

SCS Reference Manual

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Preface

I-O's SCS Printer Emulation runs on a number of different print server, display and thin client products from I-O Corporation. Please refer to the specific product user's guide for the for instructions on installation and setup. Those guides will refer to this document for instructions on SCS printing. Through out this document, "print server" and "product" will refer to the specific I-O Print Server, Print Box, Ethernet Display, Thin Client, Software Print Server, etc. host printing solution you are using.

The guide consists of the following chapters:

- **Introduction:** Provides an overview of the I-O's SCS Printer Emulation.
- **5250 SCS Setup:** Describes how to setup the IBM iSeries (midrange) system for TN5250e printing.
- **5250 SCS Printer Customization:** Describes how to adjust the final print job attributes (such as CPI, print quality, page orientation, etc.).
- **5250 SCS Printer Operation:** Provides a description of advanced functions added by I-O.
- **3270 SCS Setup:** Provides a brief description of how to setup the IBM zSeries (mainframe) system for TN3270e printing.
- **3270 SCS Printer Customization:** Describes how to adjust the final print job attributes (such as CPI, print quality, page orientation, etc.).
- **3270 SCS Printer Operation:** Provides a description of advanced functions added by I-O.
- **Troubleshooting:** Provides solutions to SCS printing problems you may encounter while using the product.

The following symbols are used in the guide:



Caution: This symbol highlights procedures that if not correctly performed or adhered to, could damage or corrupt the product or adversely affect the security and functionality of the product. Do not proceed beyond such points until the required conditions are fully understood and achieved.



Note: This symbol denotes useful additional information relevant to the procedure or feature being described.



Tip: This symbol denotes a hint, shortcut or alternate method to aid or supplement the procedure being described.

Consistent with our policy of continuous development, the product you received may have features different from to those described in this guide. Please visit our website www.iocorp.com for current information.

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Introduction

This chapter provides a brief overview of I-O's SCS Printer Emulation.

Connection of the I-O host-printing product to the IBM host is accomplished over the Ethernet link using TCP/IP and either the TN5250e or TN3270e protocol. For older legacy IBM hosts, Twinax and Coax cabling topologies will use either SNA or AnyNet protocols. TN5250e, AnyNet and SNA are used for IBM eServer i5, iSeries and AS/400 hosts. TN3270e and SNA are used for zSeries and S/390 mainframe host systems.



NOTE: FOR BREVITY, THE TERMS "PRINT SERVER", "PRODUCT" AND "I-O PRODUCT" WILL REFER TO THE SPECIFIC I-O PRINT SERVER, USB/FLASH/DIMM CARD, PRINT BOX, ETHERNET DISPLAY, THIN CLIENT, SOFTWARE PRINT SERVER, ETC. HOST PRINTING SOLUTION THAT YOU ARE USING. ESERVER I5, ISERIES AND AS/400 HOSTS WILL BE REFERRED HEREIN AS 5250 HOSTS. ZSERIES AND S/390 MAINFRAME HOSTS WILL BE REFERRED HEREIN AS 3270 HOSTS. THE TERM IBM HOST AND HOST WILL ALSO BE USED AND REFERS TO THE APPROPRIATE 5250 OR 3270 HOST WITHIN THE CONTEXT OF THE TOPIC BEING DISCUSSED.



TIP: REFER TO THE APPROPRIATE I-O USER'S GUIDE FOR SPECIFIC INSTRUCTIONS ON INSTALLING AND SETTING UP THE I-O PRODUCT. THOSE GUIDES WILL REFER TO THIS DOCUMENT FOR INSTRUCTIONS ON SCS PRINTING.

For 5250 hosts when using TN5250e, configuration is only required at the I-O product as the IBM host will automatically create a print device, writer, and spooler. However, the IBM host must be configured to use TCP/IP and TN5250e, and setup for automatic device configuration.

For 3270 hosts when using TN3270e, configuration is required at the both the I-O product and the IBM host. Because of the complexity of configuring printers on a mainframe, a knowledgeable host system administrator or IBM specialist must perform the process. The instructions contained in this document are intended to only provide a brief overview of the process.

Once the I-O product and IBM host are properly configured, print jobs sent from the IBM host are issued in IBM's proprietary EBCDIC character set and use the SNA Character String (SCS) command structure. The I-O SCS Printer Emulation converts EBCDIC to ASCII and the SCS command structure to PCL. The I-O SCS Printer Emulation can be customized to change the host print attributes if needed (CPI, page orientation, etc.). For 3270 hosts, the I-O SCS Printer Emulation will also handle the DSC (LU3) data stream as well as the SCS (LU1) data stream.

I-O has also included a number of advanced printing features in the I-O SCS Printer Emulation. These include the ability to send printer specific commands as part of the SCS data stream to accomplish printer functions beyond the ability of the IBM host... Other features include I-O's bar code language, graphing language, and even color support.

5250 SCS Setup

I-O's 5250 SCS Printer Emulation enables the I-O product to print eServer i5, iSeries or AS/400 native SCS print jobs.

Configuration of the I-O 5250 SCS Printer Emulation requires involves the following steps:

- Setup the IBM eServer i5, iSeries or AS/400.
- Setup the I-O 5250 SCS printer session on the I-O product.
- Customization, as needed, of the I-O 5250 SCS Printer Emulation configuration parameters at the I-O product to adjust the final printing output.

Instructions for the first step are found in this chapter. Customization instructions are found in the following chapter. Instructions for setting up the I-O product are found in the appropriate I-O product user's guide.

eServer i5, iSeries and AS/400 Setup

I-O's 5250 SCS Printer Emulation communicates to the IBM host via TCP/IP using the TN5250e protocol. TN5250e is an extension of the Telnet display and printer protocol used in the IBM midrange systems.

IBM has limited supported device types in TN5250e to one type – a 3812-1 page printer. To the IBM host, the laser printer looks just like an IBM dedicated printer.

To configure your eServer, iSeries or AS/400 to support TN5250e printing, the IBM host must meet the following requirements:

- Be running OS/400 V3R2 or newer, with the most recent applicable PTFs applied.
- Have the most recent version of Client Access installed on the host.
- Have the most recent version of the Telnet server installed on the host.
- Have the host's auto configuration system value turned on.
- Make certain the host can create virtual devices and there are a sufficient number of devices available to be created.

This is done using the host command:

CHGSYSVAL SYSVAL(QAUTOVRT) + VALUE(?)

The “?” is the maximum number of user-created virtual devices that can be created.

- If the OS/400 version is earlier than V4R2, the Telnet server will need to be started using the host command:

STRTCPSVR SERVER(*TELNET)

V4R2 and newer versions will automatically start the Telnet server.

After these requirements are met, the IBM host will automatically configure a printer device the first time the I-O 5250 SCS Printer Emulation session connects with the host. The IBM host will create a 3812 page printer device and assign the device name enter when configuring the I-O 5250 SCS Printer Emulation session.

I-O Product Setup

I-O's SCS Printer Emulation runs on a number of different print server, display and thin client products from I-O Corporation. Please refer to the user's guide for the specific product for instructions on installation and setup of the product.

After printer sessions have been configured, the I-O product will connect to the IBM host and a new printer session will automatically be created on the IBM host. If the print connection status page function is enabled, a page will print showing the status of the connection between the I-O SCS Printer Emulation session and the host. If the connection status indicates a good connection has been made, the printer session is ready to receive IBM host print jobs.



TIP: AFTER THE CONNECTION STATUS MESSAGE PAGE INDICATES THAT A GOOD CONNECTION HAS BEEN MADE, DISABLE THE PRINTING OF THE CONNECTION STATUS MESSAGE PAGE.

If there is a need to customize the way the print jobs are being handled by the I-O 5250 SCS Printer Emulation, refer to the ***5250 SCS Printer Customization*** chapter.

5250 SCS Printer Customization

This chapter describes how to customize the I-O 5250 SCS Printer Emulation.

I-O's 5250 SCS Printer Emulation can be configured to change the way IBM host print jobs are actually printed. Options include the ability to set the final print quality (draft or near-letter quality), the characters per inch used, etc.

Customization Methods

Customization can be done in a number of different ways depending upon the I-O product:

- Using one of I-O's management or configuration utilities for the software print servers and external network attached print servers.
- Using the HP LaserJet's Web page or front panel for internal DIMM, CompactFlash or USB products.
- Using I-O's robust and feature-rich Host Download Commands, available on all I-O products.

Please refer to the user's guide for the appropriate I-O product for specific instructions on using that product to customize the 5250 SCS printing.

Host Download Commands

Host Download commands are basically strings of text sent from the IBM host to the I-O 5250 SCS Printer Emulation session. All configuration parameters pertaining to the IBM printer emulation can be modified using Host Download commands.

Host Download commands are placed in an IBM host document, report, program or on the screen. The document or screen print is then sent to the print device assigned to the I-O 5250 SCS Printer Emulation session. There is extra space here. As part of the TN5250e data stream processing, the I-O 5250 SCS Printer Emulation session monitors the data stream and filters out Host Download commands. These commands will not print but will be used to configure the I-O 5250 SCS Printer Emulation session.

Host Download commands sent to the I-O 5250 SCS Printer Emulation session take effect immediately and stay only in the printer's active memory. To save the changed configuration beyond the end of the printer session, Host Download command Z99,0 must be sent.



CAUTION: HOST DOWNLOAD COMMAND Z99,0 IS REQUIRED IF YOU WANT THESE HOST DOWNLOAD COMMANDS SAVED FOR FUTURE PRINT SESSIONS.

The following steps describe how to enter a Host Download Command.

1. Type the Command Pass-Thru (CPT) delimiter &% (or the alternate CPT start delimiter) in the document, program, report or on the screen at the point where the command is to take effect.
2. Type an upper-case Z.
3. Type the command number for the command to be used, as shown in the table below. Always use two digits for the command number (i.e. &%Z05,1).
4. Type a comma.
5. Type the value representing the desired selection. No spaces are allowed. A space or invalid character in a command causes the 5250 SCS Printer Emulation session to ignore the command and resume printing from the point the error occurred.

6. A space or control character (i.e. NL, FF, CR, and LF) signals the end of the Host Download command.
7. Multiple commands can be chained together by using a slash (/) or backslash (\) to separate the commands (no spaces are allowed).

For example, to set the Default Print Quality (Command 22) to NLQ (Value 1), Draft Printing (Command 23) to Fast Draft (Value 1), and the Wrap/Truncate Text selection (Command 26) to Truncate (Value 1), type:

```
&%Z22,1/Z23,1/Z26,1.
```



NOTE: INVALID COMMANDS ARE IGNORED AND ARE PRINTED. THE LAST VALID SETTING WILL BE UNCHANGED.

5250 SCS Printer Configuration Options

The following table shows a complete listing of configuration options in alphabetical order as well as their associated Host Download Command Number. Following the table is the detailed explanation of each Host Download Command in numeric order.



NOTE: NOT ALL HOST DOWNLOAD COMMANDS ARE AVAILABLE IN EVERY I-O PRODUCT. REFER TO THE I-O PRODUCT USER'S GUIDE FOR A LISTING OF SUPPORTED HOST DOWNLOAD COMMANDS.

<i>Configuration Parameter</i>	<i>Command Number</i>
6 LPI String	84
8 LPI String	85
10 CPI String	86
15 CPI String	87
12 CPI String	88
17 CPI String	89
15 CPI Printing (Proprinter)	28
ASCII Dump	43
Automatic Page Orientation	08
Blank Page Suppression	91
Character Set	17
CPT End Delimiters	02
CPT Start Delimiters	01
Disable Logical-not Processing	96
Dot-Matrix Draft Printing	23
Dot-Matrix Print Quality	22
Duplexing	33
EBCDIC Dump	42
Horizontal Margin	19
Host Initialization	11
Host Language	05
IBM Drawer 1	13
IBM Drawer 2	14
IBM Drawer 3	15
IBM Drawer 4	30
IBM Drawer 5	31
IBM Motion	25
Lines Per Inch	10
Orientation	07
Override Host Formatting	16

Paper Size	09
Truncate / Wrap	26
Save Current Settings	99
User Defined Fonts	21
User Defined Strings	04
Vertical Margin	18



NOTE: IN THE DESCRIPTION OF EACH HOST DOWNLOAD COMMAND, ASTERISKS (*) IDENTIFY FACTORY DEFAULT SETTINGS.

Command No. 01: CPT Start Delimiter

Replaces the default Command Pass-Thru™ (CPT) start delimiter "&%". It may be one or two characters long. The first character may be any printable character.

<i>Value</i>	<i>Description</i>
&%	Default CPT delimiter
New characters	New CPT start delimiter
Two spaces	Deletes CPT start delimiter

Example: &%Z01,#@
 This creates the CPT start delimiter of #@.

Command No. 02: CPT End Delimiter

Replaces the default delimiter and creates an alternate CPT end delimiter "&%" as in Command 01. This delimiter cannot be used as a Host Download delimiter.

<i>Value</i>	<i>Description</i>
&%	Default CPT delimiter
New characters	New CPT end delimiter
Two spaces	Deletes the CPT end delimiter

Command No. 04: User-Defined Strings

Creates up to nine user-defined strings to send to the printer. This feature should be used to avoid re-keying of frequently used printer commands (which appear as hex values imbedded in Command Pass-Thru delimiters). When using Host Download commands, place the hex codes representing the desired printer command inside the parentheses (up to 25 hex pairs). Spaces between hex pairs are allowed to aid in readability. Consult the printer's user's guide for proper hex codes. The user-defined string is stored in memory under the selected value number (0 or 9). To activate the command, place &%UX (where X is the value number) in the document.

<i>Value</i>	<i>Description</i>
0 to 9 (hex codes)	Assigns the hex command to a one-digit delimiter (0-9)
0 to 9()	Deletes the specified user-defined string from memory.

Example: &%Z04,3(1B26643044)

Creates a user-defined string for a PCL Laser printer to start underlining. The string is represented by the value 3. To use this function, place &%U3 in the document.

Command No. 05: Host Language

Selects the host language used by the Twinax host, when the command "Use Default Language" is received.

<i>Value</i>	<i>Description</i>
00	Multinational
*01	USA/Canada
02	Austria/Germany
03	Belgium
04	Brazil
05	Canada/French
06	Denmark/Norway
07	Finland/Sweden
08	France
09	Italy
10	Japan
11	Japan (U.S.)
12	Portugal
13	Spain
14	Spanish speaking
15	United Kingdom

Example: &%Z05,00

Selects the multinational language or character set? You use the syntax language earlier in this command...

Command No. 07: Print Orientation

Determines the print orientation if it is not already determined through the host's selection or I-O's 5250 Printer Emulation's Automatic Page Orientation (APO) feature (Command No. 08).

<i>Value</i>	<i>Description</i>
*0	COR, host overrides using its Print Quality setting
1	Portrait
2	Landscape
3	COR

Example: &%Z07,2
 This selects landscape.

For a more detailed description of Automatic Print Orientation (APO), refer to the Laser Printer Operation – Print Orientation section of the SCS Printing Operation chapter.

Command No. 08: Automatic Print Orientation

Selects or deselects Automatic Print Orientation (APO).

<i>Value</i>	<i>Description</i>
0	APO Off
*1	APO On

Example: &%Z08,1
 Turns Automatic Print Orientation on.

For a more detailed description of Automatic Print Orientation (APO), refer to the Laser Printer Operation – Print Orientation section of the 5250 SCS Printing Operation chapter.

Command No. 09: Paper Size / Bin Selection

Selects paper size settings if the printer attached is a laser or selects the input tray to be used on an Epson DFX dot-matrix compatible printer.

With the default "Paper size specified", the 5250 SCS Printer Emulation session will automatically look for and recognize there is an extra space here, paper sizes mentioned below:

Letter Paper	8.5x11 in. (215.9 x 279.4mm)
A4 Paper	8.27 x 11.69 in. (210x297mm)
Legal Paper	8.5 x 14 in. (215.9 x 355.6mm)
Executive Paper	7.25 x 10.5 in. (184.2 x 266.7mm)

If the host sends one of these paper sizes, the 5250 SCS Printer Emulation session will request the attached printer load the respective paper. Otherwise, it will instruct the printer to load the previously used paper size or, if the host print job is the first after power up, it will request letter size paper.

With "A4 size paper" selected, the 5250 SCS Printer Emulation session will always instruct the printer to load A4 size paper.

If the "Paper size selected through printer's front panel" option is chosen, the 5250 SCS Printer Emulation session will not send any paper requests and the paper size selected through the printer's front panel will be used.

If the printer attached is an Epson DFX dot-matrix printer with multiple bins for different input paper paths, this command will either allow the bin commands to be passed onto the printer or suppress those commands.

<i>Value</i>	<i>Laser Printers</i>	<i>Epson DFX Dot-Matrix Printers</i>
*0	Paper size specified	Bin commands sent to the printer by the host
1	A4 size paper	No bin commands are sent to the printer
2	Paper size selected through printer's front panel	

Example: &%Z09,1

This Host Download command
selects A4 size paper

Command No. 10: LPI

Selects compressed or true LPI (lines per inch) printing. By default, LPI is compressed allowing 66 lines to be printed onto a letter sized paper when 6 LPI is requested by the host. If you are using an electronic forms package or printing on pre-printed forms, select true LPI.

<i>Value</i>	<i>Description</i>
*0	Compressed LPI
1	True LPI
2	XPoint Twinax Controller Compatible Mode

Example : &%Z10,1
 Selects true LPI printing.

Command No. 13: IBM Drawer 1

Assigns the host's Paper Drawer 1 command to a physical paper source on the printer. On the host, the available paper sources are called Source Drawer (in the printer file) or Paper Drawer (in Office Vision). On the printer, the actual paper sources are usually called input trays or bins.

Since input tray selections have been implemented differently from printer to printer, the 5250 SCS Printer Emulation session uses the unique numeric value found in the printer's PCL escape code for the particular input tray. For example, the 500 sheet Cassette of an HP LaserJet 4 Plus printer can be selected through the PCL escape code: ESC&I5H. By assigning the numeric value 5 to the IBM Drawer 1 command, the 5250 SCS Printer Emulation session would cause paper to be drawn from the 500 sheet Cassette whenever the AS/400 sends the Drawer 1 request. Refer to your printer's User's Guide for information on the PCL codes.

<i>Value</i>	<i>Description</i>
01 to 254	Numeric identifier for paper trays available on the printer
*01	Default

Example: &%Z13,5
 Assigns the host's Paper Drawer 1 command to pull paper from the printer's input bin associated with the PCL command ESC&I5H. On a HP LaserJet 4Plus, this would be the 500 sheet Cassette.

Command No. 14: IBM Drawer 2

Matches the host's IBM Drawer 2 command with a physical paper source from the printer. When the host sends a command to the printer to feed from paper drawer 2, the printer will feed from the paper source assigned to paper drawer 2. Consult the printer's user's guide for the available paper sources and respective numbers.

<i>Value</i>	<i>Description</i>
01 to 254	Paper sources available on the printer
*04	Default

Example: &%Z14,05

Assigns the optional 500-sheet cassette on a HP LaserJet 4 Plus to the host's paper drawer 2 command.

Command No. 15: IBM Drawer 3

Matches the host's IBM Drawer 3 command with a physical paper source from the printer. When the host sends a command to the printer to feed from paper drawer 3, the printer will feed from the paper source assigned to paper drawer 3. Consult the printer's user's guide for the available paper sources and respective numbers.

<i>Value</i>	<i>Description</i>
01 to 254	Paper sources available on the printer
*05	Default

Example: %Z15,04

Assigns the multi-purpose tray on a HP LaserJet 4 Plus to the host's paper drawer 3 command.

Command No. 16: Override Host Format

Allows operator settings on the printer's front panel to override format commands sent from the host.

<i>Value</i>	<i>Description</i>
*0	No, do not override IBM format commands
1	Yes, override all IBM format commands
2	Yes, override NLQ commands
3	Yes, override CPI commands

Example: &%Z16,1

Enables the front panel to override all IBM format commands

Command No. 17: Character Set

Selects the character set used when both Latin 1 Euro and CP 850 support the desired font. The character set selected is used as the underlying ASCII table for EBCDIX to ASCII translations. Consult the printer's user's guide to verify the printer also uses the font and character set selected.

<i>Value</i>	<i>PCL Laser Printers</i>
0	Latin 1 Euro
*1	CP 850

Example: &%Z17,0

Selects the Latin 1-character set that includes the Euro symbol.



NOTE: THE EURO SYMBOL IS SUPPORTED IN CODE PAGE LATIN 1 EURO CHARACTER SET FOR LASER PRINTERS.

Command No. 18: Vertical Margin

Adjusts the upper left corner starting vertical position for printing on the page in 1/60 of an inch.

<i>Value</i>	<i>Description</i>
-127 to 127	Adjustment of vertical position in 1/60 of an inch
*0	Default

Example: &%Z18,-20
 Moves printing on the page up 1/3 inch or 2 lines at 6 LPI

Command No. 19: Horizontal Margin

Adjusts the upper left corner starting horizontal position for printing on the page in 1/60 of an inch.

<i>Value</i>	<i>Description</i>
-127 to 127	Adjustment of horizontal position in 1/60 of an inch
*0	Default

Example: &%Z19,12
 Moves printing on the page 1/5 inch or 2 characters right at 10 CPI

Command No. 21: Font Strings

Assigns a font ID to a font. The first number (0-9) is one of 10 available strings, the second number (0-65535) is the host font number. The characters shown in parentheses are sent to the printer when the host font number is received. Refer to the printer's user's guide or the documentation accompanying the font cartridge /SIMM/DIMM/Soft font for a list of available fonts and their respective strings. Use the < character to indicate the Escape character.

<i>Value</i>	<i>Description</i>
0-9,	One of ten available strings
0-65535	Host font number
(ASCII Char.)	Up to 25 ASCII characters representing the desired font

Example: &%Z21,3,12345(<(12U<(s0p12h10v1s3b4102T)
 Selects the third font string to be font #12345 and selects for a HP LaserJet or Lexmark Laser printer:
 (<(12U = code page 850
 <(s0p = fixed spacing
 12h = 12 pitch
 10v = 10 point
 1s = italic
 3b = bold
 4102T) = letter gothic



NOTE: APPLIES ONLY WHEN OPERATING IN IBM 3812 EMULATION MODE.

NOTE: FONT IDS ASSIGNED THROUGH THIS FONT STRING FEATURE CANNOT BE USED WITH THE `-F` FONT CHANGE COMMAND. SEE THE ADVANCED FEATURES IN THE SCS PRINTING OPERATION CHAPTER.

Command No. 22: Dot-Matrix Print Quality

Defines the print quality when the host sends a command to use the "default" print quality. The I-O 5250 Printer Emulation module offers the selections Draft and NLQ. If the attached dot-matrix printer has the capability, Draft printing can be further defined. Refer to Command No. 23: Dot-Matrix Draft Printing, for more information.

Command No. 16: Override Host Format offers another way to modify print quality.

<i>Value</i>	<i>Description</i>
*0	DRAFT is default print quality
1	NLQ is default print quality

Example: &%Z22,1

This command selects NLQ as the default print quality.



NOTE: THE COMMAND ONLY APPLIES WHEN PRINTING TO A DOT-MATRIX PRINTER.

Command No. 23: Dot-Matrix Draft Printing

Selects the draft-printing mode when a draft print command comes from the host or from the I-O 5250 Printer Emulation module. If the attached printer only supports one draft-printing mode, this selection is ignored.

<i>Value</i>	<i>Description</i>
*0	Normal draft
1	Fast draft

Example: &%Z23,1

This Host Download command sets the printer to print fast draft.



NOTE: THE COMMAND ONLY APPLIES WHEN PRINTING TO A DOT-MATRIX PRINTER.

Command No. 25: IBM Motion

Manipulates the IBM motion command.

<i>Value</i>	<i>Description</i>
*0	Use FF (when possible)
1	Substitute multiple LF for FF
2	Suppress FF

3 Suppress CR, LF and FF

Example: &%Z25,1

Causes the I-O 5250 Printer Emulation module to count the lines specified through LPI settings and replace FF with multiple LF commands.



NOTE: THE COMMAND ONLY APPLIES WHEN PRINTING TO A DOT-MATRIX PRINTER.

Command No. 26: Truncate / Wrap

Selects whether the printer should wrap or truncate text lines longer than 8 inches. For printing on normal or wide paper (14 7/8"), select WRAP. This allows printing to the full extent of the width of the paper. The printer wraps printing beyond the margin to the next line (if the printer is configured for that paper size).

When using narrow paper (8.5"), you may select TRUNCATE. This ignores any printing beyond 8". Documents must be formatted to fit the narrower paper, since text beyond the 8" margin will truncate (i.e. not print).

<i>Value</i>	<i>Description</i>
*0	Wrap text
1	Truncate text at 8 inches

Example: &%Z26,1

Causes all text beyond 8 inches to truncate (i.e. not print).



NOTE: ONLY AVAILABLE WHEN PRINTING TO A DOT-MATRIX PRINTER.



TIP: THIS FUNCTION MAY ALSO BE RUN FROM THE I-O 5250 PRINTER EMULATION CONTROL PANEL.

Command No. 28: 15 CPI Printing (Proprinter)

Determines how host commands for 15 CPI printing should be executed.

The I-O 5250 Printer Emulation module has the ability to "artificially" print 15 CPI by printing 17.1 CPI and adjusting the spacing through insertion of a space in graphics mode. Although this option allows users to effectively print 15 CPI (e.g. when using pre-printed forms) printing speed is significantly slower.

<i>Value</i>	<i>Description</i>
*0	No, prints 15 CPI as 17.1 CPI
1	Yes, prints 15 CPI as 15 CPI

Example: &%Z28,1

Sets the I-O 5250 Printer Emulation module to "artificially" produce 15 CPI printing.



