check #, and company ID fields. The user must specify which of these fields they wish to encode into the seal when ordering the template files from Fiserv.

For your convenience, the TROY Printer Utility provides sample template files that you can use to demonstrate this feature. The demonstration template files are located in the “User Data” subfolder in the installed location of the Printer Utility. These template files should be used for demonstration purposes only, never for production.

Configuring the Secure Seal feature is most easily done using the TROY Printer Utility. Alternatively, you can use custom TROY PCL commands that are sent to the printer. Even if you decide to create your own PCL, you might find it useful to use the TROY Printer Utility to generate configuration jobs, then print to file and examine those jobs to see more complex example configuration jobs than are illustrated here. In the examples shown in the left margin and in the list on the next page, the notation “<xx>” stands for a single byte with “xx” being the hexadecimal value; e.g. <0A> is the linefeed characters.

**NOTE:** Refer to page 1-20 in Chapter 1 for a list of the Secure Seal commands.

## Secure Seal Commands

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

**TROY MICR/IRD Secure and Secure EX Printers only.** The seal options can be set using the TROY Printer Utility.

### Example PCL data to download template named “DDSignature.est”:

```

E_C%u5WADMIN      Specify ADMIN user
E_C%pØW           Specify password
E_C%u1S           User Login
E_C%v1D           Download mode in
E_C %v20I         Specify data ID of 20
E_C %v69752W     Start template
{data}           69752 binary bytes
E_C%v32D         To secure area
E_C%v20I         Specify data ID of 20
E_C%h23W         Specify name
<00><00><00><03> 8 binary bytes
<00><01><00><00>
DDSignature.est  Then template name
E_C%v0D         Download mode out
E_C %v2D        NV Report
E_C%uØS         User Logout
    
```

The encoding (.est file) template is loaded into the non-volatile secure memory area of the TROY printer in the “data” area. It is easiest to use the TROY Printer Utility to perform this download. If you want to create your own PCL, refer to Chapter 4 – *Secure and Public Resources* for the appropriate PCL commands. When downloading the template file, note the file name (also as printed on the NV report), because you will use a corresponding name when configuring the seal to use that specific template file.

Secure Seals can be created both automatically on the end of page event as well as explicitly via a “##SEAL” command. The field data that is encoded into the seal can come explicitly from a “##SEAL” command when an explicit seal is printed, or it can come from default field values configured previously, or it can come from metadata-tagged data within the print job stream. These alternatives are explained below.

Three new TROY PCL commands have been added to support the configuration of the secure seal feature: an option setting command to set some general options, a command to set a company ID, and the “##SEAL” command. The ##SEAL command is used to specify the name of the seal template, the X and Y location of the seal (optional), and the various field values (payee name, account number, etc.) to be encoded into the seal.

The option setting command controls four general options of the seal feature as listed in the following table. The default for the “Show Error” option is enabled, and the defaults for all other options are disabled.

Name	Effect of option when enabled	Bit
Use Metadata	Seal data from TROY metadata tagged fields, if available. Otherwise field data must be specified in seal command.	0
Auto Print	Auto print seal for each page. Location option must be enabled.	1
Use Location	Seal prints at location specified by X, Y position, otherwise seal prints at current PCL location on page.	2
Show Error	Display error information on front panel of printer, otherwise errors are silently ignored.	3

## Example PCL data to specify options - 1:

<code>E_C%u5WADMIN</code>	Specify ADMIN user
<code>E_C%pØW</code>	Specify password
<code>E_C%u1S</code>	User Login
<code>E_C%v1D</code>	Download mode in
<code>E_C%h8W</code>	<b>Specify option</b>
<code>&lt;00&gt;&lt;00&gt;&lt;00&gt;&lt;04&gt;</code>	<b>8 binary bytes</b>
<code>&lt;00&gt;&lt;02&gt;&lt;00&gt;&lt;07&gt;</code>	<b>Bits 0, 1, 2 are set.</b>
<code>E_C%v0D</code>	<b>Download mode out</b>
<code>E_C%-12420X</code>	<b>TROY Report</b>
<code>E_C%uØS</code>	User Logout

## Example PCL data to specify options - 2:

<code>E_C%u5WADMIN</code>	Specify ADMIN user
<code>E_C%pØW</code>	Specify password
<code>E_C%u1S</code>	User Login
<code>E_C%v1D</code>	Download mode in
<code>E_C%h8W</code>	<b>Start command</b>
<code>&lt;00&gt;&lt;00&gt;&lt;00&gt;&lt;04&gt;</code>	<b>8 binary bytes</b>
<code>&lt;00&gt;&lt;02&gt;&lt;00&gt;&lt;0F&gt;</code>	<b>All options enabled</b>
<code>E_C%v0D</code>	<b>Download mode out</b>
<code>E_C%-12420X</code>	<b>TROY Report</b>
<code>E_C%uØS</code>	User Logout

Seal options can be enabled and disabled by specifying a bitmask while in the download mode as shown in the following PCL command (refer to Chapter 2 – *Security Settings*).

```
E_C%h8W<00><00><00><04><00><02><00><single byte bitmask>
```

The last column in the seal options table (shown on the previous page) indicates which bit in the bitmask corresponds to each feature; bits are numbered from least significant to most significant. Bitmask bit positions 5 through 7 are currently unused and should always be set to zero. For example, a bitmask value of 7 has bit positions 0, 1, and 2 set; therefore, metadata will be used, the seal will autoprnt for each page, and the seal will print at the location specified by the X and Y settings.

The “Use Metadata” option allows you to pull field values automatically from the TROY printer metadata tagging module. Refer to Chapter 5 – *Data Capture Fonts* to see how PCL data can be tagged by TROY metadata tags to indicate semantic types.