NOTE: IF THE ATTACHED PRINTER CAN SUPPORT 15 CPI PRINTING USE THE EPSON DFX PRINT DRIVER. DO NOT USE THIS COMMAND.

NOTE: IBM PROPRINTERS CANNOT PRINT 15 CPI. THEREFORE, ONLY USE THIS COMMAND WHEN THE ATTACHED PRINTER IS EMULATING AN IBM PROPRINTER AND THE IBM PROPRINTER PRINT DRIVER HAS BEEN SELECTED IN THE I-O 5250 PRINTER EMULATION CONFIGURATION.

Command No. 30: IBM Drawer 4

Matches the host's Paper Drawer 4 command with a physical paper source from the printer. When the host sends a command to the printer to feed from paper drawer 4, the printer will feed from the paper source assigned to paper drawer 4. Consult the printer's user's guide for the available paper sources and respective numbers.

<i>Value</i>	<i>Description</i>
01 to 254	Paper sources available on the printer
*01	Default

Example: &%Z30,05
 Assigns the optional 500-sheet cassette on a HP LaserJet 4 Plus to the host's paper drawer 4 command.

Command No. 31: IBM Drawer 5

Matches the host's Paper Drawer 5 command with a physical paper source on the printer. When the host sends a paper source drawer 5 command, the printer will feed from the physical drawer assigned by the printer manufacturer as drawer 5. Consult the printer's user's guide for the available paper sources and respective PCL numbers.

<i>Value</i>	<i>Description</i>
01 to 254	Paper sources available on the printer
*01	Default

Example: &%Z31,05
 Assigns the optional 500-sheet cassette on a HP LaserJet 4 Plus to the host's paper drawer 5 command.

Command No. 33: Duplex Printing

Sets the 5250 SCS Printer Emulation session duplexing mode.

<i>Value</i>	<i>Description</i>
*0	Off
1	Duplexing
2	Duplexing-Tumble

Example: &%Z33,2
 Instructs the 5250 SCS Printer Emulation session to duplex and tumble all host print jobs.

Command No. 35: Process Left Margin Before/After Command Pass-Thru

This command is used when an end user desires to send Command Pass-Thru (CPT) commands at the beginning of a line, yet after the left margin. This command allows the left margin to be set either before or after the CPT command. Normally at the beginning of a line the left margin is inserted after the CPT command. However, if a customer were to use a `&%1B&%` as the Escape command at the beginning of a command string such as `&%1B&%k0S`, the Escape command `1B` would be sent first, then a left margin, and then the rest of the command string `k0S` as text. This would result in no escape command being acted upon and the string `k0S` being printed. To keep the CPT and the string together, use option 1 to insert the left margin prior to the CPT and its associated string.

<i>Value</i>	<i>Description</i>
0*	Left margin positioned after the CPT command (normal functioning)
1	Left margin positioned before the CPT command

Example: `&%Z35,1`
 Inserts the left margin before the CPT command.

Command No. 42: EBCDIC Hex Dump

Beginning with the next buffer received, all host data is sent to the printer in EBCDIC hexadecimal format until the print session is ended. Embedding this command in the data stream enables the user to print only the section of the document in question in EBCDIC hex dump format.

<i>Value</i>	<i>Description</i>
1	Start EBCDIC hex dump

Example: `&%Z42,1`
 Starts hex dump printing.

Command No. 43: ASCII Hex Dump

Beginning with the next buffer, all host data is translated from EBCDIC into ASCII hexadecimal form and printed. The ASCII hex dump prints until the printer session is ended or Host Download command `Z43,0` is received by the 5250 SCS Printer Emulation session.

<i>Value</i>	<i>Description</i>
*0	Stop ASCII Hex Dump
1	Start ASCII Hex Dump

Example: `&%Z43,1`
 Starts ASCII hex dump printing.

Command No. 44: Default Command Pass-Thru

Enables or disables the default Command Pass-Thru (CPT) and host download. When CPT is disabled, the default delimiters are not recognized as flags and will be printed

<i>Value</i>	<i>Description</i>
0*	CPT disabled
1	CPT enabled

Example: &%Z44,1
 Enables the default Command Pass-Thru delimiters



NOTE: COMMAND Z44,0 DISABLES ALL SUBSEQUENT HOST DOWNLOAD COMMANDS AND TREATS ANY STRING OF TEXT RECEIVED WITH &% AS PRINTABLE CHARACTERS. THIS MAY BE DESIRED WHEN CERTAIN TEXT STRINGS NEED TO BE PASSED TO A PRINTER EQUIPPED WITH MICR CAPABILITY OR OTHER FUNCTIONALITY. BE AWARE THAT COMMANDS 1 AND 2 ALLOW THE SELECTION OF ALTERNATE CPT START AND END CHARACTERS THAT MAY AFFECT THIS COMMAND'S USE.

Command No. 84: 6 LPI String

Used with the Generic Printer Driver to define the 6 LPI string. This string represents the printer-specific command to set the printer to 6 LPI. Consult the printer's user's guide for the appropriate ASCII hex value representing the

6 LPI command. Whenever the I-O Print Server receives a 6 LPI command from the host, it sends the string specified through this configuration option.

<i>Value</i>	<i>Description</i>
1 (up to 25 hex bytes)	Defines the 6 LPI string*
1()	Deletes the 6 LPI string

*Only characters from 01 to FF are recognized (alphabetic characters must be in upper case). Errors in the hex string will cause the print server to ignore the command and printing will resume at the point the error occurred.

Example: &%Z84,1(1B 32)
 Assigns the 6 LPI command for an Epson LQ-2500 printer (hex value 1B 32) in the interface's memory.



NOTE: IF 6 LPI STRING IS SPECIFIED, THE INTERFACE WILL IGNORE ALL 6 LPI REQUESTS FROM THE HOST.

Command No. 85: 8 LPI String

Used when the Generic printer driver and IBM 5224 or 5225 emulation is selected to define the 8 LPI string. See Reference No. 84.

<i>Value</i>	<i>Description</i>
1 (up to 25 hex bytes)	Defines the 8 LPI string
1()	Deletes the 8 LPI string

Example: &%Z85,1(1B 30)

This Host Download command stores the 8 LPI command for an Epson LQ-2500 printer (hex value 1B 30) in the interface's memory.

Command No. 86: 10 CPI String

Used with the Generic printer driver to define the 10 CPI string. See *Reference No. 84*.

<i>Value</i>	<i>Description</i>
1 (up to 25 hex bytes)	Defines the 10 CPI string
1()	Deletes the 10 CPI string

Example: &%Z86,1(1B 50)
Stores the 10 CPI command for an Epson LQ-2500 printer (hex value 1B 50) in the interface's memory.

Command No. 87: 15 CPI String

Used when the Generic printer driver and IBM 5224 or 5225 emulation is selected to define the 15 CPI string. See *Reference No. 84*.

<i>Value</i>	<i>Description</i>
1 (up to 25 hex bytes)	Defines the 15 CPI string
1()	Deletes the 15 CPI string

Example: &%Z87,1(1B 67)
Assigns the 15 CPI command for an Epson LQ-2500 printer (hex value 1B 67) in the interface's memory.

Command No. 88: 12 CPI String

Used when the Generic printer driver and IBM 5224 or 5225 emulation is selected to define the 12 CPI string. See *Reference No. 84*.

<i>Value</i>	<i>Description</i>
1 (up to 25 hex bytes)	Defines the 12 CPI string
1()	Deletes the 12 CPI string

Example: &%Z88,1(1B 4D)
Assigns the 12 CPI command for an Epson LQ-2500 printer (hex value 1B 4D) in the interface's memory.

Command No. 89: 17.1 CPI String

Used when the Generic printer driver and IBM 5224 or 5225 emulation is selected to define the 17.1 CPI string. See *Reference No. 84*.

<i>Value</i>	<i>Description</i>
1 (up to 25 hex bytes)	Defines the 17.1 CPI string

1() Deletes the 17.1 CPI string

Example: &%Z89,1(1B 0F)

Assigns the 17.1 CPI command for an Epson LQ-2500 printer (hex value 1B 0F) in the interface's memory.

Command No. 91: Blank Page Suppression in Dot-Matrix Mode

Enables a blank page to print when a form feed occurs on a blank page. The normal mode suppresses blank pages when a form feed occurs on a blank page. In dot-matrix mode, this command allows form feed commands for page positioning.

<i>Value</i>	<i>Description</i>
0*	Form Feed on blank pages ignored (normal functioning)
1	Form Feed passed to the printer.

Example: &%Z91,1

Passes form feed commands on a blank page to the printer.

Command No. 96: Disable Logical-Not Processing

Stops the print server from processing logical-not commands and to pass them through to the printer. These commands include the following: B, C, D, E, F, G, I, O, Q, S, T, and \neg .

<i>Value</i>	<i>Description</i>
0*	Logical-Not Processing Occurs (normal functioning)
1	Logical-Not Processing does not occur, passed through to the printer.

Example: &%Z96,1

Allows passing logical-not commands to the printer.

Command No. 98: Restore Defaults

Restores the factory default configuration selections returning all Host Download Commands to the settings identified herein with the asterisks (*).

<i>Value</i>	<i>Description</i>
0	Restores the factory default selections
1	Prints out the active configuration selections

Example: &%Z98,1

Prints out the active setup selections for review

Command No. 99: Save Current Settings

Causes the 5250 SCS Printer Emulation to save all Host Download Commands. (Front panel commands are not saved with this command as they are saved by the printer's menu system.)

<i>Value</i>	<i>Description</i>
0	Causes the settings to be saved.

Example: &%Z99,0
 Causes the settings to be saved.

5250 SCS Printer Operation

This chapter describes in more detail the 5250 SCS printer operation. Also described are advanced printing features designed into I-O's 5250 SCS Printer Emulation.

In general, most I-O products will connect to the IBM host over Ethernet using the TCP/IP printing protocol of TN5250e. Older legacy IBM hosts may require Twinax or Coax cabling and will utilize AnyNet or SNA protocols. Many of I-O's products will also support AnyNet and SNA in these legacy environments.

On the IBM host side, TN5250e is a self-configuring protocol that creates an IBM 3812-1 page printer device description and writer. Print jobs from the host are sent to printer in the EBCDIC character set and with SCS commands. The EBCDIC characters are converted into ASCII and the SCS commands are converted into PCL. When using a dot-matrix printer, I-O's implementation of TN5250e protocol provides a 3812 to 4214 conversion module. SCS commands are converted into Epson, or IBM Proprinter commands. The laser or dot-matrix printer then interprets the commands generating the printed output.

Running a 5250 SCS Printer Session

The 5250 SCS Printer Emulation session will automatically connect to the IBM host when the following occurs:

- On software print server products, when the session is started.
- On external hardware products such as print servers or thin clients, when the product is restarted.
- In the case of internal HP LaserJet DIMMs, CompactFlash or USB devices, when the printer is powered up.

To end the connection with the IBM host, do one of the following:

- On software print server products and some thin client models, stop the session.
- On external hardware products, power off the product.
- On HP LaserJet products, use the printer's Web interface to disconnect the session.



CAUTION: WHEN AN I-O PRODUCT IS POWERED OFF WITHOUT ENDING THE SESSION, THE IBM HOST WILL NOT IMMEDIATELY END THE CONNECTION. AFTER A TIME-OUT PERIOD THAT VARIES FROM 15 MINUTES TO SEVERAL HOURS, THE IBM HOST WILL EVENTUALLY END THE CONNECTION AND ONLY THEN ALLOW RECONNECTION. IF THE I-O PRODUCT IS POWERED UP BEFORE THIS TIME OUT PERIOD HAS EXPIRED, THE IBM HOST WILL REFUSE TO ALLOW THE 5250 SCS PRINTER EMULATION SESSION TO RECONNECT.

To immediately end the connection and allow reconnection, either of two processes may be used:

- Vary off the Device
 1. End the writer.
 2. Vary off the device.
 3. Cycle the power on the I-O product. If the I-O product is an internal DIMM, CompactFlash or USB device, then cycle the power on the printer.
- End the Telnet session:
 1. End the Telnet session by using the IBM host's TCPADM command. (You may also use the NETSTAT command, option 3 as an alternate.)
 2. At the command line, type GO TCPADM, take selection option "7", then option "3".

3. Find the IP address for the print server (or LaserJet printer if using an internal DIMM, CompactFlash or USB card) that runs the 5250 SCS Printer Emulation session, and then execute option "4 - End of Session".
4. Cycle the power at the printer.

Laser Operation

The 5250 SCS Printer Emulation session allows you to operate the I-O product just as you would an IBM 3812 printer. The IBM 3812-1 printer is a laser-type printer that provides font-changing capability, plus text rotation and compression features called Automatic Print Orientation (APO) and Computer Output Reduction (COR).

The 5250 SCS Printer Emulation provides bolding, underlining, super and subscripts by recognizing the host commands for these features.

Changing Typestyles

The tpestyle number (FGID) selected determines the font to be used. The system operator selects a default tpestyle when the printer is configured on the host, however, a word processing program may also have a default tpestyle. Since the default tpestyle can vary depending on the system setup, ask the system operator if you have questions about the default tpestyle on the system. There are two ways to change tpestyles:

- Select a tpestyle (font) number within the program or document
- Use Font Change commands in the document

Refer to the IBM program manuals (i.e. OfficeVision/400) to change tpestyles in the program. Font Change commands are placed in the document by the user (see below). The four-character font command changes the text to the new font until another Font Change command is entered or the host changes the FGID..

The host does not know a font change has taken place and may send the original font number to the printer at the beginning of each page. Therefore, the user may have to put a Font Change command at the beginning of each new page. If the pitch is changed, there may be formatting problems since the host is still formatting each line according to the pitch of the original tpestyle (font) number.

Font Change Commands

Font Change Commands allow fonts to be changed in the document without using host commands. The commands can be used in either data processing (RPG, Basic programs, etc.) or in word processing documents.

Two types of Font Change Commands exist. Both commands can be placed anywhere within a document. The command consists of the "logical not" (¬) symbol, and either a capitalized "Q" or "F" followed by the tpestyle number corresponding to the desired font. The "^" symbol can be used in place of the "¬" for non-US applications.

The Font Change Command occupies space in the program or text, however, if entered correctly, the command does not print.

- **¬Q** - Font change commands using the capital letter "Q" allow the user to access a vast number of printer-resident and optional cartridge fonts. Appendix A shows the tpestyle numbers assigned to the supported fonts. Each tpestyle number describes a font with particular attributes. For example, tpestyle number 88 represents Courier Bold, 12 pitch, 10 point.

To change a font, insert a font change command at the beginning of the text where the change is to take place. For example, to bold the word "saves" in the following sentence (assuming the current font is Courier - 12 CPI or pitch, 10 point) type:

Quality ¬Q88saves¬Q85 you time and money.

Here is how the print will look:

Quality **saves** you time and money.

The -Q85 following "saves" returns the printing back to the original font.

- **-F** - Font change commands using the capital letter "F" allow the user to access the scalable fonts shown in Appendix B. Notice that unlike the tpestyle numbers used with -Q commands, the tpestyle numbers in Appendix B describe only the tpestyle of the supported font. The size of the desired font is entered separately in the font change command. For example, to increase the size of the word "saves" in the following sentence to 30 points (assuming the current font is Arial, 12 point), type:

Quality -F6199,30saves-F6199,12 you time and money.

Here's how the print will look:

Quality **saves** you time and money.

The -F6199,12 following "saves" returns the printing back to the original font. The numbers following the comma (-F6199,30 and -F6199,12) set the point size of a proportional font (such as Arial) and the pitch size of a fixed pitch (such as Courier).

To print fonts that are not already supported through your 5250 SCS Printer Emulation session, refer to the Host Download Command No. 21 Font Strings.

Paper Output Bin Selection

The 5250 SCS Printer Emulation session allows you to direct host print jobs to any of the printer's available output bins. The HP LaserJet 5Si, for instance, can be equipped with the optional multi-bin mailbox, which offers 8 additional output bins.

To send a host job to a particular output bin, insert an I-O output command on the first line (line 1, position 1) of the document/report. The I-O output command consists of the "logical not" (~) or the "caret" (^) symbol followed by a capital letter "O" (for Output) and two digits designating the destination bin. The two-digit number corresponds to the printer's PCL command for the particular output bin as assigned by the printer manufacturer.

Once an output bin is selected, all host print jobs will be directed to that output bin until a second I-O command is sent to the printer... -O00 stops the print server from sending any output instructions to the printer. All print jobs will be directed to the output bin set through the printer's operator panel.

The I-O output commands are as follows:

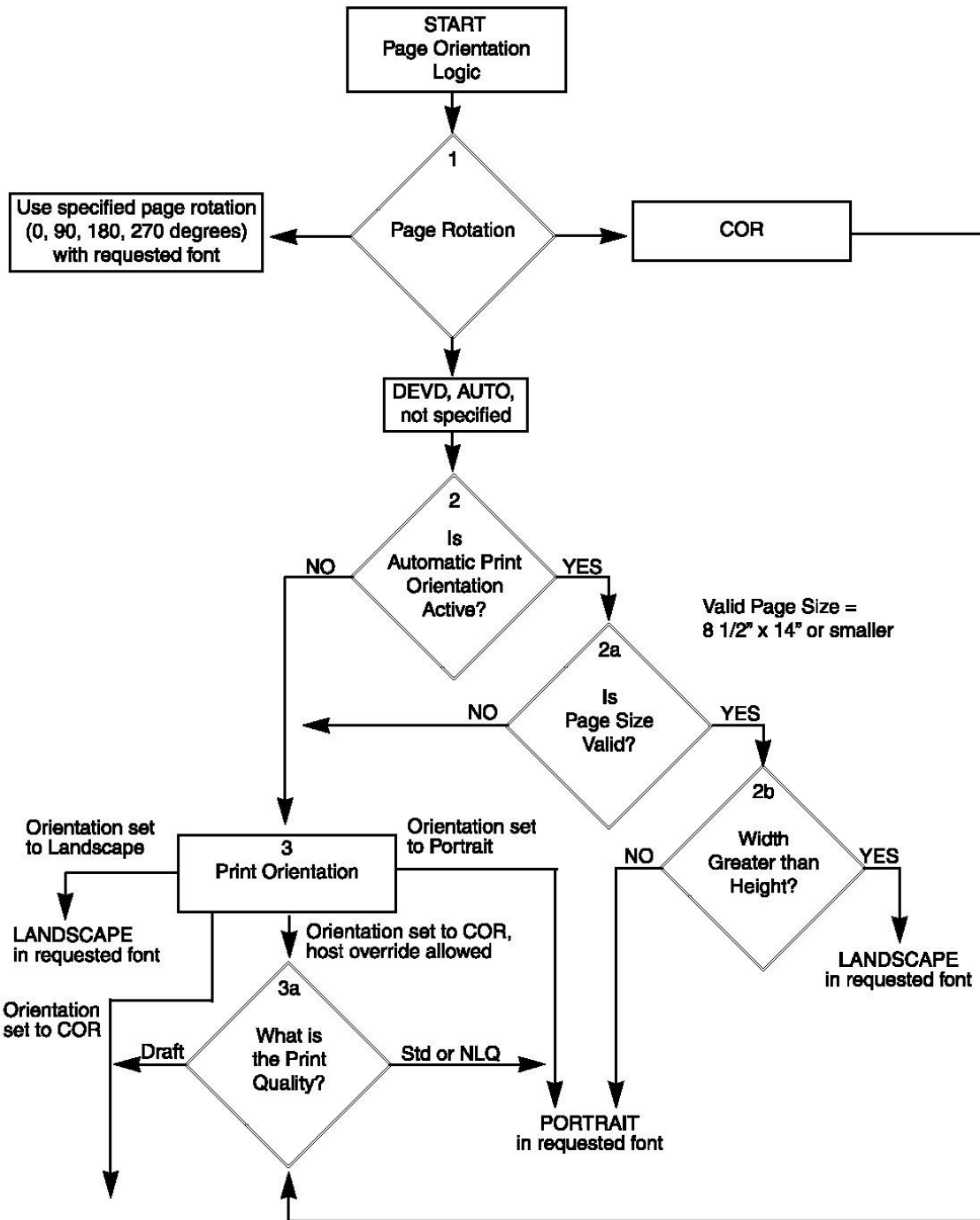
Command	Description	PCL Command
-O00	Automatic Selection	ESC%I0G
-O01	Selects output bin #1	ESC%I1G
-O02	Selects output bin #2	ESC%I2G
-O03	Selects output bin #3	ESC%I3G
-O04	Selects output bin #4	ESC%I4G
-O05	Selects output bin #5	ESC%I5G
-O06 to 99	Selects output bin #6 to 99	(Not yet assigned)

Print Orientation

When operating the 5250 SCS Printer Emulation session in IBM 3812-1 emulation mode, the print orientation of the host document or report is determined by three factors. These factors, in order of their impact on the final print orientation, are:

1. Page Rotation specified in the printer file of a data processing document or in the document format menu of a word processing document.
2. Automatic Print Orientation (APO) setting on the 5250 SCS Printer Emulation session.
3. Print Orientation setting on 5250 SCS Printer Emulation session.

Refer to the following COR Flowchart diagram while reading the description of the page rotation, automatic print orientation, and print orientation settings.



Computer Output Reduction (COR)
 0.5" margins top and left
 LANDSCAPE in reduced font:
 10 pitch font to 13 pitch
 12 pitch font to 15 pitch
 15 pitch font to 20 pitch
 Vertical spacing is:
 6 LPI = 8.7
 8 LPI = 11.6

COR Flowchart

Page Rotation (Block 1)

Degrees of page rotation can be specified through the printer file of a data processing document or in the document format menu of a word processing document. See "Changing Page Rotation Settings" below for a description on how to access the printer file and the document format menu. The available settings are 0, 90, 180, 270 degrees and AUTO (AS/400 only). The printer file also offers DEVD and COR (AS/400 only).

- 0, 90, 180, and 270 degrees specifies the desired rotation directly from the host.
- The COR setting will always print COR, unless the print quality (AS/400 and S/38) is set to NLQ or STD, or Text (S/36) is set to YES. If the page rotation is set to COR and print quality/text is one of the above-mentioned settings, the print job will print in portrait in the requested font.
- With the DEVD and AUTO settings the host does not influence the print orientation. Rather, the print orientation is determined by the settings on the I-O 5250 SCS Printer Emulation Control Panel or Host Download Command.

Automatic Print Orientation (Block 2)

If no page rotation was specified on the host, the 5250 SCS Printer Emulation session's Automatic Print Orientation (APO) feature is the first setting used to determine the final print orientation. This feature automatically rotates print jobs with dimensions of 8.5 x 14 inches or smaller to portrait or landscape orientation.

- With the APO feature ON, the 5250 SCS Printer Emulation session first checks the dimensions of the host print job. If the print job is larger than 8.5 x 14 inches the 5250 SCS Printer Emulation session cannot fit the print job on one page. In this case the orientation of the print job is determined by the print orientation setting on the 5250 SCS Printer Emulation session (BLOCK 3).
- If the dimensions of the print job are 8.5 x 14 inches or smaller, the 5250 SCS Printer Emulation session compares the width to the height and automatically rotates the print job to portrait if the height is larger than the width or landscape if the width is larger than the height.

The dimensions of a word processing document are specified directly through the document format menu. The dimensions of a data processing report are calculated using values found in the printer file

$$\text{Width} = \text{Page Width (in number of columns)} / \text{CPI}$$

$$\text{Length} = \text{Page Length (in number of lines)} / \text{LPI}$$

Print Orientation Settings (Block 3)

The 5250 SCS Printer Emulation session's print orientation settings determine the orientation of the host document/report AFTER the host's page rotation setting and the 5250 SCS Printer Emulation session's APO setting have been obeyed.

The available print orientation settings are portrait, landscape, and two COR options. The COR feature rotates documents to landscape orientation and compresses the font to print the complete document on a standard 8.5"x 11" page. This allows the user to print a report initially designed to fit on 14 7/8" x 11" green bar paper onto a standard letter or legal-size page without redesigning the report.

When used together the APO and COR features can be a powerful tool to print host jobs in portrait, landscape, or in landscape with reduced font (COR), without user intervention.

The 5250 SCS Printer Emulation session has two methods of handling COR.

- The first COR option is not a true IBM 3812 emulation, but has been added by I-O to give the user a more straightforward way of obtaining COR. The COR setting ignores print quality settings and

always prints COR (unless the host's page rotation or the interface's APO setting determine the print orientation).

- The second COR option is a true 3812-1 emulation. With certain page rotation settings on the host, the IBM 3812-1 printer allows the user to manipulate the final print orientation through the print quality setting. Note though, that this "override" only applies if the 5250 SCS Printer Emulation session's print orientation is set to "COR, host override allowed".

The following tables show what page rotation settings can be manipulated through print quality settings and how the combination of page rotation and print quality affects the final print orientation.

Host System	Page Rotation Setting	Print Quality Setting Causing Portrait Orientation
AS/400	*DEV D (printer file	*NLQ, *STD
AS/400	*AUTO (OfficeVision/400)	NLQ, Text
S/36	Not Specified	Text – Yes
S38	Not Specified	*NLQ, *STD

COR is defined as printing in landscape orientation, top left margins set at 0.5", with CPI and LPI reduced according to the following tables:

Host CPI	Reduced to:
10	13.3
12	15
15	20

Host LPI	Reduced to:	Maximum Rows (Lines) per Page
6	8.7	66
8	11.6	88

The following table shows the print orientation results desired and recommends a combination of settings required to obtain that result. Most print orientation results can be achieved with different setting combinations.

Result	Host Setting	I-O 5250 SCS Printer Emulation Setting for:	
		APO	Orientation
<p>Data Processing: Print reports with a width of 80 columns or less (at 10 CPI) in portrait <i>and</i> print reports with a width of 132 (at 10 CPI) or 198 (at 15 CPI) columns in landscape with reduced font (COR)</p> <p>Word Processing: Print documents of up to 8.5 x 14" in portrait, 14 x 8.5" in landscape, and</p>	<p>Degree of Page Rotation = *AUTO</p> <p>Rotate Paper = 1 (Automatic)</p>	ON	COR

anything larger in landscape with reduced font (COR)			
Print all reports/documents in landscape with reduced font (COR)	Degree of Page Rotation = *AUTO Rotate Paper = 1 (Automatic)	OFF	COR
Print all reports/documents in landscape with requested font	Degree of Page Rotation = *AUTO Rotate Paper = 1 (Automatic)	OFF	Landscape
Print all reports/documents in portrait with requested font	Degree of Page Rotation = *AUTO Rotate Paper = 1 (Automatic)	OFF	Portrait

Changing Page Rotation Settings

Before changing page rotation settings, first verify the current settings. In Office Vision/400, page rotation settings can be viewed and changed in the following manner:

1. Press **F20** "Format options."
2. Press **1** "Document options" then ENTER.
3. Press **1** "Document format" then ENTER.
4. Press **4** "Page layout/paper options" then ENTER.
5. Press Page Down to scroll to the second screen.
6. Locate "Rotate Paper option."
7. Move the cursor to the currently selected rotation setting and type in the desired selection.

To permanently change the page rotation setting for a data processing report the printer file must be changed. This should only be done by an MIS staff member since a changed printer file could affect many printers. The page rotation setting can be changed temporarily by overriding the printer file. The printer file must be changed or overridden before the host creates the print job. An overridden printer file applies only to active print jobs created on the host after the printer file was overridden.

To view the current printer file settings, type **CHGPRTF** followed by a space and the name of the printer file on the AS/400 or iSeries command line. Press **F4**. Make no changes unless authorized by the IS director.

- To change the printer file:
 1. Type **CHGPRTF** on the command line of the host, and press Enter.
 2. Type in the name of the printer file to be changed.
 3. Press **F10 to display** additional parameters.
 4. Press Page Down (three or four screens depending on OS/400 version) and locate "Degree of page rotation" option.
 5. Move the cursor to the beginning of the dashed line and enter the desired selection.
 6. Press ENTER to exit.
- To override the printer file:
 1. Type **OVRPRTF** on the command line of the host, and press Enter.
 2. Type the name of the printer file to be changed.
 3. Press Page Down (three or four screens depending on OS/400 version) and locate "Degree of page rotation" option.
 4. Move the cursor to the beginning of line and enter the desired selection.
 5. Press ENTER to exit.

Envelope Printing

To print envelopes, set the 5250 SCS Printer Emulation session to landscape orientation (Host Download command Reference No. 7) or activate the Auto Print Orientation feature (Host Download command Reference No. 8). The following example shows how to print envelopes from a word processing program, using the printer's optional envelope feeder.

1. Select line **1** as the first typing line.
2. Specify **Envelope** size in the program.
3. Select Feed Envelope in the program. Then choose the font desired.
4. Set the left margin to 1.
5. Type the return address, starting at line 1, column 1.
6. Type the mailing address. The appropriate space for the address will vary with the envelope size. For a Commercial 10 envelope, the address starts at about line 10, column 55.
7. Print the envelope.

The following envelope sizes are supported:

Monarch	3 7/8" x 7 1/2"
Commercial 10	4 1/8" x 9 1/2"
International DL	110 mm x 220 mm
International D5	162 mm x 229 mm

OfficeVision/400 Envelope Printing

A letter and an envelope can be printed from OfficeVision/400 in the same document as follows.:

1. Set the format for the letter and enter the letter file. (HOW?) On the first typing line, press **CMD20 for Format options**.
2. Select **1** for Document options, then another **1 for Document format**. Select **3 for Typestyle/color**.
3. Select the font ID Number for the letter, such as No. 11, 86, etc., then press ENTER.
4. From the Document Format screen, select option **4 for Page layout/paper** options. Scroll to the second screen and select a paper size of 8.5 (width) x 11 (length) inches and paper source 1. If the letter is more than one page, select paper source 1 for the following pages. Press ENTER to return to the Document format screen, then CMD 12 to return to the Document options screen.
5. Now set up the Alternate Format for the envelope. Select **2** format, then **3 for Typestyle/color**. Select the font ID for the envelope and press ENTER to return to the Alternate Format screen.
6. Select 4, Page layout/paper options. Choose a first typing line of 1, then scroll down to the second screen and choose a paper width of 7.5 (monarch size) or 9.5 (commercial, or #10 size) and a paper length of 4 inches. For a paper source, select **5 for Envelope Feed**. Press ENTER to return to the Alternate Format screen.
7. Select option 1 for Margins and Tabs and make the left margin 1. Press ENTER and **CMD3** until you are back in the document.
8. Type the letter. When done, add in a page end by pressing **ALT P**.
9. Now load in the Alternate Format for the envelope. To do this, press the **CMD5** key, Go to, and type in rf for Resetting Format. Press ENTER. Select option **4 on the Alternate Format** screen, Begin Alternate Format. Press ENTER.
10. You are now back in the document, with the Alternate Format. The cursor will be on the first

Typing line of 1, with the left margin of 1. Type in the envelope address and send the file to print. The letter will print out first, followed by the envelope.



NOTE: THE PRINTER MAY EJECT A BLANK PAGE WHEN PRINTING ORIENTATION HAS BEEN CHANGED. IF THE BUFFER AND READY LIGHT REMAIN STEADY, PRESS THE PRINT/CHECK BUTTON ON THE PRINTER'S OPERATOR PANEL TO EJECT THE LAST PAGE.

Duplex Printing

Some printers can perform both simplex (single sided) and duplex (double sided) printing. Duplex printing can be accomplished in four ways:

- In OfficeVision/400, select duplex printing in the print options menu for that document (*Type of page printing. . . Double- sided or Double-sided Tumble)
- In OS/400 V2 R3 and later, select duplex printing in the printer file (*Print on both sides. . . *Yes or *Tumble)
- Place I-O Duplexing commands in the document
- Set the 5250 SCS Printer Emulation session to duplexing mode.

For most documents, select duplex printing through the host's print options menu (OfficeVision/400) or through the printer file (OS/400 V2 R3).

I-O duplexing commands are similar to the I-O Font Change commands. These commands are placed on the first line of the document prior to any text. If the command is not on the first line, first printed position the commands do not take effect until the second page of the document). The commands are:

- D0 for simplex printing
- D1 for duplex printing
- D2 for duplex printing (tumble)

The printer will print using the currently selected mode, simplex or duplex, until the mode is changed. Envelope printing between documents does not change the printer's mode.

The 5250 SCS Printer Emulation session can be set to duplexing mode through Host Download command 33. The options are:

- 0 = Simplex
- 1 = Duplex
- 2 = Duplex(tumble) printing

Using Host Download Command, type &%Z33,1 or &%Z33,2 into the document or on the screen and print the document or the screen to set the 5250 SCS Printer Emulation session to duplex printing. &%Z33,0 returns to simplex mode.

On some duplex printing, if the last page is single sided, the last page may remain in the printer with the form feed light on. When the next job is sent, this page will be ejected. To manually eject the last page, take the printer off-line, and then press the FORM FEED button to eject the last page. Put the printer back on-line.

Other Printer Commands

The table below is a summary of special commands the laser printer emulation will obey if the commands are imbedded in a user's document.

Command	Function
---------	----------

-E	Sends an ASCII ESC command to the printer
-TY	Enables true 6 LPI printing
-TN	Disable true 6 LPI printing
-I	Ignores all host formatting commands
-S	Stops ignoring host formatting commands

The -E command allows an "Esc" (escape) command to be sent to the printer to control the printing. The -E command eliminates the need for putting in hex codes using Command Pass-Thru. These commands allow the user to access all functions and features of the printer.

Check the printer's manual or any optional technical manual for a description of the feature and the associated escape command. For example, -E(s3B would begin bold printing on an HP LaserJet printer.

The 5250 SCS Printer Emulation session will slightly compress line spacing to fit 66 lines onto the page. This may be undesirable (such as when using pre-printed forms requiring exact alignment). In these cases, the -TY command prevents the printer from compressing the line spacing.

Use the -I and -S commands to remove unwanted host commands from a printer file. For example, when printing with electronic forms software, these files are recognized by the host as text files, causing the host to format the files with unwanted carriage returns and line feeds. Placing the -I at the end of a line and -S at the front of the next line causes the 5250 SCS Printer Emulation session to remove the host carriage return and line feed commands and send only the data to the printer.

Matrix Printer Operation

IBM Matrix Printer Emulations

When printing to a dot-matrix printer, the I-O 5250 Printer Emulation session first converts 3812 SCS commands to 4214 SCS commands. These 4214 SCS commands are then converted into one of the following ASCII printer commands:

- IBM PPDS (matrix)
- IBM Proprinter
- Epson ESC/P2
- Epson DFX 8500/5000+ (no15 CPI capabilities)
- Epson FX/DFX
- Epson LQ
- Generic

Graphics Printing

Using All Points Available (APA) bit image graphics the I-O 5250 Printer Emulation module will print the same Advanced Printer Functions (APF) and Business Graphics Utility (BGU) graphics as the IBM 4214 printer. This is the graphic printing method used by IBM before IPDS was developed.

The I-O 5250 Printer Emulation module implements the LAC command by taking the dot pattern received from the AS/400 host and then printing the exact dot pattern using the printer's APA bit image graphics at 240 dots/inch. This permits the printer to print APF and BGU graphic output using exactly the same spacing as the IBM 4214 printers.

Generic Mode

The Generic printer driver should be used when the other printer drivers of the I-O 5250 Printer Emulation module are inappropriate, such as barcode label printers, embossers, or some printers from Okidata, Mannesmann-Tally or others. Refer to the printer's user's guide to find out if the printer operates with one of the I-O 5250 Printer Emulation module's print drivers.

In Generic mode, the I-O 5250 Printer Emulation module does not give the printer LPI or CPI commands. Use Host Download commands 84, 85, 86 & 87 to achieve specific CPI and LPI output. For example, assume the printer protocol the printer requires is not available on the I-O 5250 Printer Emulation module. To change the printer to 10 CPI, the printer's user's manual provides the hexadecimal value of 1B 50. Use the Host Download command 86 to assign the value 1B 50 to the 10 CPI string (type `&%Z86,1(1B 50)`). From now on, when the I-O 5250 Printer Emulation module receives a request for 10 CPI from the host, 1B 50 will be sent to the printer resulting in 10 CPI.

If nothing is assigned to the CPI or LPI string, the I-O 5250 Printer Emulation module will send nothing to the printer, ignoring CPI and LPI command sent from the host.

The I-O 5250 Printer Emulation module stores commands for the following CPI and LPI values:

- 6 LPI Host Download Command No. 84
- 8 LPI Host Download Command No. 85
- 10 CPI Host Download Command No. 86
- 15 CPI Host Download Command No. 87

Advanced Features

Command Pass-Thru™

I-O's Command Pass-Thru™ feature allows access to all the built-in features of the printer, even if these features aren't normally available through the host software. Command Pass-Thru™ lets you place printer-specific command sequences into the data sent to the printer. The I-O 5250 SCS Printer Emulation session recognizes these special sequences and "passes the command through" to the printer.

The steps below describe how to use Command Pass-Thru™.

1. Find the command for the desired print feature.
2. Convert the printer command to hexadecimal (ASCII).
3. Place &% (or the alternate CPT start delimiter), in the document at the point where the feature is to take effect. .
4. Enter the converted printer command, then enter &% or the alternate CPT end delimiter. A space may be entered between hexadecimal code pairs to make the command easier to read, but do not put spaces between the delimiter and the hexadecimal characters.
5. Move the cursor to the point in the text where the print feature ends. Enter &% or the alternate CPT start delimiter, followed by the ending printer command and then &% or the alternate CPT end delimiter, into the document.

For example:

The command ESC &d0D begins underlining and ESC &d@ ends underlining on a HP LaserJet printer. First convert the start command to the hexadecimal 1B 26 64 30 44 and the ending command to 1B 26 64 40. If the Command Pass Thru delimiter is the default &% (hex 50 6C), then enter the commands as follows:

This is an &%1B 26 64 30 44&%underlined&%1B266440&% word.

This will print on the printer as:

This is an underlined word.



NOTES: ONLY CHARACTERS FROM 01 TO FF ARE RECOGNIZED (ALPHABETIC CHARACTERS MUST BE IN UPPER CASE).

ERRORS IN THE COMMAND PASS-THRU SEQUENCE WILL CAUSE THE I-O 5250 SCS PRINTER EMULATION SESSION TO IGNORE THE COMMAND AND PRINTING WILL RESUME AT THE POINT THE ERROR OCCURRED.

COMMAND PASS-THRU MAY INVALIDATE HORIZONTAL SPACING

Although the command is displayed on the screen, the (incorrect placement of the comma) 5250 SCS Printer Emulation session treats the string as a command and does not print it. If part of the sequence is printed, an error has been made entering the codes. Check the document and make sure the correct format and EBCDIC hexadecimal characters are being used.

Avoid sending codes that would move the print position during Command Pass-Thru. Since the 5250 SCS Printer Emulation session does not process these commands, the printer emulation cannot keep track of the print position changes. This may adversely affect the position of characters following the command and the page layout.

Printing Bar Codes Using I-O's Bar Code Feature

I-O's bar code feature will allow you to create various bar codes and embed them in your printed output.

Using the I-O bar code feature, the following bar codes can be easily printed:

Type	Bar code
1	Code 3 of 9
2	Code 128
3	Interleaved 2 of 5
4	Post Net
5	UPC A
6	EAN 8
7	EAN 13
8	UPC A with number system characters

To print any of these bar codes, use the following format:

-B<type>,<height>,<width>,<hr>,<chkd>,<ast>,<data>-B

The bar code command string must contain all of these parameters, even if the parameter is irrelevant for the type of bar code being printed. For example, POSTNET comes in only one size, therefore, any height or width specifications are ignored.

- **-B** Identifies the strings as a bar code command string. **-B** must be placed at the beginning end of the string.
- **<type>** Specifies the bar code type according to the table shown above.
- **<height>** Specifies the height of the bar code. Height is expressed in multiples of 2.5 mm (approximately 1/10 inch). The height of the bar code can range from 1 (2.5 mm) to 9 (22.5 mm) inclusive.

Height values are ignored if a POSTNET bar code is being printed, since POSTNET uses one standard height. However, a valid value (1-9) must be entered for the height parameter to ensure the bar code command string is complete.

- **<width>** Specifies the width of a bar code module. A module is defined as a specific combination of bars and spaces used to represent a human readable character. By changing the width parameter, you can determine the width of the module and the thickness of the bars and spaces.

Width parameters can range from 1 to 9.

To determine the total length of the bar code, simply multiply the module length (found in the table on the following page) with the number of bar code characters.

For example, using Code 3 of 9, you want to bar code the word "PRINTERS." Assume the 5250 SCS Printer Emulation session also generates a check digit and the start/stop characters. Setting the width parameter to 2 will yield a total (get rid of the extra space) bar code length of approximately 4 cm or about 1.5 inches.

Number of characters: 11 (8 letters (PRINTERS) + 2 start/stop characters + 1 check digit)

Module width (from table below:) 3.6 mm (.14 inches) Calculation: 11 x 3.6 mm = 39.6 mm = 3.96 cm; or 11 x .14 in = 1.54 inches

Width parameters are ignored when printing POSTNET bar codes, since POSTNET uses one standard width. However, a valid value (1-9) must be entered for the width parameter to ensure the bar code command string is complete.

Module Width in mm (inches) - PCL Laser									
Width	1	2	3	4	5	6	7	8	9
Code 3 of 9	2.6 (.1)	3.6 (.14)	4.5 (.18)	5.5 (.22)	6.5 (.25)	7.5 (2.9)	8.4 (3.3)	9.4 (.37)	10.4 (.41)
Code 128	2.2 (.09)	3.1 (.12)	3.9 (.15)	4.7 (.19)	5.6 (.22)	6.4 (.25)	7.3 (.29)	8.1 (.32)	8.9 (.35)
Interleaved 2 of 5	2.3 (.09)	3.2 (.12)	4 (.16)	4.9 (.19)	5.8 (.23)	6.6 (.26)	7.5 (.3)	8.4 (.33)	9.3 (.36)
Post Net	5.7 (.23)								
EAN-13	1.5 (.06)	2 (.08)	2.5 (.1)	3.1 (.12)	3.6 (.14)	4.2 (.16)	4.7 (.18)	5.2 (.20)	5.8 (.23)
EAN-8	1.7 (.07)	2.3 (.09)	2.9 (.11)	3.6 (.14)	4.2 (.16)	4.8 (.19)	5.4 (.21)	6.1 (.24)	6.7 (.26)
UPC A	1.6 (.06)	2.2 (.08)	2.8 (.11)	3.4 (.13)	4 (.16)	4.6 (.18)	5.2 (.2)	5.8 (.23)	6.4 (.25)

Module width in mm (inches) - Epson or IBM Dot-Matrix			
Width	1	2	3
Code 3 of 9	2.7 (.11)	5.4 (.22)	8.1 (.32)
Code 128	2.5 (.1)	5 (.2)	7.6 (.3)
Interleaved 2 of 5	2.2 (.9)	4.4 (.18)	6.6 (.26)
POSTNET	6.5 (.25)		
EAN 13	1.5 (.06)	3.1 (.12)	4.6 (.18)
EAN 18	1.8 (.07)	3.6 (.14)	5.5 (.21)
UPC A	1.8 (.07)	3.6 (.14)	5.5 (.21)



NOTE: BE AWARE THAT THE TABLE GIVES ROUNDED VALUES ONLY.

- **<chr>** Identifies whether human readables are printed or not. Human readables are printed underneath the bar code. Valid values are:
 - 0 = Do not print human readables.
 - 1 = Print human readables.
 - 9 = Do not print human readables and do not line feed.
- **<chkd>** Indicates whether the 5250 SCS Printer Emulation session automatically calculates and prints a check digit. The following bar codes require a check digit; therefore, the 5250 SCS Printer Emulation session automatically generates and adds a check digit to the bar code data: Code 128, POSTNET, UPC A, EAN 8, and EAN 13.

If any of the bar codes listed above have been selected, the <chkd> selection is ignored by the interface. However, one of the following values must be entered to ensure the bar code command string is complete and valid. The options for the <chkd> parameter are:

 - 0 = Do not calculate and add a check digit.
 - 1 = Calculate and add a check digit.
- **<ast>** Specifies whether start/stop characters are automatically generated or manually added. This parameter only applies to bar code type Code 3 of 9. For all other bar code types, the 5250 SCS

Printer Emulation session automatically generates the start/stop characters and input for the <ast> parameter is ignored. However, one of the following values must be entered to ensure the bar code command string is complete and valid. The options for the <ast> parameter are:

0 = Do not automatically add start/stop characters.

1 = Automatically add start/stop characters.



NOTE: IF VALUE 0 IS SELECTED, YOU MUST MANUALLY ENTER START/STOP CHARACTERS (ASTERISKS) TOGETHER WITH THE DATA. FAILURE TO ADD THE ASTERISKS WILL CAUSE AN INVALID BAR CODE TO BE PRINTED (I.E. A BAR CODE WITHOUT START/STOP CHARACTERS). IF HUMAN READABLES ARE BEING PRINTED, THE ASTERISKS WILL ALSO PRINT AS HUMAN READABLES.

IF VALUE 1 IS SELECTED, YOU MUST NOT ADD ASTERISKS AS START/STOP CHARACTERS TO THE DATA. INCLUDING ASTERISKS WILL CAUSE AN INVALID BAR CODE TO BE PRINTED (I.E. A BAR CODE WITH A START/STOP CHARACTER PAIR IN THE BEGINNING AND A START/STOP CHARACTER PAIR IN THE END.)

- **<data>** The data to be printed as a bar code. Some bar codes require a certain number of characters. Others only allow alphanumeric or numeric characters. Before processes the data string, the 5250 SCS Printer Emulation will verify the complete data string, including the trailing -B . If an invalid data string has been entered, the 5250 SCS Printer Emulation session will print "Invalid Data".

Notes on using the I-O Barcode Feature

When using the I-O Barcode Feature remember the following:

1. Valid values must be entered for each of the parameters specified above, even if the parameter is irrelevant for the type of bar code being printed.
2. If an invalid parameter value (other than invalid data) has been entered, the 5250 SCS Printer Emulation session will process the bar code command up to that point and then reject any information received after the incorrect value.

For example, a bar code command string has been entered with an invalid, <hr> value.

```
-B2,6,6,3,0,0,code128-B
```

The 5250 SCS Printer Emulation session would print all characters after the invalid value

```
3,0,0,code128
```

This helps quickly identify where the mistake occurred.

3. Spaces in the bar code command string are invalid and will lead to the same result as mentioned in Step 2.
4. If invalid data (either too many characters or the wrong type of characters) is entered, the 5250 SCS Printer Emulation session will print the error message: **** Invalid Data ****
5. Allow for sufficient vertical spacing when printing text data beneath the bar code.

For example, when the bar code command sting is entered on line 1 of the document with a bar code height specified as 5 (approximately 1/2 inch or 3 lines at 6 LPI), and text is then entered on line 2 as follows,

```
-B5,7,1,0,0,0,1234567890-B
```

This data overrun by barcode

This bar code will overwrite the text in the second line:



TO AVOID OVERLAPPING BAR CODES WITH TEXT, ALWAYS ALLOW FOR SUFFICIENT VERTICAL LINE SPACING (E.G. LINE FEEDS) TO ACCOMMODATE THE HEIGHT OF THE BAR CODE.

6. When text data is entered to the right of the bar code command sting, the printed text will appear immediately to the right of where the bar code print ends.
7. When using the UPC-A with Number System Character, the first data character must be the designator of the number system.

Overview and Examples

The following examples give an overview of the supported bar code types. Be aware the "maximum number of data characters" does not include start/stop characters and check digits.

Code 3 of 9

Maximum number of data characters: 30
 Valid numeric characters: 0-9
 Valid alphanumeric characters: A-Z
 Valid other characters: space \$ % + - . / *
 Example: -B1,4,1,1,1,1,0123456789-B



POSTNET

Maximum number of data characters: 30
 Valid numeric characters: 0-9
 Valid alphanumeric characters: N/A
 Valid other characters: N/A
 Example: -B4,1,1,1,1,0,0123456789-B



UPC A

Required number of data characters: 10 + number system character which is placed in the 1st position of the data character parameter
 Valid numeric characters: 0-9
 Valid alphanumeric characters: N/A
 Valid other characters: N/A
 Example: -B5,5,1,1,1,0,0123456789-B

**EAN 8**

Required number of data characters: 7
 Valid numeric characters: 0-9
 Valid alphanumeric characters: N/A
 Valid other characters: N/A
 Example: -B6,3,1,1,1,0,0123456-B

**EAN 13**

Required number of data characters: 12
 Valid numeric characters: 0-9
 Valid alphanumeric characters: N/A
 Valid other characters: N/A
 Example: -B7,3,1,1,1,0,012345678912-B

**Interleaved 2 of 5**

Maximum number of data characters: 30
 Valid numeric characters: 0-9
 Valid alphanumeric characters: N/A
 Valid other characters: N/A
 Example: -B3,3,1,1,1,0,0123456789-B



NOTE: SINCE INTERLEAVED 2 OF 5 SYMBOLS ARE CREATED FROM DATA CHARACTER PAIRS, THE NUMBER TO BE ENCODED MUST HAVE AN EVEN NUMBER OF DIGITS. IF AN ODD NUMBER OF DATA CHARACTERS (INCLUDING THE OPTIONAL CHECK DIGIT) IS ENTERED, THE 5250 SCS PRINTER EMULATION SESSION ADDS "0" TO THE BEGINNING OF THE BAR CODE. IF AN EVEN NUMBER OF DATA CHARACTERS (INCLUDING THE OPTIONAL CHECK DIGIT) IS ENTERED, THE 5250 SCS PRINTER EMULATION SESSION PRINTS THE BAR CODE EXACTLY AS INPUT.

Code 128

Maximum number of data characters: 30 (includes special characters)
 Valid characters: Differs with selected code set, see table on following pages
 Example: -B2,3,2,1,1,0,BABCDEFGHIJKLMNQRSTUWXYZ-B



Code 128 has three unique character subsets (code A, B, and C) shown in the following tables. When entering data representing Bar Code 128, follow these two steps:

1. Define the desired code set. For example, type "A" to represent code A; type "B" to represent Code B; and type "C" to represent code C.
2. If you are using code set B, enter the data characters directly. The ~ character and other special characters are represented by the Symbol Character Value found in the left column of the table on the following pages.

If you are using code set A or C, enter the Symbol Character Value found in the left column of the table. Each character is represented by two digits or a ~ followed by a digit. For example, to bar code the character "&" using Code Set A, type 06.

To show how multiple character sets are used, study the following data string. Height, width, and other parameters were omitted in this example to focus your attention on the data string. Please note that this example is for illustration purposes only and is not a recommended way of bar coding.

The following data string is a fairly complex way of bar coding 10PrintBoxes10 .