As an example, the TROY firmware could capture payee data at an earlier point on the page, then later, when the seal is printed as a last event of the page, that seal could incorporate that payee data. The Payee, Date, Convenience Amount, Account number, Bank number, Check number, and Transaction number field data can all be pulled from the metadata module. As mentioned, you can use the data capture fonts (metrics file) on the Windows platform to automatically insert meadata tags into the print data stream, simply by selecting specific Windows screen fonts.

The “AutoPrint” option allows a seal to be printed as the last event on a page. This option can only be enabled if the “Use Metadata” and “Use Location” options are also enabled. If the “Use Location” Y value is positive, then a seal will always print as long as there is some metadata for that page. If the “Use Location” Y value is negative, then a seal will print for each MICR line as long as there is some metadata for that page; if no MICR line is present on the page, then no seal will print for that page. This scheme allows multiple checks to be printed on the same page, each having their own seal with check-dependent data embedded in the seal.

## Example ##SEAL command specifying default template, payee, and resolution:

```

EC%u5WADMIN Specify ADMIN user
EC%pØW Specify password
EC%u1S User Login
EC%v1D Download mode in
EC%h51W Start command
<00><00><00><04> 8 binary bytes
<00><01><00><00>
##SEAL# 7 chars
T:DDSignature.est; 18 chars
P:John Doe; 11 chars
R:300# 6 chars
EC%v0D Download mode out
EC%-12420X TROY Report
EC%uØS User Logout
    
```

## Example ##SEAL command to print a seal using all default:

```

EC%u5WADMIN Specify ADMIN user
EC%pØW Specify password
EC%u1S User Login
{ more job data }
EC%h24W Start command
<00><00><00><04> 8 binary bytes
<00><01><00><00>
##SEAL# 7 chars
A:100.00# 9 chars
{ more job data }
EC%uØS User Logout
    
```

When enabled, the “Use Location” option uses the X and Y locations as specified using the “##SEAL” command. The X position is always measured relative to the upper left corner of the page. However, the Y value is used differently. If the Y position value is positive, then the Y position is relative to the upper left corner of the page. If the Y position value is negative, then the Y position is relative to the MICR line by the number of specified decipoints. The Y position value can only be negative if the “AutoPrint” option is enabled, in which case provides the opportunity for multiple MICR lines to appear on one page.

**NOTE: The X and Y seal location values are only used if the “Use Location” option is enabled, allowing the seal to print at the specified location on the page.**

As previously mentioned, the “##SEAL” PCL command is used to specify the desired seal template, the default values for all fields, and the (optional) X and Y location values of the seal on the page (example shown below). Replace the hashmark “#” prior to the “W” with the count of bytes that follow the “W”.

```

EC%h#W<00><00><00><04><00><01><00><00><command string>
    
```

The command string has a specific format that must be used. The command string begins with “##SEAL#”, followed by one or more parameter fields (Param Field), with multiple Parm Fields separated by a semicolon. Within each Param Field, there is an initial letter (Field Letter), followed by a colon, which is then followed by a string. The table on the next page shows all possible Field Letters and their description. The string following the colon is the default value for that field. Each Field Value thus has a general format of “<Field letter>:<Field value>”. For example, “A:12345” specifies that the default account number is “12345”. The command string is terminated with a final “##”. An error will occur if any part of the string is incorrectly formatted.

## Example ##SEAL command to specify default company ID:

```

E_C%u5WADMIN Specify ADMIN user
E_C%pØW Specify password
E_C%u1S User Login
E_C%v1D Download mode in
E_C%h11W Start command
<00><00><00><04> 8 binary bytes
<00><03><00><00>
124 ID is 124
E_C%v0D Download mode out
E_C%-12420X TROY Report
E_C%uØS User Logout
    
```

## Secure Seal Field Descriptions

Field Letter	Field Name	Field Type	Max Size	Description
T	Template Name	alphanumeric	80	Encoding template name as stored in TROY NV area.
P	Payee Name	alphanumeric	32	Payee name
V	Check Value	numeric	16	Dollar value of the check (includes optional decimal point)
A	Account #	numeric	20	Account number of the checking account
B	Routing #	numeric	20	Routing number of the bank
D	Date	numeric	20	Date of the check (YYYYMMDD, YYYY/MM/DD, or DD/MM/YYYY)
N	Transaction #	numeric	20	Transaction number of the check
C	Check #	numeric	20	Check number
X	X Location	numeric	6	Specifies X location of the seal if the seal option "Use Location" is enabled. Units are 1/720" (decipoints).
Y	Y Location	numeric	6	Specified Y location of the seal if the seal option "Use Location" is enabled. Units are 1/720" (decipoints).
R	Resolution	numeric	3	Designates seal print resolution in DPI. Must be one of 75, 100, 150, 200, 300 (default), or 600.

The example command string shown below sets the default template name to "DDSignature.est", the default payee name to "John Doe", and the default print resolution to 300 DPI.

```
##SEAL#T:DDSignature.est;P:John Doe;R:300##
```

## Secure Seal Templates

**Example PCL data to download template, specify a configuration to be used with that template, metadata, and checks with seal 1 inch above MICR line (see next example which uses this config):**

```

E_C%u5WADMIN      Specify ADMIN user
E_C%pØW           Specify password
E_C%u1S           User Login
E_C%v1D           Download mode in
E_C %v20I         Specify data ID of 20
E_C %v69752W     Start template
{data}           69752 binary bytes
E_C%v32D         To secure area
E_C%v20I         Specify data ID of 20
E_C%h23W         Specify name
<00><00><00><03> 8 binary bytes
<00><01><00><00>
DDSignature.est   Then template name
E_C%h8W          Start command
<00><00><00><04> 8 binary bytes
<00><02><00><0F> All options enabled
E_C%h51W         Start command
<00><00><00><04> 8 binary bytes
<00><01><00><00>
##SEAL#
T:DDSignature.est; Matches template
X:1440;          2" from left
Y:-720;          1" up from MICR
R:300#           300 DPI
E_C%v0D          Download mode out
E_C%uØS          User Logout
    
```

For each of the field types, there is both a default and a current value stored in the printer. If the “##SEAL” command is sent while in download mode (refer to Chapter 2 – *Security Settings*), then the values specified are stored as the default value. The default values and default options for each seal field can be seen by printing the TROY configuration page report (E\_C%-1242ØX). If the “##SEAL” command is sent while not in download mode, then any values specified supersede the default values AND a seal is immediately printed. If the “Use Metadata” option is enabled and metadata was previously seen on the page, then those metadata values can also supersede the default data values.

The following command is used to specify a company ID. The default value is 0 and should be left at that value unless an “official” number is set by the seal creator. Most companies are not assigned this number and leave it at its default of 0.

```

E_C%h#W<00><00><00><04><00><03><00><00><company ID as string>
    
```

**Example PCL data that uses prior example default settings. Has metadata tagged fields in data stream. Seal prints for each page.**

```
{misc PCL}
^C(19U          Some font
^C(s1p11v0s3b16T  Payee positioning
^C&a720h1440V    Payee metadata on
^C%m1028T       Payee data
Grover Cleveland
^C%m0T          Payee metadata off
^C&a2880h720V   Amount positioning
^C%m1027T       Amount metadata on
127.34
^C%m0T          Amount metadata off
^C&a720h2880V   MICR positioning
^C(0Q          MICR Font call
^C(s1p12v0s0b0T MICR data
{data}
^C(19U          Some font
^C(s1p11v0s3b16T
  {misc PCL}
^F              Formfeed

{ and more pages }
```

The following provides some guidance on the different configuration paths you might want to consider depending on your specific needs.

On a Windows platform, you can use the data capture fonts so that the data stream contains metadata-tagged field values. To do so, specify the seal options to “Use Location”, “Use Metadata”, and “Autoprint”. Use the “##SEAL” command to specify default values that reference the already downloaded encoding template and your desired seal DPI resolution and Company ID (if used). Use the “##SEAL” command to specify defaults for field values that will not be used with data capture fonts, and hence, not be delivered by metadata in the data stream as well as the X and Y locations for the seal location.

Certain mainframes allow fonts to be separately defined from the application data. If this is the case, then the metadata tags could be added to that font definition. It would even be possible to use a pseudo font for the seal application itself.

On any platform you can use the Pattern Processor feature (see Chapter 11) on any platform to make certain changes to the data stream in order to insert metadata tags and even force the seal print event. To do so, there must be enough contextual information in the data stream to enable the Pattern Processor feature to pick out the various fields.

If you have complete control over your print data stream, then you can use any combination of the foregoing PCL data examples (shown in the column to the left) including the explicit “##SEAL” command that, when not in download mode, prints the seal immediately.

## Introduction

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

Can be enabled via the TROY Printer Utility. A valid admin login and modify mode enabled is required to configure this feature.

### Example PCL data to enable feature:

```

EC%u5WADMIN      Specify ADMIN user
EC%pØW           Specify password
EC%u1S           User Login
EC%v1D           Enter Modify mode
EC %h8W          Start command
<00><00><00><05>  8 binary bytes
<00><04><00><01>
EC%v0D           Leave Modify mode
EC %-12440X      Print Report
EC%uØS           User Logout
    
```

The pattern processor feature uses regular expressions (regex) to parse the print job data, and when certain patterns are detected, to modify the incoming data stream as specified by the substitution string. In this way, the input job can be altered to add or change PCL commands or text within the job. Background information on regular expressions can be found at: [http://en.wikipedia.org/wiki/Regular\\_expression](http://en.wikipedia.org/wiki/Regular_expression). Details can be found in POSIX 1003.2, sections 2.8 (Regular Expression Notation) and B.5 (C Binding for Regular Expression Matching).

As an introductory example, consider the regular expression “(.\*)(Hello)(.\*)” with the associated substitution string “\$1\$2World\$3” (the double quote marks are not part of either strings). If the input job data has the following string “now is the Hello time”, that string will match against that regular expression. Each parenthesized expression in the regular expression is matched in order against the dollar-number (\$1, \$2, ...) terms. So, in this case, \$1 term is “now is the “, \$2 term is “Hello”, \$3 term is “ time”. Thus, the initial string is transformed into “now is the Hello World time”.

A more practical example would be to scan for a line of form “Payee:<some name>”, changing the line so that the name after the trigger “Payee: “ is tagged with TROY metadata PCL commands indicating that that name is the payee. Refer to Chapter 5 – *Data Capture Fonts* to see how PCL data can be tagged by TROY metadata tags to indicate semantic types. In this fashion, the TROY firmware could capture payee data for the TROY seal feature even though the job did not originally contain the TROY metadata PCL tags. To effect this transform, one could use a regular expression of “(Payee:)(.\*)” paired with a substitution string of “\$1<esc>%m1028T\$2<esc>%m0T”.