~B2,...,A1716~6PrintBoxes~510~B

The following is an explanation of the above data string:

- A: selects code set A
- 17: selects the number 1 from code set A
- 16: selects the number 0 from code set A
- ~6: switches from code set A to code set B
- PrintBoxes: selects the characters PrintBoxes from code set B
- ~5: switches from code set B to code set C
- 10: selects the number 10 from code set C

Symbol Character Value	Data Character		
	Code A	Code B	Code C
00	SP	SP	00
01	!	!	01
02	"	"	02
03	#	#	03
04	\$	\$	04
05	%	%	05
06	&	&	06
07	'	'	07
08	((08
09))	09
10	*	*	10

11	+	+	11
12	,	,	12
13	-	-	13
14	.	.	14
15	/	/	15
16	0	0	16
17	1	1	17
18	2	2	18
19	3	3	19
20	4	4	20
21	5	5	21
22	6	6	22
23	7	7	23
24	8	8	24
25	9	9	25

26	:	:	26
27	;	;	27
28	<	<	28
29	=	=	29
30	>	>	30
31	?	?	31
32	@	@	32
33	A	A	33
34	B	B	34
35	C	C	35
36	D	D	36
37	E	E	37
38	F	F	38
39	G	G	39
40	H	H	40
41	I	I	41
42	J	J	42
43	K	K	43
44	L	L	44
45	M	M	45
46	N	N	46
47	O	O	47
48	P	P	48
49	Q	Q	49
50	R	R	50
51	S	S	51
52	T	T	52
53	U	U	53
54	V	V	54
55	W	W	55
56	X	X	56
57	Y	Y	57
58	Z	Z	58
59	[[59
60	\	\	60
61]]	61
62	^	^	62
63	_	_	63

64	NUL	`	64
65	SOH	a	65
66	STX	b	66
67	ETX	c	67
68	EOT	d	8
69	ENQ	e	69
70	ACK	f	70
71	BEL	g	71
72	BS	h	72
73	HT	i	73
74	LF	j	74
75	VT	k	75
76	FF	l	76
77	CR	m	77
78	So	n	78
79	S	o	79
80	DLE	p	80
81	DC1	q	81
82	DC2	r	82
83	DC3	s	83
84	DC4	t	84
85	NAK	u	85
86	SYN	v	86
87	ETB	w	87
88	CAN	x	88
89	EM	y	89
90	SUB	z	90
91	ESC	{	91
92	FS		92
93	GS	}	93
~1	US	DEL	95
~2	FNC3	FNC3	96
~3	FNC2	FNC2	97
~4	SHIFT	SHIFT	98
~5	CODE C	CODE C	99
~6	CODE B	FNC4	CODE B
~7	FNC4	CODE A	CODE A
~8	FNC1	FNC1	

I-O Graphics Language™

I-O's Graphics Language™ (IOGL) allows user to enhance printed output from the IBM host with such graphics elements as pie charts, line charts, rotated text, circles, boxes, lines, etc. In order to use IOGL, the attached ASCII printer must be a PCL5 compatible laser or inkjet printer.

IOGL is independent of other I-O features. This means if an I-O font change command is followed by an IOGL command to rotate text, the text would print in the specified font. IOGL is also independent of regular text data allowing text data to be overlaid by a graphical element, such as a shaded box.

I-O Graphics Language Overview™

The following table lists the IOGL command strings.

Graphical Elements	IOGL Command String
Line	–GL<line width>;<x start>;<y start>;<x end><y end>
Box	–GB<line width>;<x start>;<y start>;<x end><y end>;<% shading>
Circles	–GC<line width>;<x center>;<y center>;<radius>;<% shading >
Arc	–GA<line width>;<x start>;<y start>;<x end>;<y end>;<angle of rotation>
Shading/Color	–GS<# of values>;<color 1>;<% shading 1>;<color 2>;<% shading 2>;...
Pie Chart	–GP<line width>;<x center>;<y center>;<radius>;<# of segments>;<segment value 1>;<segment value 2>;...
Bar Chart (Histogram)	–GH<line width>;<x start>;<y start>;<x increment>;<y increment >;<bar width>;<# of entries>;<value 1>;<value2>;...
Run (Line) Chart	–GR<line width>;<x start>;<y start>;<x increment>;<y increment>;<# of entries>;<value 1>;<value2>;...
Text Rotation	–GT<x start>;<y start>;<angle of rotation>;<'text'>
Comments	–GX<'text'>

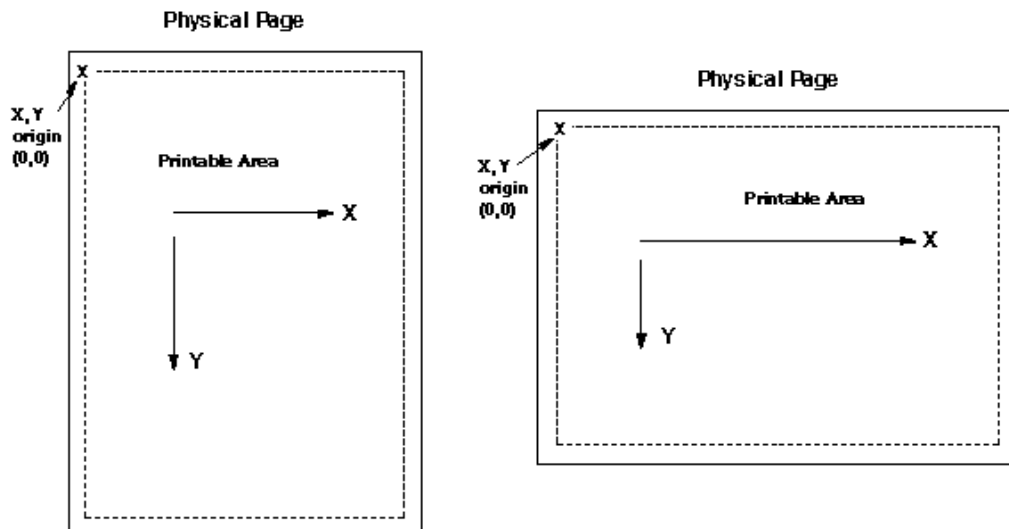
The following table lists the command parameters used in the IOGL strings.

Parameter	Description	Units of Measurement	Valid Values
'text'	text to be rotated or included in the IOGL program as a comment	N/A	any printable character
% shading	percentage of shading	percentage	0-100, integers
# of segments	number of segments printed in pie chart	each	1 to 9, integers
# of entries	number of values printed in bar or run (line) chart	each	1 to 12, integers
angle of rotation	angle of rotation of arc or text	degrees	arc: 0 to 360 integers text: 0, 90, 180, 270
bar width	width of a bar in a bar chart	n/300 inch	positive integers
color n	I-O color code to select color of pie or bar chart segments	I-O Color Command Numbers	00 to 16
line width	width of any printed line (in line, box, arc, circle, chart)	mm	any positive number
radius	radius of a circle or pie chart	n/300 inch	Positive integers
segment value n	value represented by a pie chart segment	integer	0 to 100
value n	value to be represented by a bar in a bar chart or a point in a line chart	any positive integer	any positive integer
x start	x coordinate start position for lines and boxes	n/300 inch	positive integers; incl. 0
x end	x coordinate end position for lines and boxes	n/300 inch	positive integers: incl. 0
x center	x coordinate center point of circle, arc, or pie chart	n/300 inch	positive integers: incl. 0
x increments	horizontal movement before next bar (bar chart) or value (run chart) is printed	n/300 inch	positive integers: incl. 0
y center	y coordinate center point of circle, arc, or pie chart	n/300 inch	positive integers: incl. 0
y start	y coordinate start position for lines and boxes	n/300 inch	positive integers: incl. 0
y end	y coordinate end position for lines and boxes	n/300 inch	positive integers: incl. 0
y increment	height of one unit of the value to be printed in bar or run (line) chart	n/300 inch	positive integers: incl. 0

Helpful Hints

- All xy values (start, end, center, increment) are measured in n/300 of an inch. The xy origin is the top left-hand corner of the printable area of the page (see Figure 1).

The printable area of the page may vary with the printer model and paper size being used. Refer to your printer's user's guide for specific information.



- The complete command string must be entered as shown below. Incomplete or invalid command strings will cause the 5250 SCS Printer Emulation session to print the string beginning with the invalid data .

For example, a line command string has been entered. However, an invalid <x start> value has been specified.

```
-GL30;A;1;1;600
```

IOGL would cause all characters, including the invalid value "A" to be printed:

```
A;1;1;600
```

- a comma "," or a forward slash "/" may be used as an alternative separator.
- Do not enter numeric values with commas (i.e. 50,000). The 5250 SCS Printer Emulation session will interpret the "," to be the end of the parameter (i.e. 50,000 would be interpreted as two values: value 1 = 50, value 2 = 000).

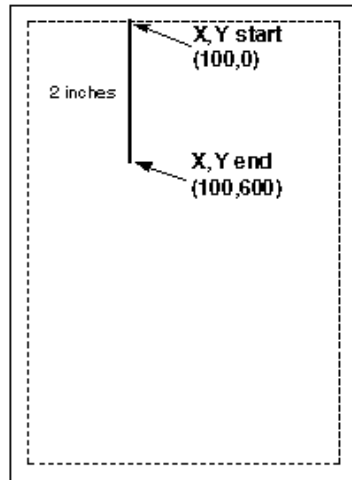
International users should also be aware decimal values used to specify line width (in mm) such as "1,5" (i.e. 1 1/2) will be interpreted as two separate values (i.e. value 1 = 1, value 2 = 5). To enter a valid decimal line width, use the period "." (i.e. 1.5 mm).

Basic Description

- Lines:** `-GL<line width>;<x start>;<y start>;<x end>;<y end>`

Draws a line from the specified xy start to xy end. <Line width> is specified in mm.

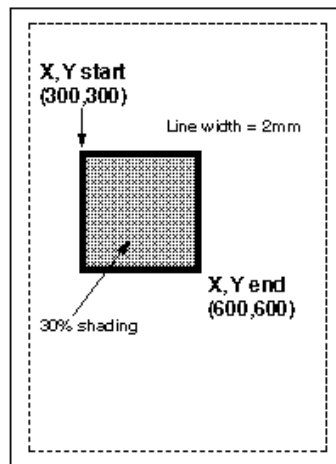
For example: `-GL2;100;0;100;600` draws a 2 mm wide, vertical (<x start> = <x end>) line of 2 inches in length (<y-end> - <y-start> = 600/300" = 2")



- **Boxes:** `-GB<line width>;<x start>;<y start>;<x end>;<y end>;<% shading>`

Draws a box from the specified xy start to the xy end. The box cannot be rotated. `<line width>` is specified in mm, `<% shading>` can range from 0 to 100.

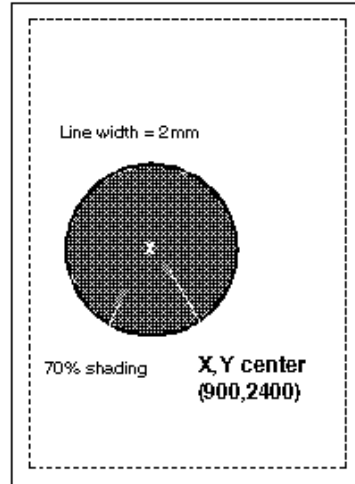
For example: `-GB2;300;300;600;600;30` draws a box with 2 mm wide border and 30% shading



- **Circle:** `-GC<line width>;<x center>;<y center>;<radius>;<% shading>`

Draws a circle with the specified radius (in $n/300$ inches) and line width (in mm) around the xy center.

For example: `-GC2;900;2400;300;70` draws a circle with a radius of 1 inch (300/300 inches)

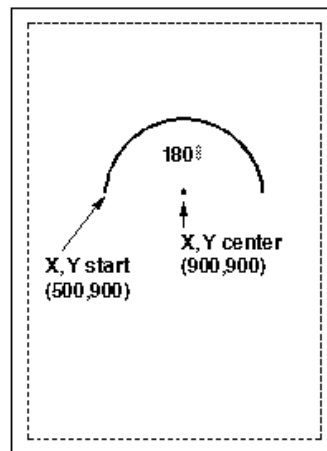


NOTE: TO AVOID CUTTING OFF PART OF THE CIRCLE, MAKE SURE THE RADIUS AND THE X,Y CENTER VALUES ALLOW THE COMPLETE CIRCLE TO FIT INTO THE PRINTABLE AREA OF THE PAGE.

- **Arc:** `-GA<line width>;<x start>;<y start>;<x center>;<y center>;<angle of rotation>`

Draws an arc around the xy center, starting at xy start and ending when the angle of rotation is completed. (Angle is measured from theoretical line xy center to xy start and rotates clockwise.)

For example: `-GA1;500;900;900;900;180` draws an arc (semi-circle since rotation is 180 degrees).



- **Color/Shading:** `-GS<# of values>;<color 1>;<% shading 1>;<color 2>;<% shading 2>;. . .`

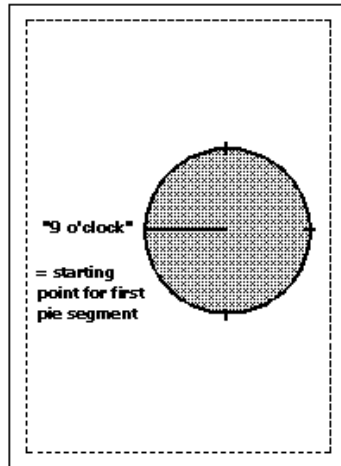
Defines the color and shading of the pie chart and bar chart segments. The first value entered in the pie and bar chart commands will be printed in color 1 with shading 1. The second value entered in the pie and bar chart commands will be printed in color 2 with shading 2.

Colors are entered as numeric values 0-16 (corresponding to I-O color command scheme). Shading is entered as a numeric value from 0-100 (% of shading). If the attached printer is not capable of recognizing PCL color commands, all printing will be black. Refer to pie and bar charts for an example.

- **Pie Chart:** `-GP<line width>; <x center>;<y center>;<radius>;<# of segments>;<segment value 1>;<segment value 2>;...`

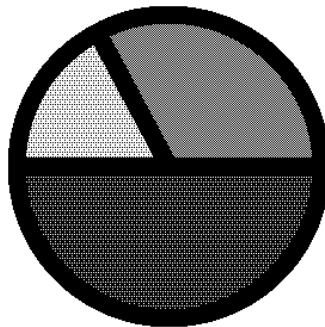
Draws a pie chart around the xy center with the specified radius (in n/300 inches), number of segments (maximum of 9), and segment values. Segment values are entered as numeric and converted to percentages. Segment values can range from 0 to 100.

Each segment will have the color and/or shading as specified in the shading command (pie chart value 1 will get color/shading value 1,...). `<line width>` is specified in mm. The first pie segment starts at "9 o'clock", meaning on the far left of the circle



For example: `-GS3;01;20;02;50;04;80 -GP5;900;2400;600;3;10;20;30` draws a three-segment pie chart. If the attached printer is a PCL color printer, the first segment will be blue (01), the second segment will be red (02), and the third segment will be green (04). The segments will be shaded at 20%, 50%, and 80% respectively.

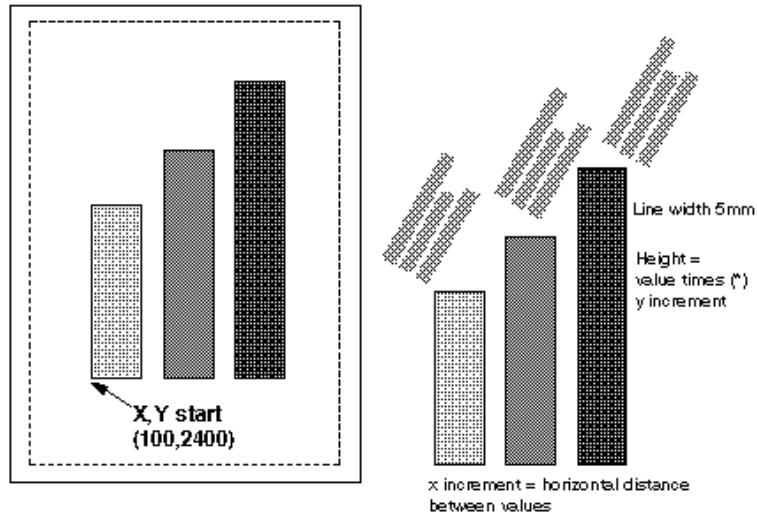
The first segment (value 10) will be 1/6 of the complete circle ($10/(10+20+30)=10/60=1/6$), the second segment (value 20) will be 2/6 of the complete circle ($20/60$), and the third segment will be 3/6 of the complete circle



- **Bar Chart (Histogram):** `-GH<line width>;<x start>;<y start>;<x increment>;<y increment>;<bar width>;<# of entries>; <value 1>;<value 2>; ...`

Draws a bar chart. xy start specifies the bottom left hand corner of the first bar (the origin on the chart's xy-scale). The x increment specifies the horizontal movement before the next bar is printed. The y increment (in n/300 inches) determines the height of the bar (multiplied by the value). The bar width (in n/300 inches) specifies the width of the bar. Bar chart values can range from 0 to 3,000. Each bar will have the color and/or shading as specified in the shading command (bar 1 is color/shading value 1,...). A maximum of 12 bars can be printed.

For example: `-GS3;01;20;02;50;04;80` and `-GH1;100;2400;300;1;100;3;500;600;800` draws three bars. If the attached printer is a PCL color printer, the first bar will be blue, the second red, and the third green. The bars will be shaded 20%, 50%, and 80% respectively



Each bar is 1/3-inch-wide (100/300 inch). The distance from the left side of one bar to the left side of the next bar is one inch (300/300). This allows other bars to be added through a separate command.

Bar 1 will be 1 2/3 inches (500 x 1/300 inch) high, bar 2 will be two inches high (600 x 1/300 inch), and bar 3 will be 2 2/3 inches high (800 x 1/300 inch).

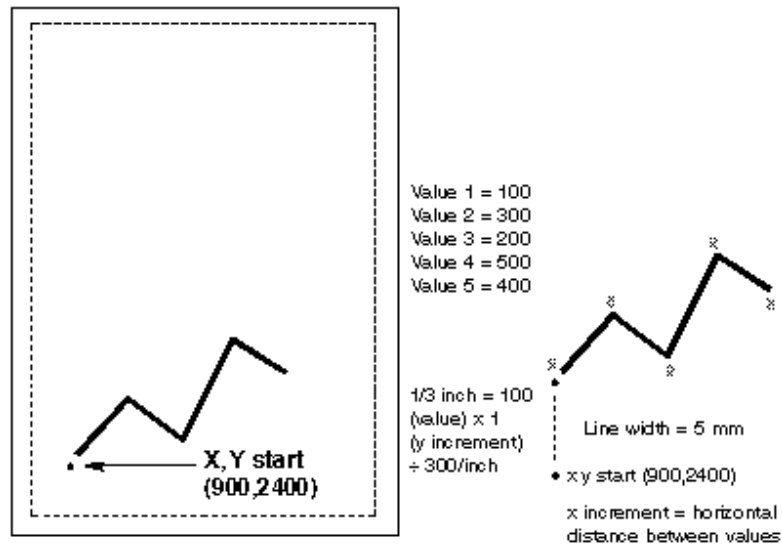


NOTE: THE Y-INCREMENT DETERMINES THE SCALING. ONLY INTEGERS (I.E. 1, 2, 3, 4, ETC.) ARE VALID. IF YOU ARE CHARTING SALES FIGURES IN THOUSANDS OF DOLLARS, THE Y-INCREMENT SHOULD BE SMALL (FOR EXAMPLE, 1). IF YOU ARE CHARTING THE NUMBER OF CUSTOMER COMPLAINTS PER PERIOD THE Y-INCREMENT SHOULD BE HIGH (FOR EXAMPLE, 100 OR MORE). BE AWARE THAT THE BAR HEIGHT MUST NOT EXCEED THE TOTAL PRINTABLE AREA OF THE PAGE.

- **Run Chart:** `-GR<line width>;<x start>;<y start>;<x increment>;<y increment>;<# of entries>;<value 1>;<value 2>; ...`

Draws a run (line) chart. The xy start specifies the origin of the chart's xy scale (xy axes are not drawn). The x increment specifies the horizontal movement before the next value is printed. The y increment determines the height of the line (multiplied by the value).

For example: -GR3;900;2400;150;1;5;100;300;200;500;400 draws a run (line) chart

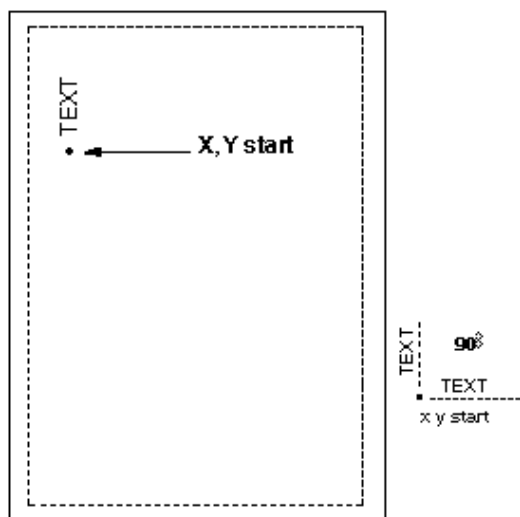


NOTE: THE Y-INCREMENT DETERMINES THE SCALING. ONLY INTEGERS (I.E. 1, 2, 3, 4, ETC.) ARE VALID. IF YOU ARE CHARTING SALES FIGURES IN THOUSANDS OF DOLLARS, THE Y-INCREMENT SHOULD BE SMALL (FOR EXAMPLE, 1). IF YOU ARE CHARTING THE NUMBER OF CUSTOMER COMPLAINTS PER PERIOD THE Y-INCREMENT SHOULD BE HIGH (FOR EXAMPLE, 100 OR MORE).

- **Text:** -GT<x start>;<y start>;<angle of rotation>;<'text'>

Prints the text ('text') in the active font, with the specified rotation and specified xy start. Text will be rotated counterclockwise.

For example: -GT1000;1000;90;'TEXT' prints the word "TEXT" in the active font with 90-degree rotation.



- **Comments:** -GX<'text'>

Allows text to be added to IOGL commands for documentation. Comments will not print out.

For example: `-GX'Pie chart with 3 elements'` can be used to document an IOGL pie chart command.

I-O Graphic Language™ (IOGL) in Action

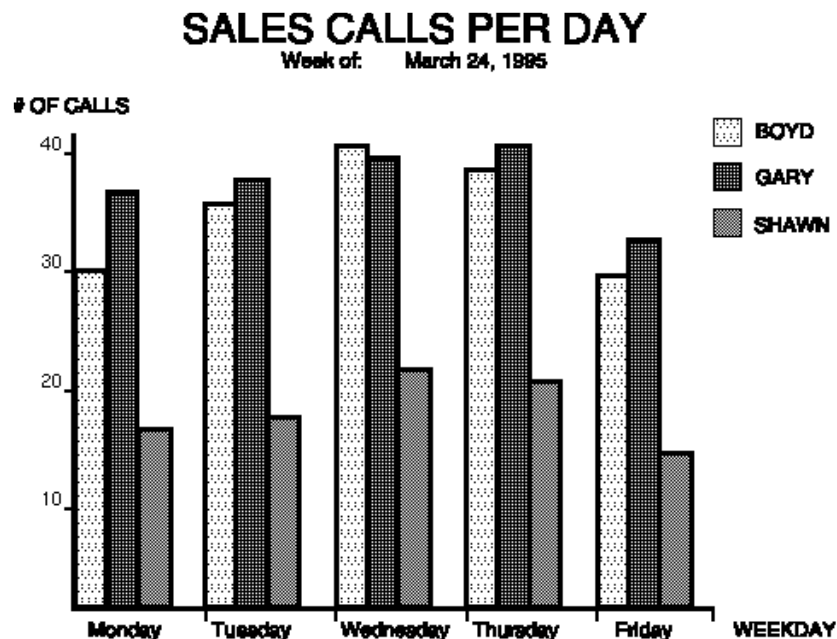
General Steps

I-O Graphics Language™ (IOGL) can be used in many different ways, enhancing the appearance of standard host reports through a few simple graphical elements such as lines, boxes, and circles; or to present pertinent data through charts. IOGL can even be used to create sophisticated electronic forms. However, to utilize IOGL all applications have the following in common:

1. Determine which IOGL elements are needed to create the desired output (i.e. the bar chart shown below uses four different IOGL elements).
2. Determine the printable area of the page.
3. Determine the positioning of the graphical elements relative to the top left-hand corner of the printable area.
4. PCL color printer only. Determine the print order of the graphical elements. The lines of the last IOGL element will overlap (and cover) the previous IOGL elements.
5. Design the graphical output, one element at a time.
6. Link the graphical output with your host application.

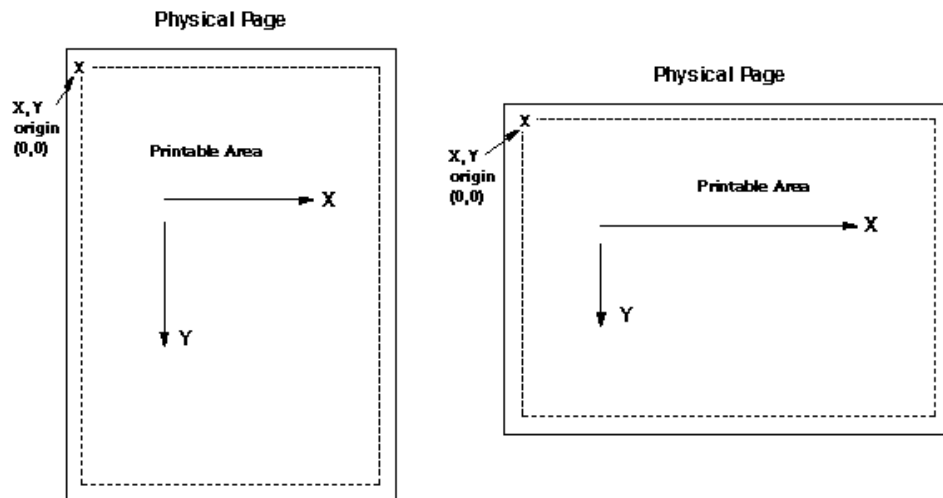
Tutorial

The following example shows how multiple IOGL elements interact to create a bar chart.