The pattern processing feature requires processing overhead, and therefore, should only be enabled if necessary. The processing overhead is more pronounced with complex regular expressions, such as back references. No overhead is incurred if the pattern processor is disabled, even if patterns have been specified. If possible, it is better to modify the source job than to use the pattern processor. Configuring the pattern processor requires more knowledge than for configuring other TROY printer features. Creating a working regular expression and its paired substitution string requires some computer programming skills. As such, most computer programmers use regular expressions as part of their standard toolkit.

## Example PCL data to disable feature:

<code>^C%u5WADMIN</code>	Specify ADMIN user
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	User Login
<code>^C%v1D</code>	Enter Modify mode
<code>^C %h8W</code>	<b>Start command</b>
<code>&lt;00&gt;&lt;00&gt;&lt;00&gt;&lt;05&gt;</code>	<b>8 binary bytes</b>
<code>&lt;00&gt;&lt;04&gt;&lt;00&gt;&lt;00&gt;</code>	
<code>^C%v0D</code>	<b>Leave Modify Mode</b>
<code>^C %-12440X</code>	<b>Print Report</b>
<code>^C%uØS</code>	User Logout

## Example PCL data remove all patterns:

<code>^C%u5WADMIN</code>	Specify ADMIN user
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	User Login
<code>^C%v1D</code>	Enter Modify mode
<code>^C %h8W</code>	<b>Start command</b>
<code>&lt;00&gt;&lt;00&gt;&lt;00&gt;&lt;05&gt;</code>	<b>8 binary bytes</b>
<code>&lt;00&gt;&lt;02&gt;&lt;00&gt;&lt;00&gt;</code>	
<code>^C%v0D</code>	<b>Leave Modify Mode</b>
<code>^C %-12440X</code>	<b>Print Report</b>
<code>^C%uØS</code>	User Logout

The regular expression matches against a scan buffer, which can hold up to 80 characters. This scan buffer is filled with data from the job until a linefeed or escape character is seen in the input data. The current scan buffer is tested against all the regular expressions in order. If a match is found, then the appropriate substitution is made. If there are more regular expressions, they will also be tested against the scan buffer. In this way, multiple matches can be made against one instance of the scan buffer. Once all possible matches take place, the data in the scan buffer is released and additional data from the print job is read into the scan buffer. One important distinction between linefeed and escape characters is that a linefeed terminates a scan buffer and is part of the current scan buffer, while an escape will terminate the scan buffer and be part of the next scan buffer. This behavior allows for matching against complete PCL commands; e.g., “<esc>%-12400X”. It also allows for matching against line-oriented jobs as might be generated from mainframe applications.

Configuring the pattern processor feature is most easily done using the TROY Printer Utility. Alternatively, you can use specially constructed PCL commands that are sent to the printer. Even if you want to create your own PCL, you might find it useful to use the TROY Printer Utility to generate configuration jobs, then print to file and examine those jobs to see more complex example configurations jobs than are illustrated here. In the examples shown in the left margin and in the list below, the notation “<xx>” represents a single byte with “xx” being the hexadecimal value; e.g., <0A> is the linefeed character.

To enable the pattern processor, send the following command to the printer:

```
<esc>%h8W<00><00><00><05><00><04><00><01>
```

To disable the pattern processor, send the following command to the printer:

```
<esc>%h8W<00><00><00><05><00><04><00><00>
```

To remove all patterns, send the following command to the printer:

```
<esc>%h8W<00><00><00><05><00><02><00><00>
```

## Implementing Pattern Processing

### Example PCL data to add a pattern:

<code>^C%u5WADMIN</code>	Specify ADMIN user
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	User Login
<code>^C%v1D</code>	Enter Modify mode
<code>&lt;esc&gt;%h8W</code>	<b>Start command</b>
<code>&lt;00&gt;&lt;00&gt;&lt;00&gt;&lt;05&gt;</code>	<b>8 binary bytes</b>
<code>&lt;00&gt;&lt;01&gt;&lt;00&gt;&lt;00&gt;</code>	
<code>&lt;0F&gt;</code>	<b>15 chars in regex</b>
<code>&lt;0B&gt;</code>	<b>11 chars in sub</b>
<code>(.*)(Hello)(.*)</code>	<b>the regex string</b>
<code>\$1\$2World\$3</code>	<b>the sub string</b>
<code>^C%v0D</code>	<b>Leave Modify Mode</b>
<code>^C %-12440X</code>	<b>Print Report</b>
<code>^C%uØS</code>	User Logout

To add a new pattern requires a more complex construct:

```
<esc>%h#W<00><00><00><05><00><01><00><00><one byte with binary length
of regex><one byte with binary length of sub><regex string><sub string>
```

Note that the hash mark (“#”) before the initial “W” means to replace that hash mark with the count of bytes that follow the “W”. In every case, the hash mark before the “W” will be replaced by a number, which is given by the sum of 8 + 2 + length of regex + length of sub string. Also note that because the length of the regex and sub strings is given by a single numerical byte, the maximum length of each of those strings is limited to 255 characters.

The *Pattern Processor Report* is activated (printed) by sending the following command to the printer:

```
<esc>%-12440X
```

A sample *Pattern Processor Report* is shown on the next page. The feature configuration shown in the sample report is used to add a Secure Seal to a print job that was not modified with any TROY-specific PCL (see Chapter 10 – *Secure Seals* for more information on the Secure Seal feature) and is a good example of the practical use of the pattern processing feature. The patterns in the example are set up to find and label the selected fields, then print the seal with the specified field information. Five pattern rules are specified in the sample report. The first, second, and fourth pattern rules match against the payee, date, and check# respectively, and then mark them with metadata tags for the seal feature. The fifth rule matches against the bank number (the routing number) taken from the MICR line. The third rule matches against the check amount and then immediately prints the Secure Seal. The Secure Seal parameters for the template name and seal placement location were configured previously.