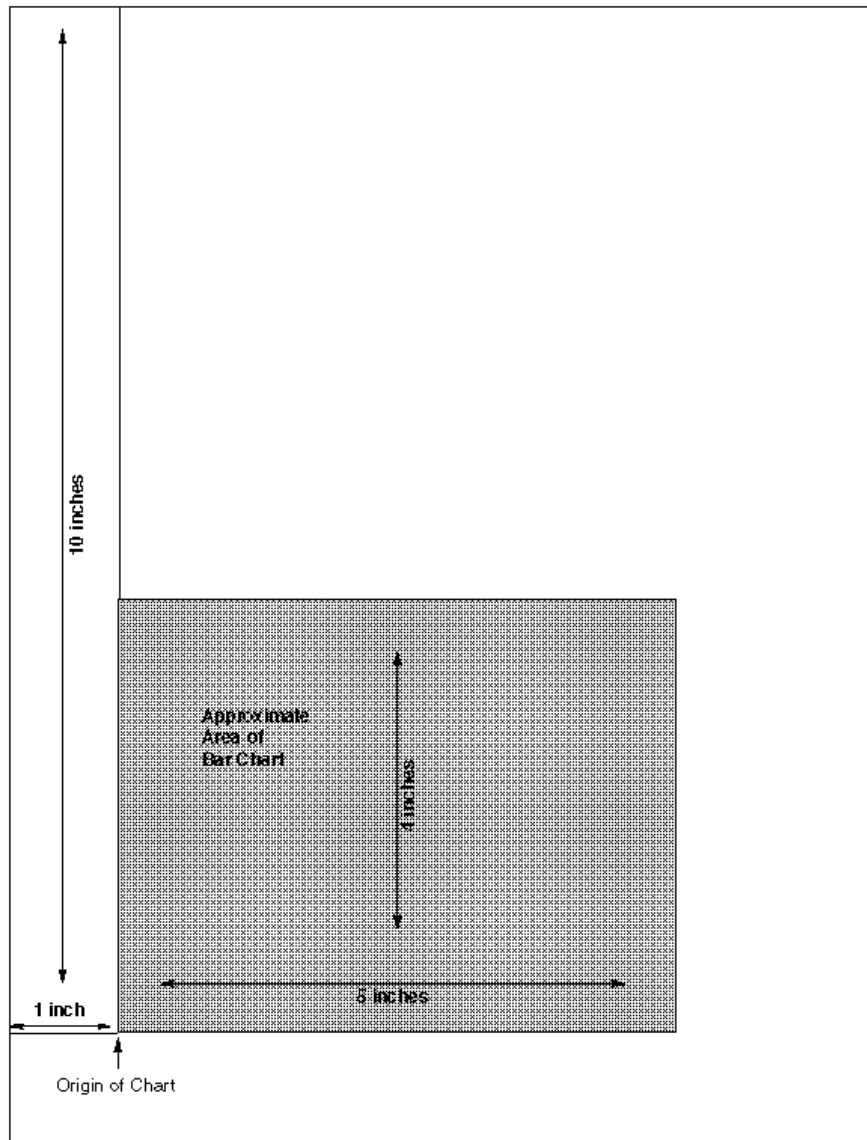


1. Following the above-mentioned general steps, we first determined the makeup of this bar chart. The example consists of four IOGL elements: bar charts, lines, boxes, and text.
2. To determine the printable area of the paper, we printed a box using 0;0 as the x,y -start coordinates. This was done by typing `-GB1;0;0;300;300;50` on the screen and sending it to the printer. The top left corner of the printed box marks the top left corner of the printable area of the

page. For reference, we drew the printable area on the blank sheet of paper. All references to distances are made in respect to the printable page, not the actual physical page.



3. Determine where the chart should be placed (always in relation to the top left-hand corner of the printable area). In the example, the bar chart is on the bottom half of a letter size page. The origin of the chart is one inch away from the left margin and 10 inches away from the top margin



Next, determine the approximate maximum height and width of the chart. In the example, 40 was the expected maximum number of calls. We chose to represent 10 calls by one inch, resulting in a total maximum height of four inches (not including the title and subtitle.) Similarly, each day was represented by one inch, resulting in a total maximum width of five inches (not including the space needed for the label "WEEKDAY").

4. If the chart is being printed on a black and white PCL printer, there is no significance to graphical element creation order. However, if you are printing on a PCL color printer, the lines of the last element will always overlay (and cover) the element previously printed. In the example, the elements creating the x and y-axes should be entered last when printing on a PCL color printer.
5. Create the separate IOGL elements based on the order determined in Step 4. In the example, the bar charts were created first. Recall the IOGL formula for the bar chart and the preceding shading/color command string:

```
-GS<# of values>;<color 1>;<% shading 1>;<color 2>;<% shading 2>;...
```

```
-GH<line width>;<x start>;<y start>;<x increment>;<y increment>;<bar width>;<# of entries>;<value 1>;<value 2>; ...
```

The bar chart was created using the following parameters: Where is the chart ?

- **Bar Chart for Boyd**

Shading/Color: Boyd's calls were plotted for each day of the business week, so the number of values is five. Since we printed to a black and white laser printer, the color parameters were irrelevant. The shading was set to 10%.

Bar Chart (Histogram): The line width was set to 1 mm. The x;y-start parameters defined the bottom left corner of the bar which is identical with the origin of the chart. Remember the origin was one inch from the left margin, and 10 inches from the top margin of the printable area. The resulting values were 300 (=1 inch x 300/inch) for <x start> and 3000 (= 10 inches x 300/inch) for <y start.>.

The bar representing Boyd's calls for Tuesday was to be printed one inch to the right of Monday's bar. The resulting <x increment> was 300 (= 1 inch x 300/inch). Since the maximum height of a bar was specified at four inches, the resulting value for <y increment> was 30 (= 4 inches/40 max. calls x 300/inch).

To aid in readability, extra space was left between the last bar of day one and the first bar of the next day. To determine the <bar width> divide the available one inch (<x increment>) into four equal sections (three bars and one space). The resulting value was 75 (= 300/4). Next, count the <# of entries> (5) and enter the respective values. The parameters are:

```
-GX'bar chart Boyd
-GS5;01;10;01;10;01;10;01;10;01;10
-GH1;300;3000;300;30;75;5;30;34;39;37;28
```

- **Bar Chart for Gary**

The bars representing Gary's calls were to be printed directly to the right of Boyd's. The resulting horizontal start value <x start> was:

$$\begin{array}{r} 300 \quad (\text{Boyd's}) \\ + 75 \quad (\text{Bar width}) \\ \hline 375 \end{array}$$

With the exception of the actual calls, the other parameters for Gary's bar chart were identical to Boyd's. The parameters are:

```
-GX'bar chart Gary
-GS5;02;75;02;75;02;75;02;75;02;75
-GH1;375;3000;300;30;75;5;35;36;38;39;31
```

- **Bar Chart for Shawn**

Shawn's bar chart was to be printed directly to the right of Gary's. The resulting horizontal starting position <x start> was:

$$\begin{array}{r} 375 \quad (\text{Gary's}) \\ + 75 \quad (\text{Bar width}) \\ \hline 450 \end{array}$$

The parameters are:

```
-GX'bar chart Shawn
-GS5;04;50;04;50;04;50;04;50;04;50
```

X and Y Axes

The x-axis (Weekday) and the y-axis (# of calls), along with the increments, were created through a series of separate lines. Notice the line width of the axis is the same as the line width of the bars.

The parameters are shown below:

```
-GX'X-Axis with increments'
-GL1;300;3000;1850;3000
-GL.5;600;3000;600;3019
-GL.5;900;3000;900;3019
-GL.5;1200;3000;1200;3019
-GL.5;1500;3000;1500;3019
-GL.5;1800;3000;1800;3019
-GC'Y-Axis with increments'
-GL1;300;3000;300;1750
-GL.5;281;2700;300;2700
-GL.5;281;2400;300;2400
-GL.5;281;2100;300;2100
-GL.5;281;1800;300;1800
```

Labels/Title/Subtitle/Legend

All text was created through text rotation command strings. Text was always printed in the selected font. In the example, Universe Medium was used in different point sizes (-Q...). The legend consists of three separate boxes followed by text rotation commands.

The parameters are shown below:

```
-GX'Font Change Command' -Q4808
-GX'Labels X-Axis'
-GT300;3100;0;'Monday'
-GT600;3100;0;'Tuesday'
-GT900;3100;0;'Wednesday'
-GT1200;3100;0;'Thursday'
-GT1500;3100;0;'Friday'
-GT1800;3100;0;'WEEKDAY'

-GX'Labels Y-Axis' -GT200;2700;0;'10'
-GT200;2400;0;'20'
-GT200;2100;0;'30'
-GT200;1800;0;'40'

-GX'Legend (boxes with text)' -GT200;1650;0;'# OF CALLS'
-GB1;1700;1650;1750;1700;10
-GT1760;1700;0;' = BOYD'
```

```

-GB1;1700;1750;1750;1800;75
-GT1760;1800;0;' = GARY'
-GB1;1700;1850;1750;1900;50
-GT1760;1900;0;' = SHAWN'

-GX;Font Change Command' -Q4813
-GX'Title'
-GT500;1500;0;'SALES CALLS PER DAY'

-GX'Font Change Command' -Q4808
-GX'Subtitle'
-GT600;1550;0;'Week of:'
-GT900;1550;0;'March 24, 1995'

```

Linking Graphical Output to a Host Application

There are several ways to link the graphical output to a host application. One method is to simply add the IOGL commands to the application code. This means whenever the application is used and sent to the printer, the IOGL commands are also sent.

Another method is to design a separate subroutine that sends the IOGL output to the printer as a macro. The IOGL macro will only be sent to the printer once and resides in the printer's active memory until the printer is powered down. The application code deletes the extra space requires only a macro call and does not require the complete graphic to be downloaded when a report is printed.

To store the IOGL output as a printer macro, begin the IOGL routine with a PCL command that begins a macro by typing: `-E&f#y0X`

Substitute the # symbol with a number that identifies the macro. Make sure this command precedes all IOGL commands. Also, be aware that PCL is case sensitive.

At the end of the IOGL routine, stop the macro and save it permanently (until the printer is powered down) in the printer's memory. To end the macro type: `-E&f#y1X`

To save the macro permanently (until the printer is powered down) type:

```
-E&f#y10X. Store this macro in the printer's memory by "printing it."
```

A call for this macro can be used in your application by embedding the following PCL command in the application code:

```
-E&f#y3X
```

Another command used to prevent overloading the printer's memory is `-E&f#y8X`. This command deletes the macro ID # currently residing in the printer's memory.

Printing Images From The Host

Company logos, signatures and other images can be stored on printer cartridges, SIMMs, DIMMs or CompactFlash. These products are offered through the printer manufacturer and/or various third-party vendors. The stored image is assigned a macro ID number that must be called up by the application when the image is to be printed. Please refer to the documentation supplied with the cartridge, SIMM, DIMM or CompactFlash for instructions on how to store an image.

Generally, a macro stored in non-volatile memory is called up by sending the command `-E&f#y3X` where # is the macro ID.

A PCL command used to reposition the stored image on a page is `-E&l#u#Z` where the first # (l#u) specifies the "Left Offset Registration" or horizontal movement in n/720 inch and the second # (#Z) specifies the "Top Offset Registration" or vertical movement of the image in n/720 inch.

The repositioning command must precede the macro call. To return to the original position, type `-E&l0u0Z` immediately after the macro call.

Color Printing

The I-O 5250 SCS Print Emulation session allows printing of color on PCL5C - compatible printers such as the HP Color LaserJet, DeskJet 1200C, or 1600C printer. Simply insert the I-O color command in front of the text you want to colorize. Return to the "normal" black color by inserting `-C00`. The I-O color commands are:

<code>-C00</code> - Black	<code>-C09</code> - Dark Blue
<code>-C01</code> - Blue	<code>-C10</code> - Orange
<code>-C02</code> - Red	<code>-C11</code> - Purple
<code>-C03</code> - Magenta	<code>-C12</code> - Dark Green
<code>-C04</code> - Green	<code>-C13</code> - Dark Turquoise
<code>-C05</code> - Turquoise/Cyan	<code>-C14</code> - Mustard
<code>-C06</code> - Yellow	<code>-C15</code> - Grey
<code>-C07</code> - White	<code>-C16</code> - Brown
<code>-C08</code> - Black	

For example, to print the word "red" in the color red in the following sentence, type:

This prints `-C02red-C00` in red.

Alternately, you can select a color through the **Typestyle/color** menu of Office Version/400 (V3R1 or later). This menu is accessed by selecting F20 (Format Options), 1 (Document Options), 1 (Document Format), and finally 3 (Typestyle/color).

You can also create one or more additional colors using the User-Defined String feature.

To print a customized color, you need to follow these steps:

1. Set up a color palette.
2. Define the color.
3. Print the color.

For detailed information on this process, consult HP's PCL5 Color Technical Reference Manual. Here is a quick overview on how to define and print colors using I-O's User-Defined Command String feature.

1. To set up a color palette, send the following string to the printer (using the Host/PC download command 04).

```
&%Z04,0(1B 2A 76 36 57 00 00 08 08 08)
```



NOTE: THE `&%Z04,0(..)` STORES THE ACTUAL COMMAND STRING (1B 2A ..) IN THE 5250 SCS PRINTER EMULATION SESSION AND ASSIGNS IT THE MACRO IDENTIFIER U0.

2. To define and print a color send the following string to the printer:

```
&%Z04,1(1B 2A 76 30 61 30 62 30 63 31 69 31 53)
```



NOTE: THE FIRST 30 (PRECEDING THE VALUE 61) IDENTIFIES THE INTENSITY OF RED OF THE COLOR. VALUES CAN RANGE FROM 0 (HEX 30) TO 255 (HEX 32 35 35).

The second 30 (preceding the value 62) identifies the amount of green. The third 30 (preceding the value 63) identifies the amount of blue you are adding to the color. Mixing these three colors (red, blue, and green) creates the color of your choice. The number 31 (preceding the value 69) assigns your customized color the value 1. The second 31 (preceding the value 52) calls up this number again and prints it.

3. Once you have sorted the color command strings in memory as described above, you can switch to the defined color any time by simply inserting the commands `&%U0` (to set up the color palette) and `&%U1` (to print the color) in the data stream.

For example:

1. To define the color red and store the customized "red" command in the 5250 SCS Printer Emulation session under the macro name U3 type the following:

```
&%Z04,0(1B 2A 76 36 57 00 00 08 08 08)
```

This string sets up the color palette.

```
&%Z04,3(1B 2A 76 32 35 35 61 30 62 30 63 31 69 31 53)
```

This command defines and prints the color red. Notice that the defined color consists of red (255) only. Green and blue components have been given the value 0 (hex 30).

2. To print the word "red" in this sentence red, type:
3. To print the word `&%U0 &%U3"red"-C08` in this sentence red, type:



NOTE: THE `-C08` IN THE ABOVE EXAMPLE RETURNS THE PRINT COLOR BACK TO BLACK.

3270 SCS Setup

I-O's 3270 SCS Printer Emulation enables the I-O product to print IBM mainframe host print jobs.

Configuration for 3270 SCS printing requires involves the following steps:

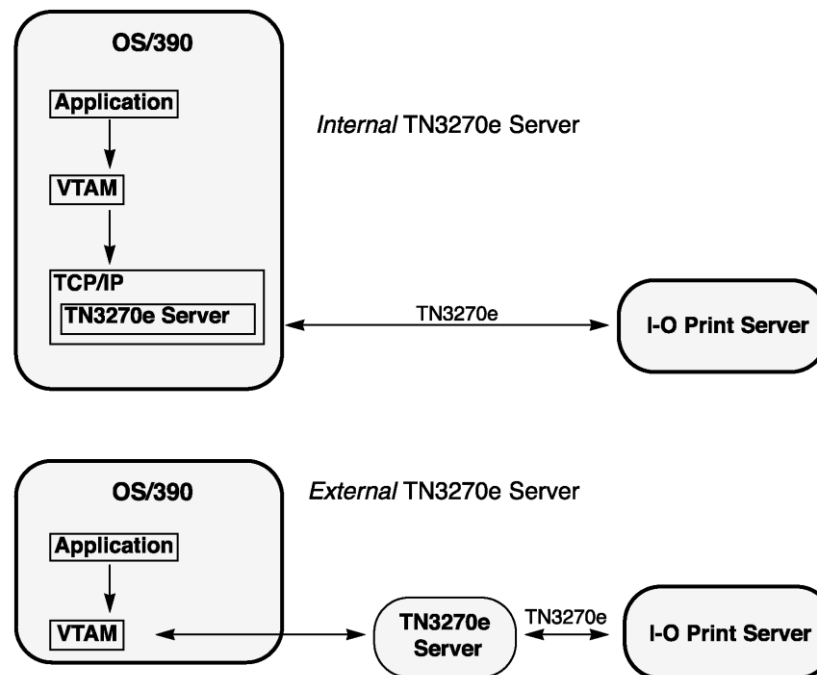
- Setup the IBM mainframe and its associated Telnet 3270 server
- Setup the I-O 3270 SCS Printer Emulation session on the I-O product
- Customization, as needed, of the 3270 SCS Printer Emulation session at the LaserJet to adjust the final printing output.

Instructions for the first two steps are found in this chapter. Customization instructions are found in the *3270 SCS Printer Customization* chapter.

zSeries / S390 Mainframe Host Setup

I-O's 3270 SCS Printer Emulation communicates to the IBM mainframe via TCP/IP using the TN3270e protocol. TN3270e is an extension of the Telnet display protocol. IBM allows only a 3287 printer type to be configured.

Connection to the IBM mainframe is accomplished through a TN3270e server. The TN3270e server can be either internal to the IBM mainframe or externally attached, such as a channel or LAN-attached gateway. The 3270 SCS Printer Emulation session then accepts SCS or DSC (LU1 or LU3) data from the IBM mainframe application through TCP/IP. Printer messages are returned through the same TN3270e link.



In general, configuring the IBM mainframe to print to an I-O product is the same as configuring a new TN3270e printer. The VTAM TCP/IP profiles are modified to indicate the Telnet device, the printer group name, the IP address group, and the printer map. JES is then modified to include the I-O product's destination id and description. Lastly the mainframes print application, such as JES23X or VPS, is configured for the remote printer.

Please refer to your IBM mainframe system administrator or other IT specialists for configuring the mainframe and Telnet server. Refer to the appropriate IBM mainframe and TN3270e server documentation for configuration instructions, such as *OS/390 Communication Server - IP Configuration Guide # SC31-8725-001*.

While configuring the printer device on the 3270 host, set the CKPTPAGE value to a value of "10" or lower. This configuration option controls how many pages are transmitted from the host to the 3270 SCS Printer Emulation session before the host sends the actual print instruction. If the value is too large, loss of data could occur.

Once the mainframe and Telnet server are configured, the I-O 3270 SCS Printer Emulation session must be configured in the I-O product.

I-O Product Setup

I-O's SCS Printer Emulation runs on a number of different print server, display and thin client products from I-O Corporation. Please refer to the user's guide for the specific product for instructions on installation and setup of the product.

After printer sessions have been configured, the I-O product will connect to the IBM host and a new printer session will automatically be created on the IBM host. If the connection status page function is enabled, a page will print showing the status of the connection between the I-O SCS Printer Emulation session and the host. If the connection status indicates a good connection has been made, the printer session is ready to receive IBM host print jobs.



TIP: AFTER THE CONNECTION STATUS MESSAGE PAGE INDICATES A GOOD CONNECTION HAS BEEN MADE, DISABLE THE PRINTING OF THE CONNECTION STATUS MESSAGE PAGE.

If there is a need to customize the way the print jobs are being handled by the I-O 3270 SCS Printer Emulation, refer to the ***3270 SCS Printer Customization*** chapter.

3270 SCS Printer Customization

This chapter describes how to customize the I-O 3270 SCS Printer Emulation.

I-O's 3270 SCS Printer Emulation can be configured to change the way IBM host print jobs are actually printed. Options include the ability to set the final print quality (draft or near-letter quality), the characters per inch used, etc.

Customization Methods

Customization can be done in a number of different ways depending upon the I-O product:

- Using one of I-O's management or configuration utilities for the software print servers and external network attached print servers.
- Using the HP LaserJet's Web page or front panel for internal DIMM, CompactFlash or USB products.
- Using I-O's robust and feature-rich Host Download Commands, available on all I-O products.

Please refer to the user's guide for the appropriate I-O product for product specific instructions used to customize the 5250 SCS printing.

Host Download Commands

Host Download commands are sent from the IBM 3270 mainframe to the 3270 SCS Printer Emulation session as part of a print job. All configuration parameters pertaining to the 3270 SCS Printer Emulation session can be modified using Host Download commands. For a description of the Host Download commands see *3270 SCS Configuration Options*. Host Download commands are placed in a Host document or on the screen. The document or screen print is then sent to the printer. As part of the 3270 data stream processing, the I-O 3270 SCS Printer Emulation monitors the data stream and filters out Host Download commands. These commands will not print but will be used to configure the I-O 3270 SCS Printer Emulation session.

Host Download commands sent to the I-O 3270 SCS Printer Emulation session take effect immediately and stay only in the printer's temporary or active memory. To save the changed configuration beyond a power off, Host Download command `&%Z99,0` must be sent last.

Take the following steps to enter a host download command.

1. Type the Command Pass-Thru (CPT) delimiter `&%` (or the alternate CPT start delimiter) in the document or on the screen at the point where the command is to take effect.
2. Type an upper-case **Z**.
3. Type the **command number** for the command to be used, as shown in the table below. Always use two digits for the command number (i.e. `&%Z05,1`).
4. Type a **comma**.
5. Type the **value** representing the desired selection. No spaces are allowed. A space or invalid character in a command causes the I-O product to ignore the command and resume printing from the point the error occurred.
6. A space or control character (i.e. NL, FF, CR, LF) signals the end of the Host Download command.
7. Multiple commands can be chained together by using a slash (/) or backslash (\) to separate the commands (no spaces are allowed).

For example, to set the characters per inch, line spacing, and form length (commands 3, 4, and 5) in one command string, place `&%Z3,15/Z4,2/Z5,70` followed by a space, in the document. This selects 15 CPI, double spacing, and 70 lines.

Commands take effect immediately unless noted otherwise. Any errors cause the 3270 SCS Print Emulation session to ignore the command and continue printing. For a command to be stored in permanent memory, the command Z99,0 must be the last command sent to the printer.

3270 SCS Printer Configuration Options

The following table shows a complete listing of configuration options in alphabetical order as well as their associated Host Download Command Number. The detailed explanation of each configuration parameter follows the table.



NOTE: NOT ALL HOST DOWNLOAD COMMANDS ARE AVAILABLE IN EVERY I-O PRODUCT. REFER TO THE I-O PRODUCT USER'S GUIDE FOR A LISTING OF SUPPORTED HOST DOWNLOAD COMMANDS.

<i>Configuration Parameter</i>	<i>Command Number</i>
6 LPI String	84
8 LPI String	85
10 CPI String	86
15 CPI String	87
12 CPI String	88
17 CPI String	89
Alternate Paper Tray Orientation	63
Auto Print Tray Orientation	61
Automatic Function at End of Job	20
Character Set Selection	65
Characters Per Inch	03
Command ID Character	41
CPT Ending Delimiter Characters	39
CPT Start Delimiter Characters	40
CR at MPP+1	15
Custom User Strings	55
FF after Timeout	27
FF Valid Location	19
FF after Local Screen Copy	13
FF before Local Screen Copy	12
FF Usage	25
Form Length	05
Intervention Required Timeout	34
Line Spacing	04
Lines Per Inch	02
LU1 Language	08
LU3 Print Image (Non-SCS Mode)	14
Manual Paper Tray Orientation	64
Maximum Print Position	06
NL at MPP+1	16

Override Formatting Commands	30
Overwrite DSC (LU3) Translation Table	71
Overwrite EBCDIC (SCS/LU1) Translation Table	70
Paper Path	11
Paper Size	32
Primary Paper Tray Orientation	62
Print Case	07
Restore Defaults or Configuration	98
SCS TRN Translate	45
Start / Stop ASCII Hex Dump	42
Start / Stop EBCDIC Hex Dump	43
Store Configuration in Permanent Memory	99
Suppress Empty Forms	26
Suppress IBM Control Codes	36
True LPI Spacing	38
Truncate/Wrap Select	31
Valid FF at End of Print Buffer	18
Valid FF followed by Data	17
Vertical Channel Select (VCS)	37



NOTE: IN THE DESCRIPTION OF EACH HOST DOWNLOAD COMMAND, ASTERISKS (*) IDENTIFY FACTORY DEFAULT SETTINGS.

Command 2: Lines Per Inch

Selects default LPI. The IBM host will control the LPI unless Command 36 is used to override the host LPI commands.

<i>Value</i>	<i>Description</i>
3	3 LPI
4	4 LPI
*6	6 LPI
8	8 LPI

Example: &%Z2,8
 Sets the printer to 8 LPI default

Command 3: Characters Per Inch

Selects default CPI. The IBM host will control CPI unless Command 36 is used to select override of host CPI commands.

<i>Value</i>	<i>Description</i>
0	No default sent to printer
*10	10 CPI
12	12 CPI
15	15 CPI
16	16.7 CPI

Example &%Z3,15
Selects 15 CPI as the default Character per inch value.

Command 4: Line Spacing

Selects default Line Spacing

<i>Value</i>	<i>Description</i>
*1	Single Space
2	Double Space

Example: &%Z4,2
Selects double space as the default line spacing.

Command 5: Form Length

Selects default Form Length (MPL = Maximum Print Lines). With Command 25 set to 0 and Command 5 set to 000 the printers front panel selection will control form length.