## More complex add pattern example:

<code>E_C%u5WADMIN</code>	Specify ADMIN user
<code>E_C%pØW</code>	Specify password
<code>E_C%u1S</code>	User Login
<code>E_C%v1D</code>	Enter Modify mode
<code>&lt;esc&gt;%h8W</code>	<b>Start command</b>
<code>&lt;00&gt;&lt;00&gt;&lt;00&gt;&lt;05&gt;</code>	<b>8 binary bytes</b>
<code>&lt;00&gt;&lt;01&gt;&lt;00&gt;&lt;00&gt;</code>	
<code>&lt;0C&gt;</code>	<b>12 chars in regex</b>
<code>&lt;13&gt;</code>	<b>19 chars in sub</b>
<code>(Payee:)(.*)</code>	<b>the regex string</b>
<code>\$1<sup>E_C</sup>%m1028T</code>	<b>sub string</b>
<code>\$2<sup>E_C</sup>%m0T</code>	<b>sub string (cont.)</b>
<code>E_C%v0D</code>	<b>Leave Modify Mode</b>
<code>E_C%-%12440X</code>	<b>Print Report</b>
<code>E_C%uØS</code>	User Logout

## TROY 2420 SERIES - Pattern Processor Report

Status: Enabled  
Options: None

### Defined Patterns

ID	Status	Regular Expression and Substitution Pattern
1	Enabled	<pre>(.*) (PAYEE:) ([[[:space:]]+)(.*) \$1\$2\$3&lt;esc&gt;%m1028T\$4&lt;esc&gt;%m0T</pre>
2	Enabled	<pre>(.*) (DATE:) ([[[:space:]]+)(.*) \$1\$2\$3&lt;esc&gt;%m1029T\$4&lt;esc&gt;%m0T</pre>
3	Enabled	<pre>(.*) (AMOUNT:) ([[[:space:]]+)([0-9.,]+)(.*) \$1\$2\$3&lt;esc&gt;%m1027T\$4&lt;esc&gt;%m0T\$5&lt;esc&gt;%h20W&lt;0x00&gt;&lt;0x00&gt;&lt;0x00&gt;&lt;0x04&gt;&lt;0x00&gt;&lt;0x01&gt; &lt;0x00&gt;&lt;0x00&gt;##ABSEAL####&lt;esc&gt;%m0R</pre>
4	Enabled	<pre>(.*) (CHECK #:) ([[[:space:]]+)([[[:digit:]]+)(.*) \$1\$2\$3&lt;esc&gt;%m1036T\$4&lt;esc&gt;%m0T\$5</pre>
5	Enabled	<pre>(.*) (\*p1226X:)(!*) ([[[:digit:]]+)(.*)((.*) \$1\$2\$3&lt;esc&gt;%m1034T\$4&lt;esc&gt;%m0T\$5\$6</pre>

## Introduction

It is often desirable to secure, via encryption, documents containing sensitive or private information before sending them across public networks. Electronic check data, in particular, signature and MICR fonts, need to be prevented from being copied and used fraudulently. To increase the security of our products, TROY has implemented a set of printer decryption algorithms.

TROY's cryptography support is intended to thwart all manner of "man-in-the-middle" attacks. This means we assume the host side and printer side are secure, but the communication channel between the two is vulnerable. A security opponent has access to the cable between the printer and host and can read, write, delay, and generally intercept data on wire. Such opponents can insert new data on wire, replay old data in either direction, and modify data coming down the wire in either direction. It is the aim of the TROY Security Printing Solutions to prevent such opponents from accessing valuable customer data.

There are numerous de-facto and emerging cryptography standards based around two principle architectures:

- *Symmetric Key (SK)*: both the encrypter and the decrypter use the same key kept secure by means of a one way hashing function (SHA) of password phrases (hereafter passphrases).
- *Public Key*: uses a public key (shared with the person you authorize to read your data) and a private key (one not shared but unique to you). It requires both a public and a private key to decrypt the data within the stream. Certificates can be used (exchanged) to authenticate the originator of the data. This is more secure, but more complicated to deploy.

In order to deliver a simple yet manageable cryptography solution, TROY has chosen to implement symmetric key decryption. Twofish and Rijndael are 128-bit algorithms, while Triple DES (DES3) is a 168-bit algorithm.

Encryption is provided using the TROY Port Monitor, included with the TROY Secure printers and DIMMs. Contact TROY technical support if matching encryption software source code is needed outside of the Microsoft Windows environment.

## Decryption Password

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only

You must put the printer in download mode before using the Decryption Password command.

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v1D</code>	Enter download
<code>^C%<b>c8WPASSWORD</b></code>	
<code>^C%vØD</code>	Exit download
<code>^C%uØS</code>	Logout

The password used to encrypt your data must be the same as the password used to decrypt your data. If they do not match, random characters will print. All of the supported decryption methods in a TROY Security Printing Solution use the same password. This command defines the password for the printer.

`^C % c # W password`

# = Length of the password

The default password for every printer is "PASSWORD".

The maximum number of characters that can be contained in a password is 128.

The password can contain any printable character except for the ' ' (double-quote) character; however, it is strongly recommended that password characters remain in the range of Ø-9, A-Z and a-z. Spaces between words are allowed.

The password defined remains in effect until changed.

An emergency password is available from TROY technical support, calculated from the serial number of the printer and the current page count, should the password be forgotten.

## Decryption Control

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	
TROY Port Monitor	√

### Usage Restrictions:

TROY Secure printers and DIMMs only

Contained in each print job in which the print data has been encrypted. No printer password is required to use decryption, however, the user must know (or have configured) the symmetrical encryption passphrase in their TROY Port Monitor.