<i>Value</i>	<i>Description</i>
000	No form length control
001	Set form length in number of lines up to 255
*066	Factory Default

Example: &%Z5,70
Sets form length to 70 lines for A4 paper

Command 6: Maximum Print Position

Selects the maximum number of characters that can be printed on each line.

<i>Value</i>	<i>Description</i>
000	Infinite line length
001	Set MPP of characters

to
255
*80 Factory Default

Example: &%Z6,63
Sets MPP to 63 characters



NOTES: NORMAL VALUES ARE 80, 132, OR 198 CHARACTERS. THIS DEFAULT EMULATES THE FRONT PANEL SELECTION ON AN HP PRINTER.

MPP AND THE CURRENT POSITION WILL NOT BE ALTERED BY CHANGES IN CPI.

THE INFINITE LINE LENGTH WILL PLACE NO LIMITS ON THE NUMBER OF CHARACTERS THAT CAN BE SENT TO THE PRINTER ON A SINGLE LINE.

Command 7: Print Case

Selects default print case. This default only affects LU3 printing.

<i>Value</i>	<i>Description</i>
0	Mono case
*1	Dual case

Example: &%Z7,0
Sets default to mono case

Command 8: LU1 Language

Selects default LU1 language.

<i>Value</i>	<i>Description</i>
*01	English (U.S.) EBCDIC
03	Austrian/German
04	Belgian
05	Brazilian
06	Canadian (French)
07	Danish/Norwegian
08	Danish/Norwegian (alt.)
09	Finnish/Swedish
10	Finnish/Swedish (alt.)
11	French
12	French – Alternate (same as 11)
13	Austrian/German (alt.)
14	International Set 5
15	Italian

16	Japanese (English)
19	Spanish
20	Spanish (alt.)
21	Spanish Speaking
22	English (U.K.)
23	Norwegian (same as 07)
24	Swedish (same as 09)
25	EBCDIC – Alternate (same as 01)
26	Norwegian - Alternate (same as 08)
27	Swedish - Alternate (same as 10)
28	Portuguese
29	Canadian Bilingual (same as 06)
30	French 105-character AZERTY (same as 11)
31	Swiss German (same as 14)
32	Swiss French (same as 14)

Example: &%Z8,04
Sets LU1 language to Belgian



NOTE: THIS COMMAND, ALONG WITH COMMAND Z99,0, CHANGES THE DEFAULT LU1 LANGUAGE SELECTION IN THE PERMANENT MEMORY OF THE INTERFACE. THE COMMAND VALUE SHOULD MATCH THE LANGUAGE NUMBER USED IN IBM CU CONFIGURATION SEQUENCE NUMBER 121.

Command 11: Paper Path

Selects default paper path for the Page Presentation Media (PPM) command.

<i>Value</i>	<i>Description</i>
0	Ignore the host PPM command and select the paper tray through the printer's front panel
*2	Cut sheet feeding from primary bin is default
3	Cut sheet feeding from alternate bin 1 is default
4	Envelope feeder default
5	Manual sheet feed default
6	Manual envelope feed default
9	Cut sheet feeding from alternate bin 2 is default

Example: &%Z11,5
Selects manual sheet feed as the default source of paper



NOTES: THIS COMMAND DEFINES THE DEFAULT PAPER SOURCE FOR THE PAGE PRESENTATION MEDIA (PPM) COMMAND IN SCS MODE. IF THE PPM COMMAND IS RECEIVED FROM THE HOST, THE INTERFACE ALWAYS SENDS THE PAPER SOURCE TO THE PRINTER UNLESS VALUE 0 IS SELECTED.

REDUNDANT AS THIS IS STATED IN THE NEXT SENTENCE, IF THE PRINTER DOES NOT HAVE A SECONDARY PAPER BIN OR AN ENVELOPE FEEDER, THIS COMMAND IS IGNORED. A MANUAL SHEET FEED COMMAND IN THE SCS PPM CAUSES THE PRINTER TO WAIT FOR THE OPERATOR TO INSERT PAPER IN THE MANUAL FEED TRAY. THIS COMMAND TAKES EFFECT IMMEDIATELY IF PLACED ON THE FIRST POSITION OF THE PAGE (LINE 1, POSITION 1); OTHERWISE, THIS COMMAND TAKES EFFECT ON THE NEXT PAGE.

Command 12: Form Feed Before Local Screen Print

Specifies whether a form feed is performed before doing local screen print.

<i>Value</i>	<i>Description</i>
*0	No form feed before local screen dump
1	Form feed before local screen dump
<i>Example:</i>	&%Z12,1 Performs a FF before local screen dump



NOTE: THIS COMMAND ONLY AFFECTS THE LOCAL SCREEN COPY FUNCTION, NOT THE HOST-INITIATED LOCAL COPY PRINTING, AND FUNCTIONS ONLY IN LU3 (NON-SCS) OPERATIONS

Command 13: Form Feed After Local Screen Copy

Specifies If a form feed is performed after a local screen dump.

<i>Value</i>	<i>Description</i>
*0	No Form Feed after local screen dump
1	Form Feed performed after local screen dump
<i>Example:</i>	&%Z13,1 Performs a FF after local screen dump



NOTES: TO USE THIS FUNCTION, THE RPQ SHOULD BE:

IBM 3268 RPQ SC9508

IBM 3287 RPQ MC3750

IBM 4214 OPT 20=3

THIS COMMAND ONLY AFFECTS THE LOCAL SCREEN COPY, NOT THE HOST-INITIATED LOCAL COPY PRINTING, AND FUNCTIONS ONLY IN LU3 (NON-SCS) OPERATIONS.

Command 14: LU3 Print Image (Non-SCS Mode)

Selects Null Line Suppression or True Screen Image in LU3 printing mode.

<i>Value</i>	<i>Description</i>
--------------	--------------------

*0	Null line suppression in local copy and non-SCS print
1	Null line suppression in non-SCS print and true screen image in local copy
2	True screen image in non-SCS print and null line suppression in local copy
3	True screen image in non-SCS print and true screen image in local copy

Example: &%Z14,3
 Prints true screen image in non-SCS print and local copy



NOTES: TO USE THIS FUNCTION, THE RPQ SHOULD BE:

IBM 3268 RPQ SC9505

IBM 3287 RPQ SC3741

IBM 4214 OPT 18=2

AVAILABLE ONLY IN LU3 (NON-SCS) OPERATIONS

0 AND 1 ARE ONLY FUNCTIONAL FROM CUT TERMINALS.

Command 15: CR at MPP + 1

Sets the printer in accordance with the RPQ installed in the control unit.

<i>Value</i>	<i>Description</i>
*0	First print position (PP) of next line
1	First PP of current line

Example: &%Z15,1
 Prints first PP of current line as the next PP when a CR is received at MPP+1.



NOTES: TO USE THIS FUNCTION, THE RPQ SHOULD BE:

IBM 3268 RPQ SC9501

IBM 3287 RPQ S30219

IBM 4214 OPT 15=1

AVAILABLE ONLY IN LU3 (NON-SCS) OPERATION

Command 16: NL at MPP + 1

Sets the printer in accordance with the RPQ installed in the control unit.

<i>Value</i>	<i>Description</i>
*0	First PP of current line + 2 lines
1	First PP of next line

Example: &%Z16,1

Performs first PP of next line as the next PP when an NL is received at MPP+1.



NOTES: TO USE THIS FUNCTION, THE RPQ SHOULD BE:

IBM 3268 RPQ SC9502

IBM 3287 RPQ S30219

IBM 4214 OPT 15=1

AVAILABLE ONLY IN LU3 (NON-SCS) OPERATION.

Command 17: Valid FF Followed By Data

Sets the printer in accordance with the RPQ installed in the control unit.

<i>Value</i>	<i>Description</i>
*0	Second print position of first line on next form
1	First print position (PP) of first line on next form

Example: &%Z17,1

Performs first PP of first line on next form as the next PP when a valid FF is not positioned at the end of an IBM print buffer.



NOTES: FOR THE VALUE 1 SELECTION, THE RPQ WOULD BE:

IBM 3268 RPQ SC9503

IBM 3287 RPQ N/A

IBM 4214 OPT 16=2

AVAILABLE ONLY IN LU3 (NON-SCS) OPERATION.

Command 18: Valid FF at End Of Print Buffer

Sets the printer in accordance with the RPQ installed in the control unit

<i>Value</i>	<i>Description</i>
0	First PP of second line on next form
*1	First PP of first line on next form

Example: &%Z18,1

Performs first PP of first line on next form as the next PP when a valid FF is received at the end of an IBM print buffer.



NOTES: TO USE THIS FUNCTION, THE RPQ SHOULD BE:

IBM 3268 RPQ SC9504

IBM 3287 RPQ SC3749

IBM 4214 OPT 17=2

AVAILABLE ONLY IN LU3 (NON-SCS) OPERATION.

Command 19: FF Valid Location

Sets the printer in accordance with the RPQ installed in the control unit

<i>Value</i>	<i>Description</i>
*0	FF is valid only at the first print position or at position MPP+1.
1	FF is valid anywhere it occurs.

Example: &%Z19,1
 Makes FF valid anywhere it occurs



NOTES: TO USE THIS FUNCTION, THE RPQ SHOULD BE:

IBM 3268 RPQ SC9506

IBM 3287 RPQ SC3739

IBM 4214 OPT 19=1

AVAILABLE ONLY IN LU3 (NON-SCS) OPERATION.

Command 20: Automatic Function at End Of Job

Sets the printer in accordance with the RPQ installed in the control unit.

<i>Value</i>	<i>Description</i>
*0	NL is automatically executed after the buffer is completed (unless a FF, NL, or CR was last in the buffer).
1	FF is automatically executed after the print buffer is completed (unless a FF was last in the buffer).

Example: &%Z20,1
 Sets the printer to issue a FF automatically at the end of the print buffer.



NOTES: TO USE THIS FUNCTION, THE RPQ SHOULD BE:

IBM 3268 RPQ SC9507

IBM 3287 RPQ SC3740

IBM 4214 OPT 20=2

AVAILABLE ONLY IN LU3 (NON-SCS) OPERATION.

DO NOT PRESS THE FORM FEED OR LINE FEED BUTTONS ON THE FRONT OF THE PRINTER. THIS WILL CAUSE THE HOST AND PRINTER TO LOSE SYNCHRONIZATION OF PAPER POSITION. THIS COMMAND REDUCES THE NEED TO ADVANCE THE PAPER.

Command 25: Form Feed Usage

Enables a Forms Feed from the host system to be converted to the required number of line feeds When printing variable length forms

<i>Value</i>	<i>Description</i>
*0	Pass FF from host to the printer
1	Count the lines in Command 5 and send multiple line feeds to the printer in place of the host FF
2	Ignore all IBM Motion Commands

Example: &%Z25,1
Sets the printer to count the lines specified in Command 5.

Command 26: Suppress Empty Forms

Suppresses blank printout pages caused by form feed commands that occur at the top of a form.

<i>Value</i>	<i>Description</i>
*0	No, do not suppress empty forms
1	Yes, suppress empty forms

Example: &%Z26,1
Sets the interface to suppress empty forms



NOTES: IF SELECTED, THE INTERFACE IGNORES FORM FEED COMMANDS LOCATED AT THE TOP OF FORM POSITION.

THIS COMMAND AFFECTS PRINTING IN BOTH DSC AND SCS MODES. THIS DIFFERS FROM THE IBM 3287, WHICH SUPPRESSES FORM FEED ONLY IN DSC MODE.

Command 27: FF After Timeout

Sends a Form Feed if unprinted data remains in the print buffer for the specified coax port timeout interval selected with Command 51.

<i>Value</i>	<i>Description</i>
*0	No extra FF is sent
1	Send FF after timeout value

Example: &%Z27,1
Sends a FF after time delay selected by command 51 (default = 5 sec.) when unprinted data remains in the print buffer.



NOTES: IN MOST CASES, THE HOST APPLICATION GENERATES A TERMINATION FF AND THERE IS NO NEED TO CHANGE THIS COMMAND FROM THE DEFAULT.

Command 30: Override of Formatting Commands

Enables the printer's front panel selections to control how a job is printed.

<i>Value</i>	<i>Description</i>
*0	Normal operation (disabled)
1	Formatting commands are not sent to the printer (enabled)

Example: &%Z30,1
Sets override of formatting commands



NOTES: WHEN ACTIVE, THIS COMMAND OVERRIDES THE I-O PRINT SERVER'S DEFAULT SELECTIONS FOR CPI, LPI, FONT, ORIENTATION, BIN SELECTION, PAPER SIZE, COR AND LINE COMPRESSION.

A RESET COMMAND IS SENT TO THE PRINTER BEFORE A 3270 PRINT JOB IN ORDER TO RESTORE THE PRINTER'S FRONT PANEL DEFAULT SELECTIONS.

THIS COMMAND HAS NO EFFECT ON THE SPECIAL FEATURES COMMAND PASS-THRU, USER STRINGS, INITIALIZATION STRINGS AND 3270 HOST RPQS.

Command 31: Truncate/Wrap Select

Selects truncate or wrap if the maximum print position is exceeded.

<i>Value</i>	<i>Description</i>
*0	Allow text to print on next line when maximum print position is exceeded
1	Truncate text beyond the maximum print position

Example: &%Z31,1
Causes text that exceeds the maximum print position to be truncated (not printed)

Command 32: Paper Size

<i>Value</i>	<i>Description</i>
*0	Selects 8 1/2" x 11" letter paper
1	Selects A4 (210mm x 297mm, 8.27" x 11.69") paper
2	Selects 8 1/2" x 14" legal paper

Example: &%Z32,1
Selects A4 paper

Command 34: Intervention Required (IR) Timeout

Sets the time interval before an intervention-required signal is sent to the host after a printer error occurs. Note that the I-O Print Box setup switch #4 must be set to "0" (enabled). IBM uses 5 seconds

for each value i.e. a value of 1 would be 5 seconds, 10 would be 50 seconds, 12 would be 60 seconds and so on.

<i>Value</i>	<i>Description</i>
000	Never send an IR
001 to 255	IR is sent seconds after printer error occurs
*120	Default, send IR after ten minutes.

Example: &%Z34,036
Sets IR time interval to 3 minutes (= 36 *5/60)

Command 36: Suppress IBM Control Codes (Host Commands)

This function is used to suppress selected IBM control codes sent from the host system.

<i>Value</i>	<i>Description</i>
*0	Obey all IBM control codes (Supp None)
1	Suppress all IBM control codes (Supp All)
2	Suppress LPI, CPI, MPP and MPL control codes (Supp CPI/LPI)
3	Suppress CPI and MPP control codes (Supp CPI)
4	Suppress LPI and MPL control codes (Supp LPI)
5	Suppress print quality specified in the PPM command (Supp Quality)

Example: &%Z36,2
No LPI, CPI, MPP or MPL commands are sent to the printer. The document prints using the printer's defaults values.



NOTES: IF THIS COMMAND IS SET TO 1, DOCUMENTS NEED TO BE FORMATTED BY SENDING TRANSPARENT CONTROL CODES TO THE PRINTER USING COMMAND PASS-THRU OR SCS MODE TRANSPARENT DATA.

IF VALUE 2 IS SELECTED, THE SCS PITCH (CHARACTERS PER INCH), LINE DENSITY (LINES PER INCH), SHF (MAXIMUM PRINT POSITION), AND SVF (MAXIMUM PAGE LENGTH) COMMANDS WILL NOT BE SENT TO THE PRINTER.

Command 37: Vertical Channel Select (VCS)

Specifies vertical channel select (VCS) emulation. Functions similarly to a vertical tab, except the 3287 does LF only.

<i>Value</i>	<i>Description</i>
0	3287 VCS emulation
*1	3268/4214/4224 VCS emulation

Example: &%Z37,0
Selects 3287 VCS emulation

Command 38: True LPI Spacing

Because laser printers have a non-printable region around the edge of single sheet pages, 6 LPI and 8 LPI spacing is compressed slightly to enable 66 lines and 88 lines to be printed on 11-inch long paper. This can cause a problem when using preprinted forms that must align precisely. Command 38 enables a user to override the laser printer LPI compression.

<i>Value</i>	<i>Description</i>
0	Compress the vertical LPI spacing
*1	Print using true 6 and 8 LPI spacing
Example:	&%Z38,1 Specifies true 6 and 8 LPI vertical spacing.



NOTE: IF TRUE LPI IS SELECTED, THE USER MAY NEED TO ADJUST DOCUMENT FORMATS TO ALLOW FOR THE REDUCED NUMBER OF LINES PER PAGE, OR THE EXTRA LINES WILL PRINT ONTO ANOTHER SHEET OF PAPER.

Command 39: CPT Ending Delimiter Characters

Specifies the two characters used for the ending Command Pass-Thru delimiters

<i>Value</i>	<i>Description</i>
XXYY	XX is the ASCII hexadecimal value of the first character and YY is the ASCII hexadecimal value of the second character.
Example:	&%Z39,253F Specifies the %? characters as the alternate ending delimiter characters (% ASCII hex value is 25 and ? ASCII hex value is 3F).



NOTES: IF AN ENDING DELIMITER IS NOT SELECTED WITH THIS COMMAND, THE DELIMITED SELECTED WITH COMMAND 40 WILL BE USED AS A DEFAULT.

THE DEFAULT DELIMITER (&%) WILL NO LONGER BE ACTIVE IF THIS COMMAND IS USED. IF COMMAND 39 AND COMMAND 40 ARE BOTH ENTERED, COMMAND 39 MUST BE SENT AFTER COMMAND 40 TO BE ACTIVE.

ONE DELIMITER CHARACTER CAN BE SPECIFIED ENTERING THE HEX CODE FOR THE CHARACTER FOLLOWED BY TWO ZEROS (E.G., &%Z39,2500 SELECTS & AS THE DELIMITER).

A HEX CODE STARTING WITH 00 IS INVALID.

Command 40: CPT Start Delimiter Characters

Specifies the two characters used for the beginning Command Pass-Thru delimiter

<i>Value</i>	<i>Description</i>
XXYY	XX is the ASCII hexadecimal value of the first delete the extra space here character and YY is the ASCII hexadecimal value of the second character

Example: &%Z40,253F

Specifies the %? characters as the beginning delimiter characters (% ASCII hex value is 25 and ? ASCII hex value is 3F).



NOTES: HOST DOWNLOAD COMMANDS WILL USE THE CPT BEGINNING DELIMITER CHARACTERS. THE NEW CHARACTER(S) REPLACE THE &% IN FRONT OF THE Z.

IF YOU DO NOT SELECT AN ENDING DELIMITER WITH COMMAND 39, THE DELIMITER SELECTED WITH COMMAND 40 WILL BE USED AS THE DEFAULT ENDING DELIMITER.

THE DEFAULT BEGINNING DELIMITER (&%) WILL NO LONGER BE ACTIVE IF COMMAND 40 IS USED. .

ONE DELIMITER CHARACTER CAN BE SPECIFIED BY ENTERING THE HEX CODE FOR THE CHARACTER FOLLOWED BY TWO ZEROS (E.G., &%Z40,2500 SELECTS & AS THE DELIMITER).

A HEX CODE STARTING WITH 00 IS INVALID.

Command 41: Command ID Character

Specifies the character used for the command identifier that follows the delimiter characters.

<i>Value</i>	<i>Description</i>
00	Deletes the previously selected character
ZZ	ZZ is the ASCII HEX value of the desired command ID character

Example: &%Z41,59

Specifies "Y" as the command ID character



NOTE: THE CHARACTER SELECTED MUST NOT BE 0 THROUGH 9 OR A THROUGH F (VALID HEX VALUES), OR L, P AND U.

Command 42: Start and Stop EBCDIC Hex Dump

After receiving a start command, starting with the next buffer received, all host data is sent directly to the printer as hexadecimal printing until the printer is powered off.

<i>Value</i>	<i>Description</i>
*0	No action taken
1	Start EBCDIC hex dump
2	Stop EBCDIC hex dump

Example: &%Z42,1

Starts buffer hex dump printing



NOTE: THIS COMMAND ENABLES THE USER TO PRINT ONLY THE SECTION OF THE DOCUMENT IN QUESTION IN BUFFER HEX DUMP FORMAT. HEX PRINTING STARTS WITH THE BUFFER AFTER THE START COMMAND.

Command 43: Start/Stop ASCII Hex Dump

After receiving a start command, starting with the next buffer received, all host data is translated into ASCII (from EBCDIC) and then sent to the printer in ASCII hexadecimal form. The ASCII hex dump is performed until the printer is powered off.

<i>Value</i>	<i>Description</i>
*0	No action taken
1	Start ASCII Hex Dump
2	Stop ASCII Hex Dump

Example: &%Z43,1
Starts ASCII hex dump printing.

Command 45: SCS TRN Translate

Specifies how transparent data sent using SCS code 35 is handled.

<i>Value</i>	<i>Description</i>
0	Binary Transparent
*1	Emulate IBM 3287 Printer

Example: &%Z45,0
All SCS Code 35 data is sent to the printer as binary codes without translation.



NOTES: VALUE 1 CAUSES VALID GRAPHIC CHARACTERS TO BE PRINTED NORMALLY (I.E., CONVERTED FROM EBCDIC TO ASCII), WHILE CONTROL CODES AND INVALID GRAPHICS ARE PRINTED AS HYPHENS, AND NORMAL PAGE FORMATTING IS MAINTAINED.

VALUE 0 SENDS THE 8-BIT BINARY CODES DIRECTLY TO THE PRINTER AS RECEIVED FROM THE HOST.

SCS CODE 36 FUNCTIONS THE SAME AS CODE 35.

AVAILABLE IN SCS (LU1) MODE ONLY.

Command 55: Custom User Strings

Allows the user to define two custom user strings, (maximum 25 bytes each), which are stored in the memory of the interface and sent to the printer whenever the character delimiter, letter U, and number of the string appears in delete the extra space the text of the document (i.e. &%U3).

<i>Value</i>	<i>Description</i>
0-1(value)	Defines the custom user string (max. 25 bytes of ASCII hex code)
0-1()	Deletes custom user string

Example: &%Z55,1(1B01)
Defines the &%U3 custom user string to send an "Escape and SOH" (1B and 01 hex) to the printer, the doublewide command (in what mode?).



NOTES: A MAXIMUM OF 25 BYTES OF ASCII HEX CODE MAY BE ENTERED PER STRING.

TO AID IN READABILITY, A SINGLE SPACE IS ALLOWED BETWEEN HEX BYTES THIS COMMAND, IF PLACED AS THE FIRST PRINTABLE DATA AT THE TOP OF THE PAGE (POSITION 1, LINE 1), WILL BE SENT TO THE PRINTER PRIOR TO THE DATA.

TO CHANGE A CUSTOM USER STRING, SIMPLY INPUT THE NEW CUSTOM USER STRING VALUES; THE OLD STRING IS AUTOMATICALLY ERASED.

Command 61: Automatic Print Orientation (APO)

Laser printers have the ability to automatically control page orientation if the user decides to activate Auto Print Orientation (APO). Refer to the 3270 page orientation logic chart in the Computer Output Reduction section of this manual.

<i>Value</i>	<i>Description</i>
*0	APO is ACTIVE. The page dimensions of a document are checked to determine if the data should be printed in landscape
1	APO is NOT ACTIVE. Print orientation is controlled by the orientation selections specified in Commands 62, 63, and 64.

Example: &%Z61,1
Disables APO



NOTE: APO ACTIVE IS THE RECOMMENDED SELECTION. USERS CAN MANIPULATE THE PAGE DIMENSIONS USING SCS COMMANDS TO CONTROL THE ORIENTATION OF THE PRINTING AS LONG AS THE PAGE SIZE REQUIRED IS 8 1/2 X 11" OR SMALLER.

Command 62: Primary Paper Tray Orientation

The SCS (LU1) PPM command specifying the paper source can have a printing orientation assigned to the designated paper tray. Refer to the page orientation logic chart in the Computer Output Reduction section of the manual. This command duplicates the IBM 3812 and 4028 printer's features with the additional selection of option 3 below.

<i>Value</i>	<i>Description</i>
*0	Computer Output Reduction (COR) Mode is active when paper is specified from the primary tray
1	Prints PORTRAIT orientation using the active font when the primary tray is specified
2	Prints LANDSCAPE orientation using the active font when the primary tray is specified
3	User Defined mode. Documents are printed using the fonts and orientation the user specifies through the &% font ID commands.

Example: &%Z62,3
Specifies the document is printed as formatted when the primary paper tray is specified.

Command 63: Alternate Paper Tray Orientation

This command functions identically to Command 62 except it controls the orientation for printing that specifies the alternate tray for the paper source.

Even if the printer does not have an alternate paper tray, the SCS (LU1) host specifies the alternate tray, and the interface prints the document in accordance with this selection.

<i>Value</i>	<i>Description</i>
*0	Computer Output Reduction (COR) Mode is active when paper is specified from the alternate tray
1	Prints PORTRAIT orientation using the active font when the alternate tray is specified
2	Prints LANDSCAPE orientation using the active font when the alternate tray is specified
3	User Defined mode. Documents are printed using the fonts and orientation the user specifies through the &% font ID commands.

Example: &%Z63,2
 Specifies landscape orientation will be used for all printing when the SCS (LU1) PPM code specifies the alternate paper tray.



NOTE: THE VALUE 3 IS AN EXCELLENT CHOICE WHEN COR IS NOT REQUIRED, SINCE THE USER CAN DECIDE THE FONTS AND ORIENTATION HE DESIRES BY USING &% FONT ID COMMANDS.

Command 64: Manual Paper Tray Orientation

This command functions identically to Command 62 except it controls the orientation for printing when the PPM Command specifies the manual feed tray as the paper source.

<i>Value</i>	<i>Description</i>
*0	Computer Output Reduction (COR) Mode is active when paper is selected from the manual feed tray
1	Prints PORTRAIT orientation using the active font when the manual feed tray is specified
2	Prints LANDSCAPE orientation using the active font when the manual feed tray is specified
3	User Defined mode. Documents are printed using the fonts and orientation the user specifies through the &% font ID commands.

Example: &%Z64,1
 Specifies portrait orientation on all printing using paper from the manual feed slot.



NOTE: THE LASER PRINTER WILL, UPON RECEIPT OF THE MANUAL FEED TRAY COMMAND, NOT PRINT UNTIL PAPER IS PLACED INTO THE MANUAL FEED SLOT. THIS ALLOWS THE USER TO INSERT SPECIAL FORMS, LETTERHEAD, OR COLORED PAPER INTO THE MANUAL FEED SLOT.

Command 65: Character Set Selection

Enables the user to select the ASCII character set used in the conversion from EBCDIC (SCS/LU1) or DSC (LU3) to ASCII.

<i>Value</i>	<i>Description</i>
1	Roman 8 character set
*2	Code Page 850 character set

Example: &%Z65,2
 Selects Code Page 850



NOTES: THE CHARACTER SET SUBSTITUTIONS DEFINED IN COMMANDS 70 AND 71 MUST BE ADJUSTED IF THE ASCII CHARACTER SET IS CHANGED.

ALL PREVIOUSLY DEFINED SUBSTITUTIONS ARE LOST FROM NV MEMORY WHEN THE CHARACTER SET SELECTION IS CHANGED.

REFER TO THE CHARACTER SET SUMMARY TABLES AT THE END OF THE SELF-TEST TO CONFIRM WHICH ASCII CHARACTER IS PRINTED FOR EACH OF THE 3270 HEX CODES. BOTH THE EBCDIC AND DSC TABLES ARE PROVIDED.

Command 70: Overwrite EBCDIC (SCS/LU1) Translation Table

Custom substitutions defined by this command and stored in permanent memory are written into the EBCDIC (SCS/LU1) to ASCII translation table.

<i>Value</i>	<i>Description</i>
XX	The EBCDIC character to be changed (in hex)
YY	The substitute ASCII character for the EBCDIC character above

Example: &%Z70,7B,40/Z99,0
 Prints a 40 ASCII hex (a @ symbol) when the interface receives an EBCDIC 7B (a # symbol). The command is followed by a command Z99,0 to store the active setup selections in permanent memory.



NOTES: PREVIOUSLY STORED SUBSTITUTIONS ARE AUTOMATICALLY CHANGED TO THE NEW SELECTION WHEN THE SAME HEX LOCATION IS SPECIFIED IN THE EBCDIC TABLE.

PREVIOUSLY STORED SUBSTITUTIONS ARE CANCELLED IF AN ASCII HEX SEQUENCE OF 00 IS SPECIFIED.

USE COMMAND Z99,0 TO SAVE ANY CHARACTER TABLE SUBSTITUTIONS BEYOND THE NEXT INTERFACE POWER DOWN.

THE ACTIVE EBCDIC (SCS/LU1) TRANSLATION TABLE PRINTS OUT AT THE END OF THE INTERFACE SELF-TEST SUMMARY.

Command 71: Overwrite DSC (LU3) Translation Table

Custom substitutions defined by this command, and stored in the permanent memory, are overwritten into the DSC (LU3) to ASCII translation table.



NOTES: THIS COMMAND FUNCTIONS SIMILARLY TO COMMAND 70 EXCEPT THE SUBSTITUTIONS ARE APPLICABLE TO THE DSC (LU3) TRANSLATION TABLE. REFER TO THE COMMAND 70 INSTRUCTIONS. THE ACTIVE DSC (LU3) TRANSLATION TABLE PRINTS OUT AT THE END OF THE INTERFACE SELF-TEST.

Command 84: 6 LPI String

Used with the Generic Printer Driver to define the 6 LPI string. This string represents the printer-specific command to set the printer to 6 LPI. Consult the printer's user's guide for the appropriate ASCII hex value representing the

6 LPI command. Whenever the I-O Print Server receives a 6 LPI command from the host, it sends the string specified through this configuration option.

<i>Value</i>	<i>Description</i>
1 (up to 25 hex bytes)	Defines the 6 LPI string*
1()	Deletes the 6 LPI string

*Only characters from 01 to FF are recognized (alphabetic characters must be in upper case). Errors in the hex string will cause the print server to ignore the command and printing will resume at the point the error occurred.

Example: &%Z84,1(1B 32)

Assigns the 6 LPI command for an Epson LQ-2500 printer (hex value 1B 32) in the interface's memory.



NOTE: IF 6 LPI STRING IS SPECIFIED, THE INTERFACE WILL IGNORE ALL 6 LPI REQUESTS FROM THE HOST.

Command 85: 8 LPI String

Used when the Generic printer driver and IBM 5224 or 5225 emulation is selected to define the 8 LPI string. See Reference No. 84.

<i>Value</i>	<i>Description</i>
1 (up to 25 hex bytes)	Defines the 8 LPI string
1()	Deletes the 8 LPI string

Example: &%Z85,1(1B 30)

This Host Download command stores the 8 LPI command for an Epson LQ-2500 printer (hex value 1B 30) in the interface's memory.

Command 86: 10 CPI String

Used with the Generic printer driver to define the 10 CPI string. See *Reference No. 84*.

<i>Value</i>	<i>Description</i>
1 (up to 25 hex bytes)	Defines the 10 CPI string
1()	Deletes the 10 CPI string

Example: &%Z86,1(1B 50)
 Stores the 10 CPI command for an Epson LQ-2500 printer (hex value 1B 50) in the interface's memory.

Command 87: 15 CPI STRING

Used when the Generic printer driver and IBM 5224 or 5225 emulation is selected to define the 15 CPI string. See *Reference No. 84*.

<i>Value</i>	<i>Description</i>
1(up to 25 hex bytes)	Defines the 15 CPI string
1()	Deletes the 15 CPI string

Example: &%Z87,1(1B 67)
 Assigns the 15 CPI command for an Epson LQ-2500 printer (hex value 1B 67) in the interface's memory.

Command 88: 12 CPI String

Used when the Generic printer driver and IBM 5224 or 5225 emulation is selected to define the 12 CPI string. See *Reference No. 84*.

<i>Value</i>	<i>Description</i>
1(up to 25 hex bytes)	Defines the 12 CPI string
1()	Deletes the 12 CPI string

Example: &%Z88,1(1B 4D)
 Assigns the 12 CPI command for an Epson LQ-2500 printer (hex value 1B 4D) in the interface's memory.

Command 89: 17.1 CPI String

Used when the Generic printer driver and IBM 5224 or 5225 emulation is selected to define the 17.1 CPI string. See *Reference No. 84*.

<i>Value</i>	<i>Description</i>
1(up to 25 hex bytes)	Defines the 17.1 CPI string
1()	Deletes the 17.1 CPI string

Example: &%Z89,1(1B 0F)
 Assigns the 17.1 CPI command for an Epson LQ-2500 printer (hex value 1B 0F) in the interface's memory.

Command 98: Restore Defaults or Print Configuration

Restores the factory default configuration selections, prints out a copy of the active configuration selections, or restores the permanent memory selections to the active setup status.

<i>Value</i>	<i>Description</i>
0	Restores factory default setup values
1	Prints out the active setup selections
2	Restores the setup selections stored in the permanent memory to active status

Example: &%Z98,1
 Prints out the active setup selections for review



NOTES: IF A DOCUMENT IS PRINTED USING TEMPORARY HOST DOWNLOAD COMMANDS (COMMANDS NOT STORED USING THE Z99,0 COMMAND), VALUE 2 WILL RESTORE THE PERMANENT MEMORY SELECTIONS.

PUT A &%Z98,2 AT THE END OF THE DOCUMENT TO RESTORE THE STANDARD SETUP PARAMETERS FOR THE NEXT USER OF THE PRINTER.

THE ACTIVE SETUP AND PERMANENT MEMORY SETUP SELECTIONS ARE THE SAME AFTER A COMMAND Z99,0 OR A COMMAND Z98,2 IS SENT TO THE PRINTER.

Command 99: Store Configuration in Permanent Memory

Send this command after all desired host download configuration commands have been sent to the interface. Command 99 stores the active setup in the permanent memory of the interface. Otherwise, active configuration commands are lost when the printer is turned off.

<i>Value</i>	<i>Description</i>
0	To complete the command, the value 0 must be used

Example: &%Z99,0
 Stores the currently active setup selections in the permanent memory of the interface.



NOTE: HOST DOWNLOAD SELECTIONS FOLLOWED BY A COMMAND Z99,0 WILL BE STORED IN PERMANENT MEMORY AND ACTIVE WHEN THE PRINTER IS TURNED ON. ONLY USE COMMAND Z99,0 WHEN THE HOST DOWNLOAD SELECTION NEEDS TO BE PERMANENTLY STORED IN THE MEMORY OF THE INTERFACE.

3270 SCS Printer Operation

3270 Host Printer Emulations

I-O's 3270 SCS Printer Emulation emulates a 3287, 3262, 3268, 3812-1, 4028, 4214 or 4224 SCS printer on the IBM mainframe host system.

Selecting Fonts

You can select a printer resident font or a font from an optional font cartridge in the printer by entering a font change command in the document. The font change commands take the following format: &%(P or L)[font ID]. The &% (or the alternate beginning delimiter selected with command 40) is the delimiter that signals the I-O product the information following is a command. The letter P (portrait) or L (landscape) controls the orientation of the printing and the font ID number (5 digits) selects the font. Refer to Appendix A for a list of supported fonts.

For example: &%L00086 selects Prestige 12 CPI font in landscape orientation. The font ID number must select a font available in the printer or in the installed cartridge. If the proper cartridge is not installed, or the font does not exist on the cartridge, the printer will automatically select an alternate landscape font for printing. Multiple font changes can be made in a document as long as all fonts are in the same orientation. Changes in orientation (portrait or landscape) automatically eject the page. A font ID that changes the orientation from the previous page must be on the first line and first position of the page or a blank page will be ejected. A blank page at the first of a print job is often caused by a change in orientation.

Computer Output Reduction (COR)

Computer Output Reduction (COR) is an IBM printer feature that automatically rotates data processing reports to landscape orientation and compresses the text to fit 198 columns x 66 lines on the page. COR is enabled by doing the following: The formatting is off for the numbered items that follow.

1. Select APO active with command 61 (value 0).
2. Select COR for the paper source with commands 62-64 (value 0). When COR is enabled, the following format changes are automatically made to data processing reports:

- The page is printed in landscape orientation.
- Vertical line height is 70% of specified.
- A 0.5-inch blank area is provided on the top and left edge of the paper.
- The selected pitch is changed as follows:
 - 10 pitch to 13.3 pitch
 - 12 pitch to 15 pitch
 - 15 pitch to 19 pitch

A combination of control codes in the printer data stream and the settings in the configuration are used to determine page orientation when processing SCS or DSC (LU1 or LU3) data streams. Some applications will not allow the user to insert the data stream commands required to achieve orientation and format selection. Where the insertion of the required data stream commands is not possible, the user can select the orientation and format desired by using the printer configuration settings. Use of the Write Control Character (WCC) in the DSC data streams for orientation and format selection is not recommended.

Automatic Print Orientation (APO)

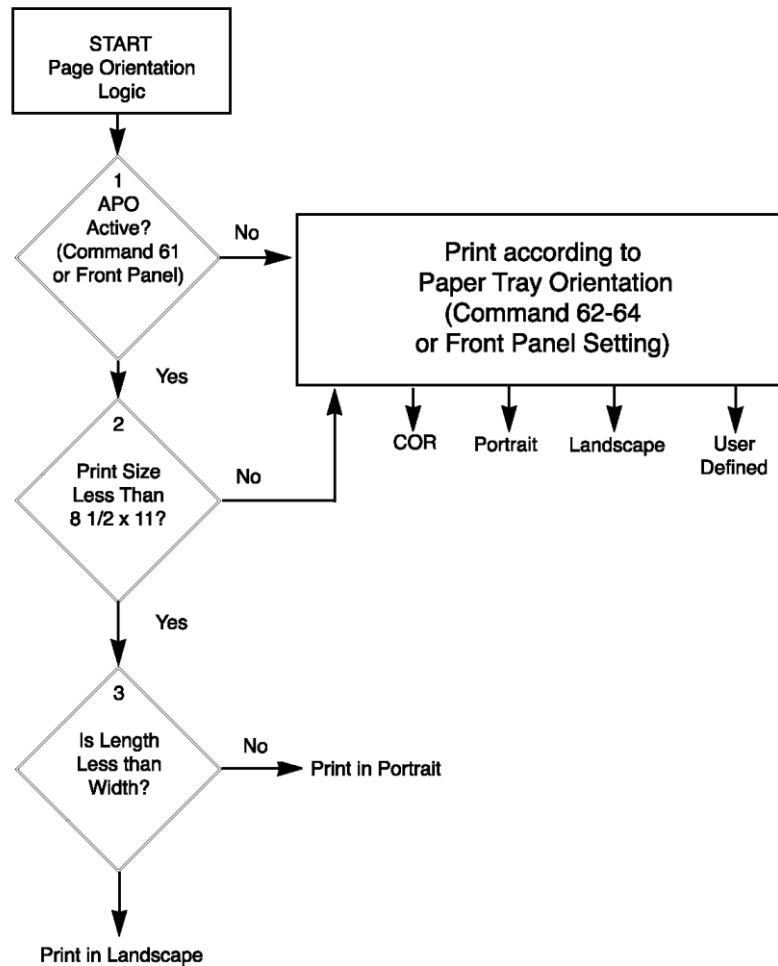
When Automatic Print Orientation (APO) is activated (command 61, value 0), the I-O product notes the format of the print image and calculates the required print dimensions. The following illustration shows how the page size determines the orientation for APO. If a calculated paper size is larger than 8 1/2" x 11", the paper tray orientation selection (commands 62-64) determines the orientation.

In DSC (LU3) mode, the values used in the calculations are specified by the I-O Print Server's active configuration selections. In SCS (LU1) mode, the values are specified in the data stream by the SCS controls. If a value has not been set in the SCS data stream, the I-O Print Server's active configuration will be used.

The APO feature also uses the calculated print width and length to determine the print orientation when the dimensions are less than 8 1/2" x 11". When the width is greater than the length and APO is active, the document prints in landscape, even if the font is specified as portrait.

The steps below describe printing with the APO feature (refer to the illustration on the following page).

1. If APO is not active (command 61, value 1), the I-O product uses the paper source selections (commands 62-64) to control orientation in the active font. If APO is active, the report continues to block 2.
2. The I-O product calculates the page size. If the page size is more than 8 1/2" x 11" the I-O product uses the paper source selections to control the orientation in the active font. If the report is less than 8 1/2" x 11" it continues to block 3.
3. At block 3, the I-O product checks the length and width. If the report is longer than it is wide, it prints in portrait. If the report is wider than it is long, the report prints in landscape.



Print Position and Page Length

The table below outlines the PMPP (Physical Maximum Print Position) and PMPL (Physical Maximum Page Length) for letter, legal, and A4 size paper.

Paper Size	PMPP at				PMPL at			
	10 CPI	12 CPI	15 CPI	17.1 CPI	6 LPI	8 LPI	True 6 LPI	True8 LPI
Letter								
Portrait	80	96	120	136	66	88	63	84
Landscape	105	126	157	178	50	87	48	84
COR	136	154	201	201	66	89	--	--
Legal								
Portrait	80	96	120	136	84	112	81	108
Landscape	135	162	202	230	50	67	48	64
A4								
Portrait	78	93	117	133	70	93	67	89
Landscape	112	134	167	191	49	66	47	

Digital Printer Finishing Features

Digital printers offer more functionality than line or laser printers in the form of "finishing features". Finishing features includes stapling, stitching, folding, inserting, punching and so on. Document management features (such as queuing, multiple copies, etc.) are also considered to be part of the finishing feature set.

Canon

Canon imageRUNNER models that are supported by I-O Print Servers are:

- I-O 5435dp: Models with a fully functional parallel port including:
imageRUNNER 330, 400, 550, 600, 60, 2200, 3300, 3800, 5000, 6000
- I-O 5755dp: All imageRUNNER models with output speeds of 22 ppm and greater
- I-O 5435dp: All imageRUNNER models with output speeds of 22 ppm and greater

Configure the imageRUNNER

For models 330, 400, 550, 600 and 60, the following configuration settings must be made before using the I-O Print Server with the imageRUNNER:

Server Version:	2.0 or higher
Enable Parallel Port:	Yes
Port Timeout in Seconds:	30
Ignore EOF Character:	Yes
Parallel Connection:	Direct Connection
Font Source:	Internal

For models 2200, 3300, 3800, 5000, and 6000, make certain that the parallel port is enabled, and the time out has been set at 30 seconds or longer.

Canon imageRUNNER printers connected to an IBM host via Ethernet and an I-O 5735dp or 5755dp IPDS/SCS Printer Gateway require a bi-directional setting to be activated.

To turn on the bidirectional setting at the imageRUNNER:

1. Press the Additional Functions button on the panel.
2. Select System Settings on the touch screen.
3. Select Network Settings.
4. Select TCP/IP Settings.
5. Select RAW Settings.
6. Within the Raw Settings screen, select ON.
7. With the RAW / Use Bidirectional screen, select ON.
8. Press OK.
9. Press DONE repeatedly until returned to the normal operating screen.

When the bi-directional setting is turned on, the imageRUNNER will report the following conditions to the I-O Print Server. The print server will in turn report the appropriate printer status to the IBM host:

- Power Off is reported as Device Not Ready
- Paper Jam is reported as Device Not Ready
- Cover Open is reported as Device Not Ready
- Paper Out is reported as Paper Out
- True Print Complete reporting via PCL Echo is available.

Using Logical-Not Commands

For SCS printing, finishing features are easily accessed using I-O's unique scripting language. The scripting language uses "logical-not O" (-O) commands. This language structure enables users to imbed finishing features directly within the print job without having to redo or customize complicated Host applications.

Each finishing feature has a command reference (the actual name of the feature) and a parameter (the description of where or how a feature is placed). I-O's logical-not command structure follows the same pattern except instead of spelling out each word in the command; I-O uses a shortened reference code for each command. Following the -O is a "C" (to signify Canon). The third character represents the command and the fourth character represents the parameter.

To successfully execute finishing features, the logical-not commands must always come at the beginning of a print job. These logical-not commands may be embedded in host programs, procedures, word processing documents, etc. In a word processing document, these commands start in line one, column one. Logical-not O commands may be strung together so that a number of finishing features may be used.

Once an SCS job, with logical-not commands, is sent to the I-O Print Server, they will be converted into the appropriate Canon PJI finishing instructions and sent onto the printer.

The following table shows the finishing features available on the imageRUNNER.

Finishing Command	Finishing Parameters	I-O Finishing Command Code
BOOKLET	OFF	B0
	ON	B1
COPIES	1 ... 99 COPIES	C1 ... C99
DEPARTMENT ID & Password	0-9999999 & 0-9999999999	Dxxxxxxxx,yyyyyyyyyy
ENGINE SPOOL	OFF	E0
	ON	E1
FORM FILE	OFF	F0
	ON	F1
INTERLEAVE	OFF	I0
	BLANK	I1
	PRINT	I2
MAILBOX*	DISABLED	V0
	ACTIVE	V1
MAILBOX NUMBER*	0...99	M0 ... M99
	DISABLED	MX
PROOF COPY	OFF	O0
	ON	O1
PUNCH	OFF	P0
	TOP	P1
	BOTTOM	P2
	RIGHT	P3
	LEFT	P4

SLIP SHEET	OFF	A0
	ON	A1
SORTER MODE	OFF	S0
	COLLATE	S1
	GROUP	S2
	CROSS COLLATE	S3
	CROSS GROUP	S4
STAPLE	OFF	T0
	ONE UPPER LEFT	T1
	ONE UPPER RIGHT	T2
	ONE LOWER LEFT	T3
	DOUBLE TOP	T4
	DOUBLE LOW	T5
	DOUBLE LEFT	T6
	SADDLE STITCH	T7
ZFOLD	OFF	Z0
	ON	Z1



NOTE: *MAILBOX AND THE MAIL BOX NUMBER MUST BE USED TOGETHER.

Example: -OCT2 -OCP4

This example illustrates a print job that will sort each group, insert a cover sheet onto each, and staple every group on the top-left corner. The "-O" is the beginning of the command. The "C" indicates that a Canon imageRUNNER 550 or 600 printer is the target printer. The "T" indicates that the stapling finishing feature will be applied to the print job, and the "2" tells the Canon to put the staple in the upper right-hand corner. The "-OP4" command tells the Canon printer to punch on the left side of the stapled document. Any number of commands may be entered in this manner.

-OCV1-OCM7

In this example "-OCV1" sends the print job to the mailbox, and "-OCM7" identifies mailbox # 7. A -OCV0-OCMX will disable the mailbox function and return the mailbox number to the printer's default.

Operational Notes

Not all finishing options listed in the previous section are available on every imageRUNNER model.

Cross-Group & Cross-Sort: These options are only available on the 550, 600, and 60 models. Many newer imageRUNNER printers can be setup to offset through the printer's front panel.

Booklets: When printing and 8 ½ x 11" booklet using 11 x 17" paper, in the Configuration or Management Utility paper handling section, you will need to map the printer's 11 x 17" paper tray as 8 ½ x 11". Then when printing from the IBM host, send the input paper bin that coordinates with this new tray mapping. The printer will recognize that it is receiving 8 ½ x 11" pages but will be using 11x 17" paper.

Department ID: If the Department ID function has been setup on the imageRUNNER printer to control what print jobs may be sent to that printer, you will need to enter that value in the Department ID field (a numeric value from 1 to 7 digits in length) as well as a Password (a numeric value from 1 to 10 digits in length). The command is in the form of -OCDxxxxxx,yyyyyyyyyy. The x represents the department ID, and the y represents the password value.

Troubleshooting

This chapter contains solutions for possible problems encountered while using the SCS Printer Emulation product. If a problem persists after you implement the solutions provided here, or if you encounter a problem not listed here, please refer to the following resources:

- The I-O Knowledge Base at www.iocorp.com.
- The user's guide for the I-O product.
- Your I-O Dealer
- I-O's Technical Support Group at 801-973-6767 or by email at support@iocorp.com.

TN5250e Printing

Problem	Solution
<ul style="list-style-type: none"> • The AS/400 assigns a 3812 printer device with a name of QPADEVnnnn (where nnnn is a 4-digit number). 	<ul style="list-style-type: none"> ✓ If the IBM Host Printer Name is left blank when configuring the 5250 SCS Printer Emulation session, the AS/400 will create a 3812 device but will give the printer the name of QPADEVnnnn, with nnnn being a 4-digit number. However, each time the 5250 SCS Printer Emulation connects to the host, the nnnn number for the printer may be different. This could cause problems where specific a printer name is used for printed output. I-O does not recommend you let the AS/400 create the printer name.
<ul style="list-style-type: none"> • The AS/400 assigns a VT100 display device with a name of QPADEVnnnn (where nnnn is a 4- digit number). 	<ul style="list-style-type: none"> ✓ The AS/400's Telnet server is not up to the most current version and does not support TN5250e printing. Install the most recent PTFs. Also make certain to install the most recent version of Client Access on the IBM host.
<ul style="list-style-type: none"> • The writer is in a writing status, but there is no output and there are no messages on the AS/400. 	<ul style="list-style-type: none"> ✓ This usually occurs when communication has been lost with the host. Re-establish the session by do the following: <ol style="list-style-type: none"> 1. End the writer. 2. Vary off the device. 3. Restart the I-O printer device or session.
<ul style="list-style-type: none"> • The printer device is in a Vary On pending state. 	<ul style="list-style-type: none"> ✓ Restart the session as follows: <ol style="list-style-type: none"> 1. End the Telnet session by using the AS/400's TCPADM command. (as an alternate use the NETSTAT command, with option 3.) <ol style="list-style-type: none"> a. At the command line, type GO TCPADM, take selection "7", then "3". b. Find the IP address for the 5250 SCS Printer Emulation session, then execute option "4 - End of Session".

- The 5250 SCS Printer Emulation session loses connection with the AS/400 host after a period of inactivity.
- ✓ c. Restart the I-O printer device or session.
 - 2. If the connection status message does not indicate a successful Telnet session has been established, you may need to change the name of the IBM Host Printer Name of the 5250 SCS Printer Emulation session. This occurs because the AS/400 often does not allow the original printer device name to be used until an IPL is performed at the AS/400. This may also occur when the original name objects have been deleted.
- ✓ The AS/400 has a timeout value that can be set to terminate any Telnet display or printer session. Setting this value to a longer timeout will allow the 5250 SCS Printer Emulation session to remain connected for a longer period. However, this longer timeout will also allow an unattended Telnet display session to remain open for a longer period as well and may create a security issue.
- To change the Telnet inactivity timer, follow these steps:
1. Using the AS/400's CFGTCP command, select menu option 20, Configure TCP/IP Applications.
 2. Select menu option 11, Configure Telnet.
 3. On the next screen, select menu option 12, Inactive Job Time-out.
 4. Change the QINACTITV value to a longer value, or use *NONE to deactivate the inactivity timeout.

TN5250e Connection Status Message

The I-O 5250 SCS Printer Emulation session reports the success or failure of an attempt to communicate with the host by printing a brief connection status message on the attached printer.

The message will show whether the connection succeeded or not, the name of the host AS/400 this 5250 SCS Printer Emulation session is connected to, the host printer name, and the session status. (If there is no Host or printer name in the message the host AS/400 did not send the information.)