### Example:

```

Ec%-12345X      HP PJL UEL
@PJL JOB NAME="Sample" CR LF
@PJL SET RESOLUTION=600 CR LF
@PJL ENTER LANGUAGE="PCL" CR LF
Ec%c2T          Twofish Method
Encrypted data begins here
PCL print data
Ec%c0T          Encryption off
Padding bytes per encryption method
Encrypted data ends here
Ec%-12345X      HP PJL UEL
@PJL EOJ NAME="Sample" CR LF
Ec%-12345X      HP PJL UEL
    
```

Print jobs sent to the printer can be encrypted using one of a series of supported encryption methods. The job must then identify to the printer (using non-encrypted commands) the type of decryption needed to properly interpret the data in the print job.

<sup>E</sup><sub>c</sub> % **c # T**

# = Ø – No decryption needed

**1 – Reserved**

2 – Enable Decryption Using Twofish Method

3 – Enable Decryption Using Triple DES (DES3) Method

4 – Enable Decryption Using AES (Rijndael) Method.

Default = Ø (No decryption needed)

Range = Ø, 2 – 4 (values outside range are ignored)

All supported encryption methods use symmetrical key encryption.

Each print job must enable encryption just prior to the encrypted data and must disable encryption just prior to resuming plaintext (un-encrypted data). Note that the disable encryption command will be sent in encrypted form. The command to enable encryption also specified the method of encryption. Only the PCL portion of a job can be encrypted; do not attempt to encrypt any P<sup>J</sup>L. Also note that the encrypted job will not be same size as the plaintext; up to 16 additional padding bytes can be added.

## Decryption Mode

### Also Available Via:

Printer Control Panel	√
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY Secure printers and DIMMs only

You must put the printer in download mode before using the Decryption Mode command.

### Example:

$\text{E}_c\%u5WADMIN$	Specify name
$\text{E}_c\%p\emptyset W$	Specify password
$\text{E}_c\%u1S$	Login
$\text{E}_c\%v1D$	Enter download
$\text{E}_c\%c1M$	<b>Decrypt all jobs</b>
$\text{E}_c\%v\emptyset D$	Exit download
$\text{E}_c\%u\emptyset S$	Logout

Print jobs sent to the printer can be required to be encrypted as an additional security measure. The Decryption Mode command controls whether the TROY Security Printing Solution will allow non-encrypted jobs to be printed.

$\text{E}_c\%c\#M$

# =  $\emptyset$  – Job-by-Job

1 – All Jobs

Default =  $\emptyset$  (Job-by-Job)

Range =  $\emptyset, 1$  (values outside range are ignored)

When the Decryption Mode is set to Job-by-Job ( $\emptyset$ ), the printer will allow the contents of the job to determine if the printer is to decrypt the job before processing using the Decryption Control command ( $\text{E}_c\%c\#T$ ).

When the Decryption Mode is set to All Jobs (1), the printer will reject any job that does not contain the Decryption Control command within the first eleven bytes of PCL data following the **@PJL ENTER LANGUAGE = PCL** and  $\text{E}_c\#$  command sequence in the header of the job. The printer will display or print a message indicating the job received was not encrypted and the job will automatically be purged.

## Introduction

While TROY makes every effort to make MICR features and capabilities universal across its line of printers, some features only make sense when offered on specific printer models. This section outlines those features that are implemented on a subset of TROY Security Printing Solutions.

**NOTE: TROY MICR 2200 Series printers do not have a control panel. As a result, all references in this document to features being accessible via the printer control panel do not apply to the TROY MICR 2200 Series printers. This restriction has not been replicated throughout this documentation in order to make the document easier to read.**

## Pages Per Cartridge

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY 2200 MICR Series printers only.

You must put the printer in download mode before using the Pages Per Cartridge command.

### Example:

<code>^C%u5WADMIN</code>	Specify name
<code>^C%pØW</code>	Specify password
<code>^C%u1S</code>	Login
<code>^C%v1D</code>	Enter download
<code>^C%t5123L</code>	<b>5123 pages per cart.</b>
<code>^C%vØD</code>	Exit download
<code>^C%uØS</code>	Logout

**NOTE:** The TROY 2200 MICR Series printers do not contain a toner level sensor, so a page counting system is used to determine when a low toner condition has been reached.

The Pages Per Cartridge command defines how many pages should be printed per TROY MICR toner cartridge before the cartridge is to be considered out of toner.

`^C % t # L`

# = Number of pages (expressed as a decimal number)

Default = 5000 (TROY standard, assuming 5% toner density per page)

Range = 0 - 9999 (values outside range are ignored)

**NOTE:** Checks printed at the end of a toner cartridge's life may graphically appear to be of high quality, encouraging users to increment Pages Per Cartridge to higher and higher levels. Beware, however, that MICR signal strength does not dissipate linearly with graphical appearance. Normally MICR signal levels decay faster than graphical quality decays. Attempting to "stretch" the number of pages per cartridge can lead to the creation of checks that are below acceptable MICR signal levels for banks, resulting in rejected checks. Always use a certified MICR line reader to verify MICR signal levels when changing the Pages Per Cartridge value.

## Reset Page Counter

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

TROY 2200 MICR Series printers only

### Example:

$E_C \% u 5 W A D M I N$	Specify name
$E_C \% p \emptyset W$	Specify password
$E_C \% u 1 S$	Login
$E_C \% v 1 D$	Enter download
$E_C \% - 1 2 4 \emptyset 2 X$	<b>Reset page counter</b>
$E_C \% v \emptyset D$	Exit download
$E_C \% u \emptyset S$	Logout

When a new MICR toner cartridge is installed into a TROY 2200 Series printer, use Reset Page Counter to reset the internal page counter to the Pages Per Cartridge value.