The connection status message will look somewhat like:

```
AS/400 Host Communication Status:
Connection attempt succeeded
Host system S101256R
Printer name TNPRT00
Status code I902 - Session successfully started
```

The status code "I902" shown in the above example is the normal code indicating successful host communication. Possible values of the status code and suggested actions are as follows:

Message	Solution
<ul style="list-style-type: none"> • 0101 — Host not responding to pings 	<ul style="list-style-type: none"> ✓ This message usually indicates one of the following: <ul style="list-style-type: none"> • TCP/IP has not been started on the host. • The host's IP address has not been correctly entered in the 5250 SCS Printer Emulation configuration page. • The product has not been correctly connected to the LAN.
<ul style="list-style-type: none"> • 0102 — Host rejected connect to Telnet port 	<ul style="list-style-type: none"> ✓ The host answers pings, but rejects a TCP/IP connect attempt, probably because the Telnet server has not been started.
<ul style="list-style-type: none"> • 0111 — Host Telnet session lost 	<ul style="list-style-type: none"> ✓ Usually means the printer has been varied off at the host, the host has gone down or there is a communication failure (router etc.).
<ul style="list-style-type: none"> • 2777 — Damaged device description 	<ul style="list-style-type: none"> ✓ Delete and recreate the device description on the IBM host.
<ul style="list-style-type: none"> • 8902 — Device not available 	<ul style="list-style-type: none"> ✓ This code appears when the 5250 SCS Printer Emulation session attempts to start a session for a printer whose name duplicates the name of a printer already active on the host. In many cases, this status code means the I-O product with a 5250 SCS Printer Emulation session has been powered-off and then powered back on within a few minutes. When the I-O Product with an active 5250 SCS Printer Emulation session is turned off, it takes the AS/400 about 10 minutes to determine that the TCP/IP sessions for the printers are no longer active. If the 5250 SCS Printer Emulation session is restarted while the host shows the old printer sessions are still active, requests for new sessions will be rejected with this code.

- 8906 — Session initiation failed
- 8907 — Session failure
- 8920 — Object partially damaged
- 8921 — Communications error
- 8922 — Negative response received
- 8925 — Creation of device failed
- 8928 — Change of device failed
- 8930 — Message queue does not exist
- 8935 — Session rejected
- 8940 — Automatic configuration failed or not allowed
- E001 — No Telnet printer support at host

You can recover by doing one of the following:

- Wait 10 minutes trying to establish another 5250 SCS Printer Emulation session.
- At the AS/400, manually terminate the old TCP/IP sessions.
- Avoid the problem by allowing the 5250 SCS Printer Emulation session to end its TCP/IP connection gracefully before powering the I-O product off.

- ✓ The operating system on the AS/400 supports only display (not printer) devices in Telnet sessions. Update your AS/400 to support TN5250e printer sessions.

- I902 — Session successfully started
- I904 — Source system at incompatible release

TN3270e Connection Status Messages

I-O's 3270 SCS Printer Emulation session reports the success or failure of an attempt to communicate with the host by printing a brief connection status message on the printer. The connection status message will look somewhat like:

```
TN3270 Host Connection Status
Connection attempt succeeded
Host address 128.03.254
Printer name TNETPRT2
Status code I002-Session successfully started
```

The message will show whether the connection succeeded or not, the IP address of the host computer the 3270 SCS Printer Emulation session is connected to, the host printer name, and the session status.

The status code (I002) shown in the above example is the normal code indicating successful host communication. The possible values of the status code and suggested actions are as follows:

Message	Solution
<ul style="list-style-type: none"> 0102 — Host rejected connect to Telnet port 	<ul style="list-style-type: none"> ✓ The print server's attempt to start a Telnet session with the host failed. This message usually indicates one of the following: <ul style="list-style-type: none"> • The host is down. • No Telnet server is active on the host. • Communication hardware (e.g. router) required for this connection is down. • The host's IP address is incorrectly configured on the SCS Printer Emulation setup page.
<ul style="list-style-type: none"> 0111 — Host Telnet session lost 	<ul style="list-style-type: none"> ✓ Usually means the printer has been stopped on the host. Also appears if the host goes down or if there is a communication (e.g. router) failure while a Telnet session with the host is active.
<ul style="list-style-type: none"> E001 — No Telnet printer support at host 	<ul style="list-style-type: none"> ✓ The operating system on the host computer supports only display (not printer) devices in Telnet sessions. Verify your operating system supports printing via Telnet.
<ul style="list-style-type: none"> E003 — TN3270 session negotiation failed 	<ul style="list-style-type: none"> ✓ Usually means there is no printer defined on the host with the printer name that appears in the connection status message. This code will also appear if there is a printer with the desired name, but that printer is already active and the name is not available for use over this new connection. Verify a printer with the desired name is defined on the host, and the printer is available for use by this print server.
<ul style="list-style-type: none"> I002 — Session successfully started 	<ul style="list-style-type: none"> ✓ The printer session is ready for print jobs.

Appendix A – -Q 5250 Font References

The following chart lists the laser printer resident fonts and font cartridges along with the font ID (FGID) number used to select the font when using the -Q Font Change Command. The fonts listed in this Appendix can be used in two ways:

1. Enter the Font ID (FGID) number in the Typestyle/Color menu of OfficeVision/400.
2. Embed the Font ID (FGID) number preceded by -Q in your host document or report.

For more information, consult the Font Change section of the 5250 SCS Printing Operation chapter.

Typeface	Symbol Set	Orientation	Pitch	Point	FGID
Line Printer	L1/R8/850	P/L	13.33	8.5	204
Line Printer	L1/R8/850	P/L	15	8.5	223
Line Printer	L1/R8/850	P/L	17.1	8.5	254
Line Printer	L1/R8/850	P/L	19	8.5	281
Courier	L1/R8/850	P/L	10	12	11
Courier Bold	L1/R8/850	P/L	10	12	46
Courier Italic	L1/R8/850	P/L	10	12	18
Courier	L1/R8/850	P/L	12	10	85
Courier Bold	L1/R8/850	P/L	12	10	88
Courier Italic	L1/R8/850	P/L	12	10	89
Letter Gothic	L1/R8/850	P/L	12	12	87
CG Times	L1/R8/850	P/L	Prop.	6	4605
	L1/R8/850	P/L	Prop.	8	4606
	L1/R8/850	P/L	Prop.	10	4607
	L1/R8/850	P/L	Prop.	12	4608
	L1/R8/850	P/L	Prop.	14	4609
	L1/R8/850	P/L	Prop.	18	4611
	L1/R8/850	P/L	Prop.	24	4614
	L1/R8/850	P/L	Prop.	30	4617
CG Times Bold	L1/R8/850	P/L	Prop.	6	4625
	L1/R8/850	P/L	Prop.	8	4626
	L1/R8/850	P/L	Prop.	10	4627
	L1/R8/850	P/L	Prop.	12	4628
	L1/R8/850	P/L	Prop.	14	4629
	L1/R8/850	P/L	Prop.	18	4631
	L1/R8/850	P/L	Prop.	24	4634
	L1/R8/850	P/L	Prop.	30	4637
CG Times Italic	L1/R8/850	P/L	Prop	6	4645

	L1/R8/850	P/L	Prop	8	4646
	L1/R8/850	P/L	Prop	10	4647
	L1/R8/850	P/L	Prop	12	4648
	L1/R8/850	P/L	Prop	14	4649
	L1/R8/850	P/L	Prop	18	4651
	L1/R8/850	P/L	Prop	24	4654
	L1/R8/850	P/L	Prop	30	4657
CG Times Bold Italic	L1/R8/850	P/L	Prop.	6	4665
	L1/R8/850	P/L	Prop.	8	4666
	L1/R8/850	P/L	Prop.	10	4667
	L1/R8/850	P/L	Prop.	12	4668
	L1/R8/850	P/L	Prop.	14	4669
	L1/R8/850	P/L	Prop.	18	4671
	L1/R8/850	P/L	Prop.	24	4674
	L1/R8/850	P/L	Prop.	30	4677
Univers Medium	L1/R8/850	P/L	Prop.	6	4805
	L1/R8/850	P/L	Prop.	8	4806
	L1/R8/850	P/L	Prop.	10	4807
	L1/R8/850	P/L	Prop.	12	4808
	L1/R8/850	P/L	Prop.	14	4809
	L1/R8/850	P/L	Prop.	18	4811
	L1/R8/850	P/L	Prop.	24	4812
	L1/R8/850	P/L	Prop.	30	4813
Univers Med Italic	L1/R8/850	P/L	Prop.	6	4825
	L1/R8/850	P/L	Prop.	8	4826
	L1/R8/850	P/L	Prop.	10	4827
	L1/R8/850	P/L	Prop.	12	4828
	L1/R8/850	P/L	Prop.	14	4829
	L1/R8/850	P/L	Prop.	18	4831
	L1/R8/850	P/L	Prop.	24	4834
	L1/R8/850	P/L	Prop.	30	4837
Univers Med Condensed	L1/R8/850	P/L	Prop.	6	4845
	L1/R8/850	P/L	Prop.	8	4846
	L1/R8/850	P/L	Prop.	10	4847
	L1/R8/850	P/L	Prop.	12	4848
	L1/R8/850	P/L	Prop.	14	4849
	L1/R8/850	P/L	Prop.	18	4851
	L1/R8/850	P/L	Prop.	24	4854

	L1/R8/850	P/L	Prop.	30	4857
Univers Med Cond. Italic	L1/R8/850	P/L	Prop.	6	4865
	L1/R8/850	P/L	Prop.	8	4866
	L1/R8/850	P/L	Prop.	10	4867
	L1/R8/850	P/L	Prop.	12	4868
	L1/R8/850	P/L	Prop.	14	4869
	L1/R8/850	P/L	Prop.	18	4871
	L1/R8/850	P/L	Prop.	24	4876
	L1/R8/850	P/L	Prop.	30	4877
	Univers Bold	L1/R8/850	P/L	Prop.	6
L1/R8/850		P/L	Prop.	8	4906
L1/R8/850		P/L	Prop.	10	4907
L1/R8/850		P/L	Prop.	12	4908
L1/R8/850		P/L	Prop.	14	4909
L1/R8/850		P/L	Prop.	18	4911
L1/R8/850		P/L	Prop.	24	4914
L1/R8/850		P/L	Prop.	30	4917
Univers Bold Italic	L1/R8/850	P/L	Prop.	6	4925
	L1/R8/850	P/L	Prop.	8	4926
	L1/R8/850	P/L	Prop.	10	4927
	L1/R8/850	P/L	Prop.	12	4928
	L1/R8/850	P/L	Prop.	14	4929
	L1/R8/850	P/L	Prop.	18	4931
	L1/R8/850	P/L	Prop.	24	4934
	L1/R8/850	P/L	Prop.	30	4937
Univers Bold Condensed	L1/R8/850	P/L	Prop.	6	4945
	L1/R8/850	P/L	Prop.	8	4946
	L1/R8/850	P/L	Prop.	10	4948
	L1/R8/850	P/L	Prop.	12	4949
	L1/R8/850	P/L	Prop.	18	4951
	L1/R8/850	P/L	Prop.	24	4954
	L1/R8/850	P/L	Prop.	30	4957
Univers Bold Cond. Italic	L1/R8/850	P/L	Prop.	6	4965
	L1/R8/850	P/L	Prop.	8	4966
	L1/R8/850	P/L	Prop.	10	4967
	L1/R8/850	P/L	Prop.	12	4968
	L1/R8/850	P/L	Prop.	14	4969
	L1/R8/850	P/L	Prop.	18	4971

	L1/R8/850	P/L	Prop.	24	4974
	L1/R8/850	P/L	Prop.	30	4977
ITC Zapf Dingbats	14L	P/L	Prop.	6	4985
	14L	P/L	Prop.	8	4986
	14L	P/L	Prop.	10	4987
	14L	P/L	Prop.	12	4988
	14L	P/L	Prop.	14	4989
	14L	P/L	Prop.	18	4991
	14L	P/L	Prop.	24	4994
	14L	P/L	Prop.	30	4997

Optional Fonts as originally found in ProCollection Cartridge					
Typeface	Symbol Set	Orientation	Pitch	Point	FGID
Line Printer	ASCII	P/L	17.1	8.5	253
Courier Bold	ASCII	P/L	10	12	45
Courier Italic	ASCII	P/L	10	12	17
Courier	ASCII	P/L	12	10	84
Courier Bold	ASCII	P/L	12	10	108
Courier Italic	ASCII	P/L	12	10	92
Courier	Legal	P	10	12	51
Courier Bold	Legal	P	10	12	52
Courier Italic	Legal	P	10	10	53
Courier	Legal	P	12	10	93
Courier Bold	Legal	P	12	10	94
Courier Italic	Legal	P	12	10	95
Prestige Elite	ASCII	P/L	15	7	220
Prestige Elite	ASCII	P/L	12	10	83
Prestige Elite Bold	ASCII	P/L	12	10	113
Prestige Elite Italic	ASCII	P/L	12	10	114
Prestige Elite	Legal	P	15	7	219
Prestige Elite	Legal	P	12	10	97
Prestige Elite Bold	Legal	P	12	10	98
Prestige Elite Italic	Legal	P	12	10	99
Letter Gothic	ASCII	P/L	27	3.6	291
Letter Gothic	ASCII	P/L	19	6	281
Letter Gothic	ASCII	P/L	17.1	9.5	257
Letter Gothic	ASCII	P/L	12	12	66

Letter Gothic Bold	ASCII	P/L	12	12	69
Letter Gothic Italic	ASCII	P/L	12	12	68
Times Roman	ASCII	P	Prop.	8	163
Times Roman	ASCII	P	Prop.	10	164
Times Roman Bold	ASCII	P	Prop.	10	165
Times Roman Italic	ASCII	P	Prop.	10	166
Times Roman	ASCII	P	Prop.	12	167
Times Roman Bold	ASCII	P	Prop.	12	168
Times Roman Italic	ASCII	P	Prop.	12	169
Times Roman	Legal	P	Prop.	8	173
Times Roman	Legal	P	Prop.	10	174
Times Roman Bold	Legal	P	Prop.	10	175
Times Roman Italic	Legal	P	Prop.	10	176
Times Roman	Legal	P	Prop.	12	177
Times Roman Bold	Legal	P	Prop.	12	178
Times Roman Italic	Legal	P	Prop.	12	179
Helvetica	ASCII	P	Prop.	8	183
Helvetica	ASCII	P	Prop.	10	184
Helvetica Bold	ASCII	P	Prop.	10	185
Helvetica Italic	ASCII	P	Prop.	10	186
Helvetica	ASCII	P	Prop.	12	187
Helvetica Bold	ASCII	P	Prop.	12	188
Helvetica Italic	ASCII	P	Prop.	12	189
Helvetica Bold	ASCII	P	Prop.	14	190
Helvetica Bold	Legal	P	Prop.	14	191

Optional Font as originally found in WordPerfect Cartridge					
Typeface	Symbol Set	Orient	Pitch	Point	FGID
CG Times	DskTop	P	Prop.	6	4685
CG Times	DskTop	P	Prop.	8	4686
CG Times Bold	DskTop	P	Prop.	8	4706
CG Times Italic	DskTop	P	Prop.	8	4814
CG Times	DskTop	P	Prop.	10	4867
CG Times Bold	DskTop	P	Prop.	10	4707
CG Times Italic	DskTop	P	Prop.	10	4815
CG Times	DskTop	P	Prop.	12	4688
CG Times Bold	DskTop	P	Prop.	12	4708

CG Times Italic	DskTop	P	Prop.	12	4816
CG Times	DskTop	P	Prop.	14	4689
CG Times Bold	DskTop	P	Prop.	14	4709
CG Times Italic	DskTop	P	Prop.	14	4817
CG Times Bold	DskTop	P	Prop.	18	4711
CG Times Bold	DskTop	P	Prop.	24	4714
Univers	DskTop	P	Prop.	14	4789
Univers	DskTop	P	Prop.	18	4791
Univers	DskTop	P	Prop.	24	4794

Optional fonts as originally found in Microsoft Cartridge					
Typeface	Symbol Set	Orientation	Pitch	Point	FGID
Helvetica	L1/R8	P	Prop.	8	34102
Helvetica	L1/R8	P	Prop.	10	34103
Helvetica Bold	L1/R8	P	Prop.	10	34123
Helvetica Italic	L1/R8	P	Prop.	10	34231
Helvetica	L1/R8	P	Prop.	12	34104
Helvetica Bold	L1/R8	P	Prop.	12	34124
Helvetica Italic	L1/R8	P	Prop.	12	34232
Helvetica Bold	L1/R8	P	Prop.	14	34125
TmsRmn	L1/R8	P	Prop.	8	5686
TmsRmn	L1/R8	P	Prop.	10	5687
TmsRmn Bold	L1/R8	P	Prop.	10	5707
TmsRmn Italic	L1/R8	P	Prop.	10	5815
TmsRmn	L1/R8	P	Prop.	12	5688
TmsRmn Bold	L1/R8	P	Prop.	12	5708
TmsRmn Italic	L1/R8	P	Prop.	12	5816
TmsRmn Bold	L1/R8	P	Prop.	14	5709
Line Printer	L1/R8	P	Prop.	835	223

Optional Fonts as originally found in Polished Worksheet Cartridge					
Typeface	Symbol Set	Orientation	Pitch	Point	FGID
Prestige Elite	L1/R8/850	P/L	15	7	221
Prestige Elite	L1/R8/850	P/L	12	10	86
Prestige Elite Bold	L1/R8/850	P/L	12	10	111
Prestige Elite Italic	L1/R8/850	P/L	12	10	112

Prestige Elite	Legal	P/L	15	7	219
Prestige Elite	Legal	P/L	12	10	97
Prestige Elite Bold	Legal	P/L	12	10	98
Prestige Elite Italic	Legal	P/L	12	10	99
Letter Gothic	L1/R8/850	P/L	27	3.6	290
Letter Gothic	L1/R8/850	P/L	12	12	87
Letter Gothic Bold	L1/R8/850	P/L	12	12	110
Letter Gothic Italic	Legal	P/L	12	12	109
Letter Gothic	Legal	P/L	27	3.6	292
Letter Gothic	Legal	P/L	12	12	90
Letter Gothic Bold	Legal	P/L	12	12	107
Letter Gothic Italic	Legal	P/L	12	12	106
Presentational Bold	ASCII	P/L	8.1	16	434
Presentational Bold	Legal	P/L	8.1	16	431

Optional Fonts as originally found in Persuasive Cartridge					
Typeface	Symbol Set	Orientation	Pitch	Point	FGID
Letter Gothic	ASCII	P/L	10	14	39
Letter Gothic	Legal	P/L	10	14	38
Presentational Bold	ASCII	P/L	10	14	6
Presentational Bold	Legal	P/L	10	14	7
Presentational Bold	ASCII	P/L	8.1	16	434
Presentational Bold	Legal	P/L	8.1	16	431
Presentational Bold	ASCII	P/L	6.5	18	435
Presentational Bold	Legal	P/L	6.5	18	432
Presentational Bold	ASCII	P/L	5.7	24	436
Presentational Bold	Legal	P/L	5.7	24	433
Helv Outline	ASCII	P/L	Prop.	24	34115
Helv Outline	Legal	P/L	Prop.	24	34116
Serifa	ASCII	P/L	Prop.	24	34215
Serifa	Legal	P/L	Prop.	24	34216
Line Draw	LinDrw	P/L	10	14	31
PC Line Bold	PCLin	P/L	10	14	32

Optional Fonts as originally found in Forms, Etc. Cartridge					
Typeface	Symbol Set	Orientation	Pitch	Point	FGID

Univers	L1/R8/850	P/L	Prop.	6	33101
Univers	L1/R8/850	P/L	Prop.	8	33102
Univers Bold	L1/R8/850	P/L	Prop.	8	33122
Univers Bold	L1/R8/850	P/L	Prop.	10	33123
Univers Bold	L1/R8/850	P/L	Prop.	12	33124
Univers Bold	L1/R8/850	P/L	Prop.	14	33125
Helv Cond. Black Bold	TXNum	P/L	Prop.	24	34128
OCR-A	OCR-A	P	10	12	19
Tax Line Draw	Taxlin Drw	P/L	10	12	30

Optional Fonts as originally found in Bar Codes & More Cartridges					
Typeface	Symbol Set	Orientation	Pitch	Point	FGID
Letter Gothic	L1/R-8	P/L	15	9.5	230
Letter Gothic	L1/R-8	P/L	112	12	87
Letter Gothic	L1/R-8	P/L	10	14	40
OCR-A	OCR-A	P	10	12	19
OCR-B	OCR-B	P	10	12	3
Code 3 of 9	3 of 9	P	8.1	12	60
Code 3 of 9	3 of 9	P	4.6	12	240
EAN/UPC 10 Mil	UPC	P	Prop.	12	170
EAN/UPC 13 Mil Bold	UPC	P	Prop.	12	171
USPS Zip	ZIP	P/L	Prop.	12	172
Line Draw	LinDrw	P/L	10	12	33

Optional Fonts as originally found in Text Equations Cartridge					
Typeface	Symbol Set	Orientation	Pitch	Point	FGID
Prestige Elite	L1/R-8	P	15	7	221
Prestige Elite	L1/R-8	P	17.1	1	256
Prestige Elite	L1/R-8	P	12	10	86
Prestige Elite Bold	L1/R-8	P	12	10	111
Prestige Elite Italic	L1/R-8	P	12	10	112
CG Times	L1/R-8	P	Prop.	8	157
CG Times	L1/R-8	P	Prop.	10	158
CG Times Bold	L1/R-8	P	Prop.	10	159
CG Times Italics	L1/R-8	P	Prop.	10	155

Optional Fonts as originally found in Global Text Cartridge					
Typeface	Symbol Set	Orientation	Pitch	Point	FGID
CB Century Schoolbook	L1/R-8/850	P/L	Prop.	8	16950
CB Century Schoolbook	L1/R-8/850	P/L	Prop.	10	16951
CD Century Schlbk Bold	R-8	P/L	Prop.	10	16971
CD Century Schlbk Italic	R-8	P/L	Prop.	10	17079
CG Triumvirate	L1/R8	P/L	Prop.	10	33335
CG Triumvirate Bold	L1/R8	P/L	Prop.	14	33357

Optional fonts as originally found in Pretty Faces Cartridge					
Typeface	Symbol Set	Orientation	Pitch	Point	FGID
Microstyle	ASCII	P	Prop.	18	5910
Microstyle Bold	ASCII	P	Prop.	36	5920
Hobo Medium	ASCII	P	Prop.	30	5930
Hobo Medium	ASCII	P	Prop.	14	5940
Thunderbird	ASCII	P	Prop.	54	5950
Signet Roundhand	ASCII	P	Prop.	18	5960
Signet Roundhand	ASCII	P	Prop.	14	5970
ITC Dingbats	ITC	P	Prop.	36	5980
ITC Dingbats	ITC	P	Prop.	18	5990

Appendix B – –F 5250 Font References

The following chart lists the laser printer scalable resident fonts along with the font ID (FGID) number used to select the font when using the –F Font Change Command. The fonts listed in this Appendix can be used in two ways:

1. Enter the Font ID (FGID) number in the Typestyle/Color menu of OfficeVision/400.
2. Embed the Font ID (FGID) number and desired point size preceded by –F in your host document or report.

For more information, consult the Font Change section of the 5250 SCS Printing Operation chapter.

Font	FGID
Letter Gothic	410
Letter Gothic Bold	420
Letter Gothic Italic	430
Courier	460
Courier Bold	470
Courier Italic	480
Courier Bold Italic	490
Symbol	3400
Symbol PS	3450
Wingdings	3500
Dingbats	3600
CG Omega	4919
CG Omega Bold	4939
CG Omega Italic	5047
CG Omega Bold Italic	5067
CG Times	5687
CG Times Bold	5707
CG Times Italic	5815
CG Times Bold Italic	5835
Arial	6199
Arial Bold	6219
Arial Italic	6327
Arial Bold Italic	6347
Garamond Antique	8503
Garamond Halbfett	8523
Garamond Kursiv	8631
Garamond Kursiv Halbfett	8651
Coronet	8759

Clarendon Condensed	8779
Marigold	8887
Albertus Medium	12855
Albertus Extra Bold	12875
Times New	16951
Times New Bold	16971
Times New Italic	17079
Times New Bold Italic	17099
Antique Olive	33335
Antique Olive Bold	33355
Antique Olive Italic	33463
Univers Medium Condensed	33591
Univers Bold Condensed	33601
Univers Medium Condensed Italic	33719
Univers Bold Condensed Italic	33729
Univers Medium	34103
Univers Bold	34123
Univers Medium Italic	34231
Univers Bold Italic	34251
Helvetica	33103
Helvetica Bold	33123
Helvetica Oblique	33231
Helvetica Oblique Bold	38251
Helvetica Narrow	31103
Helvetica Narrow Bold	31123
Helvetica Narrow Oblique	31231
Helvetica Narrow Oblique Bold	31251
Palatino Roman	6099
Palatino Bold	6119
Palatino Italic	6227
Palatino Bold Italic	6247
ITC Avant Garde Gothic Book	32591
ITC Avant Garde Gothic Demi	32601
ITC Avant Garde Gothic Book Oblique	32719
ITC Avant Garde Gothic Demi Oblique	32729
ITC Bookman Light	4909
ITC Bookman Demi	4929
ITC Bookman Light Italic	5037

ITC Bookman Demi Italic	5057
New Century Schoolbook Roman	16941
New Century Schoolbook Bold	16961
New Century Schoolbook Italic	17069
New Century Schoolbook Bold Italic	17089

3812 Font Numbers Which Use the CG Times Typeface	
Font	FGID
Sonoran-Serif	751
Sonoran-Serif	1051
Sonoran-Serif Bold	1053
Sonoran-Serif Italic	1056
Sonoran-Serif	1351
Sonoran-Serif Bold	1653
Sonoran-Serif Bold	2103