$E_C \% - 1 2 4 \emptyset 2 X$

The page counter can also be reset by powering off the TROY 2200 Series printer and powering it back on again.

## Toner Low Warnings

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

**TROY 2200 MICR Series printers only**

**You must put the printer in *download mode* before using the Toner Low Warnings command.**

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%-1241ØX</code>	<b>Disable toner low</b>
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

When the page counter in a TROY 2200 Series printer indicates there are 700, 500 and 250 pages remaining, the printer can be configured to print a toner low warning page. This command enables and disables this warning page from printing.

`E_c % - # X`

# = 1241Ø – Disable (do not print toner low warning pages)

12411 – Enable (print toner low warning pages)

Default = Enabled

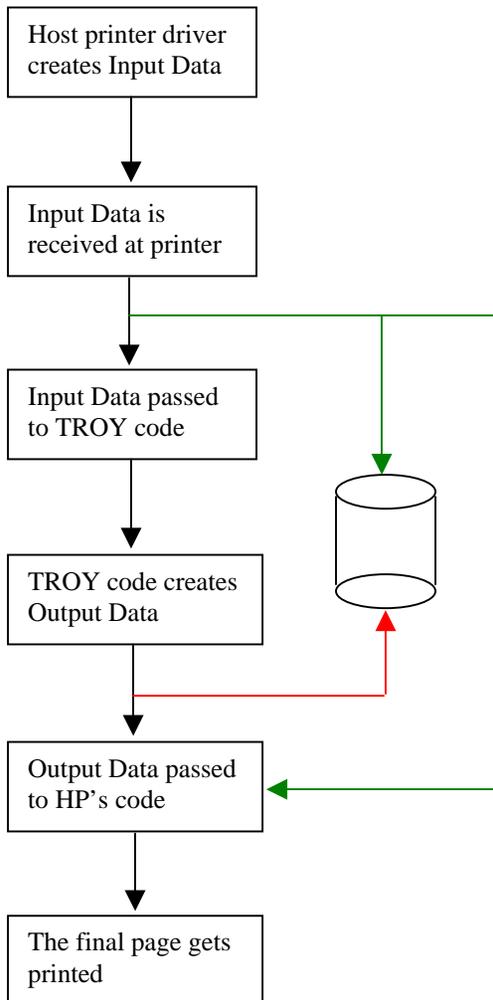
Range = 1241Ø - 12411 (values outside range may apply to other printer commands)

Toner low warning pages print on the current media being printed from the current media tray. Toner low warning pages also print in series within a job.

## Introduction

### Print Data Flow:

Key: Normal print data flow  
 New Input Data flow  
 New Output Data flow



When programming PCL, it is often desirable to be able to examine the data received by the printer before pre-processing and the data after pre-processing by the TROY DIMM but before it is handed to the HP printer controller for rendering. TROY has created a series of diagnostics “routings” that can be enabled to facilitate such analysis. One of these routings is analogous to the industry-standard HEXDUMP capability offered on many printers.

There are three available routings for data:

- **Hex Output:** prints the data to the printer as hexadecimal output.
- **Send Data To File:** saves the data on the local file system as a file.
- **Route To Next Process:** moves the data onto the next logical process, be that pre-processing or submission to the HP rendering code.

Multiple routings can be used at once. For example, it is legitimate to save data to a file while sending it to the next process. However, it is not possible to print the data in Hex Output format while simultaneously sending the data to the HP rendering code (two sets of data cannot print at once).

Be careful when saving files to the printer file system. NFS or PJP must be used to extract files from the file system, requiring that a network card be present in the target printer. Also, local storage space is very limited and can fill up quickly. Saving data to file should be used primarily when sending code samples to TROY at TROY’s request.

The printer can be configured to process routings for a user-specified number of jobs. This is useful when analyzing data spanning multiple jobs. These commands will have no effect upon the current job. They are posted to a queue that is used to manage subsequent jobs.

**NOTE:** By their nature and out of necessity, job routing commands can be used to defeat MICR job security. However, because the commands require password authorization, they cannot be used to defeat security without first compromising the printer’s security password(s).

## Job Input Routing

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must put the printer in *download mode* before using the Job Input Routing command.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%r4I</code>	<b>Save input job in file</b>
<code>E_c%r1O</code>	Do not print the job
<code>E_c%r1J</code>	Route data for 1 job
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

The Job Input Routing command controls how print data, in its original form and unaltered by the TROY Security Printing Solutions code, is to be routed through the printer.

`E_c % r # I`

# = A bit pattern defining the job routing of print data is defined as follows:

- + 1 – Send a copy of the print data directly to the HP rendering code
- + 2 – Do not send a copy of the print data to the TROY MICR Series printer code
- + 4 – Save a copy of the print data in a file on the printer's file system
- + 8 – Send a copy of the print data to the HP rendering code in Hex Dump format and print a report of the data contained in the input file

Default = Ø (route the input job through the TROY MICR Series code)

Range = Ø – 8, (values outside range are ignored)

**NOTE:** The printer is unable to process Hex Dump and job printing at the same time. If both are needed, run the same input file to the printer two or more times with different Job Input Routing settings.

The exact location and name of the debug file created in response to sending data to the printer's storage is highly printer model dependent. Some printer models do not support this capability, and the request will be ignored. If the printer does support this capability, typically the debug file(s) will only be append to and never deleted. This allows the capture of multiple jobs across power cycles as necessary. However, it also requires explicit deletion of the capture file(s) if desired before performing a new capture.

Concatenation of job routing commands is supported.

## Job Output Routing

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must put the printer in *download mode* before using the Job Output Routing command.

### Example:

$\text{E}_c\%u5WADMIN$	Specify name
$\text{E}_c\%p\emptyset W$	Specify password
$\text{E}_c\%u1S$	Login
$\text{E}_c\%v1D$	Enter download
$\text{E}_c\%r4I$	<b>Save input job in file</b>
$\text{E}_c\%r1O$	Do not print the job
$\text{E}_c\%r1J$	Route data for 1 job
$\text{E}_c\%v\emptyset D$	Exit download
$\text{E}_c\%u\emptyset S$	Logout

The Job Output Routing command controls how print data, in its modified form (altered by the TROY MICR Series printer code) is to be routed through the printer.

$\text{E}_c\%r\#O$

# = A bit pattern defining the job routing of print data, defined as follows:

- + 1 – Do not send a copy of the TROY modified print data to the HP rendering code
- + 2 – Save a copy of the modified print data in a file on the printer's file system
- + 4 – Send a copy of the modified print data to the HP rendering code in Hex Dump format and print a report of this data

Default = 0 (route the input job through the TROY MICR Series code)

Range = 0 – 4, 6, (values outside range are ignored)

**NOTE: The printer is unable to process Hex Dump and job printing at the same time. If both are needed, run the same output file to the printer two or more times with different Job Output Routing settings.**

The exact location and name of the debug file created in response to sending data to the printer's storage is highly printer model dependent. Some printer models do not support this capability, and the request will be ignored. If the printer does support this capability, typically the debug file(s) will only be append to and never deleted. This allows the capture of multiple jobs across power cycles as necessary. However, it also requires explicit deletion of the capture file(s) if desired before performing a new capture.

Concatenation of job routing commands is supported.

## Job Routing Count

### Also Available Via:

Printer Control Panel	
TROY Printer Utility	√
TROY Port Monitor	

### Usage Restrictions:

You must put the printer in *download mode* before using the Job Routing Count command.

### Example:

<code>E_c%u5WADMIN</code>	Specify name
<code>E_c%pØW</code>	Specify password
<code>E_c%u1S</code>	Login
<code>E_c%v1D</code>	Enter download
<code>E_c%r4I</code>	<b>Save input job in file</b>
<code>E_c%r1O</code>	Do not print the job
<code>E_c%r1J</code>	Route data for 1 job
<code>E_c%vØD</code>	Exit download
<code>E_c%uØS</code>	Logout

The Job Routing Count command determines the number of jobs the current input and output routings will affect.

`E_c % r # J`

# = number of jobs to route using the current routing

Default = Ø (do not route)

Range = Ø – 99 (values outside range are ignored)

Concatenation of job routing commands is supported.

## Routing Examples

`E_c%r0i0o5J`

(The following is a list of examples to demonstrate the utility of the diagnostics commands.)

Route the next five jobs normally (no special diagnostics processing).

`E_c%r2i1o2J`

Route the next two jobs to the “bit bucket”. Neither the TROY code nor the HP rendering code will see the job as sent to the printer from the host.

`E_c%r3i1o3J`

Route the next three jobs directly to the HP rendering code, bypassing the TROY code. The TROY code will not see any of the data stream, and all commands (including any TROY PCL commands) will be sent directly to the HP rendering code. Note that this is nearly identical to not having the TROY code installed and provides a quick means of testing the HP rendering code’s response to a print job as if the TROY code were not installed.

`E_c%r0i1o1J`

Allow the TROY code to process the input job, but do not forward the TROY modified output data to the HP rendering code. This allows the TROY code to respond to the command stream, but prevents any printing since the HP rendering code never sees any data. This can be useful for performing certain tests of the TROY code while suppressing printing.

`E_c%r10i1o1J`

Reformat the input job data into hexadecimal dump format and send the hex-dump job directly to the HP rendering code (bypassing the TROY code). No PCL commands (TROY or HP) will be processed. The TROY filter will not see any of the data from the data stream and the HP rendering code will only see the data after it has been converted into hex-dump format. This is a useful command for inspecting the data being sent from a host system without the TROY code altering the data.

`E_c%r6i1o1J`

This is very similar to the previous example; however, the received data is routed (unaltered) to the printer's file storage instead of being printed in hex. This is a useful command for capturing the data that a host is actually sending to the printer.

**NOTE:** This command only works on printers that support a file system.

## Routing Examples (cont.)

`E_c%r5i1o1J`

This is very similar to the previous example; however, the received data is sent to BOTH the printer's file system *and* to the HP rendering code. No data is sent to the TROY code. This command allows the input data to be captured to a file as well as the job being processed by HP's rendering code and printed as normal.

`E_c%r0i5o1J`

Allow the TROY code to process the input data from the host, but convert the output to hex-dump format before sending the data to the HP rendering code. This means HP's rendering code will only produce a hex-dump print of the output of the TROY code, and it will not respond to any commands sent to it from the TROY code.

`E_c%r0i3o1J`

Identical to the previous example except the output of the TROY code is captured to a file on the printer's file system.

`E_c%r8i5o1J`

This produces a combined hex-dump of the input data received from the host and the output of the TROY code. The TROY code will process the commands received. HP's rendering code will not process any commands. Different fonts are used in the dump to indicate input versus output data.

`E_c%r4i3o1J`

This captures both the input data stream and the output of the TROY code to the printer's file system. The captured input data is sent to a different file from the captured output data. The TROY code will process the commands received. HP's rendering code will not process any commands.